

DRYANDRA STUDY GROUP
NEWSLETTER NO. 59



ISSN: 0728-151X

Dryandra cynaroides
JULY 2010

ASSOCIATION OF NATIVE PLANT
SOCIETIES OF AUSTRALIA

Dryandra cynaroides grows in gravelly soils between Pingelly and Woodanilling. It is found in reserves such as Dryandra, Tutanning and Harrismith.

It is an open shrub usually branched from the base with few flowers in the heads.

Almost all parts of the plant are hairy, including the prominent prophylls on the stems. It flowers in summer.

DRYANDRA STUDY GROUP

LEADER

Mrs. Margaret Pieroni
22 Ravenhill Heights
DENMARK
WA 6333
Email: mpieroni@bigpond.com
Phone: (08) 9848 3331

NEWSLETTER EDITOR

Mr. Tony Cavanagh
16 Woodlands Drive
OCEAN GROVE
VIC. 3226
Email: tony.cav@bigpond.net.au
Phone: (03) 5255 1180

Hello and welcome to Newsletter No. 59.

We are passing through a wetter-than-normal winter (great) but it is also colder and darker than I can remember for some time so it doesn't make one want to spend a lot of time in the garden. The plants don't seem to mind and so far most of the 50 or so young plants I put in this autumn are looking good.

On the *Dryandra* front, there is some good news and some bad news. The good news is that, as reported elsewhere, the ANPSA committee (successor to ASGAP) has unanimously voted that the Dryandra Study Group should continue, even if there need to be some name changes. They still have work to do about things like what we say on the Societies' websites on *Dryandra* v *Banksia* but we can continue as before. The bad news is that far from going away, the mania for changing names because of the "latest" discoveries in DNA work is only getting worse. Alex George told me recently that the small genus of *Actinostrobus* with just three species in south west WA has been "absorbed" into *Callitris*. BUT there is worse. A paper recently published in the systematics journal *Taxon* foreshadows lumping *Beaufortia*, *Calothamnus*, *Conothamnus*, *Eremaea*, *Lamarchea*, *Petraeomyrtus*, *Phymatocarpus*, and *Regelia* into *Melaleuca*!!! And they apparently haven't looked at the *Leptospermum* group yet. Now the paper only foreshadows these changes and nothing may come of it but the mere fact that such an outrageous situation could develop (and no matter what they say, it doesn't help anybody in trying to identify plants), makes me ask "When will all this madness end?"

Turning to other more pleasant matters, Margaret updates us on several trips she made to locate dryandras in the field (some of the places she visited sound wonderful). It seems the lack of rain is affecting the dryandras in the bush just as much as in our gardens. She also continues her series looking back over the early days when we were all learning the complexities of this wonderful genus. Margaret has also been concerned for some time about whether *Banksia recurvistylis* really is another species or is it really at best merely a subspecies or variety of *Dryandra meganotia*. Certainly the unusual seeds and capsules are nearly identical, the leaves are very similar and they live in similar habitats although separated by some 80 km. And of course, one has a lignotuber (*D. meganotia*) while the other hasn't. It seems to me that at best they are two subspecies (as with *D. armata* and *D. borealis*).

Alex George kindly made available his paper presented at the IPPS (International Plant Propagators Society) meeting in Fremantle earlier this year. This exhaustively looks at the situation of how plants are named, why names changes occur and discusses aspects of the recent DNA analysis which are causing such wholesale changes to plant names. Naturally, he does a case study on *Banksia* and *Dryandra* and then considers the situation in Australia where most Herbaria accept the new names whereas most "customers" do not. As it is a long paper, I was going to split it but decided to publish it completely in this issue. It might be best to read it in a couple of sittings but it is well worth while to gain some understanding of a very messy situation.

I have updated the holdings of the Digital Photographic Collection and have listed those we don't hold. If you have any of these, I would be happy to receive them. There is also some background to our new Study Group Co-Ordinator Geoff Lays but I am still waiting (perhaps in vain) for articles from you about your favourite *Dryandra*. Surely it can't be that hard to pen a few lines on this or any other topic of your interest. And a final reminder that subscriptions are now due, same as previous years. Please complete the form at the end of the Newsletter and forward with your cheque to Margaret.

