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# ISOPOGONS & PETROPHILES

The Association of Societies for Growing Australian Plants Isopogon & Petrophile Study Group Newsletter

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*Isopogon alcicornis*. Near Esperance, WA, October 2003.  
(See page 9 for more details about this species)

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## EDITORIAL

Well here we are at last. Edition number 6 has finally rolled off the production line. As per usual, I must apologise for the delay. My excuse is two gorgeous young girls who occupy every waking moment, and most of the night as well. Ahh a full night's sleep- those were the days! Because of my tardiness all memberships will be rolled over until the end of June.

Here in Melbourne the weather has finally turned to summer with long hot days and thankfully some fairly cool nights. We had some excellent rain over the winter and spring, and although the drought is not over and the reservoirs are still at less than 60% full, we are much better off than many of you in other areas. As a result of these rains, this spring I was treated to a



*Isopogon formosus*

wonderful flowering display in my garden. Particularly good were *Isopogons formosus*, *sphaerocephalus*, *trilobus*, and *anemonifolius* "woorikee" and *Petrophiles biloba* and aff. *brevifolia*. I also had the first flowering of *Isopogon* "Stuckey's hybrid", and an unknown *Isopogon* that may be *I. sp.* Watheroo. All has not been positive though with the death of my *Isopogon latifolius*, soon after the first rains of winter. It wilted and died with over twenty developing buds! Just before this I had straightened it up and staked it, and hope that I hadn't damaged the roots in doing so. (I did get a grafted one from "Gardening Australia Live" though and fingers crossed it will last longer.) More recently, I lost a *Petrophile longifolia*, I'd grown from seed that had flowered for the first time in spring. Most things, however, are still going well, and I have a



*Petrophile* aff. *brevifolia*

number of seedlings and struck cuttings ready to plant in the autumn.

This issue is a bumper one at 15 pages and contains some great letters and articles from you the members. Thanks very much to everyone who contributed, as it makes for great reading, in addition to adding to our knowledge of the genera.

There's a look at *Petrophile diversifolia* with wonderful drawings of its unique foliage by Margaret Pieroni. Thanks very much Margaret. The featured species is *Isopogon alcicornis*, a rare taxon from WA, and one of my favourites. There's also a look at the botanist Ludwig Diels, an update on the study group questionnaires and an article on the important discovery of smoke's active germination ingredient.



"Woorikee"

To those that haven't sent in material, it's never too late to put pen to paper or fingers to keyboard. Tell us what you know about *Isopogons* and *Petrophiles*, your successes and failures, or just how they are going in your garden or their natural habitat. Who knows, you may get your words in print!

Finally, a big thanks goes to Margaret Pieroni and Tony Cavanagh for sending in photos for the study group's virtual photo library. I am always looking for more photos and will copy/scan them and return the originals if you wish.

I hope that you all had a wonderful festive season and that 2005 is a great year.

Remember the ASGAP 2005 conference, with tours to the heart of *Isopogon* and *Petrophile* territory before and after, is in Perth in October. I hope to see you there. Enjoy this issue and all the best with your *Isopogon* and *Petrophile* growing.

David Lightfoot ☺

## Members' letters and emails

From Margaret Pieroni. Attadale, WA.

July 2004

Unfortunately none of the *I. alpicornis* germinated using my tried and true leaf burning method. I still have one plant of *P. filifolia* left, still in its pot, about 10cm high and several *P. helicophyllas*, most of which are waiting for me at the Banksia Farm [Mt Barker, WA. <http://www.banksiafarm.com.au>].

Some of the mystery Isopogons and Petrophiles from Morande Nursery have not flowered or have died. *I. dubius* is sprawling on the ground, showing no signs of flowering. I thought it was because it doesn't get enough sun but paradoxically it is growing towards the shade of the house!

One unidentified plant with very fine, divided terete leaves has terminal buds, so if and when it flowers, I'll send you a specimen [Thanks looking forward to it-Ed]. It looks like the flowers will be yellow.

Stuckey's hybrid has also failed to flower.

August 2004

My plant of *P. filifolia* was dead when I got back from Cape Arid. The plants left with Kevin Collins, [the owner of the Banksia farm,] are doing extremely well- *P. helicophylla* in bud and others e.g. *I. dubius* and *formosa* in flower.

We found an interesting Petrophile on the Diamonds Hill- Could be a range extension of *P. cyathiforma*- or a new species. I'll show it to Mike [Hyslop] or Barbara [Rye] [at the WA herbarium]. It was not flowering.

Dr D Foreman, of the National Herbarium of Victoria, described *P. cyathiforma* in 1995 in the *Flora of Australia* Vol 16. It is one of a number of species allied to *P. ericifolia*. According to Australia's Virtual Herbarium (<http://www.rbq.vic.gov.au/avh/>) it has been collected from The Stirling Ranges in the West to Ravensthorpe in the East, and from the South

Coast up to Hyden and even further North. It is a shrub up to 65cm tall. The leaves are about 15mm long and simple, hugging the stems. The inflorescence is cup shaped, with prominent bracts and bright yellow flowers that appear from September to December. I would really like some photos of this species. If anyone has any could they please forward them to me? Thanks Ed

December 2004

During our most recent reconnoitre for the northern Conference [ASGAP 2005] tour, in October, Elizabeth George and I saw quite a few Isopogons and Petrophiles. The pink *Petrophile serruriae*, near the coast, south of Jurien was very striking.



