



Isopogon & Petrophile *Study Group*

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STUDY GROUP LEADERS/NEWSLETTER EDITORS

Catriona Bate & Phil Trickett

Email: catrionaandphil@gmail.com

Ph: 0409 789 567



Petrophile biloba in cultivation near Noojee, West Gippsland VIC, 14 September 2014.
Photo: Di Clark. See [page 19](#) 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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Financial report

Hello again everyone

What a great time of year it is! Despite the dry weather there is a lot happening in our garden. Spring has sprung and Jacky lizards are darting everywhere. The birds are even more active than usual, executing high-speed kamikaze manoeuvres straight into our large glass windows.

The bees are going berserk, we have been watching them swarm all over a large leionema shrub outside the bedroom window for what seems like months, not to mention the hakeas which are providing a progressive dinner for them. We have acquired a little bee hotel and there has been much debate over the best spot for it.

Which brings up the perennial question – ***what pollinates isopogons and petrophiles?*** There is general agreement that insects do the job, but which ones? Are there different pollinator species for different I&P species? It seems that little is known on the subject. As usual for these genera, it is down to us as a study group to try to find out more.

How are your detective skills?

This spring and summer let's put isopogon and petrophile plants
under surveillance...



Whether you're in a garden or out in the bush, pay close attention to which bugs are hanging around isopogons and petrophiles. Make a note, or better still, take a snap.

We'll be asking you what you've observed.
Group results will be written up and published next year.

It's another great I&P season in our garden. Last year we mercilessly hacked back an *I. dawsonii* and it has put on a particularly impressive display. They say position is everything and our two mature plants illustrate the point – one is tucked over on the other side of the garden close to other large shrubs while this one is in a more open spot near our front door where we see it all day. Its flowers presented like multiple bouquets have been delighting us for months. Also putting in a long run are the many Stuckey's Hybrid plants scattered around our garden, which light up each corner they preside over. A number of young *I. mnoraifolius* plants are flowering in profusion this year – we have really enjoyed the gorgeous pale green and pink chequerboard pattern of buds clustered all along the stems. We also have another, larger form of *I. mnoraifolius*, a tough shrub which always looks good.

Phil has been on a mission to graft as many *I. latifolius* as possible, putting them into the garden, and has been rewarded with many huge flowers on almost every one this year. We have been very pleased with our grafted *I. ceratophyllus* which has shown its appreciation of good conditions by putting on lots of golden flowers along the stem and tips. We've never observed this in the wild. A dwarf *I. anemonifolius* has been in flower since autumn while our other one is only just starting to flower. We've noticed a similar delay between two plants of dwarf *I. anethifolius*. Perhaps it's something to do with different locations in the garden, or could it be different forms of these dwarfs? There are too many other I&Ps looking good to list here – suffice to say, that every garden wander is a discovery tour!

We hear it's another magnificent season in WA – heartbreaking for us as unfortunately we can't make it over there this year. Luckily we have some reports from the west this issue to keep us up to date. But it's always nice to see I&Ps in the bush around here, their yellow drumstick heads like beacons guiding us. Although in the bush many seem to be flowering late, probably due to the dry, this season we've already seen *I. anemonifolius* and *I. anethifolius* flowering well, south as far as Lake Tabourie and north as far as South West Rocks. One plant of *I. anethifolius* was flowering away in a rock crevice half way down a steep gully of massive granite boulders on the escarpments of Morton National Park. Could there be a more inhospitable spot? We usually don't see many petrophile flower heads until summer but a form of *P. sessilis* was at its flowering peak recently at Jervis Bay.

This issue we also look at some lovely gardens featuring I&Ps in Sydney and the Grampians in Victoria. On the propagation and cultivation front, some of our members have reported back on their activities, and Miriam Ford briefs us on her team's outstanding success with the cutting material she received earlier this year. Phil has been busy grafting as usual (he has also managed to get some isopogon grafts into the ANBG) and he updates us on grafting experiments. Although you might think it's too early to think of pruning, we explain why now is the time to plan if not begin your pruning activities.

Our species profiles are *Isopogon formosus* and *Petrophile biloba*, two western species which seem to be relatively tough. We definitely should all be growing these! Thanks to those who took the time to share their knowledge with all of us. We also explore the special nature of pollen presenters in I&P flowers. And if you've ever seen people confuse South African species such as leucodendrons with isopogons, or wondered how isopogons and petrophiles are related, you'll be interested in our article about the familial relationships of these genera (see [Leucophiles and isospermums](#)). Remember when we asked for photos of *I. formosus* for a painting in progress? We enjoy the results of Marina Lommerse's artistry in the final product.

Spring is a great time to propagate I&Ps so don't be afraid to give it a go. You could be as successful as Miriam and her team at Yarra Yarra. Follow their example and take advantage of our cutting and seed sharing arrangements (see [details pp. 5-6](#)). And keep an eagle eye out for pollinators in your neck of the woods. Marjorie Apthorpe has already spotted one isopogon visitor, just passing through! (See [From our members](#).)

Catriona and Phil

From our members

Erica Rink, Southern Highlands, NSW

My first Isopogons are in. One is *Isopogon anemonifolius* bought locally at Wariapendi Nursery in January. It has heaps of flower buds on, so very happy. The other with no provenance is doing well on the nature strip. So far so good.

Mike Beamish, Boolarra VIC

Not much to report on I&P's in the garden, I still only have one of each. *I. buxifolius* is growing and flowering nicely in its waterwell pot, the foliage reddened over the winter months, but is greening up again with the warmer weather. *P. pulchella* is still alive in the garden on the western side of the block, but is getting crowded out by a large *Lambertia orbifolia* that has decided to lean over the top of it. I'll be doing some pruning in the near future!

Barb & David Pye, Bullengarook, VIC

We are long term APS members and keen growers of Isopogons and Petrophiles both in our garden at home and at the Melton Botanic Garden. We live in Bullengarook which is in the hills northwest of Melbourne at an altitude of 500m. The climate here is cold but not frosty. Isopogons did really well here for many years until we had a really wet summer some years ago and we lost almost all of our WA species.

Our main interest in growing them now is in the Melton Botanic Garden which is in the driest part of Melbourne. The temperatures here are much warmer than Bullengarook (about 4 degrees on average) but there is much heavier frost. We are currently growing 7 species of Isopogon and 7 species of Petrophile in the WA garden there. The beds are built up with local soil and topped with about 10 cm of river sand. All of our species have done extremely well. The only frost damage has been to some flower buds on our *Isopogon latifolius* despite a really heavy frost which damaged many other WA genera.

We have propagated from both seed and cuttings. We are keen to add to our collection of WA species of Isopogon and Petrophile if you have any tips on where to purchase them. We are currently growing Isopogons *buxifolius*, *divergens*, *formosus*, *latifolius linearis*, *scabriusculus* and *trilobus* (pictured, left) and Petrophiles *biloba*, *ericifolia*, *fastigiata*, *longifolia*, *teretifolia* and 2 other unidentified species.



Kevin Collins, Mt Barker, WA



Currently flowering in nursery pots are *P. serruriae* X *diversifolia* (pictured, left) and *P. diversifolia*.

Most of my cutting grown I&Ps are flowering after one season compared to seed 3 years. Cuttings planted out last year are flowering for the first time. The only loss on planting out was a dwarf *I. cuneatus* from Cheynes headland. They include

what I thought were *I. polycephalus*, *P. divaricata*, an unknown petrophile, and *I. scabriusculus* ssp. *pubifloris* (pictured, right) from Boonalling reserve. Others flowering or in bud include *P. squamata*, *I. buxifolius* var. *linearis*, *I. buxifolius* var. *obovatus*, *I. spathulatus*, *P. diversifolia* x *serruriae* (pot plant), and *P. diversifolia* (seed grown). Cuttings to take root from last season include *I. attenuatus* and *P.*



brevifolia. New seed germinations sown mid-May 18 are *I. trilobus* 10 from 10 and *P. longifolia* 1 from 5.

