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DRYANDRA STUDY GROUP NEWSLETTER No. 71

AUSTRALIAN NATIVE PLANTS SOCIETY (AUSTRALIA)

***D.* sp. "Boyup Brook", garden, Denmark** **Margaret Pieroni**

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Hello and welcome,

When Margaret told me she had been contacted by Kevin Thiele and asked if she could assist one of his honours students who was studying several of the unnamed species, I was delighted because this is the first university student project that I know of dealing with dryandras. After reading Margaret's articles describing their travels, I contacted the student, Francis Nge to ask if he would write an article for the newsletter and tell us about himself and the project. He was very happy to do so and also sent quite a number of interesting pictures which I have included. By the sounds of it, we may have at least two new species in the next year or so. I must also say that I admire Margaret's dedication in making several field trips over extensive areas of the state, the maps which Francis has developed showing clearly how widespread examples of the various taxa are. And congratulations, Margaret, on your 80th birthday.

It was a bit disconcerting to hear of the loss of many roadside collections and the fact that some species like *porrecta* had barely flowered this year, apparently due to drought. These losses mean that it is imperative that we learn of all the populations of the various taxa to ensure that some are not lost and Francis's work is helping do this. Sadly, I reported on the probable demise of the Cranbourne Special Collections plantings here in Melbourne. These were one of the first projects the group was involved with and at one stage, we had over 100 species of *Dryandra* growing. Fungal disease in the soil and the tendency of many of the species growing there (mainly non dryandras) to go feral has meant that the Gardens authority are reassessing the area although they have promised to propagate many species for growing elsewhere. New member Tim Darrington, who lives in France and grows Banksia and other Australian plants in glasshouses, has written of his experiences in cultivation of Proteaceae in conditions in -8-12°C winters and highly alkaline water. It will be interesting to see if dryandras behave any differently. Margaret drew my attention to an article in the WSWA Newsletter for February in which the author Jim Barrow raises some amusing points concerning the current banksia/dryandra controversy. Jim kindly supplied it to me – see what you think. I raise the question of my ageing *D. longifolia* in the hope that some of you have have a solution. And, we are now on the Web, linked to the ANPSA website, thanks to the good work of ANPSA webmaster Brian Walters. Eventually all our newsletters will be available, the issues up to No. 62, the first electronic version, are now being scanned.

Just a final reminder, subscriptions for 2015-2016 are now due; a form is attached for your convenience, with subs remaining the same. And of course if you have any interesting tales or experiences or even problems with your dryandras, we'd love to hear from you.

Happy Dryandra growing

Tony

Francis Nge's Honours Project on dryandras

For those of you who don't know me, I am an Honours student based at UWA and my research topic is focused on the taxonomy of the magnificent group of dryandras (*Banksia* ser. *Dryandra)* under the supervision of Kevin Thiele. I'm sure Margaret has told you of our trips that we've been having across the south west of Western Australia, and I'm very grateful for her help throughout this project, which is invaluable to us. Having recently

Margaret and Francis at Boyup Brook

moved over and settled into Western Australia, I was captivated by the spectacular forms and diversity of wildflowers in the south west. The sclerophyllous nature of our flora along with the WA 'wacky' factor in many of our plants is something that I've not seen before. My family lived a 'nomadic' lifestyle as some would say, we've moved and lived in four different countries (and counting). As such, I've the pleasure of experiencing the different environments that each of these countries hold, from the moist tropical evergreen rainforests of Borneo to the lush temperate forests of New Zealand. But I must say, the kwongan vegetation in WA is utterly different and have no comparable analog in the world (except for the fynbos in South Africa). The genus that struck me first was the Banksias, which later led led me to the dryandras. I'd realised that it is only fitting that my Honours project should have a focus on these plants.