Happy *Dryandra* growing,

TONY

Some clarification on the position of the Dryandra Study Group within ANPSA

Margaret and I recently had an email from Paul Kennedy who is currently the President of ANPSA (I think that this stands for Association of Native Plant Societies of Australia but could be wrong. I have looked everywhere in my Australian plants material and group newsletters and not once have I seen it actually spelled out. Anyway, it has taken over from ASGAP as the overarching body for the "administration" of Australian Plant Societies in Australia). The text is given below:

Hi Margaret and Tony. At our ANPSA telephone linkup on the 12th. May, 2010 your matter of the future of the Dryandra Study Group was discussed. The Delegates were unanimous in recommending that the Dryandra Study Group should continue even if there are name changes. I expect there will be some other issues to overcome as we confront matters such as name changes but this can be done at the appropriate time. I will be in WA later in the year and plan to meet up with Margaret so I can have further discussion then and in the meantime will remain in contact with both of you and Geoff via the e mail line.

Regards, Paul Kennedy.

So that is very good news, especially the fact that delegates from all states felt strongly enough about our position to vote unanimously to retain the group. I think that Cas Lieber, Leader of the Banksia Study Group, will be relieved as well – I cannot imagine he was relishing the thought of picking up another 135 or so taxa to study! Anyway, folks, business as usual although we may in the future put the "Banksia" names in as well, depending on decisions that ANPSA takes about what names they will put on the Society web page.

Tony Cavanagh

The Dryandra digital photograph collection

I think that I rather pompously called this the *Dryandra* digital archive when I announced it in January 2009 (N/L 56) but the above is perhaps a little more explicit. Anyway things have gone a bit quiet on this front although I am very grateful to members who have supplied pictures. We are still short of pictures of a number of taxa and I have listed these below. If any of you have digital pictures of any of these, I would be pleased if you could forward them to me, preferably at good resolution, say 1 MB minimum. If you have a number, it is preferable to burn them to a DVD or CD, otherwise for just a couple, you can send them to me at full resolution as an email attachment. The email address is: tonycav40@hotmail.com

We are looking for pictures of the flower head ("flowers"), the plant form, flowering branches, plant habitat, new growth and close-ups showing any aspect of interest (even "arty" pictures will be considered). If you have, it, please include the date the picture was taken (month and year), the location (location in wild or cultivation) and any other relevant points. I look forward to being able to take some of those below off the list before the next newsletter so please check your pictures and send missing ones to me.

List of taxa missing from the digital photographic collection (some names abbreviated to save space)

<i>acanthopoda</i>	<i>arctotidis</i>	<i>armata</i> v <i>armata</i>	<i>aurantia</i>	<i>bipinnat. s. multifida</i>
<i>columnaris</i>	<i>concinna</i>	<i>conferta</i> varieties	<i>corvijuga</i>	<i>cypholoba</i> <i>echinata</i>
<i>epimicta</i>	<i>erythro. v. inopinata</i>	<i>ferrug. s. tutanningensis</i> & <i>obliquiloba</i>	<i>fililoba</i> <i>foliolata</i>	
<i>fraseri</i> v. <i>oxycedra</i>	<i>fuscobracteata</i>	<i>glauca</i>	<i>ionothocarpa</i>	<i>kippist. v. kippistaina</i>
<i>kippist. v. paenepeccata</i>	<i>lind s. lind</i> v. <i>mellicula</i>		<i>lind s. media, agricola, sylvestris</i>	
<i>longifolia</i> s. <i>sylvestris</i> , <i>calcicola</i>	<i>meganotia</i>	<i>mimica montana</i>	<i>nana</i>	
<i>mucron s. mucronulata</i>	<i>nivea</i> Morangup	<i>nobilis</i> s. <i>fragrans</i>	<i>octotriginta</i>	
<i>plumosa</i> s. <i>denticulata</i>	<i>pterid s. pteridifolia</i> & <i>vernalis</i>	<i>proteoides</i>	<i>pulchella</i>	<i>rufistylis</i>
<i>sclerophylla</i>	<i>seneciifolia</i>	<i>serra</i> <i>speciosa</i> s. <i>speciosa</i> & <i>macrocarpa</i>	<i>stenoprion</i>	
<i>stricta</i>	<i>stuposa</i>	<i>subpinn v subpinn</i> & <i>imberbis</i>	<i>tenuifol v. reptans</i>	<i>tortifolia</i>
<i>tridentata</i>	<i>trifontinalis</i>	<i>vestita</i>	<i>wonganensis</i>	<i>xylothemelia</i>

Follow up from Neil & Wendy Marriott (see Maria Myers Dryandra Garden – in N/L 58)

We had a good wet winter in 2009 and have lots of young plants to go into the Dryandra Garden in autumn. Most dryandras already planted have grown superbly with the extra rain, *D. subulata*, *ionothocarpa*, *ideogenes*, *drummondii* subsp. *macrorufa* in particular flowered spectacularly.