*Petrophile serruriae*

On top of the hill on Passinto Road, north east of Western Flora Caravan Park [near Eneabba], Allan Tinker showed us the *P. aff. ericifolia*, a lovely shrub about 2m tall. [I think

this *Petrophile* is actually *P. recurva*, a plant first described in *Flora Of Australia Vol 16*, and one I have seen in that area-Ed]

My potted *P. helicophylla* plants did very well at the Banksia Farm at Mount Barker. Most of them are still there awaiting my move to my new home. Kevin used three plants with flowers in bud, in a display garden during their Wildflower Festival, in October. He buried the pots so that they appeared to be



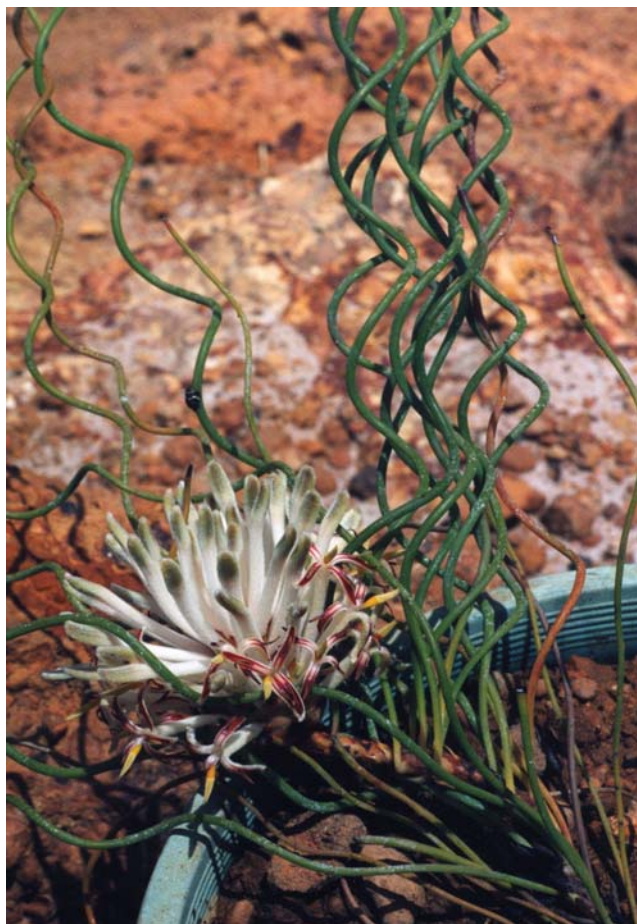
*Petrophile recurva*

growing in a garden bed. The foliage attracted a lot of interest. I brought one of them back here to Denmark because the pot was deteriorating. The flowers stayed unopened for several weeks, even though they seemed to be fully developed, but as soon as I re-potted the plant into a bigger pot with more room to water it, they started to open and I took the photos. I'm looking forward to planting them and other Isopogons and Petrophiles at my new house. Those that I want are available at local nurseries. We planted two *I. formosa* and one *I. dubius* that I'd left at the Banksia Farm, in the garden of the house where I'm living at present. They had flowered well in August - September and needed planting out.

I'm looking forward to growing such as *Isopogon latifolius* and *Banksia coccinea*, which don't do well (*B. coccinea* won't flower,) in Perth. There are so many wonderful plants on the block that I won't want, or need to plant many others. I'm finding 'new' ones every time I go there. There are no

Isopogons and only one Petrophile, *P. diversifolia*.

Margaret has moved to Denmark, which is West of Albany on the South Coast of WA and close to the Stirlings and Fitzgerald River areas- Isopogon and Petrophile heaven. Please let us know how the potted plants go in the garden, and if they set seed Margaret. Ed



*Petrophile helicophylla*

From Barbara Buchanan. Myrree, Vic.

March 2004

The next Growing Australian [the Vic APS regional newsletter] will carry a glowing article on New life (or some such title) about regrowth after the drought. I should have known better than to tempt fate. We have had no more than a few mm a couple of times, too small to be of any use in the ground, since Dec 22<sup>nd</sup>. January was cool, but February and March to date have been very hot again and the garden is suffering badly again. It is a rainfall pattern very

similar to the SW and some plants are in fact thriving, (I've probably put a jinx on them by saying so) but there are lots of fresh gaps. Borers are partly to blame and increasing crowding and competition as the garden ages. We put in an extra tank so that I still have a little water left for pots, unlike last year, but it is too close to the line for comfort.