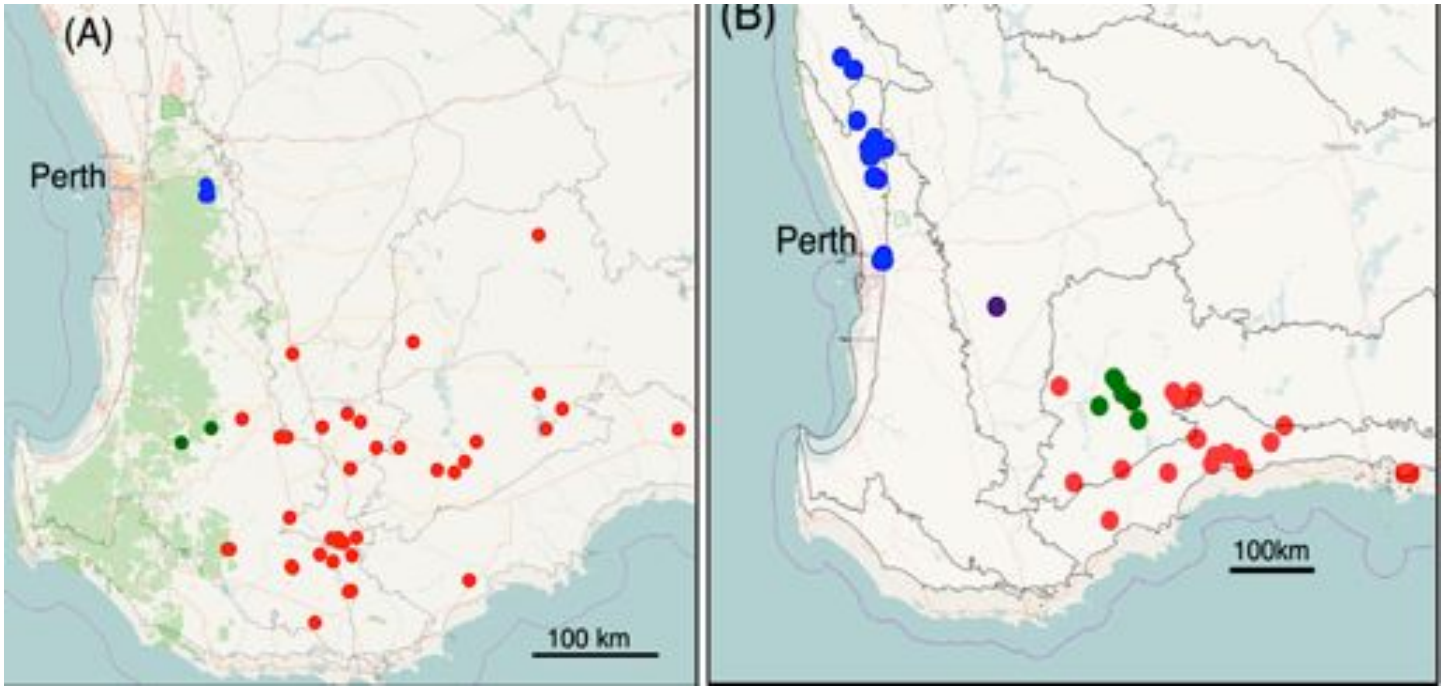
My project focuses on resolving the taxonomic boundaries of *B.* sp. Boyup Brook and *B.* sp. 'Jingaring'. These taxa belong to the series *Aphragma sensu* George (1999). There are

Half buried flowertheads of sp "Boyup Brook" Francis

currently nine species within the series, most of which are prostrate and have inflorescences that flower along the ground. Rough observations and initial discussions with Margaret had led us to believe that *B. aurantia, B. porrecta,* and *B. pteridifolia* are close relatives to *B.* sp. Boyup Brook and *B.* sp. 'Jingaring', based on their morphology. (**Editor's Note:** The other species in Series *Aphragma* are – *blechnifolia, calophylla, fililoba, lepidhoriza, nervosa* and *shanklandiorum*).

B. sp. Boyup Brook was first collected by Leigh Sage in 2000. Only two populations are currently known of this taxon, and hence it is recognised as a Priority One taxon of conservation significance. It is distinguished morphologically in that the number of flowers per inflorescence is intermediate between *B. aurantia* and *B. porrecta*. Its leaves are similar in shape to *B. porrecta,* but longer than *B. aurantia* and are dark green in contrast to the blue-grey foliage of *B. aurantia* (**Fig**.)(M. Pieroni, pers. comm.). The geographic ranges of these three taxa do not overlap. *Banksia*

aurantia grows in sand depressions within wandoo woodland near York, whereas *B.* sp. Boyup Brook occurs closer in range to *B. porrecta*, with *B. porrecta* having a wide distribution from Woodanilling to Newdegate (Cavanagh and Pieroni 2006). *B.* sp. Boyup Brook grows as the dominant understorey of jarrah forests in localised clearings whereas B. porrecta occurs in a variety of habitats, from under dense cover of Allocasuarina shrubs, Wandoo woodlands, to open areas in heath and mallee in the wheatbelt (**map**.). Differences in



Colours represent taxa as follows: (A) green sp. "Boyup Brook", blue *aurantia*, red *porrecta*; (B) purple sp. "Jingaring", red *pteridifolia* subsp. *pteridifolia*, blue *pteridifolia* subsp. *vernalis*, green *pteridifolia* subsp. *inretita*.