Dryandra trips in 2010

Since moving to Denmark and the publication of *The Dryandras*, I haven't made many trips specifically to look at dryandras. This year, with friends who have recently come to Denmark to live and are wildflower enthusiasts, I have revisited some of my old 'haunts'.

In mid April we set out for the Fitzgerald National Park and the Ravensthorpe area in the hope that those regions had received enough rain for some plants, *D. pteridifolia* in particular, to be flowering.

In recent years I have observed that, because the rainfall is decreasing year by year, that for some plants it takes an extraordinary amount of rain for them to flower at all and I have known some dryandras to go for 5 years without flowering. As well, it seems that the usual flowering period for many of them is later. Last year, *D. quercifolia* was in full flower in August when it was April when I first saw it in the wild in the early 1980s. I have read that, because of global warming, flowering of plants in the northern hemisphere is earlier and is causing problems, whereas here, in the south west of WA, it appears to be later, although this doesn't seem to apply to cultivated plants. I have had to water plants in my garden to keep them alive – and I still lost some small, newly planted ones, because we have not had the usual year-round rains in the last few summers. It has been very humid, too, which might account for the losses of most of my seedlings. Until now, I was having more success with them than I did in the city.

Arriving at the first dryandra stop, on Devil's Creek Road, just west of the entrance to the Fitzgerald River National Park, (FRNP), we found that there were very few *D. quercifolia* in flower. After a stop at Mt. Maxwell to admire the views, we found some pink-flowering *Verticordia sieberi* and an un-named *Chamelaucium* (sp. Mt. Maxwell).

We stayed overnight at Quaalup homestead and went for a short walk on the Nature Trail, where most of the plants are labelled. I was amused to see that the sign in front of *Dryandra plumosa* had been altered from 'Banksia' back to 'Dryandra'.

Work has begun on the sealing of the road at the eastern end of the FRNP, west of Hopetoun and we didn't expect to be able to get though on Hamersley Drive, past East Mt. Barren, but the road wasn't closed until the next day. Between the recent fires and the roadworks, this area is a sad site. There must be more Declared Rare Species (DRF) on and around East Mt. Barren than anywhere else in the state and there are DRF signs and temporary fences everywhere, so I can only hope that the plants will survive. There are no rare dryandras there but several other plants that don't occur anywhere else and some of them are in the path of the new road.

The next day, which was very hot, we went to No Tree Hill, hoping to find *D. pteridifolia* in flower. Unfortunately, this area appears to have missed out on the rain and the plants were not even in bud and had not flowered last year. There are no trees or large bushes, as the name implies, so the lack of shade on such a hot day prevented us from walking very far. I was looking for the supposed hybrid of *D. quercifolia* x *pteridifolia* but it seems to have died without me having seen it in flower. (See Newsletter No. 45). Everything was very dry and there was no sign of that area having received any recent rain whereas just a few kilometres to the north east, the Desmond track was almost impassable owing to the gutters cut across the road by flooding rains.

South of Ravensthorpe, Elverdton Road cuts across from the Hopetoun Road to South Coast Hwy., through the southern part of the Ravensthorpe Range This is a favourite place for dryandras that I have visited many times in the last thirty years, observing various plants and how they have survived (or not), several fires and other disturbances.

At the western end of the road, we found *Eucalyptus desmondensis* with a few pale yellow flowers. This is a very attractive small open tree with a weeping habit. Nearby, *Hakea verrucosa*, a plant I expected to see in flower, had very small buds, only.

On top of Mt. Desmond, I was able to show my friends several flowering plants; *Beaufortia orbifolia*, one that can be counted on to flower almost any time of year; *Eucalyptus megacornuta* and two dryandras; *D. foliosissima* (only one plant flowering) and *D. quercifolia*. The latter had more flowers than plants seen earlier. Further on, we walked down a track where the hybrids, *D. quercifolia* x *foliosissima* and *D. quercifolia* x *corvijuga* were growing until they were killed by fire several years ago. The seedlings I observed after the fire that were

almost certainly hybrids have also died. There are fewer plants of *D. corvijuga* there, since the fire and they have not produced any buds, this year. We found a few *Hakea obtusa* just beginning to flower.