I am delighted to see the feature on *P. fastigiata* (Newsletter 5). I have wanted to grow it since about 1994, but none of the seed I had germinated. The other one from my Esperance trips was *P. squamata*, which did very well here for some years but finally died last year. I have produced tiny roots on several cuttings but they have never progressed and eventually died- ? needing a mycelium in the soil. So I was delighted to see they are doing well as Cranbourne. Maybe I'll be able to get new plants. When the rush of planting up the new gardens is over maybe the friends of Cranbourne could develop a system of supplying such hard to get plants to study groups and country groups. [*The RBG Cranbourne is currently creating a large display garden showcasing our wonderful flora Ed*] I saw the Proteaceae area there years ago with Alf Salkin and Tony Cavanagh as the *Phytophthora* was starting to appear. It is good to know it has not been completely devastating.

I was in Adelaide last year and managed to get to the Bellair Nursery and picked up a couple of new Petrophiles, *brevifolia* and *seminuda*, plus *I. cuneatus* which I decided to try and grow in a pot. It was very root bound and yellow (in a tube) and had lost its growing tips but I think it might do.

I wondered about the white, grey and pink colour forms of *P. biloba*. My former plants used to go through various colour phases. I would be disappointed by the grey buds, then the pink would appear. My plants were from two different seed sources too.

Re the germination trial, my heartfelt sympathies. I used to get similar results with the daisies. What I did learn was that there is an easier way to apply smoke treatment, with a layer of smoke impregnated vermiculite available from wholesale nursery supplies [*and in small packets sold as "Seed starter" from the Wildflower seed company, Canning Bridge WA Ed*]

I have been around the garden and filled in the questionnaire. Most of the Petrophiles have come from APS meetings. I see there is nothing left from my own raising.

Cheers

Barbara Buchanan

PS A couple of points of rain overnight! Lifesaving if not drought breaking.

*Thanks for that Barbara, especially for filling out the questionnaire. I really feel for people in the country during drought- especially the recent prolonged one. Even with water restrictions we really have no worries in the metropolitan areas. Ed*

From Bob O'Neill. Wandin North, Vic.

March 2004

Here on the homefront it is something of a mixed bag. The current dry is creating a lot of sad plants, a number of which have gone or will be lost before long. Generally speaking the Isopogons and Petrophiles are doing very well indeed. I mentioned that I bought a dozen plants from Phillip Vaughan some time ago. Three I lost after a short time, the others are now going very well indeed, to the point that yesterday I even took a few cuttings from them. Most of the other Isopogons are doing very well, some in a moist bed doing extremely well.

I am in the process of creating a number of large beds from a plantation area down the back. To do this is requiring a lot of work. First I am weed spraying then, as far as possible, I am removing remnant grass by hand tools, this being the more exhausting work. The area is then mulched, so far 140m<sup>3</sup> being spread. To finish as far as I

would want and to resheet other parts of the garden as well I will need at least another 50 or 60m<sup>3</sup> of mulch. All this is certainly changing the bottom part of the garden.

The long dry spell has stopped planting out, but it has allowed other work. The mulching is a big job, we have dismantled the igloo and relocated it to permit the construction of another shed. When all that is completed we will really get serious about propagation, some for here, some for sale.

*Luckily there was a good deal of rain in Bob's part of the world over winter and he has had some great success as he details below. Ed*

August 2004

The Isopogons continue to grow on well with no current losses—either I am tinny or else they are very versatile. The earliest ones are just beginning to flower.

Earlier I lost a few advanced plants that I bought. I feel in future I will only buy advanced plants with cutting material to minimise losses.

Growing well are *Petrophiles longifolia* and *shuttleworthiana*. Once they are mature enough I'll strip all the cutting material. *Isopogon divergens* is also doing well.

Across the board the garden is most pleasing with the Acacias the current star attraction.

October 2004

Just to catch up with you on our Isopogons. This is our first season that we have had anything really worthwhile to show and I am not disappointed. I had no idea that Isopogons could be such a dazzling display in the garden. As I indicated earlier, they

have been easy plants to propagate, amongst the easiest in fact, and there have been very few casualties.

The first to flower was the hybrid [Stuckey's Hybrid], and it did very well. I would have a number of plants of this form. *Formosus*, *buxifolius*, *cuneatus*, *dubius* and *anethifolius* have all more or less come out at the same time, in early October. *Cuneatus* is our most spectacular with its large purplish flowers, a real show stopper. Our best plant is in full sun in a moist situation. I will be taking a lot of cuttings once the main flowering is over and have a number of these spectacular plants in high profile parts of the garden.

I went with the Foothills Group to Ocean Grove recently and as part of the day out visited Phillip Vaughan's nursery. An *Isopogon latifolius* was in full bud stage, the buds about the size of a cricket ball with one bud showing a few tufts of purple. I was delighted to buy one of the plants there. Later we went to John Mahony's nursery in the area and there I was able to pick up 3 more small plants as well as 2 of *Isopogon cuneatus*. My day was made. I also bought 9 of the prostrate, mound type banksias which were only in small pots so like the little dryandras that I picked up at Colac [at the Fred Rogers seminar]. These have been potted on.