flowering times are also noted for the three taxa, *with B. aurantia* flowering in April, *B.* sp. Boyup Brook in June and *B. porrecta* in July (Cavanagh and Pieroni 2006). The differences in morphology, flowering time, habitat, and disjunct distributions of these taxa suggests that they are separately evolving lineages where genetic exchange does not occur – i.e. distinct species (De Queiroz 2007). However, whether this separation of lineages has occurred recently or otherwise remains to be tested.

sp. "Jingaring" Margaret

Banksia sp. 'Jingaring' was collected in 1997 by Rob Davis and is currently labelled under *Banksia pteridifolia* subsp. *pteridifolia* (R.Br.) A.R.Mast & Thiele. It is considered to be morphologically intermediate between subsp. *pteridifolia*, subsp. *vernalis* (A.S.George) A.R.Mast & Thiele, and *B. aurantia,* based on a preliminary assessment of morphological traits, geographic distributions, and phenology (Cavanagh and Pieroni 2006). *Banksia* sp. 'Jingaring' has been observed flowering in April (pers. obs.), but records showed that the main flowering period is in July. In comparison, the flowering times for *B. pteridifolia* subsp. *pteridifolia* are from March to May, *B. pteridifolia* subsp. *vernalis* from September to October, and *B. pteridifolia* subsp. *inretita* from May to July (Cavanagh and Pieroni 2006). The 'Jingaring' population is geographically isolated from the other subspecies of *B. pteridifolia,* occurring in the central wheatbelt, whereas *B. pteridifolia* subsp. *vernalis* occurs in scattered localities throughout the northern sandplains, and both *B. pteridifolia* subsp. *pteridifolia* and *B. pteridifolia* subsp. *inretita* occur in the southern wheatbelt near Esperance (**map**)(Cavanagh and Pieroni 2006). The disjunct population of *B.* sp. 'Jingaring' and different flowering time in comparison with the other *B. pteridifolia* subspecies suggests that it might be a distinct taxon and thus warrants further study.

In order to assess the species boundaries of these taxa, I'll be using both morphological and molecular methods to delimit these taxa. Leaf samples have been collected across populations from our field trips for DNA material and we are currently in the process of extracting and sequencing the genetic material. In addition, both leaf and floral characters have been measured and scored from herbarium specimens at the WA herbarium and also from material that we'd collected on our field trips.

Our morphometric results suggests that *Banksia* sp. Boyup Brook is not a distinct taxa, but it is actually just another population of *B. porrecta.* Having sorted through the specimens in the WA herbarium however, we did come across a distinct morphotype of *Banksia porrecta* which is largely confined to Lake Magenta Reserve and its surrounding area. The morphometrics results also supported this observation. I'm just waiting for our genetic results to confirm its

Leaves of *porrecta* "east" (top), *porrecta* "west" (middle), sp. Boyup Brook (bottom)

status. The eastern form of *B. porrecta* is distinguished from its western form and *B.* sp. Boyup Brook by its shorter triangular leaf lobes that lack an orange indumentum on the leaf underside, and pink flowers (perianth) with wider involucral bracts. Our morphometric

***porrecta* "east" left, "west" right**

results also suggests that *B.* sp. 'Jingaring' is likely to be a distinct new taxon, being morphologically more similar to *B. aurantia* than *B. pteridifolia.* We will be getting some interesting genetic results soon in the coming months and I will keep you posted on the outcome. Watch this space and thank you all for your support!

Francis

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Excursions and more on flowering times

Kevin Thiele, who has recently resigned as the curator of the WA Herbarium, was the co- author of the paper which resulted in the transfer of *Dryandra* to *Banksia.* While still at the Herbarium, last year, he helped us with the Conferta Project, as I reported in the last newsletter. At the time, he asked me for information about *Dryandra* (*Banksia*) sp. Boyup Brook, as he had an Honours student about to work on it.

I was happy to help as the plants are so rare and they need to be described as soon as possible in order for it to be protected. Sp. Boyup Brook, which was originally mis-identified by the Herbarium when it was first collected as *D. aurantia,* was flowering in June when I collected it in 2004. This is also the usual flowering time of *D. porrecta.* The student, Francis Nge, had looked at specimens of both and had found the two from the original location and another from a private property and some of the *D. porrecta* from nearby locations which seemed to be different from the eastern (type) locations. He wanted to also compare them with *D.aurantia* which he had collected earlier.

A date in April was arranged to collect leaf material from *D.*sp. Boyup Brook and from *D. porrecta* from nearby and across its range to the type location, east of Woodanilling. They didn't necessarily need flowering specimens.