Miriam Ford, Hurstbridge, VIC

I have been gathering up a variety of Iso-Pets at various plants sales and from Kuranga Native Nursery. I now have the majority growing in either large baths or pots. I am not growing many directly in the ground & the ones I am are in raised beds with improved drainage. I deal with heavy clay mixed with shale but fortunately have good slopes to work on. I have gardened in bath tubs for many years now (my husband is something of a collector and gathers them up when they appear in hard rubbish on the side of the road) as I have found it works a treat for the fussy/WA lovelies, doing well overall despite some serious late frosts. The *I. cuneatus*, *latifolius*, *dubius* and *anemonifolius* were protected by the *Xerochysum bracteatum* triflids who do not know their place or do they? I use a good quality native potting mix (purchased in bulk from a local supplier) in the baths with native fertilizer as well as regular doses of Power Feed as a soluble fertilizer. Bush Tucker is a great pelletized native fertilizer and I use that a few times during the year.

The collection to date: *Isopogons cuneatus*, *latifolius*, *dubius*, *anemonifolius*, 'Candy Cones' (*formosus* X *latifolius*), 'Pink Sparkler' (*I. formosus*) and a hybrid *I. formosus* X *dubius*; petrophiles *biloba*, *pedunculata* and *ericifolia*. The Petrophiles have been planted in a raised mound and are doing fine so far.

Karlo Taliana, Georges Hall, Sydney

Unfortunately, not a great deal to report in my garden when it comes to I&Ps. My grafted *I. latifolius* continues to flower well along with the grafted *I. prostratus*. My *P. teretifolia* this year looks to have 9 flowerheads but still a fraction early for them to fully form in time for this newsletter.

Mark & Carolyn Noake, Moruya NSW

The Is and Ps are working their magic here at Glendeuart again this year. Where many plants have suffered from our extraordinary dry spell, most of the *Isopogons* and all of the *Petrophiles* in our small collection have done well.

We've lost a couple of local *I. anethifolius* which is a rare experience for us, and *I. cuneatus*, both on its own roots and grafted, has bitten the dust after a year or two of showy displays. Most have done well though with the collection growing to include *I. anemonifolius*, *I. anethifolius*, I "Stucky's Hybrid", *I. dawsonii*, *I. mnoraifolius* and *I. prostratus* all doing well.

After a few attempts, we have found a spot that *I. formosus* loves. Situated just below a dry-stone wall in sandy soil with healthy drop off, the plants have thrived to a point where they required an enthusiastic prune this year from around 500 mm to 300 mm which removed most of the previous year's growth. The reward comes in the form of long-stemmed terminal inflorescences right across the bushes. *P. sessilis* and *P. pulchella*, both local species, are growing well but seem reluctant to flower whilst *P. biloba* and *P. teretifolia* have been flowering sensationally for at least a month. Our *P. pedunculata* plants from seeds and cuttings are still too young to flower.

A semi shaded spot has become available in the garden so tube stock of *I. anemonifolius*, *I. dawsonii* and *P. pedunculata* have been recently planted to mimic the open forest which occurs naturally around our area. An *I. anemonifolius* sourced from an inland spot has done well in the same part of the garden with no attention whatsoever, so we have high hopes that this experiment might work. Well I must head off and see if any more of those pesky *I. anethifolius* have popped up in the mulched pathway. Enjoy your IPs!

Marjorie Apthorpe, Currowan, NSW

Isopogon formosus: Bought this plant as tube stock from a native plant nursery in Albany, W.A ('formosa' on the plant label) in late 2016. Now two years on, 900 mm high, growing at Currowan at the top of a steep drop-off, under a *Pittosporum* tree, in shade for much of the day. Soil is gravelly clay but drainage is good due to the drop. Plant has coped with four months of frost, but is sheltered somewhat by the overhanging tree. Plant is growing well with new shoots but has not flowered (perhaps too much shade). Phil has suggested taking cuttings and trying them in a sunnier spot. No pollinators seen, obviously, but this caterpillar (pictured left) showed an interest in the isopogon.



Isopogon anethifolius from seed (continued):

Slow progress. The original nine plants grown (previous newsletter) have been whittled down to five: two eaten by a wallaby, two turned brown and died, four now in 100 mm pots, one in the ground and growing well after surviving late frost. Also beginning to put on growth: one seedling of Stuckey's Hybrid, grown from a flower head received at the 2017 APS meeting at which Catriona and Phil gave a presentation on *Isopogon* and *Petrophile*. Photos right: *Isopogon anethifolius* - 3 seedlings at 14 months - and *Isopogon* 'Stuckeys Hybrid' seedling at left, 10 months old.



Exchanging cuttings and seed

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).
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*

Report back: cuttings mail exchange results

Miriam Ford

The cutting material sent to me in early April this year was processed immediately upon arrival and has done well I am pleased to say. We have a propagation group – the APS Yarra Yarra growers – which is greatly supported by a collaboration with the Wildlife Sanctuary and Indigenous Nursery at La Trobe University in Bundoora. We have use of the production room facilities, the polyhouses and the glasshouse (during the late Autumn to mid-Spring months) with its commodious heat beds and automated misting. In return for the use of these facilities we do volunteer work for them.

Very few of the cuttings put in met their demise and we now have the following growing strongly in either forestry tubes (FT) or super tubes (ST). Some of the root systems developed simply would not fit in an FT (see photo) hence the move directly to STs for several. The table below gives the details and the photos illustrate their joie de vivre. Some were potted on at around 4 months and the rest (*I. dawsonii* & *Petrophiles*) at around 5 months in. We used a cutting mix of 50/50 coir/perlite and purple clonex for dipping.



Genus	Species	FT/ST
<i>Isopogon</i>	<i>mnorafolius</i>	2/3
	<i>anethifolius</i>	7/1
	<i>Stuckey's hybrid</i>	0/4
	<i>dawsonii</i>	0/3
	<i>anemonifolius</i>	0/3
<i>Petrophile</i>	<i>sessilis</i>	5
	<i>pedunculata</i>	3
	<i>pulchella</i>	3

Focus on....pollen presenters

Catriona Bate

These brightly coloured, prominent projections provide a striking and dynamic display. Occurring towards the end of a thin style, they may be yellow, orange or red. Pollen presenters are one of the most conspicuous characteristics of *Isopogon* and *Petrophile*. A lack of nectar may explain its prominence. The proteaceae has the greatest diversity of pollen presenter morphology in the flowering plants; of these, the most elaborate and attractive presenters are found in isopogons and petrophiles.

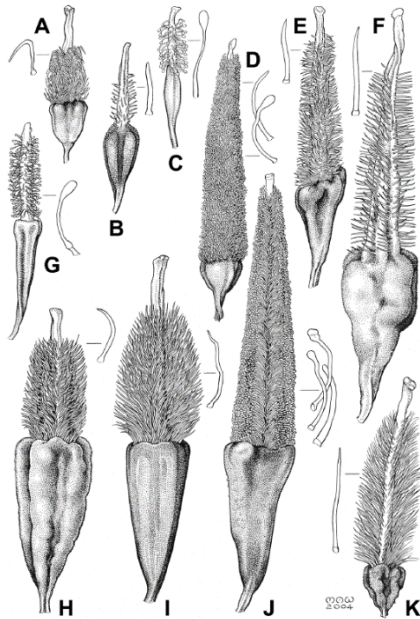
The pollen presenter is a mechanism by which the pollen, which would otherwise be difficult to access for potential pollination vectors such as bees, is positioned on the extended style of the flower, facilitating crosspollination.



Photo: Terry Dunham



This presenter is a modification of the upper part of the style – towards its end, below or around the small stigma, it dilates or swells before tapering off towards the apex. The terminal portion may be brush-like or smooth (glabrous). The simplest form (left) is a fusiform swelling (spindle-shaped or tapering at both ends) supporting sparse or dense hairs. More elaborate types (e.g. right) have constrictions which divide the presenter in two: above the basal portion is a short bulge and a constriction, and topping that a tapering portion, usually longitudinally grooved and sticky. This unswollen portion or brush is densely hairy. It is often referred to as the receptor, where most of the pollen adheres in newly opened flowers.