*Petrophile shuttleworthiana*

Rabbits have been a nuisance to the point that I have bought tree guards for the first time. This will slow my planting operations somewhat. I am ready to put out another 100 plants in the near future and the ground is now in good nick to do that. There may be a bit of watering over summer but with

any luck we will have a few storms during the hotter weather and this will minimise bucketing to frugal levels.

The garden is at its best at the moment with many hours seated on the mower. We have the first of a series of weddings here in the next couple of months so to get the place at its peak we will cut the lawns twice this week to have it spot on. I trust that you are at peace with the world in your Isopogon patch.

Regards, Bob.

*Wow the gardens sound like they were fabulous this spring Bob- Not sure I like the idea of mowing the grass twice a week though! Ed.*

From Joke Meyer, Tamworth NSW  
June 2004

In Spring 2003 I went on a coach trip to see the WA wildflowers. I saw Isopogons and Petrophiles in their natural glory.

My plants haven't done well at all. I thought that the climate here was the reason for my failures. John Niven just about 100km North is doing well, so I will keep on trying and keep you posted

*I would think your climate would be pretty good for Isopogons and Petrophiles, little humidity and not too much rain, but they do need great drainage in general. If you have purchased bigger plants, perhaps you are having the trouble that a number of us have had with poor root development and therefore less ability to cope in dry times. Ed*

From Lloyd Carman, Eden Hills SA  
July 2004

Here is an update of the Isopogons and Petrophiles I am currently growing; *Isopogon anethifolius*, *axillaris*, *dubius*, *formosus*,



*Petrophile serruriae*

*polycephalus*, and *spherocephalus*. *Petrophile biloba*, *brevifolia*, *fastigiata*, *pulchella*, *seminuda*, and *serruriae* (yellow).

These are growing quite well, particularly since the good rains we have had over the last two months. I have been feeding them with slow release native pellets with 2% phosphorus, 18%N and 10%K (3 to 4 months). Also, a covering of humus from the garden. Some of the species mentioned are only 6 months old and when planting them in the garden I mixed some humus in the hole and a sprinkle of fertilizer. The results are very encouraging.

*That's a great list of species, Lloyd. Please keep sending in updates. Ed*



Awabakal Reserve flora- pre fire.

From Paddy Lightfoot, New Lambton, NSW

Jan 2005

There are wonderful heathlands near to the Newcastle metropolis. One of these is the sandy acidic Awabakal Reserve near Dudley Beach. In this particular area there are many low growing, and spectacular when in flower, specimens of *Isopogon anemonifolius*. The area is frequently burnt. The most recent fire was a very hot burn in January 2002. It was interesting in the following two years to find healthy vigorous new growth from the lignotuber. This emphasises the fact that we growers should prune vigorously if we are not burning our suburban plots. Many species of Isopogon do not have a lignotuber and would be killed

by fire. If the fires were very frequent plants without a lignotuber may well become extinct in the location. Early nurserymen must have found this plant floriferous and growing round Port Jackson as it was introduced to England in 1791 - 3 years after the first fleet!



*Isopogon anemonifolius* growing back from its lignotuber after the fires

The following is an email thread from the Isopogon and Petrophile yahoo groups site ([http://groups.yahoo.com/group/Isopogon\\_s\\_Petrophiles](http://groups.yahoo.com/group/Isopogon_s_Petrophiles)) following the discussions regarding grafted *Isopogon latifolius* first raised by Cas Liber- see Newsletter 5.

From Dan K, Adelaide, SA  
Feb 2004

I have one of those [grafted *Isopogon latifolius*], which I bought from a now defunct native nursery in Adelaide, not actually all that expensive either.

It has grown much slower than ungrafted *I. latifolius* and hasn't flowered in either of its two seasons, but it has survived two summers, which isn't something I've managed to get ungrafted plants to do. For me, they grow through the first summer rapidly, form numerous buds, and when the first one opens in the second spring - the plant drops dead. Now, if I can only get the grafted one to flower, I'll be right... certainly seems hardy and compatible at this stage (probably closing in on three years old).

Mark Ross, Windsor, NSW

Dan

The one I grafted Nov 2002 flowered this spring for me, although was only small, It has really put some growth on this summer though.

David Lightfoot, Surrey Hills, Vic

Feb 2004

Dan,

Mine is now three years past purchase, ungrafted and is about 1.5X1.5m. It flowered last year with about 12 heads. I hope it will have more this year, but they do seem to be a bit slower getting to flowering stage than some plants.

Mark how old is the scion material you use? For grafted hakeas I've heard a lot of people use cotyledon grafts, which would obviously have the same lag as seed grown plants, whereas older material would be faster to flower.

If its survived two summers, fingers crossed you've got a long term prospect there, Dan.

*[Unfortunately as mentioned in the editorial my plant died in June 2004]*

From Dan K, Adelaide, SA

David,

It has put on a lot of new growth this summer, so I have high hopes for next spring! It is now about 60 x 60cm and looks very healthy, so fingers firmly crossed. Will let you know, as it does seem promising at this stage.