I had suggested that *D.* sp. Jingaring, which I had also photographed in flower, in June could also be included in the study. It is also very rare – as far as I know there are only a few plants in Jingaring Reserve.

My plant of *D.* sp. Boyup Brook here, in my Denmark garden was flowering well, with 9 flower heads. It has always flowered earlier than those in the wild.

I contacted Val Crowley, a Study Group member from Darkan, with whom I had travelled previously, looking for Dryandras in her area. (She was the discoverer of two populations of *D. subpinnatifida* var. *imberbis* which are since probably destroyed). I remember her showing me a specimen of what I thought was *D.* porrecta that looked different from others I'd seen. It had been collected by Brenda Trigwell from what was then her property, not far from the *D.* sp. Boyup Brook location and well before that was first collected. Val was able to supply the name and contact details of the present owner of the property. She also had records of the *D. porrecta* specimens that Francis had looked at and I had one from the roadside adjoining the property.

On 7th April, Brian Moyle came down to Denmark and the next day, we met Kevin, Francis and another student at the road, 20 km north of Boyup Brook to walk into the forest for about a kilometre to find the plants. After a fruitless search at the GPS location of the first specimen, collected by Leigh Sage, Kevin suggested that we go further, to the location of my specimen. The GPS co-ordinates system had been changed when Brian and I found the location in 2004. (See newsletter no.48).

We eventually found the plants and leaf samples were collected. Surprisingly, it was beginning to flower. One of the 'patches' (probably one plant) is still fairly compact but others appear have spread out with their underground stems, to merge with nearby plants and it is not possible to determine the number of individual plants without DNA sampling as was done with *D. ionthocarpa* subsp. *chrysophoenix.*

After leaving the location, Kevin tried to ring the property owner without success. When we reached the roadside location we found the verge completely cleared for road widening and the search for Val's other *D. porrecta* collection was equally futile. The plants might have been *D.* sp. Boyup Brook, *D. porrecta* or perhaps intermediate between the two – we may never know.

We didn't find any more plants of *D. porrecta* until we got to the reserve on Orchard Rd, at the end of

Dinwoodie Rd (see Hot Spot map). I only knew of a couple of plants there but the others found plenty of them, further east on Orchard Rd.

Kevin rang the owner of the property that evening and arranged to visit it later. The man was aware of a " Banksia thing" having been collected there and mentioned a Western Power survey.

The next morning, after staying at Woodanilling, we went south to Broomehill Golf Course to check another population of *D. porrecta* from a Herbarium collection. We walked the full width of the course, crossing fairways with remnant vegetation between but failed to find the plants at the GPS location. We did find them, however, while walking back to the cars.

All the plants of *D. porrecta* that we saw on the trip were in very poor condition and showed no signs of flowering, this year.

We went north to the type location of *D. porrecta* at Bibiking Reserve, where a further collection was made and then to another location that I have not previously seen, south west of Highbury. This population of what I assume is *D. porrecta* looked somehow different. The leaves appear to be larger and I found a dead flower head with the optimum number of flowers for the species. This population is possibly the northernmost one and quite a distance from others that I know of. Lyn Alcock lives not far from there so, providing it gets some rain, she might be able to find some flowers, next year.

By the time we got to Jingaring Reserve, South east of Brookton, we were running late. Brian and I had to return to Perth for dinner with old friends from Attadale to celebrate my birthday. At the reserve, I quickly located the plants of *D.* sp. Jingaring to show the others. I left my camera in the car not expecting the plants to be in flower – but they were – two months earlier than before. Francis took some photos after we left and kindly sent them to me.

Kevin and Francis had already decided that *D.* sp. Jingaring should be dealt with along with the *D. pteridifolia* group. They were interested to see it, nonetheless. Its flowers are similar to both *D. aurantia* and *D.* sp. Boyup Brook.

In late April, I went with members of the Albany DPaW Rare Flora Recovery team to a meeting in the Stirling Ranges. Once again, despite moving the usual meeting to a month earlier, we were unable to visit the site of *D. anatona* because of too much rain.

We had quite good weather, on the day and went to Mt. Toolbrunup to find a recently discovered hibbertia. Surprisingly, *D. formosa* and *D. mucronulata* were flowering – way ahead of time. The Stirling Range form of *D. formosa* is magnificent – with larger flower heads than the coastal form.

In Denmark, we only had one very hot day, in summer; unlike Perth with its record heat wave. We had long breaks without rain but with overcast skies. Once again, I lost plants, both in my garden and bush areas.

I'm planning several trips in spring and some of the areas have had good rains so far, this year so we're hoping to find lots of dryandras in flower, (providing they don't flower before we get there)!