Examples of pollen presenters in *Petrophile* sect. *Arthrostigma*. Source: B.L. Rye and M. Hislop, *A taxonomic update of Petrophile sect. Arthrostigma*, *Nuytsia* 15 2005

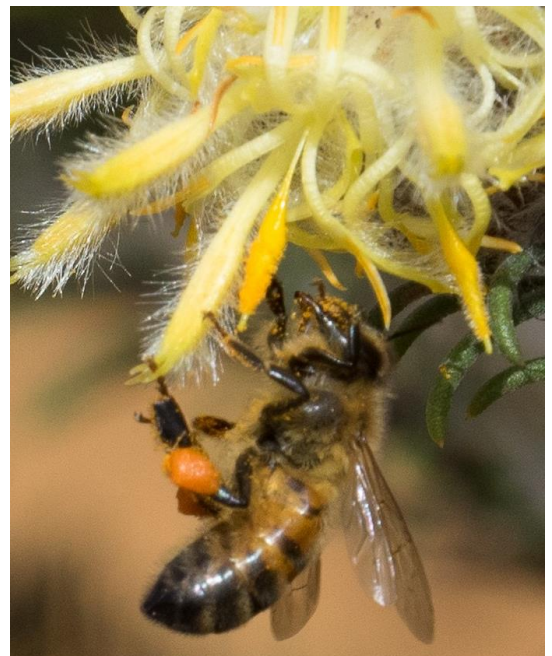
Pollen presenters vary in shape and form between and within genera and can be used to group species and distinguish one from another. For example, within *Isopogon* the *I. spathulatus* group all have a similar type of pollen presenter. Important characters include length (total, base and brush), brush diameter, hair length and even hair orientation, the density of the brush, and the colour and shape of the base. Increasingly, botanists working with I&Ps are using this structure in taxonomy.

Petrophile species are highly variable but similarities in pollen presenters are present within many of its groups. Petrophile pollen presenter characters are of particular importance in the group *Petrophile* sect. *Arthrostigma* from the south-west of Western Australia. In this group all species have simple entire leaves, the best-known species being *Petrophile linearis*. Vital for distinguishing the taxa in this section are the shape and brush of the pollen presenter, which in some taxa is so distinctive as to be unique in the genus. The brush generally has larger hairs than in other sections, with the hairs sometimes so dense that the brush axis is completely obscured.

Although the term ‘brush’ is used to describe the hairy portion in other species, it is mainly in sect. *Arthrostigma* species that the hairy portion is really brush-like in appearance.

While in bud, the perianth tube protects the pollen presenter and male reproductive parts within an expanded section near its tip. Inside, pollen is produced by the anthers and deposited on the pollen presenter lying adjacent to them. The presenter holding its pollen is then unveiled by the collapse of the perianth at anthesis (full functioning). The four tepal lobes of the perianth tube peel back like a banana and curl towards the floral axis. The stigma at the end of the style is not initially mature, thus avoiding self-pollination.

After the flower opens, the presenter is visited by insects like ants, bees, wasps, or flies. Little is known about I&P pollinators although in a few cases the literature records native bees as visitors. Insect-pollinated flowers tend to be blue/purple/pink, cream/white or yellow and considerably smaller than bird-



Lyn Alcock took this amazing photo of a bee collecting pollen from *Petrophile imbricata* on 1 October 2018 in Dyandra Woodland, WA. Bees take pollen back to the hive for food. As well as pollen grains on its head, there are balls or pellets of pollen attached to its hind legs (long hairs keep them in place during flight).

pollinated species. Although the pollen presenter has been suggested as a convenient landing spot, in fact insects hover around I&P flowers. However, it has been suggested that presenter structure relates to pollinator species with unique needs, which may explain the wide diversity in pollen presenter structure observed among petrophiles.

Pollen is a protein-rich food and a reward for many pollinators. Insect visitors such as bees, flies, mites and beetles may eat pollen but any insect visitor can potentially rub some off and transfer it to another flower. If its stigma is receptive and the pollen comes into contact, pollination occurs i.e. pollen grains are transferred to the female reproductive structure.

There is another important function for the pollen presenter. It changes colour from yellow to orange-red. The timing of the change corresponds to loss of stigma receptivity, completion of pollination and onset of ovule seed swelling. As insects do not see red they will ignore presenters of this colour and visit yellow presenters in flowers still to be pollinated. Colour change is believed to maximize pollination and foraging efficiency.



A similar colour change (from white or yellow to various shades of red) can also be found in species of other genera (e.g. *verticordia*), occurring either on the flower or over the inflorescence, or near the site of harvestable pollen as in I&Ps. In all cases harvestable pollen is absent from the red phase. All bee, wasp, beetle, fly, butterfly and moth visitors select flowers in the white/yellow phase rather than the red or intermediate phase. These species are highly floriferous and occur in dense patches. Since only a small proportion of flowers may be receptive at any one time, it is concluded that retention of flower parts essentially serves to enhance long-distance attraction.

Western Australia 2018 update

It's another great year for I&Ps in their heartland – southwest WA. Apparently, the season's been quite late due to cold weather and unseasonal rains. Here are a few reports from members.

Lyn Alcock

Last year, as I assisted with orchid surveys following very large burns north of Walpole, I travelled some very remote roads and came across some sights of I&Ps which literally took my breath away. In lower swamp areas there were great swathes of different ones as the season progressed. And to think that so very few people would ever see these sights, as they are so remote.

In Western Australia, 2018 commenced as a very dry year and there were dire predictions re. the flowering of orchids and all native wildflowers. As the year progressed no rain appeared and we were all wondering what on earth there would be around to see. However, in late April/May/June unseasonal rains fell throughout the southern half of the state, but the general feeling was that it was way too late to have any effect, especially on the terrestrial orchids. How wrong we were.

Come July and it quickly became obvious that orchids were appearing in great numbers and the everlastings and wreath flowers were putting on an amazing show up north. So then all the wildflowers began their amazing display, especially our wonderful isopogons and petrophiles.

Living in Narrogin makes access to both north and south relatively easy, and this year I have seen many beautiful I&P flowers. The *Dryandra* Woodlands is very close by and provides a wonderful array...more stunning this year than I have seen.



I. crithmifolius in Dryandra; *P. heterophylla* in Dryandra



I. latifolius the rare flora in The Stirling Range; *P. diversifolia* in Mt Barker area

I also headed up north to Hi Vallee farm [Badgingarra] in August to visit with Joy & Don Williams...and of course to view the many flowers on their farm. Joy and I spent many hours exploring the area and appreciating the amazing wildflowers, the highlight being a random discovery of a prized Queen of Sheba orchid. *Isopogon adenanthoides* (below) and *Petrophile nivea* (right)...which was



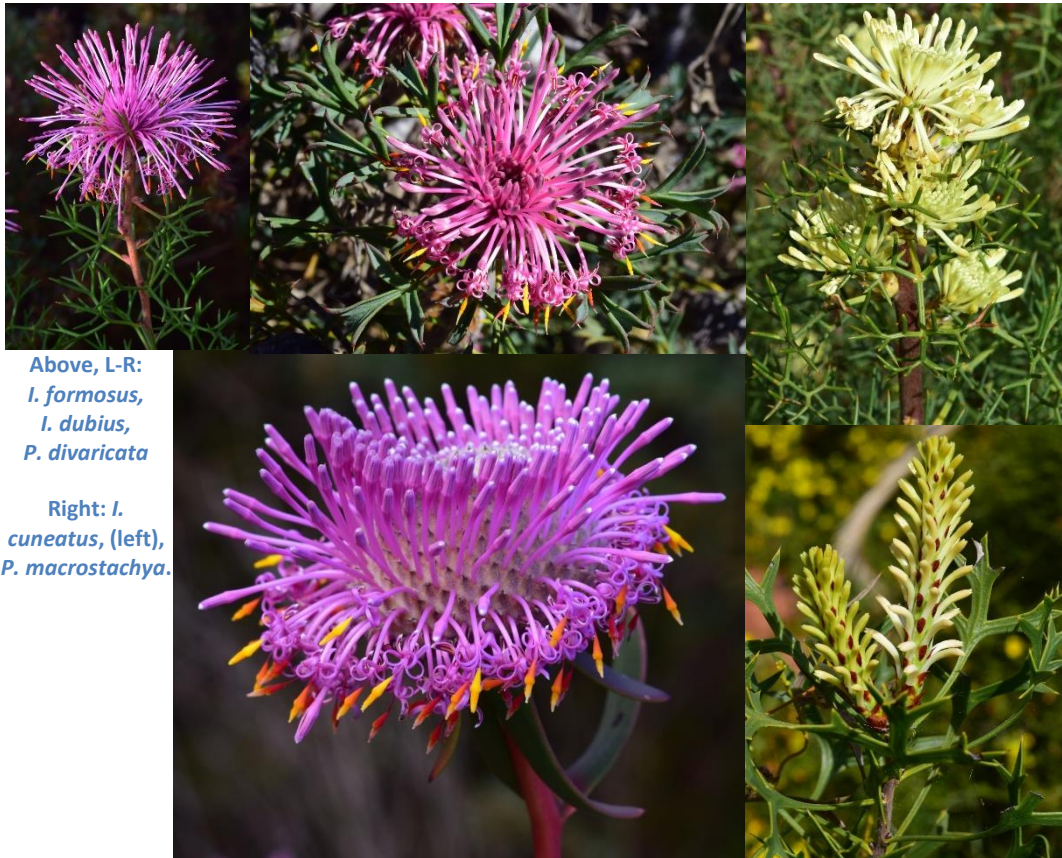
magnificent this year. [This rare species is only known from Hi Vallee.]