Mark Ross, Windsor, NSW

Feb 2004

David

The scion was from a cutting grown plant done as a top wedge using the mummy method.



## *ISOPOGON ALCICORNIS* Diels

*Isopogon alpicornis* is one of the rarer members of the genus. It comes from a limited area about 50-150 km north and east of Esperance, on the eastern edge of the South West botanical zone. It has been given a priority 3 rating by the Western Australian Dept. of CALM. "Priority 3" flora have some populations in areas that are not believed to be under immediate threat, but are a priority for further study and consideration for declaration as "rare". *I. alpicornis* is found in Nature Reserves and National Parks in the Esperance area, and therefore does not seem to be under immediate threat, despite its limited range and uncommonness within that range.

It gets its specific name from the Latin *alci-* meaning elk and *cornis* meaning horn (thus elk horned), referring to the shape of its leaves.

It is a dwarf shrub ideally suited to the small garden.

It only gets to about 50cm high by up to a metre (but usually less) wide, and develops a lignotuber. I have seen this species growing vigorously from its lignotuber in an area burnt out by fire. Thus it was ready to flower again the next spring, well ahead of the plant varieties that are killed by fire and have to grow to maturity from seed. This is a definite survival advantage in its fire prone habitat. Relatively short branchlets arise from the lignotuber in a suckering fashion and are pale brown to grey.

The leaves are a fabulous feature of this species. They are up to 40 cm long and reach upwards from the stem on long (15cm) petioles. They are pinnately divided in their upper parts into 3-5 segments giving the elk horn appearance. (NB the lower leaves are shorter, around 10cm, and are not divided in the elk horn manner) When young they are villous but are overall glabrescent. When young they are grey with an



excellent reddish tinge (see the photo below left), and then mature to grey-green or bright green.

The flowers appear from September to December, and although some herbarium specimens have been marked as pink, I have only seen them a creamy or pale to bright yellow colour.



After fire- Vigorous new growth from the lignotuber of *Isopogon alpicornis*, surrounded by pioneer plants like *Lechenaultia formosa*.

Each individual flower is about 20mm long giving an overall diameter of the inflorescence of up to 5cm. Inflorescences are held low to the ground and are often obscured by the foliage. They can be single or grouped and can be numerous. Given these flowering habits, I assume the pollinators are ground dwelling animals or perhaps

ants/other crawling insects. (I do not know of any study into the pollinators of *I. alpicornis* and so this is supposition on my part). The fruiting cones are 2.5-3 cm in diameter. Like other Isopogons there is great variability in seed set on individual fruiting

cones, with some containing little or no seed, and others absolutely packed with seed. The teardrop shaped seeds themselves are quite large for *Isopogon*, being about 5mm by 2mm and covered in a dense mat of hair.

As mentioned above *I. alcicornis* is found in a limited area at the eastern end of the south west botanical



zone of WA. Although much of this region has an open heath type of vegetation, this *Isopogon* is found mainly in low mallee shrubland. It grows in sandy

often gravelly lateritic hillsides of the area. Reasonably often, it seems to be associated quite closely with the trunks of the local Eucalypts and rarely is in the open without some overhanging vegetation. It has been said to prefer sandy depressions that remain moist for lengthy periods.

Although not common, this plant is not unknown in cultivation. It was being grown in the rare and endangered garden at Kings Park, Perth. It seems to tolerate the coastal areas of Victoria, successfully being grown to flowering in Ocean Grove and Warrnambool. In addition, there were a couple of struggling specimens at the RBG Cranbourne when I visited there last year.

*Isopogon alcicornis* seems to germinate readily from fresh seed without pre-treatment (with the usual *Isopogon* caveat that one actually has seed rather than chaff- see Issue 1, page 4). The branchlets are short and relatively thick and so I am not sure of its amenability to being grown from cuttings. I have a single cutting that has been in since October 2003.

It shows no signs of striking roots, growing shoots or dieing for that matter.

I do not think that anyone has tried to graft this species.



This plant should be grown in a well drained soil, and would probably benefit from a good mulch and the addition of some slow release low P fertilizer and iron. From its natural habitat I would think it would prefer a little shelter, rather than full sun. Given its association with Eucalypts in the wild, it may have some mycorrhizal requirement.

Could any members who know more about this plant, e.g. natural habitat observations/study, where it is being grown, its cultivation requirements, or any colour variations seen (like pink!), please let me know? Thanks in advance.

Although the flowers are somewhat hidden, its compact shape, amazing foliage and red tinged new growth make this a desirable species. I think it deserves to be growing in many more home and botanic gardens.

(Map and drawing reproduced from *Flora of Australia* Vol. 16 with permission of ABRIS.)