Margaret Pieroni 14/5/16

More travels in mid May

In mid May, Keith Alcock, Lyn Alcock and I made a two day trip from here to look at *D.* sp. Boyup Brook, *D. porrecta, D. pteridifolia* subsp. *pteridifolia* and *D. pteridifolia* subsp. *inretita.*

I met Keith at Mount Barker and we looked for flowers on the plants of *D. porrecta* there. We only found one bud on one plant. It will be a few weeks before it opens.

We went east of Albany, the next day to look at the dryandras on Bluff Creek Rd, hoping to find *D. blechnifolia* in early flower. We found several

plants but no sign of flowers. Later, we met Lyn at Cheyne Beach and showed her the 'Proteaceae Patch ' on Bald Island Rd. At the eastern end, the track has been remade but the humps across it are too steep for anything but a 4WD vehicle so it is still impassable in a car. We found a few plants of *D. blechnifolia* with one or two buds at about the same stage as the *D. porrecta* plants.

The following day after meeting John Cullen (former Study Group member and discoverer of *D. idiogenes*), north of Boyup Brook, we visited the population of *D.* sp. Boyup Brook. John had to return to Jurien Bay and the three of us went on to Dumbleyung to spend the night before heading east to (Dryandra Hot Spot), Burngup South Rd to look for *D. pteridifolia* subsp. *inretita.* We found a few flowers hidden within the very prickly foliage but none that were at a good stage to photograph. Kevin Thiele and Francis were planning to visit the sites so I asked if they could send me better photos. In the list of plants at the various "hot spots", for that location, I have included *D. ferruginea* subsp. *chelomacarpa* but, looking at it again, we think it's more likely to be subsp. *ferruginea.*

At Tarco Rd, we stopped to look at the dryandras there and, among the population of *D. ferruginea* subsp. *chelomacarpa* we found two plants in flower. Their flowering time is usually in spring.

Arriving at the populations of *D. pteridifolia* subsp. *pteridifolia,* on Old Newdegate Rd between Milsteed and Newdegate – Ravensthorpe Rd, we found some plants in flower – later than usual, this time. I was looking for the most colourful flowers to photograph, that is ones with pink styles and copper-coloured hairs on the limbs. We found some with bronze-coloured hairs that were slightly pink and then, on the shoulder of the road another with copper- coloured hairs. The flower heads are mostly hidden in the prickly foliage.

We looked at a population of the eastern form of *D. porrecta* on Lake Magenta Rd and found many buds under the sandy soil. We could see, as Kevin Thiele and Francis had suggested, that these plants looked different from the ones we'd looked at further west, including the type near Woodanilling.

***D. porrecta,* eastern form, at Lake Magenta Rd.**

The sandy soil might explain the difference. Their DNA work should answer this question. At the moment, their thinking is that *D.* sp. Boyup Brook is also *D. porrecta* and that *D.* sp. Jingaring is a new taxon.

Recently, I received some photos from Francis. He sent a good one of *D. pteridifolia* subsp. *inretita* and some of *D. pteridifolia* subsp. *pteridifolia*, including the brightest pink one I have ever seen. In this group (series Aphragma), the only other species with long bowed styles, is *D. shanklandiorum*, which also displays the same colour variations.

Francis Nge

Lyn Alcock has been to Boolanelling Reserve, where we found Corrigin Blue, last year. She sent photos of *D. horrida* with a very weird flowering habit. The flower heads are on the ends of spikes of new growth. I have observed these long leaf-growth spikes on related species, such as *D. cynaroides* and *D. vestita* but never with flowers on top of them. Alex George wondered whether they might be a hybrid with *D. vestita* because of the crowded flowers in the head, (those of *D. horrida* are more spread out) and because of the colour of the flowers being more yellow than orange, as Lyn noted. I suppose this phenomenon is a response to the altered weather patterns, as is the (mostly) earlier flowering times of many plants. The growth spurts are obviously a response to more than usual rain - but flowers, as well? That is very strange.

Kevin Collins will be keeping an eye on the *D. porrecta* plant with the bud at Mount Barker and when it opens, we are planning to go to the eastern populations to photograph the flowers, (after disinterring them).