I have lived in WA for 7 years, but travelled here extensively prior to that. My first love is the terrestrial orchids, and I travel almost constantly throughout the state as they flower. However I have always had a deep interest in all wildflowers and Isopogons and Petrophiles have fascinated me for some years, and so hunting them has been added to my itinerary as I chase the orchids.

I hope you enjoy some of my photos of just a very few of the I&Ps I have seen. I am known as a VERY prolific photographer, so if ever a photo of a specific flower is needed, many come to me. I am still learning the names of some of the species of I&Ps but as time goes by they capture my imagination more and more. Unfortunately I live in a unit and have little garden space, so growing them is not an option, but I do enjoy reading all about other's efforts.

Mike Beamish

I have some photos from our recent trip to WA, so I've picked out a few of the I&P's seen in the south-west in late September and early October. The *I. formosus* were in the Cape Riche area, as were *I. cuneatus* and *I. baxteri*. The *I. dubius* is from John Forrest NP on the Darling Scarp. Of the Petrophiles, *P. serruriae* was from Mt Barker and *P. macrostachya* from the sandplains north of Perth, *P. divaricata* from Cape Riche, and *P. diversifolia* at the Mt Martin Botanical Reserve near Albany.



Above, L-R:
I. formosus,
I. dubius,
P. divaricata

Right: *I. cuneatus*, (left),
P. macrostachya.

Margaret Pieroni

I went up to Hi Vallee in early August. Unfortunately, the weather was terrible. The isopogons and petrophiles were flowering well – *P. nivea* was at its best.



I wanted to find flowers on *Dryandra cypholoba* so Don drove us to Big Soak Plain where I knew it grows. Just as we arrived, late in the afternoon, the sun came out. We found lots of plants of the dryandra but no flowers. We did, however, find *Isopogon panduratus* subsp. *panduratus* (pictured) in flower.

I took part in the “Hakea Crawl” recently. We went to Cape Riche, calling in at the marvellous spot on South Coast Highway. We had missed the best of the isopogons and petrophiles but there were still plenty for the people to get an idea of how stunning it is. We went to Cheyne Beach but not as far as the “Proteaceae Patch”, there. *P. divaricata* and *P. squamata* were flowering well, adding to the yellow-flowering shrubs which predominated (acacias and, near Cape Riche, *Hakea ilicifolia*). *Isopogon formosus* was still flowering at most of the places we visited.

Kevin Collins

Recent excursions: *P. filifolia* in early bud at Gull Rock Rd., Albany, plus what looks like a weird variant of *I. scabriusculus*. At Mondurup Reserve (Denmark), *P. serruriae* (right) and a beautiful coloured formosus...much finer foliage than the pale pink ones in the Fitzgerald NP.



Just back from Esperance doing our reconnaissance trip for the post conference tour next year. Our tour was interesting – 20mm of rain and 4 out of 6 wet days. Fitzgerald NP was closed (ruled out West Mt. Barren and Sepulcralis Hill). Had to find & survey alternatives should this be the case next year early October. Cascades Rd was a skating rink. What a muddy car we came home with. Wasn't but should have been closed to heavy traffic at least. Nowhere to safely take a bus off the side in those conditions for some 200kms. Last two days were brilliant sunshine for Lucky Bay and the Eastern end of FNP. In lieu of Sepulcralis Hill found a great coastal site with loos, good walking paths and great low coastal evolution. Cave point/West beach – dwarf I & P s, prostrate *Callistemon pinifolius*, very low *H. victoria* etc.



Got a few great pics of flowering I & P's. We saw *I. formosus* (Swamp Rd., Bremer Bay, pictured above right), baby *I. trilobus* (Mount Benson (Ravensthorpe), *P. seminuda* and *P. glauca*. Saw I. sp. Ravensthorpe here also....not in flower (tall 1.6m looking like *buxifolius* but leaves more like *attenuatus*). Also I. sp. Newdegate (*I. nutans*), pink slightly nodding (Roe Lookout south of Lake King), a mystery petrophile, and *P. heterophylla* near Jerdacuttup. Finally what looks like *P. phyllicoides* near Boxwood Hill (below, right). Last but not least an old inflorescence from FNP coast – leaves curve upright, flowers dusky pink – grey, thickened needle foliage. Gorgeous looking plant. [Probably *P. teretifolia*.]



Don & Joy Williams

Simply, it has been and still is just great wildflower wise here (as at end of October at Hi Vallee, Badgingarra WA). The everlastings, not our real scene, were super good and bought lots of eastern staters over. They all finish up looking at our diversity. *Petrophiles serruriae*, *shuttleworthiana*, *macrostachya* and *linearis* are still flowering.

Catriona and Phil

In late July we visited the remote east of WA and found ourselves down south at Nuytsland Nature Reserve on the Great Australian Bight looking for the rare banksia *B. epica*. Following the 1870 telegraph track (still with the original telegraph wire lying along the track) we came across an unexpected proteaceae hotspot. Apart from *B. epica* further along the track, very few proteaceae are recorded for this area. This is seriously remote and inhospitable country about 100km south and east of Balladonia. You may be familiar with the sheer cliffs of the Bight – the Baxter Cliffs south of Caiguna are a little further east as is Cocklebidy. We found many plants of *B. media* and *Grevillea macrostylis*, with massive specimens of *B. speciosa*. While some of these occurred on the typical limestone plain, most were concentrated along a large sand dune.

Although it was a bit early for I&P flowering, we also found *I. trilobus* plus many plants of *P. teretifolia*. One species already in flower (in fact nearly finished) that intrigued us was an unknown isopogon. It's not particularly showy (see right) but looked a bit like *Isopogon pruinosus* subspecies *glabellus*. On further investigation it may be *I. aff. polycephalus* currently only known from Cape Arid National Park and adjacent areas so our collection is probably the furthest east it has been recorded. Looks like it's yet another species requiring taxonomic work.



Jurassic isopogons at Mount Annan

Catriona Bate

At Mount Annan in southwestern Sydney there's been quite a bit of renewal work to spruce up the garden beds towards the top of the hill opposite the visitor centre and car park. The Australian Botanic Garden Mount Annan is part of the Sydney Royal Botanic Gardens and is home to over 2000 species of Australian native plants. Currently attracting visitors to its spring display of swathes of pink and white paper daisies, it's worth venturing beyond the showy front beds.

A feature of the hillside is large sandstone boulders amongst which a cornucopia of proteaceae can be found. One section here allows children to roam the paths discovering beasts of ancient Australia via an interactive app which makes the animals come to life. The stars of the botanical setting for this Jurassic adventure are isopogons!

We have seen mass plantings of eastern isopogons used to great effect at Cranbourne Botanic Gardens in Victoria (see our article in NL17), where there were several different displays each featuring a single species in different areas of the gardens which relied on the foliage effects of *I. anemonifolius* and to a lesser extent, *I. anethifolius* forms. At Mount Annan, the overall area is larger with over sixty isopogon plants dotted on a slope around large rocks. While relatively new, the plants have grown vigorously over the last eighteen months or so.