Before heading for home, we drove north on the road to Lake King, turning off at the road to Mt. Short. It had been quite a while since I'd been there and what had been a small gravel pit is now a very big one and there are fewer plants of *D. corvijuga*. *D. pallida* was flowering very well, here. We followed a rough track to join Floater Road where we spotted a couple of *Hakea verrucosa* in full flower. The rain and hence the flowering, evidently, was patchy. We drove up a very eroded track to the top of Mt. Benson where there is a good area of dryandras, including *D. corvijuga* and *D. foliosissima*. Lower down, at a parking bay where I have previously seen *D. corvijuga*, I couldn't find any plants of it since the area has been disturbed by roadworks and fire.

There's no doubt that some plants can survive disturbance and come back well, especially re-sprouters. Seedlings appear, often in profusion, sometimes including hybrids but with the declining rainfall, they often can't be sustained and rare or of limited distribution, species such as *D. corvijuga* appear to be in decline.

A month later, with my friend Julie, I drove up to the northern wheatbelt town of Moora for the opening of an exhibition of botanical paintings by the Botanical Artists Group, (BAG). We went via Cranbrook, Brookton, Beverley, York and Toodyay and Bindoon, by-passing Perth, breaking the journey at Popanyinning on the way up and on the way back.

We called at Yilliminning Rock, east of Harrismith where I collected a leaf of *D. meganotia* to draw. I wanted to get a typical one comparable to the one I'd already drawn of *D. aff. meganotia*. Just north of where we stayed, south of Popanyinning is a stand of *D. stuposa*, where I first saw it in flower. There were a few flower heads for Julie to photograph.

From Toodyay we drove across to Bindoon and then took North Rd. to Bindoon – Moora Rd. to check on the population of *D. drummondii* subsp. *hiemalis*. I was saddened to see what has become of the plants. The gravel pit where I had photographed several beautiful shrubs has been used as a rubbish tip and then filled with weed-ridden soil. Another gravel pit has been opened up, away from the remaining plants but there are not many of those. They were in bud but a long way from flowering.

At what once was a wonderful stop to see many species, especially Proteaceae, south of Gillingarra, is a scene of devastation. The rare *D. serratuloides* subsp. *serratuloides* has just about all gone. They existed in a narrow strip between the railway line and the road so they have suffered disturbance from both sides despite the 'Rare Flora' markers beside both the railway and the road. *D. kippistiana* and *D. fraseri* var. *fraseri* also occur, here. There are some *D. serratuloides* further south and north of this spot but they are not marked.

Just north of the town is a terrible sight – tall trees dead and not one plant growing on the roadsides. Trenches have been put in to drain the site in a vain attempt to stop the salt destruction. There are some *D. serratuloides* north of there but they are in a parking bay and so are vulnerable and declining.

On the way back to Popanyinning, we went east of Brookton, to Alderside to look at *D. ionthocarpa* subsp. *chrysophoenix*. The plants are not in very good shape. When I first saw it and photographed the flowers, it was following a fire and the plants had resprouted well and were not closely surrounded by other species. The area is very over-grown, now.

We made our way to the eastern end of Tutanning Reserve to look at *D. proteoides*. The plants appear to be suffering from the lack of rain and only a few of the plants had buds that were a long way from opening. I have seen the same plants with flowers beginning to open at the same time of year, three years ago. Half-way along Yornaning Road, going east to Dryandra, there is a lone *D. proteoides* which is much healthier.

At my favourite dryandra spot, south east of the Lions Village, as well as *D. cynaroides*, *D. columnaris*, *D. nivea*, *D. squarrosa*, *D. nivea* and *D. nobilis*, there was *D. stuposa* in flower. This species usually flowers in late summer but odd flowers can also be found year round. I couldn't resist these lovely flowers, some with bees busily working the flowers inside the styles of the about- to-open flowers, looking as though they were in a cage, so out came my camera!