Margaret Pieroni 11/6/16

The Cranbourne Special Collections are no more

Long time members will know of the plantings of *Dryandra* and other, mainly Proteaceous genera, at the Cranbourne Annexe (as it was then known) of the Royal Botanic Gardens here in Melbourne. I am currently preparing a summary history of these plantings for the next Newsletter but they began around 1977 when Waverley SGAP stalwart, the late Alf Salkin, put in some 200 specimens of Eastern Australian banksias as a study plantation for a masters thesis he was completing at Monash University. I knew Alf through the Banksia Study Group (and he was a founding member of the Dryandra Study Group as well) and he developed the idea of using an abandoned sand mined area in the newly acquired Cranbourne Annexe to establish plantations of *Dryandra* and other Proteaceae. The first dryandras went in in May-June, 1980 and were followed over the years by numerous group plantings, not only of Dryandra, but also western *Adenanthos, Banksia, Isopogon, Petrophile, Hakea, Lambertia, Persoonia* and I think even unusual genera such as *Synaphea* and *Zylomelum.* I must admit I don't know why there were no grevilleas but the deep sandy soil may not have suited many species and for Alf, who co-ordinated most of the plantings, it was probably just one group too many. In any case, these various plantings became known as the "Special Collections".

Regimented plantings around 1985 Tony

I'll give more details in the next Newsletter about what we planted but we eventually had some 108 *Dryandra* taxa, many new to science and unnamed at the time, thanks to the generosity of former Leader Keith Alcock who collected hundreds of seed samples which he propagated and helped plant. He eventually moved from Victoria to WA with his work and is still a very active and extremely knowledgeable propagator and grower of dryandras. Margaret visited Cranbourne several times when she was in Victoria and I well remember her delight at seeing the two forms of *D. subpinnatifida* (low mound and then unnamed, and the more usual upright medium shrub) growing together in the same row. Another characteristic she noted in the later years was that many species grew bigger and bushier at Cranbourne than in their natural habitat, had larger flowers and better seed production, but, less exciting, that some species such as *D. cuneata* and especially *D. squarrosa* had

a major tendency to weediness and were beginning to spread throughout the area and well away from their "home rows".

A major setback was the identification, in the early 1990s, of the fungal disease *Phytophthora cinnamomi* in several areas of the gardens. These were usually sections that had been heavily disturbed, either for sand mining or in creating garden beds and so forth, but there is always the possibility that the planting out of the Special Collections could have been partially responsible. The Gardens' staff experimented with treating infected soil before planting out in garden beds and for the Special Collections area, forbidding vehicle movement and asking visitors to wear disposable plastic bags over shoes. While many large plants died, many were quickly replaced by seedlings and I wrote in 2007, somewhat optimistically as it turned out, "I am pleased to say that the dryandras are fighting back and we were quite astonished at how many seedlings were apparent, albeit of a limited number of species, and how many of the original species had actually survived". I might add that these were mainly in the first couple of areas planted out which tended to be on slopes and in deep, well drained sand. In another more low-lying area, losses were close to 100% and, over the years, more originals have died, especially in less satisfactory sites.

Site of the old 1983-4 planting Tony

Another factor which has directly contributed to the current situation that I will discuss in a moment, was the evidence that many of the species, not just dryandras, were rapidly becoming weeds. Also, the local bush was claiming its own and indigenous plants were spreading back among the Special Collections. The gardens staff began a program to remove "feral" plants from the plantations but asked me to help identify what they proposed to cut out to ensure they were not removing rare and endangered species. The main *Dryandra* culprits were *D.squarrosa* (an absolute star), *D. cuneata, D. nobilis* and even *D. falcata,* but they were nothing when compared with the Persoonias, some Banksias and Hakeas, and Isopogons and Petrophiles. I will never forget the dozens of *Petrophile linearis and P. longifolia* in full flower and 2-3 m high along with the spectacular *Lambertia echinata* var *citrina* with bright yellow flowers being considered for demolition.

Fast forward to October 2015 when I was contacted by Rodger Elliott and later one of the Cranbourne staff who asked if I could help with *Dryandra* identification at the Special Collections area of the Cranbourne Botanic Gardens. They wanted to check what was still growing and hoped to propagate desirable plants for themselves and other gardens, but the main reason was the preparation of a detailed report on the current situation with the Special Collections to develop a forward plan.

Two things were immediately evident. Many species have died, sometimes replaced with self sown seedlings and more worryingly, species from several genera have gone completely wild and are spreading everywhere, both through the Special Collection area and into the natural bush. The worst offenders are the Isopogons and Petrophiles which

***Petrophile serruriae* among the dryandras Tony**

are all through the old Dryandra areas but also some eastern Banksias and, surprisingly, Persoonias. Dryandras which are a problem are *squarrosa* and *cuneata*. There is almost nothing left of the old planting layouts, everything looks like natural bush and seedlings are everywhere. We have identified all remaining *Dryandra* species and the curator

Warren Worboys has promised to send me the final lists for all the genera of interest. It was all very

Mix of local bush and dryandras Tony

disappointing and I don't think that anyone knows why many species have died out, certainly not from Phytophthora as the "weeds" are all Proteaceae, and are extremely healthy. A detailed assessment/ evaluation of the horticultural and conservation status is yet to be completed although it is likely that the area will eventually be “decommissioned” and restored to heathland, with significant taxa from the collections propagated and distributed to Cranbourne and other Botanic Gardens.