The species are grouped together in the large garden in a natural way and the expanse forms a patchwork of different shades of green. Isopogons are fantastic foliage plants year-round and the deep emerald green colour of *I. dawsonii* is a lovely foil for the brilliant pea green of *I. anethifolius* which was looking luminous one overcast day we visited. These species both have long, soft leaves. *I. anemonifolius*, with its anemone-like leaves, is also used for varying foliage texture.

When we visited this spring, the plants had flowered well and in profusion as we would expect. The cream flower heads of *I. dawsonii* were almost finished and *I. anethifolius* was also well advanced. *I. anemonifolius* was at its peak showing off beautiful electric yellow flower heads presented almost as if in a vase (pictured below). Their yellow colouring was beautifully set off by groundcovers of Pigface (*Carpobrotus glaucescens*) in a bright orange/yellow shade. This prostrate, creeping succulent has long trailing stems to 2 m long, and mainly flowers from October to January.



The contrasting heights of these isopogon species also work well together grading from the tallest (*I. dawsonii*) down to *I. anethifolius* and *I. anemonifolius*. A newly planted area of massed *I. petiolaris* will provide a prostrate component again with very attractive foliage. This is another underused eastern species with attractive foliage as well as flowers. Dotted around here and there in groups of two or three were young

plants of WA species *I. cuneatus*.

This approach with massed planting could easily be scaled down and applied in our gardens. It will be interesting to watch this garden grow over the next few years. Pruning is likely to be important over time for many of these plants.

Profile – *Isopogon formosus*, R. Br., *Trans. Linn. Soc. London* 10:72 (1810)



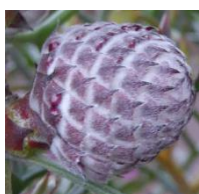
Robert Brown first described *Isopogon formosus* in 1810. It is appropriately named, as *formosus* is a Latin term meaning 'beautifully formed' or 'handsome'. Its common name is the 'Rose Coneflower'. There are now two recognised subspecies:

- **subspecies *formosus***. The more common form and frequently cultivated.
- **subspecies *dasylepis***. Has priority three conservation status (poorly-known) and occurs in different areas further west along the WA coast. This species differs in having slightly smaller flowers, leaves held closely to branchlets rather than spreading, and narrow rather than terete leaves with incurved margins.

In 2017, a similar species *I. heterophyllus* was placed into *I. formosus* subsp. *formosus*. This form had previously been recognised as a simple leaved (or sometimes divided towards the leaf apex) form, generally found in the Stirling Range and adjacent areas.

However, it was considered that this form intergraded in leaf morphology with *I. formosus* subsp. *formosus* and did not warrant species recognition.

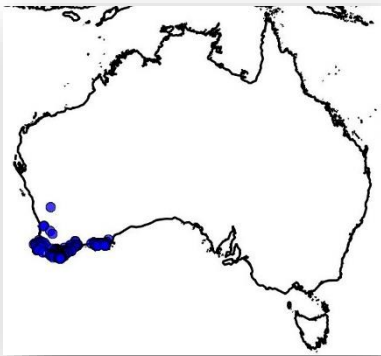
Description – *Isopogon formosus* is a variable shrub, ranging from almost prostrate or dwarf forms on exposed coastal headlands such as Cheynes Beach near Albany to more than 2 m tall inland from the coast. The leaves are terete and rigid but not prickly, 1-3 times ternately divided to a length of 5 cm, with a groove along the upper side and a pointed end. Globular inflorescences are terminal or in



upper axils, to 20 mm in diameter. Slender, smooth flowers are relatively long at around 25 mm, and hang downwards on opening. The flowering period is also lengthy, from July to November, with flower colour varying from pink to magenta, to mauve.



This species usually has many stems and a very attractive columnar habit. With its spreading leaves, subspecies *formosus* foliage has a three-dimensional hexagonal effect, with upright columns about 7cm in diameter.



Distribution – subspecies *formosus* is abundant along the southern coastal strip of WA from Walpole west of Albany, east to Cape Arid National Park. Subspecies *dasylepis* is rarer and found considerably west of subspecies *formosus*, along the western coast of WA, from Busselton south to the Scott River region near Augusta. Both subspecies can be found in seasonally swampy sandy heath.

Cultivation – this extremely desirable plant provides a mass display of bright pink to mauve flowers throughout spring. It is also a particularly good foliage plant. It is the most common WA isopogon in cultivation and is relatively hardy given good drainage. Mounded or sloping beds produce best results, and these conditions have resulted in long-lived plants even in high summer rainfall eastern states gardens. It

withstands extreme heat and is considered frost hardy to -8°C, surviving heavy frosts in Canberra and Armidale NSW. Long stems make it highly suitable for floriculture – like many isopogons the blooms last well in a vase, and foliage can last almost indefinitely. Pruning directly after flowering will promote maximum flowering for the following season.

This is one of the easiest species to strike from cuttings. It has been grafted onto eastern rootstocks but needs an interstock of *I. cuneatus*.

Confusing species – traditionally *I. formosus* has been confused with a highly similar simple-leaved species known as *I. heterophyllus*, but this has now been resolved by including it in *I. formosus* as noted above. Another source of confusion is *I. dubius* which has similarly divided leaves, however its leaves are flat rather than terete (rounded in cross-section). The grey-leaved form of *I. formosus* is often found in nurseries incorrectly labelled as *I. dubius*.

Cultivars – there are a few desirable forms around :

- *I. formosus* 'Pink Sparkler'
- *I. formosus* 'Pink Profusion' and *I. formosus* grey leaf form – both are compact grey leaf forms.
- *I. 'Candy Cones'* – a hybrid between *I. formosus* and *I. latifolius*; very difficult to maintain on its own roots even in summer dry climates.
- Axillary flower form (not yet a recognised cultivar)



In cultivation, Moruya NSW, October 2018. Photo: Mark Noake

Cultivation advice from members – *Isopogon formosus* is widely grown by our members over a range of different climates, from summer-dry southern and western States, to a diversity of summer-wet eastern States climates including heavy winter frost in Armidale/Uralla and Canberra regions. Members consider *I. formosus* to be very frost tolerant but report some losses when more severe frosts of -8°C and worse strike. So, in gardens subject to these extreme frosts some overhead protection is recommended.

Good drainage is considered vital across all regions but is particularly important in summer-wet eastern gardens where raised beds are commonly used. Mark & Carolyn Noake and Bob & Ruth Pulford grow spectacular plants of *I. formosus* on the NSW coast by planting on sloping ground where water drains away quickly. Attempts to grow these plants on flat ground where water-logging occurs have resulted in sudden deaths in wet periods. In summer-dry gardens, our members still recommend planting in raised beds to ensure good drainage, and this has resulted in long-lived specimens.

Liesbeth Uijtewaal in the Netherlands has grown *I. formosus* in pots with great success. She currently has one seven years old, commenting that it requires lots of water but can tolerate some dryness. She considers it so hardy for her that she uses *I. formosus* as a rootstock to grow other isopogons. Miriam Ford grows this species in an old bath tub.

Members report that the forms of *I. formosus* in cultivation strike very easily from cuttings using Clonex Purple or Ezi-Root hormone gels. Plants can also be grown from seed but the ease of striking cuttings for this species tends to make seed growing obsolete. For those who seek hardier plants which do not require great drainage, grafting onto *I. mnoraifolius*, *I. anemonifolius* or *I. anethifolius* is very straightforward using the cutting graft method, but an interstock of *I. cuneatus* is required for success.

In summary, *Isopogon formosus* is regarded as probably the toughest and most adaptable of the WA isopogons to cultivation.

Painting *Isopogon formosus*

Last newsletter, artist Marina Lommerse told us her painting of *Isopogon formosus* was 80 per cent complete. Earlier this year, many of us contributed photos to assist Marina. Since then, the painting has been finished and exhibited.

The exhibition ***Beauty from the Bush: Botanical Art of Western Australia***, curated by botanist Sue Radford, was held in Kelmscott, WA on 22-24 June 2018. A celebration of Western Australian botanic art about native flora, in particular its wildflowers, it was intended to spark interest in our special environment and the global renaissance in the old and respected field of botanic art and illustration, and was part of the 60th State Conference of the Wildflower Society of WA. It included fourteen artists including Marina, and the featured artist was our own member Margaret Pieroni. Best known for her amazing dryandra paintings, Margaret has also produced paintings of isopogons and petrophiles.