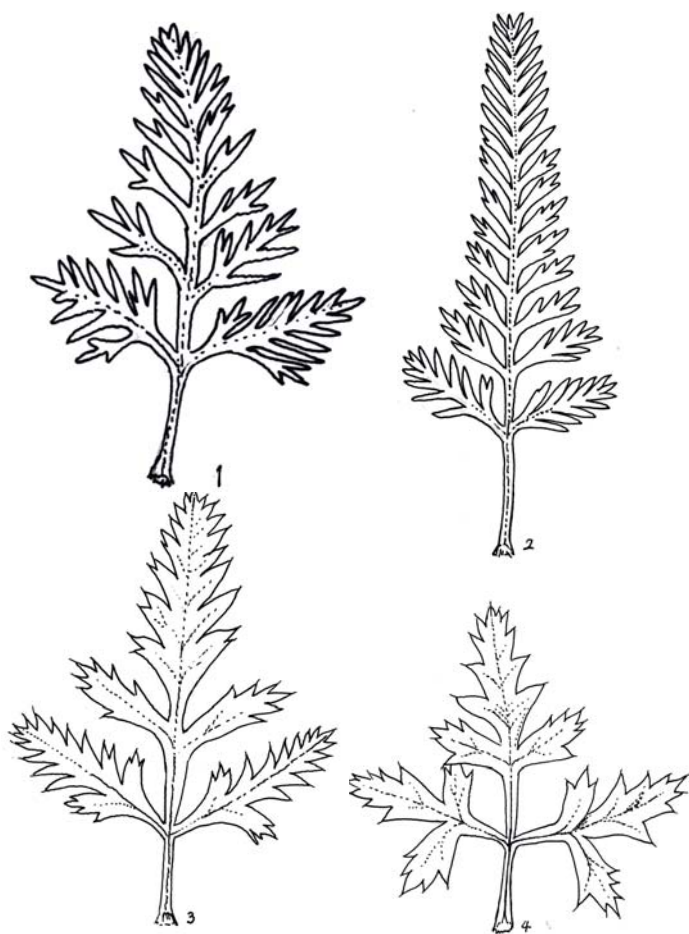
## FRIEDRICH LUDWIG EMIL DIELS. 1874-1945

Ludwig Diels was director of the Berlin Botanical Gardens and together with Ernst Pritzel travelled extensively through Western Australia in 1900-1901. They collected some 5700 specimens during their journey and together published the *Fragmenta Phytographiae Australiae Occidentalis* in 1904-05. They made the original descriptions of 235 new species, including *Isopogon alcicornis*. A number of their original collection specimens reside in the WA Herbarium, which is fortunate as the Berlin Herbarium was destroyed during Allied bombing raids in World War II. Diels was particularly

interested in the vegetation as a whole, rather than the individual plants, and in 1906 published the 416 page *Die Pflanzenwelt von West-Australien südlich des Wendekreises*, (The Plant World of Western Australia south of the Tropic) which detailed his observations on the flora and vegetation. He was the first botanist to recognise distinct botanical regions in WA (now the Northern, Eremaean and South-West), although his original borders have been revised since then. His "big picture" thinking was well ahead of his time.

PETROPHILE DIVERSIFOLIA R.BR.- MARGARET PIERONI

*Petrophile diversifolia* is an interesting plant, well deserving of its name as it has three different leaf shapes as the plant grows. Seedlings would not indicate a member of the *Proteaceae*. They look like small ferns with small bracken-like leaves (1), then longer ones (2). Until, at about 30cm in height, the plant produces leaves (3, 4), which 'morph' into stiff mature leaves with pungent lobes.



The plants are almost always single-stemmed, reaching to 3m. The rather small, very hairy white to pink flowers appear in clusters in spring.

I propagated this species in my Attadale (Perth) garden simply by dropping a fruiting branch onto the ground, amongst the leaf litter and potting up the resulting seedlings.

*Petrophile diversifolia* is very fast growing and short-lived but self-seeds readily. On my

block at Denmark, on the south coast, west of Albany, it occurs naturally and seedlings are coming up constantly. The adjoining block was once a gravel (laterite) pit and plants regenerating there are so thick they look like weeds! The front of that block is devoid of trees, but in the past, the topsoil



from the excavation was deposited on what was to be my block. As a consequence I have a great variety of regrowth, including jarrah, Marri and Karri trees and most likely still have a store of seeds in the ground. I intend to fill lots of pots with some of the topsoil and see what comes up while the house is being built.

*I have grown this plant from seed with some ease in Melbourne. The seed was not pre-treated and I got good germination rates. At the RBG Cranbourne the plants are 2-3 m high and have only a few stems. My plant is about 1.5 m high and I have tip pruned it from 'birth' to give it a bushier habit. It has not flowered (2years old) but this may be because the flowers are terminal and so I may be nipping out the buds with my pruning. I will leave it for the next year to see if I can get some flowers. Ed*

## QUESTIONNAIRE UPDATE

In this round there were four questionnaires returned from NSW/ACT and seven from Victoria.