Large *D. squarrosa* with dead plants in foreground Tony

(Acknowledgements:
I am particularly grateful to John Arnold and Warren Worboys for looking after me so well during my time at Cranbourne and Sharon Willoughby for several discussions on the history of the Special Collection plantings and on the role of SGAP and its members as “enthusiastic amateurs” in collaborating with professionals in plant conservation projects).

Tony Cavanagh, July 2016

Growing Banksias in Vienne, France

Report, 28th February 08

(Editor’s Note : Tim has recently joined the Dryandra Study Group although as the report extract below shows, he has been growing Banksias since 2005 or earlier. I asked Tim if he could write something about his interest in Proteaceae and his cultivation practices and he provided this article which was a report for the Newsletter of the Australasian Plant Society of the UK. Tim is coming to WA around September this year and is very much looking forward to catching up with Margaret and visiting as many dryandras in the field as he can).

‘In December 2006, I wrote a progress report for Alex George, who is writing a new book about Banksias after "the Banksia Book" which is a must for anyone seriously interested in Banksias. In August 2007, I had the honour of meeting Alex in his home near Perth, by which time, back in France, my first Banksia (*spinulosa ssp collina*) was coming into flower. This present report is an updated version, some 15 months later about the 12 species acquired prior to 2006, although at present I have seedlings of over 20 species.

We live in the Rhône valley, some 30km south of Lyon, where the winter can often bring prolonged periods with -8°C or -10°C every night for a week, and even as low as -12°C to -14°C on the odd night. Needless to say, no Banksia could survive this unprotected. So in general, I grow them in containers or terracotta pots, and they all go into my poly-tunnel green house for the winter, where, since the installation of bubble wrap and a domestic VMC fan which draws in "warmer" air (5°C to 8°C) from the basement of our house, the temperature never gets lower than -5°C. I should state that the winter 06/07 was incredibly mild, and that the winter 07/08 has also been mild, by local standards.

For successful Banksia cultivation, the essential piece of information from my experience (and which does not appear clearly in any book I've read) is "keep the pH well down". As early as 2000, I tried to grow Banksias planting them in peat or peat substitute based composts, avoiding phosphates like the plague, etc. and they all became chlorosed and

died within 1 year or 18 months until I discovered (about 3 years ago) that our water is extremely basic (each m^3 of water brings the equivalent of 270g of $CaCO_3$). I have now "solved" that problem by using collected rainwater (when it's available) or by injecting nitric acid (HNO_3) into the water supply to bring the pH down to between pH 5 and pH 6 (when rainwater is not available and when on holiday). Now nearly all ssps have nice healthy green leaves and in just two seasons (18 months) *B. spinulosa collina* (the one which does not have spiny leaves) grew from being a scion 30cm high to become a well formed bush 1.60m high and that in a 11.5 litre container!

I should add that when I have seen Banksia ssps in European botanic gardens (in particular the excellent garden of southern hemisphere plants at Roscoff) they often look "chlorosed". In my opinion, if it's not too much phosphorous, then it may well be down to the pH!

As to potting mixes, I have through time experimented with various potting mixtures. I had experimented with a 50/50 peat/perlite mix but found that too much perlite tends to "float" to the top. Since early 2005, my favourite mix has been 25% pouzzolane (0.5 to 1.2cm grade), 25% perlite and 50% peat substitute acidophile compost to which I add 5-10% soil from our garden. The garden soil is poor mica-schistic based granulely stuff which is fairly well draining and good for growing vines and stoned fruit trees (cherries, apricots, peaches).

This has proved satisfactory for most things including Banksias. I am currently experimenting by giving some of my Banksias a good top dressing of well decomposed leaf mould, which I hold in place with some potting mix or a layer of acidified builders' sand (I wash the sand in a weak solution of nitric acid, and then rince it before using it). I also feed lightly my Banksias with "native garden" Osmocote from Australia which is N:P:K = 17 : 1.6 : 8.7 plus trace elements.

I have found that Banksias, particularly those from WA are sensitive to damping off at the young seedling stage, and particularly so in our unusually wet 2007 summer. The other factor which probably reduces the risk of fungal attack for more mature plants is that during winter they are watered sparingly using a micro-drip system (typically a plant in a 5.5 l container or a 25cm pot gets about 330 ml once a week).'