Marina advises that the original *Isopogon formosus* painting sold before the show opened and she also sold a print of it on the opening night. Marina has kindly allowed us to share the results with you below. How appropriate that we are featuring this species in this edition! Marina has also joined our Study Group so maybe we will see more I&P paintings which will help us raise awareness of these beautiful plants.



Grafting update

Phil Trickett

Since the last newsletter I have conducted a number of trials in search of a way to reliably graft WA petrophiles. While I have had some success using the Qld petrophile *P. shirleyae* as a stock for cutting grafts, too many continue to sit in my glasshouse taking up valuable room and refusing to strike roots, some after more than 12 months!

The first trial involved investigating whether any of the eastern petrophiles *P. pulchella*, *P. sessilis*, *P. canescens* and *P. pedunculata* will graft onto the isopogon rootstock that I use, *I. mnoraifolius*. The reasoning behind this was that if any of these petrophiles proved compatible with *I. mnoraifolius*, then it may be feasible to graft WA petrophiles onto *I. mnoraifolius* using the compatible eastern petrophile as an interstock. Interstock grafts are not ideal as it requires two grafts to take for each grafted plant. However, given that very high success rates of more than 80% that can be achieved grafting isopogons using the cutting graft method, I would expect interstock grafts to achieve more than 70% success rates, making such grafts worthwhile.

Early results show that *P. pedunculata* may be compatible with *I. mnoraifolius*. Each graft shows *P. pedunculata* buds appearing on the grafts onto *I. mnoraifolius*. As a result, I have regrafted many of the October 2017 petrophile grafts from our trip to WA. Many of these original grafts showed very healthy scions but no signs of roots on the rootstocks. We will report on these regrafts next newsletter, hopefully with some positive results. While *P. pedunculata* at this stage looks the most promising of the eastern petrophiles for use as an interstock onto *I. mnoraifolius*, the other three eastern petrophiles all look healthy on *I. mnoraifolius*. It's just a matter of time to see if they are compatible.

Another unexpected but promising solution to grafting WA petrophiles emerged recently when I checked seven cuttings of a petrophile Catriona and I found in the Jervis Bay region. All seven had developed masses of

healthy roots since they were processed in late April, a huge surprise given my past difficulty putting roots on any petrophile. This petrophile looks to us to be one of the intergrades between *P. sessilis* and *P. pulchella*. There is considerable variation in the leaf divisions throughout the population, with most resembling *P. sessilis* but with some looking closer to *P. pulchella*.

As a result of the apparent ease in striking this petrophile, I have processed a range of petrophile cutting grafts on this Jervis Bay stock. If these strike roots as quickly as the initial seven from April, then this may prove to be the petrophile stock I am seeking out. Results of this trial should also be available for the next newsletter.

Our isopogon grafts on *I. mnoraifolius* continue to flourish in our garden. 'New' grafts of note include *I. baxteri* (with *I. cuneatus* as an interstock), *I. teretifolius*, *I. nutans*, *I. panduratus* subsp. *panduratus*, *I. gardneri* * *I. divergens*, and *I. gardneri* are all growing beautifully. A number of *I. formosus* grafts are ready for planting out. Like *I. baxteri*, these require *I. cuneatus* as an interstock. Interstock cutting grafts are very easy and quick to do, and as mentioned above, the high success rates in grafting isopogons using the cutting graft method means that the extra interstock graft only reduces the success rate marginally.

Our grafted isopogons on *I. mnoraifolius* are proving far more reliable to those that I previously grafted using *I. anethifolius*. We have yet to lose one in our garden, in contrast to those on *I. anethifolius*, too many of which dropped dead suddenly. Luckily, all the WA isopogons tried so far are compatible with *I. mnoraifolius*, apart from *I. formosus*. *I. baxteri* and *I. linearis* which need *I. cuneatus* interstocks.

It's time to prune!

Phil Trickett

With many of our isopogons still in full flower, you may not think that the time to prune is rapidly approaching. But with isopogons and petrophiles, they set their flower buds for next years' flowering very soon after the completion of this years' flowering. This means that it is vital to prune before next year's buds begin to form. Otherwise, you will be cutting off next years' flowers!



How to approach pruning? Obviously, it depends on the growth habit of the plant in question...

Some I&Ps need pruning to maintain an attractive form and reasonable size. Those which grow very vigorously and develop very long stems need pruning in their early life or they can grow into straggly, leggy forms. Examples of isopogons which often grow seemingly with a mind of their own are *I. anethifolius*, *I. cuneatus* and *I. formosus*. *P. pulchella*, *P. biloba*, *P. pedunculata* and *P. sessilis* are similar examples of petrophiles which require pruning in their early years.

So how much should be pruned off these plants? Like most native plants, you can go as hard as you like as long as you don't cut below the leafy branches. Some plants can respond to heavy pruning below leafy branches, but you need to know the plants that respond to such pruning and those that don't. The first prune should remove straggly branches coming from the base of the plant close to the soil. These branches tend to run along close to the ground and are more prone to disease. Then it's simply a matter of pruning back all the branches, particularly the long arms, to encourage an attractive shape. This also encourages more branching to maximise flowering.

Naturally bushy species which require little or no pruning include *I. dubius*, *I. anemonifolius* and *I. divergens* among isopogons, and *P. canescens*, *P. longifolia* and *P. filifolia* among petrophiles. However, they can be pruned if desired – generally only a light trim is needed.

Profile – *Petrophile biloba*, R. Br., *Suppl. Prodr. Fl. Nov. Holl.* 7 (1830)



Photo: James Gaither

Petrophile biloba was first described by Robert Brown in 1830. Biloba refers to its ultimate leaf lobes which are often divided into two broad lateral lobes. Its common name is the ‘Granite Petrophile’, presumably in reference to its favoured habitat of gravelly, granitic slopes.

Description – *Petrophile biloba* is an erect shrub up to 2 m in height. Its short, rigid leaves are alternate and about 15 mm long – about half taken up by the stalk (petiole) and the rest flat, divided three times and then into two. Each has a prominent vein along which the leaf is folded, and a pointed tip which makes it somewhat prickly. These glabrous (hairless) leaves are a contrast to the rest of the plant such as branchlets, flowers and cone scales, which are generally very hairy.

Flowering generally occurs from June to October, and flowers are highly attractive. The colour is grey/pink with white-grey tips while the

smooth inside of the perianth is a deeper pink. Variations have been reported in white, grey, pink and pink-grey. Each perianth tube is up to 20 mm long and very woolly with white hairs, and, unusually for a petrophile, opens only part way to reveal the pollen presenter. Compared to other I&Ps which usually have a hundred or more flowers on each inflorescence, *P. biloba* has relatively few. Inflorescences occur along the stem in leaf axils in great numbers and produce a spectacular display. They are followed by small ovoid cones 6-14 mm in diameter with persistent scales.



Above, inflorescence, leaf and stem. Below, flower showing perianth, tepals and pollen presenter. Photos: Mark Noake



This species often has multiple stems and a very attractive columnar habit. Its leaf and flower arrangements have a three-dimensional effect in upright columns about 5 cm in diameter.



Wannamal, WA, October 2017



Distribution – *Petrophile biloba* occurs in the Darling Range in Western Australia, from the Canning River area south east of Perth north to Wannamal just north of Bindoon.

Cultivation – this is one of the most beautiful petrophiles in flower and is considered one of the hardiest of the western species. It is also cultivated for its distinctive foliage. Long-lived specimens grow well in Canberra but not in Armidale, indicating frost tolerance only to around -4°C.



In cultivation, Pomonal VIC, October 2018

Despite this hardiness, it is rare to find plants available in nurseries. It is therefore a priority of the study group to cultivate this species and introduce plants into both public and private gardens. Like most WA petrophiles, grafted forms are probably required for consistently reliable results in east coast gardens. Regular pruning is recommended to encourage bushiness and promote maximum flowering.