Left: *Dryandra acanthopoda*
West of Woodanilling, May 2010

Middle: *D. cynaroides*
Dryandra, December 2007

Below: *D. stuposa*
West of Woodanilling, May 2010



We drove across to Albany Hwy. on Robinson West Rd., then to the reserve on the corner of Dinwoodie and Orchard roads. The dryandras at this disused gravel pit were also late flowering. The area looks much different from when I first visited it soon after it was filled and the species-rich vegetation began to grow back. There are fewer plants of the rarer dryandras such as *D. lepidorhiza* and *D. preissii* and they were not in good condition and not forming buds for this year. It was the same for *D. porrecta*, the 'underground' dryandra which should have been starting to flower. *D. armata* var. *ignicida* is doing well and is now the dominant plant in the area. *D. rufistylis*, which used to grow as a tall, columnar plant is now stunted and may be dying out.

Continuing along Orchard Rd., we turned north on Carter Road where we were thrilled to find *D. acanthopoda* in flower and the best *D. stuposa* plants of all in Windegynne Reserve. It was good to see plants in good condition, here. If you formed the impression, reading this, that I have been disappointed when revisiting my old haunts, to find them much degraded with the plants suffering from lack of rain, you are right. The last stop on our way home was therefore a pleasant surprise.

Last week, Kevin Collins and I went to Fremantle to attend a day of the International Plant Propagator's Society where Alex George and Kevin Thiele gave talks on their differing views of the recent name changes.

Before returning to Mt. Barker, we visited the nursery and garden of Ben Croxford at Karnup to pick up some banksia and dryandra plants that Ben had grown from seed for Kevin. I was amazed at his beautiful garden – one of the best I have ever seen. It is beautifully landscaped with plants mainly grouped by genus and planted in threes, where possible. There are several hard-to-grow dryandras among the many taxa that are thriving. The most remarkable are the *D. nana* plants. This is extremely difficult to grow. I don't know of anyone else who has grown this successfully but I would be interested to know if I am wrong.

On Albany Hwy, just north of Weir Rd, north of Tenterden, we stopped to look for *D. preissii* and *D. lepidorhiza*. We found quite a few healthy plants on both sides of the road as well as a large *D. porrecta* beginning to flower, on the sloping edge of the road verge.

Margaret Pieroni 20/5/10

New Study Group Co-Ordinator

You may be aware that the previous co-ordinator Phillip Robinson has retired, with Geoff Lays taking over. The following is a slightly condensed version of Geoff's background, reproduced from the March 2010 *Acacia Study Group Newsletter*. Thanks to the editor Bill Aitchison for allowing us to use it.

"I have been a keen bushwalker and photographer for over 40 years and now have collected some 17,000 images of Australia. My humble ambition is to photograph every plant and fungus in Australia – after 40 years, I am 20% of the way there.

As most bushwalkers were of little help in identifying species, I joined the Maroondah branch of SGAP 30 years ago and am now Vice-President. There I discovered the volumes of *Flora of Victoria* to help identify (most) of the species I photographed. Fungi are my other great love but fungi knowledge is much harder to come by. Field Naturalists Club of Victoria has a keen fungi group and I am also a volunteer at the Royal Botanic Gardens in Melbourne where I database fungi sightings from amateurs all over Australia for Fungimap. This aims to map where and when 115 'easy to identify' fungi grow and produce fruiting bodies. I have also been on many field trips with botanists to collect seed for the Millennium Seedbank, satisfying, yes, but the current drought makes seed collecting in the wild so much more difficult. They have also helped me identify many of my images.

Now we are retired, we have time for trips to the top end and WA to complement my bushwalking in the south eastern states.

Nowadays, I give many illustrated talks on fungi and flora to plant societies, field naturalists, landcare and similar groups. My laptop travels with me so I could give you a talk too on one of my travels. (Geoff spoke to our APS group in Geelong on fungi and it was very informative, especially when you know nothing about fungi! - Ed.). In August we plan to go the Kimberleys and come home via North Queensland, our trip covering all mainland states." (half your luck, Geoff – Ed.).

Geoff's email address is gjmk.lays@bigpond.com

Looking Back (Continued)

Continuing the correspondence from Margaret Pieroni, then living in Perth to Keith Alcock, at the time Dryandra Study Group leader, in Victoria. Updates of Dryandra names and other comments are in brackets, in italics.