Tim Darrington, July 2016

On Banksias, Dryandras, and Hairy Fish

Reproduced from the Feb WSWA Newsletter)

Classification has always been about putting similar things in the same box. It is how one defines "similar" that changes. The earliest classifications were presumably pragmatic: things you could eat in one box, things you couldn't eat in another, things you could use for medicines in yet another. In modern classification the idea of evolution determines what is thought to be similar. Hence, one criterion is that all the organisms in the one box should have evolved from a recent common ancestor. No problem there: both Banksias and Dryandras can be assumed to have a recent common ancestor. It is the second criterion that is tricky: all the descendants of a recent common ancestor should be in the same box. Dryandras can be assumed to have evolved from within the Banksias and therefore this criterion requires that they both be in the same genus.

Let us see what happens if we apply these criteria to humans. The mnemonic for remembering the higher classifications is: King Philip Came Over For Good Soup. (Kingdom, Phylum, Class, Order, Family, Genus, Species.) We are in the Kingdom Animalia, Phylum Chordata, Sub-Phylum Vertebrata, and Class Mammalia. Other Classes at the same level are: jawless fish (lampreys and the like); cartilaginous fish (sharks and rays); bony fish; amphibians; reptiles; and birds. Reptiles includes lizards and snakes, crocodiles, turtles and dinosaurs.

The first problem is that birds certainly evolved from dinosaurs. The reptile class therefore does not include all the descendants from the one ancestor; birds must go into the dinosaur box. The next problem is that mammals must have evolved from primitive reptiles, so by the same logic, mammals must also go into reptiles. Those of you who think that Dryandras should be sunk into Banksias must therefore think of yourselves as hairy lizards.

But wait, there is more. Where did reptiles evolve from? Surely from bony fish. So reptiles and fish should not be at the same level: reptiles, together with birds and mammals, all must go into the fish class. You are not hairy lizards after all: you are hairy, air-breathing fish.

Or we could decide that it was rather silly and abandon the second criterion.

Jim Barrow

More on hairy fish

Alex George, acting as a proofreader, has drawn my attention to an article published in December 2015, In it, the author, Damien Aubert, criticizes the "Hairy Fish" model, which he calls "Cladism" and which only reflects the branching order of the lineages on the tree of life. He argues that the length of the branches, that is the degree of modification, should also be taken into account. He calls this "Evolutionism". He argues that cladism is part of a more general philosophical movement … characterized by anti-realism and a metaphysical way of thinking. He identifies biologically unrealistic assumptions on which cladism is based and argues that they have been empirically falsified. In other words, we are not hairy fish and Dryandras are not Banksias. I wonder if he will be listened to!

Jim Barrow, Feb 2016

More on *D. longifolia*

In the last Newsletter, I reported on problems with my c.30 year old *D. longifolia*. The foliage has turned yellow and brown and it looks for all the world that the plant is dying. As I said previously, it could simply be old age and nothing else in the bed is affected and, as the pictures below show, it is still flowering. Another specimen is now showing similar symptoms so perhaps they are on their way out. Does anyone else have experience with old specimens of this or other *Dryandra*?

The Dryandra Study Group is now on the Web

Brian Walters, ANPSA Webmaster, recently approached Margaret and I offering to create a Web page for the Group on the ANPSA site. This has basic information about the aims and purposes of the Study Group, a discussion on the "controversy" regarding *Banksia* and *Dryandra,* and pictures of a range of typical dryandras which help to show the differences between the two genera. I will be providing some more in the future to broaden the coverage. It will also include copies of the Newsletter from No. 62 (first electronic version) and new issues will be added but, as with several other groups, they will be 12 months behind. The ANPSA Study Group Co-Ordinator Jane Fountain is keen for earlier issues from all Study Groups to be made available through the Web site as they are an invaluable record of the findings and achievements of the Groups. All of our back issues are now being digitized and hopefully can be added over the next 6 months or so.

Brian is finalizing the page and you can find it by going to the web site:

http://anpsa.org.au/dryandraSG/

Newsletters can be searched using the search box that appears on the site.

Tony Cavanagh July 2016

A.N.P.S.A. DRYANDRA STUDY GROUP

SUBSCRIPTIONS FOR 2015- 2016

The group's year runs from July 1, 2015 to June 30, 2016 and subscriptions are now due. Subscriptions are $10.00 for Australian members and $12.00 for overseas. The cost for receiving by email is $5.00*. Please make cheques payable to the Dryandra Study Group and forward to Margaret. Thanks to all those who have paid.

***If you wish to receive the Newsletter by email, please include your email address:**

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