Confusing species – a columnar habit and distinctive pink/grey axillary inflorescences make this species easy to identify. *Petrophile squamata* has similarly 3-lobed flat leaves but without further division and is a much smaller shrub with small, pale yellow axillary flowers. *Petrophile biternata* also has flat leaves divided into threes but then divides into three again and has yellow terminal flowers.

Cultivation advice from members – *Petrophile biloba* is considered one of the hardiest of the WA petrophiles but that is not saying much with most being very difficult to maintain even in WA gardens. However, many of our members have plants growing successfully over a range of climates. *P. biloba* can also be found in public gardens such as the Royal Botanic Gardens Cranbourne (Vic), the Kevin Hoffman Walk in Lara (Vic), Pangarinda Botanic Garden, Wellington East (SA) and Nangawooka Reserve (SA), and the Australian National Botanic Gardens in Canberra. This [link and video](#) from *Gardening Australia* in 2015 discusses the importance of a suitable microclimate for this species.

Frost tolerance is an issue but only when temperatures drop to -4°C or worse. Armidale members report losing plants to the severe frosts of -7°C and worse experienced in this region. However, overhead protection of plants in the Australian National Botanic Garden has seen plants survive Canberra winters with no damage, demonstrating how to grow these plants in severe frost climates.

As with *I. formosus*, good drainage is essential for longevity. Mark and Carolyn Noake have successfully grown *P. biloba* on sloping garden beds where water cannot pool in high rainfall events. Other members report good success on well-drained, raised beds, which again minimise the chances of water-logging of roots.

Members find *P. biloba* easy to strike from cuttings, again using Clonex Purple or Ezi-Root hormone gels. As yet, it has not been successfully grafted.

Leucophiles and isospermums

Catriona Bate

I was stopped in my tracks on a visit to a large (mainly native) Sydney plant nursery by a beautiful array of what looked like isopogons and/or petrophiles. It's rare to see even one plant let alone a whole range of species! My excitement was short-lived, however, when closer examination revealed the plants to be leucadendron cultivars, with some leucospermums thrown in. What a disappointment!

What led me astray were the leaf shapes, red stems, red new growth and even some cone-shaped buds – all characteristic of isopogons/petrophiles. It was a clear reminder of the similarity of our Australian *proteaceae* to their South African cousins. Many Australians lump species like leucadendrons, leucospermum and proteas, in with our own natives and simply regard the whole lot as native Australian plants. The fact that companies like Proteaflora produce Australian waratahs and banksias as well as a range of South African proteaceae under their label adds to this confusion.



There is, in fact, a close relationship between isopogons and petrophiles, and leucadendrons and leucospermums. They all belong to the *Proteoideae* subfamily of proteaceae, along with proteas. *Flora of Australia* notes that some isopogon species may be most closely related to some of the South African *Proteoideae*. Other familiar Australian proteaceae like banksias and grevilleas are classified as *Grevilleoideae*. The character of paired flowers (two flowers in a single bract axil) separates *Grevilleoideae* from *Proteoideae*.

Isopogons are often described as mini-proteas or protea-like. Common names also reflect subfamily similarities – leucadendrons are conebushes, petrophiles are conesticks, cone-bushes, and cone-flowers, and certain isopogons are sometimes cone-flowers (although the genus is generally called drumsticks because of its rounded seed heads).

Leucadendron has about 80 species, all found in South Africa. The genus name means white tree, referring to *Leucadendron argenteum*, from Table Mountain near Cape Town. Dense, silky leaf hairs make this famed but now endangered tree glisten silver.

Before refinements to the 1975 landmark classification of *Proteaceae*, isopogons and petrophiles were subtribe *Petrophilinae* within *Proteoideae*. Now, *Isopogon*, along with *Adenthanthos*, is grouped with *Leucadendron* and *Leucospermum* (tribe *Leucadendreae*) rather than with *Petrophile* (tribe *Petrophileae*).

Like isopogons/petrophiles, leucadendron and leucospermum species are mainly small shrubs with leaves of widely varying shapes. The fruit is a nut

shaped like a cone. These genera can be tough and easy to grow in the right conditions. There are key differences – many of the Southern African species have waxy, leathery leaves, and their foliage is more colourful compared with Australian species. Seed form and dispersal method, bracts and inflorescences differ. Showy leucospermums are brilliantly coloured in shades of red, orange, and bright yellow. Leucadendrons are less flashy and more about colourful foliage and fruiting heads.

Further, leucadendron plants are dioecious, with separate male and female plants. This makes them more inclined to genetic variation by cross-pollination. Leucadendron hybrids are produced through interspecific hybridization.

Leucospermum is derived from the Greek words leukos meaning white, and sperma meaning seed. A fleshy, white covering (the elaiosome) surrounds the seed. A common species is *Leucospermum conocarpodendron*, the species name referring to cone-shaped fruits. Commonly known as pin-cushion flower, there are 48 species found in Zimbabwe as well as South Africa.

One of the most striking differences between these closely related Australian and Southern African genera is their use in floriculture. Leucadendrons and leucospermums, like proteas, are popular cut flowers due to their vibrant colours, foliage, and long-lasting vase life. Many hybrids and cultivars have been developed. Of the proteaceae in cultivation in Australia, leucadendrons has long been the largest crop, followed by Protea and Banksia, with leucospermum and adenanthos in lower numbers.

In contrast, isopogons and petrophiles are rarely seen in the cut flower trade. They have great potential, with many species having showy and terminal flower heads and interesting foliage. They also have a long vase life of one to three weeks. Like proteas, they drink plenty of water once the stems are cut. Many isopogon species are recommended for cut flowers. Reportedly, *Isopogon cuneatus* is the most widely used species for cut flower arrangements, a winter flowering period adding to its desirability. These days the NSW species *I. anemonifolius*, *I. anethifolius*, and *I. dawsonii* are also known to be grown for the flower trade, and their foliage and fruit (cones) are also marketed.

The comparison with these Southern African genera serves to emphasise how far behind we are regarding plant breeding and cultivation. It further underlines the importance of our work on the cultivation of isopogons and petrophiles to promote and conserve them.

Grampians gardens

Catriona Bate

The gardeners of the Grampians are legendary for their ability to successfully grow spectacular WA natives as well as eastern genera. We were lucky enough to visit several local gardens recently and while they have a wide range of different genera we found I&Ps in all of them. A few of these gardeners are members of our Study Group. For those of us struggling to grow these genera, it is a useful reminder that not only is it possible to grow them well, but they ornament any garden with colour and texture and shape through their foliage and floral display.

WA flora are well suited to this region with predominantly sandy soils, low rainfall (400-500mm annually), long hot dry summers and winter rainfall. This similarity to southwest WA conditions means plants do not generally need to be grafted. In transforming bare paddocks these gardens have survived frost, extreme heat, drought, fire, feral animals and reduced rainfall due to climate change. They feature inorganic mulches such as scoria or gravel.

Wartook Gardens – Royce and Jeanne Raleigh

Renowned growers Royce and Jeanne aim to try and grow the many showy and unusual plants that do not find their way into the nursery trade. They have large raised beds and have found that good drainage is by far the most important aspect of growing all garden plants. Their huge garden is around 45 years old and shows how an older garden can be kept looking fresh and exciting.

For isophiles like us the standout species in this garden is *I. dawsonii* – not a WA species at all but one from inland NSW west of the Great Divide. The original plant is about the same age as the garden and proves how adaptable this species is. Now about 4m by 4m (this is the largest isopogon species), it was covered with flowers and looking great even with a load of hundreds of cones persisting from previous years. Royce



commented that it produces many seedlings which have allowed them to spread its progeny around the garden, and has attractive red foliage in winter. Another NSW species, the small shrub *I. mnoraifolius* (pictured left), was showing off with heaps of flowers and unusual foliage. A relatively young *I. anethifolius* showcased the delicate foliage of this species. In the past Royce and Jeanne have grown *I. anemonifolius* ('Sunshine', the straight-leaved cultivar), noting that it is frost and drought hardy with flowers that make a wonderful show, really brightening a garden.

Newer plantings include *I. formosus* and *P. fastigiata*. The Raleighs have also grown other WA species such as *P. ericifolia* ssp. *ericifolia* (showy, frost hardy and can stand extended dry periods) and *P. biloba*, which they believe is one of the best petrophiles.