From a letter to Keith dated 22/3/86:

It will take me quite a while to reply to your letter in full. I've checked off the various locations and marked them on my maps. When we go on our bus trips, we can't afford the time to search out a particular plant without precise information, unlike when I go off with one or two friends in my own car. We've planned a super trip for this year (*Wildflower Soc. bus trip with Coates Wildlife Tours*) and I'm looking forward to seeing *Dryandra obtusa* and *D. sp. J (D. meganotia)*, in flower. Kevin and I worked it out this week. We will be spending the long weekend, 27-29th September, at the Stirling Ranges where Neville Marchant will lead the excursions during the weekend, then those of us on Kevin's tour will set off through Ongerup towards Ravensthorpe. We will spend a day at the eastern end of the Fitzgerald River National Park – East Mt. Barren and from Hopetoun we'll go towards Esperance but will be by-passing it to join the road north at Grass Patch. Then we'll come back along the Norseman – Lake King Rd., hoping to call at Peak Charles if the track into it is passable. We'll come back to Perth by the same route as last year except that we won't be by-passing Harrismith, this time!

Do you have a location and flowering time for *D. foliosissima*? I have a record for Lake Grace and a time of mid-autumn. If I get a location for it I will make a special trip in May. I have more or less decided to go back and make a proper collection of the arctotidis and nivea forms at Hassell NP (*D. brownii*) and I could check *D. preissii*, as well. If I do manage to find *D. foliosissima* in flower, it would make the trip very much more worthwhile.

I had a letter from Alex (*George, in Canberra*) the other day. He said the northern *D. tortifolia* is the correct one and the one in the Stirlings and Hassell NP is in the 'nivea' complex. I'm more than ever sure now, that the larger plant in my photo is the real *D. arctotidis* and it looks like the photo in Sainsbury. (*The photos were of D. brownii. Nindethana were selling seeds of what we now believe is a stable hybrid of D. brownii X nivea, as D. arctotidis.*)

I'm pleased to have the specimen and location of *D. horrida* from you as Sainsbury has the wrong photo in his book and, coincidentally, I've organised a 'Kevin' weekend on 14-15th November to Charles Gardiner Res. and Yorkrakine Rock.

Rob (*Sainsbury*)'s book has convinced me that the leaf prints in the SG newsletter and the actual ones that you send me are much easier to match up than the photos which are not to scale. Perhaps this is something to consider for THE BOOK. By the way, I would be delighted to be included as an author. I received Hartley (*Tobin*)'s letter last week and I'm willing to start on drawings as soon as he can provide seedlings.

Now for the locations of the *D. ferruginea* forms: I would say that Rosemary Cugley's plant is the same as your '*Grevillea involucrata*' form. (*Keith had collected D. ferruginea subsp. chelomacarpa in the same area as the grevillea, south west of Newdegate*). The flowers were quite small, about the same size or slightly smaller than the small-flowered *D. ferruginea*. The number of flowers in the head seem to be fewer, though the bracts are typical. The plant is on their property with 35 acres fenced with 5 years regrowth. This is the area we visited. It is a marvellous patch for many verticordias, including an undescribed yellow one, *Grevillea prostrata* and many more wildflower species. It is sandy but supports a surprising number of Proteaceae. There were quite a few plants of the *D. ferruginea* but I only found the one in flower,

The Corrigin small-flowered form (*D. ferruginea subsp. obliquiloba*) grows to form a shrub about 1m tall and wide. From memory, I'd say that the plants are quite a bit bigger than the large-flowered form from Tutanning. (*subsp. tutanningensis*). The location, at Corrigin is 2 km west of town on Brookton Hwy. and the plants are growing on and near the top of the hill around the look-out tower.

The 'dwarf', prostrate one, (*D. ferruginea subsp. flavescens*) I can't pinpoint, I'm afraid. I thought it was nearer the Frank Hann NP than to Lake King, east of the vermin fence. (*We saw this on an earlier Wildflower Soc. bus trip but none of the passengers could agree as to its location*).

I saw Max Luscombe from Morande Nursery at Garden Week and he told me about the 'runcinata' plant. He told me it was collected in the Stirlings, on Stirling RA. Drive. Your leaf does look similar to the plant in my garden but it definitely isn't prostrate, as in your sketch. I'll send you a photo of it. (*D. ferruginea* subsp. *pumila*).