Isopogon species being grown	State/s where it is being grown
<i>alcicornis</i>	Vic
<i>anemonifolius</i>	NSW, Vic
<i>anethifolius</i>	ACT, NSW, Vic
<i>axillaris</i>	NSW
<i>baxteri</i>	Vic
<i>buxifolius</i>	ACT, Vic
<i>ceratophyllus</i>	NSW
<i>cuneatus</i>	Vic
<i>dawsonii</i>	NSW, Vic
<i>divergens</i>	ACT, Vic
<i>dubius</i>	ACT, Vic
<i>fletcheri</i>	ACT, NSW, Vic
<i>formosus</i>	ACT, NSW, Vic
<i>latifolius</i>	Vic
<i>linearis</i>	Vic
<i>mnoraifolius</i>	Vic
<i>petiolaris</i>	Vic
<i>polycephalus</i>	Vic
<i>prostratus</i>	Vic
<i>sphaerocephalus</i>	NSW, Vic
<i>teretifolius</i>	NSW, Vic
<i>trilobus</i>	Vic
<i>dubius</i> X <i>formosus</i>	NSW
“Stuckeys Hybrid”	ACT, Vic

Petrophile species being grown	State/s where it is being grown
<i>biloba</i>	NSW, Vic
<i>brevifolia</i>	Vic
<i>canescens</i>	NSW
<i>diversifolia</i>	Vic
<i>ericifolia</i>	Vic
<i>fastigiata</i>	Vic
<i>filifolia</i>	Vic
<i>glauca*</i>	Vic
<i>longifolia</i>	NSW, Vic
<i>pulchella</i>	NSW
<i>seminuda</i>	Vic
<i>serruriae</i>	Vic
<i>squamata</i>	NSW, Vic
<i>teretifolia</i>	Vic

It is very interesting to see the range of climate, watering and soil conditions that these plants are tolerating. Only one reported garden is in a humid summer region and contains NSW origin Isopogons and Petrophiles only. That member has tried Western Australian origin species without success, but has not tried SA/Vic species.

Although the majority of members have purchased all or most of their plants, some are self-propagating. Species grown from cuttings include *Isopogon anemonifolius*,

*anethifolius*, *dawsonii*, *formosus*, *linearis*, and *trilobus*. Grafted species are *Isopogon latifolius*, *cuneatus* and *linearis*.

First flowering is reported at between 1 and 4 years for all species.

Virtually all plants are being grown in well drained gravel, sand or sandy loam, with some exceptions on clay (*I. anethifolius*, and *anemonifolius*) Most successful growers have used some supplementary watering, especially during the first summer or two, depending on rainfall. Most plants are grown in full sun but a number of species (both Western and Eastern) will tolerate part shade. One member, living in the NSW Northern Tablelands, is growing all the species marked NSW in the tables above. These plants are all tolerating severe conditions with temperatures down to -15C.

Thanks to all those members who have returned their questionnaires. They give a snapshot of what people are growing and what species are possible to maintain in various localities.

\**Petrophile glauca* is a relatively newly described species (1995 in Flora of Australia). Plants of this species were often known as *P. trifida* in the past. *P. trifida* is not a currently recognised species.

## SMOKE'S SECRET DISCOVERED

The prestigious journal *Science*, in August 2004, published the important discovery of the active progermination ingredient in smoke<sup>1</sup>. In a way this has been the holy grail of native plant propagators and bush regenerators.

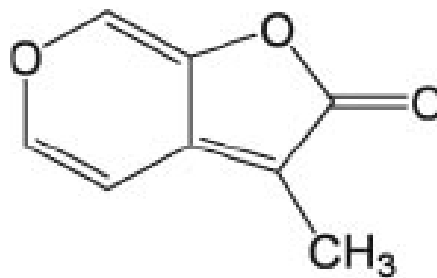
About fifteen years ago South African researchers proved that it was smoke, rather than heat and ash, that led to the high germination rates seen after a bushfire. In 1993, Dr Kingsley Dixon, at Kings Park and Botanical Garden, showed their discovery was also true for many difficult to germinate Australian plant species.

However, smoke is difficult to apply directly to seed, or revegetation areas. Therefore smoke water was developed, where smoke is bubbled through water leaving behind its chemicals. The resulting product could be sprayed over seeds or revegetation areas, and would promote the germination of many Australian plant species. The active ingredient in the smoke water, however, took eleven years to be discovered.

The team at the University of Western Australia realised they had to sift through the approximately 4000 individual chemicals in smoke. They added various solvents to smoke water to isolate different chemical groups and then began to test them on seeds to determine which was active. After four years of work they had narrowed it down to three chemicals that they could not separate further, using conventional techniques. Therefore, they broke them all down, identified the pieces and put them back together again! By testing all three they finally found the active compound. Not only had they identified it, but also isolated and

then synthesised it artificially.

The final active chemical was previously unknown to science. It is from a group known as butenolides and has the mouthful of a name, "3-methyl-2Hfuro [2,3-*d*] pyran-2-one". Luckily, it has been christened Gavinone, after the PhD student, Gavin Flematti, who isolated it.