Grannes Garden, Stawell – Glenda and Greg Lewin

This garden is a showcase for modern garden design. It has an open feel and a well-defined structure. Features included rusted steel edging, steps, Grampians sandstone, artworks, and small spaces/gardens. Plants are mostly set apart from each other to maximise their impact. Amongst the mostly WA flora a smallish *I. anethifolius* was attracting photographers with golden flower heads against deep green fern-like foliage. A few plants of *P. ericifolia* ssp. *ericifolia* (found in the Stirlings in WA) had nearly finished flowering but their low mounded form looked very effective amongst mounded grasses. We also found an *I. formosus* flowering well in an interesting paler pink shade.



Panrock Ridge, Stawell – Neil and Wendy Marriott

We ran out of time to do justice to this well-known garden which includes the national living grevillea collection. The vast plantings cluster in a naturalistic way among exposed granite tors around a hilltop. Neil and Wendy aim to display some of the gems of the Australian flora in a way which highlights the plants against contrasting foliage colour and texture.



Neil has long experience growing I&Ps. We found a terrific specimen of *I. anemonifolius* 'Sunshine' (pictured left), its huge yellow flowers glowing in the afternoon sun. Nearby were some lovely mounded 'tufties' among prostrate banksias and other low plants in a rockery bed. For us, these were the stars of this display – a couple of advanced petrophiles from WA with long, simple, terete leaves. These are outstanding examples. Flowering profusely, the attractive cream flower heads were tucked down on branchlets near the base of the leaves.

Of the several WA petrophile species with these leaves there are a few that tend to be confused with each other. Traditionally known as *P. longifolia*, taxonomic revisions in 2005 resulted in the following species: *P. filifolia* ssp. *filifolia*, *P. filifolia* ssp. *laxa*, *P.*

prostrata and *P. longifolia*. The strictly prostrate habit of *P. prostrata* (typical in the Fitzgerald River National Park) makes it easier to identify but *P. filifolia* and *P. longifolia* are very similar. However, it appears that *P. longifolia* as now defined is difficult to find in the wild and has priority three conservation status (poorly-known). This means that what we know as *P. longifolia* in cultivation is more likely to be *P. filifolia*.

Thus Neil's plants are probably *P. filifolia* ssp. *filifolia*. Mostly in bud now (late October), this species does tend to flower later in the year (Oct-Jan rather than Aug to early November for *P. longifolia*). Both species rely mainly on foliage and form for impact, perfectly illustrating the Marriott philosophy that it is the foliage variations that make a garden look good for the whole year.



Linda and David Handscombe, Pomonal

This well-established garden reveals its I&P gems slowly, as you explore. Its wide range of WA species is the source of many floral arrangements and tube stock plants.



As you drive in, a magnificent specimen of *I. anethifolius* grabs attention. As it turned out, we had already admired it – Linda and her team were responsible for the table centrepieces which featured its blooms at the FJC Rogers seminar dinner at Horsham only days earlier. Almost all the flowers were sourced from the Handscombe garden, including this *I. anethifolius* as well as beautiful flower heads from *P. ericifolia* ssp. *ericifolia*. Amazingly, given the longevity and beauty of these inflorescences, this must be one of the first times either species has been seen in floral arrangements.



Linda showed us excellent examples of *I. dubius*, *I. latifolius*, *I. trilobus* and even *P. brevifolia* tucked away around the garden. She also grows *I. anemonifolius* 'Sunshine'. *I. cuneatus* does not seem to grow as well as other WA species but she has it nestled in amongst other plants where it receives some protection. At Panrock Ridge Neil Marriott appears to have a similar experience with this species, and it appears that it does not tolerate heavy frosts.

At their peak were *I. formosus* and *P. biloba*, our two profile species. Two advanced plants of *I. formosus*, each almost a couple of metres high, had a dazzling display of many large flowerheads. We thought the first one we saw, in the shade of a casuarina, was an amazingly bright pink. However, the other plant which was in full sun, was an electric pink (right). It was interesting to contrast the long stems of *I. formosus* with their terminal flowers with the similarly long stems of *P. biloba* with axillary flowers all along the stem. This specimen was tall (at least two metres high) and relatively narrow.



Phillip Vaughan's Nursery, Pomonal



Many of us are familiar with Phillip Vaughan's various gardens over the years. There is always a stunning range of hard to find WA species and traditionally his nursery has been one of the few places to find WA I&P species. Phillip is a legendary grafter but does not tend to graft I&Ps, and in his conditions he can grow WA species on their own roots.

This is the third garden of Phillip's we have visited and while it is still relatively young, true to form everything is flowering profusely in large raised beds. Phillip often selects the best forms of species to grow and propagate. We admired *P. ericifolia* ssp. *ericifolia*, *P. fastigiata*, and *P. filifolia* ssp. *filifolia* (see discussion above). There were several plants of *P. biloba* looking unusually dense and already showing paler green new growth. Among the isopogons the cultivar 'Candy Cones' (*formosus* x *latifolius*) exhibited its usual large deep pink flowers and *I. divergens* also had unusually large and deep pink flowers above pale green new leaves. In contrast the flower heads of *I. scabriusculus* ssp. *scabriusculus* have a sparse fringe of terete leaves. Both of Phillip's forms had particularly attractive pink flowerheads with one displaying a deep magenta hue (pictured left).

Curios which will be interesting to monitor include what look to be young *I. panduratus* and *I. attenuatus*, and even *P. helicophylla* already displaying its corkscrew leaves.

In the press

Photos taken in our garden featured on the covers of *Native Plants for NSW April 2018* (right). On the front was *I. dawsonii* and the back featured the beautiful geometric patterns of the bud of endangered species *I. fletcheri*. *I. dawsonii* is fairly easily grown in eastern states and has lovely soft foliage. *I. fletcheri* is a lot more difficult but easy to graft.

Facebook

Every spring I&P photos appear among the thousands on social media. It's noticeable that very few contributors know species names. However, it's great to see I&Ps getting some attention.



What beautiful plants: Most people commenting are unfamiliar with these genera but all it takes is a photo to elicit transports of excitement. All the usual superlatives feature (e.g. gorgeous, stunning, incredibly beautiful).

...my first *Isopogon* has me totally intrigued.
...such amazing complexity
...look at those curls and the yellow tips!
...near perfect geometry of opening flower bud
...mesmerised by nature's spirals
...like a purple pine cone exploding
...like fireworks
...a 'starburst' experience
...I'll never look at an *isopogon* the same way again.
I thought they were ugly but I was very wrong.

They are particularly taken with the intricate flower heads. See samples, left.

What's out in the garden: In recent posts *P. biloba* inflorescences are starring in a couple of gardens, also *I. prostratus*. *I. dubius* at Burrendong Arboretum gets a mention, and *I. asper* at the Australian National Botanic Gardens in Canberra also gets a couple of posts.

What's out in the bush: In the WA kwongan, *I. latifolius* is looking incredibly pink in the Stirlings, *P. teretifolia* is good near Bremer Bay, *I. crithmifolius* has been good in Dyrandra Woodland where *P. fililoba* ssp. *fililoba* has also been spotted, *I. divergens* is on show near Moora, and *I. teretifolius* (the pale pink nodder) has been photographed at Foxes Lair near Narrogin. In the east, recent sightings of *I. anethifolius* at Barrenjoey, and *I. anemonifolius* at Heathcote, Hat Head and Agnes Banks have been posted.

How to grow I&Ps: A recurring theme is that all species are impossible to grow (e.g. *unbelievably hard to grow beauties... Isopogons are "fuss pots"*).

Conservation: Gavin Phillips reports on the efforts of rock climbers in the Blue Mountains to reduce unnecessary impact on the vulnerable species *I. fletcheri*. A population of 20 plants at Banksy Crag is the second largest patch of plants known after the major population at Govett's Leap. Working with National Parks & Wildlife (NPWS), climbers have recently rerouted access to avoid the plants, with signage directing trekkers to a new lower route. Source: **Rock Climbing in the Blue Mountains** Facebook page

Financial Report

Total 02/04/2018	\$1,135.08
Bank balance	\$1,070.62
Cash on hand	\$64.46
Donations	\$40.00
Total 31/10/2018	\$1,175.08
Bank balance	\$1,110.62
Cash on hand	\$64.46