The Chemical structure of Gavinone

Gavinone is incredibly potent, being active at concentrations between 1 part per million and 100 parts per trillion! To give you some idea of these scales, this means 1 gram could be dissolved in a swimming pool and then would be enough to treat a hectare of ground. It has been shown to be active on plants from Australia, and North America as well as crop and weed species. It has potential for use in gardens, plant propagation, mining site and other bush restoration projects, and even in agriculture. It has been said the discovery has the potential to provide multimillion dollar benefits, by cutting down the number of crop seeds needed and by greatly reducing the costs and increasing the effectiveness of revegetation projects. By the way, in case you are wondering, yes, the research group has patented their discovery. Dr Dixon predicts that the product could be available to home gardeners within 5 years, and to industry even sooner. No longer will we need to risk life and limb by setting fire to our pots of Isopogon and Petrophile seed!

<sup>1</sup> Flematti, G.R. *et al.* 2004. A compound from smoke that promotes seed germination. *Science* 305 (Aug. 13): 977

## GLOSSARY

**Bracts-** A modified leaf at the base of the flower. They can be the showy part of the inflorescence, e.g. in Flannel Flowers (*Actinotus helianthi*) and Qualup Bells (*Pimelea physodes*).

**Cotyledon-** a simple embryonic leaf, often the first leaf after germination.

**Glabrescent-** becoming hairless over time

**Glabrous-** without hairs, smooth

**Inflorescence-** a group of flowers arranged as a distinct entity

**Laterite-** a reddish clay like mixture of iron and aluminium oxides and hydroxides formed from the weathering of basalt. Ironstone

**Lignotuber-** a swelling at the base of the stem, often underground, that contains dormant buds and energy stores. If the top of the plant is destroyed, it can regrow from the lignotuber.

**Lobe-** a leaf segment, usually rounded, that is not divided all the way to the midrib

**Mycorrhiza-** An mutually beneficial association between a plant root and a soil based fungus providing a nutrient exchange system.

**Pinnate-** has an appearance like a feather. The description of compound leaves where the leaflets arise from a spine and give this appearance.

**Petiole-** the stalk by which a leaf is attached to the rest of the plant

**Pungent-** a stiff, sharp point

**Suckering-** from Sucker- a shoot formed from a root or stem close to or below soil level

**Simple (leaves)-** entire without teeth or lobes

**Taxa-** (plural of taxon) comes from taxonomy, which is the science of classifying organisms into groups. A taxon is a group of plants sharing a relationship and so are categorised together. It is a unit of taxonomy.

**Terete-** circular in cross section.

**Terminal-** at the end of a shoot

**Villous-** covered in long hairs

## ISOPOGON AND PETROPHILE STUDY GROUP BALANCE SHEET

### 2002-2003 Supplementary

Balance brought forward	\$356.52
Deposits June 17 <sup>th</sup> 2003-June 30 <sup>th</sup> 2003	
Membership subscriptions	25.00
Withdrawals June 17 <sup>th</sup> 2003-June 30 <sup>th</sup> 2003	
Stationary	47.76
Balance at June 30 <sup>th</sup> 2003	\$333.76

### Financial Year 2003-2004

Balance brought forward	\$333.76
Deposits	
Membership subscriptions	167.00
Sale newsletter back issues	5.00
Donations	10.00
	\$182.00
Withdrawals	
Stamps & Postage	50.00
Stationery	11.35
NL Printing expenses	50.00
	\$111.35
Balance at June 30 <sup>th</sup> 2004	\$404.41
Balance Bendigo Bank account	\$374.41
Cash at hand	\$30.00
	\$404.41

## SEED BANK

The following seeds are available for members. Please send me a stamped self-addressed envelope, containing your requests and a small seed-type envelope for each species. I have purchased seed from Nindethana seeds. (Nindethana have the largest range of Australian plant seed that I have seen. You can find them on the web at <http://members.iinet.net.au/~nindseed/> or order a catalogue by writing to PO Box 2121, Albany, WA, 6331.) Thanks to Maragret Pieroni and Phil Trickett for their donations to the seed bank. Please let me know which species you would most like to see in the bank. Donations of seed from any taxa will be gratefully added to the bank

*Isopogon adenanthoides*

*Isopogon formosus*

*Isopogon trilobus*

*Petrophile antecedens*

*Petrophile biloba*

*Petrophile carduacea*

*Petrophile canescens*

*Petrophile diversifolia*

*Petrophile drummondii*

*Petrophile ericifolia*

*Petrophile fastigiata*

*Petrophile filifolia*

*Petrophile heterophylla*

*Petrophile incurvata*

*Petrophile linearis*

*Petrophile longifolia*

*Petrophile macrostachya*

*Petrophile media*

*Petrophile pedunculata*

*Petrophile pulchella*

*Petrophile rigida*

*Petrophile scabriuscula*

*Petrophile semifurcata*

*Petrophile serruriae* yellow & pink

*Petrophile shirleyae*

*Petrophile shuttleworthiana*

*Petrophile striata*

*Petrophile teretifolia*

## REFERENCES

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