Alex is currently sorting out the 'nivea' complex. To quote from his letter: 'The *D. nivea* around Perth is not *D. nivea*. It has a name but I'm not sure which of several, is the correct one. (*D. lindleyana* subsp. *lindleyana*). Typical *D. nivea* is a small, bushy shrub from Esperance. The original was collected there in 1792, by Labillardiere'. I sent him some prints of the various 'niveas' in the hope that he can name them. He told me is hoping to visit you next month and I urged him to do so if he possibly can. I told him that you probably have the best collection (of specimens) in Australia and a visit would be mutually beneficial.

We've had some good early rain and I'm about to do some planting out.

If we ever get THE BOOK done, we could always publish your letters to me – must be almost novel length, by now!

Letter dated 26/4/86

It was good to hear from you the other day. I was so excited, after my trip that I couldn't wait to tell you the news. (I had phoned Keith as soon as I returned home to tell him about my discovery of what we immediately began calling 'IT', *D. ideogenes*). I thought you'd like to know the result of my search for the Cugleys' *D. ferruginea*, (subsp. *chelomacarpa*) as well. As I told you, I'm sure they are all the same species and that your slides show the same one. As you can see from the leaves I've enclosed, they vary considerably, on the same plant and even on the same branch. Your 'south of Newdegate' leaf is also the same, I'm sure. The specimen I collected at Cugley's is the typical form which is in the area. I couldn't find any seed on them and, in fact, very few old flowers. I spent most of yesterday packing your specimens and extracting the seed from the seed heads. There was no seed in sp. 9, (*D. ferruginea* subsp. *chelomacarpa*), the seed of *D. quercifolia* had a lot of insect damage and the 'new' one, sp. 12, (*D. idiogenes*) though I thought I'd collected plenty seed heads, only had three follicles plus what I hope you'll find on the two pieces I'm sending you. (The specimen numbers here are those I gave to the specimens I collected on the trip).

I packed up the specimens for Alex on Thursday and rang one of his colleagues, at the Herbarium. I wasn't sure how to treat them as it was important for the old flowers and fruits to arrive intact and the little 'pteridifolia' (*D. lepidorhiza*) had already shed some follicles. The botanist suggested that I take them straight in and he promised to phone Alex to see what he wanted done with them – so that's what I did.

I found a letter from Elizabeth when I got back telling me how much they'd enjoyed their visit with you and how impressed they'd been with Cranbourne (the SG living collection of dryandras at the Cranbourne Annexe of the Royal Botanic Gardens, Victoria) and your garden. I wish I could have been there, as well.

Alex phoned me last week. He was wondering whether I had the correct slide of *D. sclerophylla* and told me what to look for in the styles. I couldn't see any differences between it and *D. kippistiana*, in my photos but there were other differences that I described in a letter to him and, if necessary, I'll tell him exactly where I photographed it so that he can check it when he comes to WA. I'll let you know, but I am satisfied it's not *D. kippistiana*. Ted Griffin showed me the plant (north east of Badgingarra) and identified it as *D. sclerophylla*.

I wonder whether the plants I saw in Alexander Morrison NP and at the Williams' place are the ones you thought might be a different species? I assumed that they were *D. kippistiana*, but much smaller, more straggly plants. (I may have found *D. kippistiana* var. *paenepeccata* which looks like an intermediate between *D. kippistiana* and *D. sclerophylla*.)

Alex had sent me a photocopy map of the Kukerin – Lake Grace area where he'd photographed *D. foliosissima* on 30th May 1964, as near as he could remember and Shirley worked out the distance from the Tarin Rock turn off and we found it, right there. The plants were quite small but in bud.

At our last Wildflower Soc. meeting one of the members, Frank Philips, who is very knowledgeable of our flora, brought in a specimen of a dryandra with long, narrow leaves, that he'd collected near New Norcia. Neville Marchant took it to send to Alex, so I'll be interested to know what it was. I found a beautiful 'mound nivea' at Tarin Rock Reserve and it occurred to me that perhaps it was that species, but I would have thought that Frank

would be familiar with it as we have seen it on several excursions. Does the 'mound nivea' flower for you, in Victoria? (It was *D. nivea* subsp. *nivea*). I have a plant of the local one which grows in the bush, close to my place but doesn't flower in my garden. (*D. lindleyana*, which did eventually flower).

The leaves of all the forms of *D. ferruginea* are certainly extremely variable. At Dumbleyung, there was the shrub form with leaves that were almost entire with very short lobes, though, once again, they varied from plant to plant. These ones, as at Corrigin, are shrubs about 1m x 1m with the small flower heads within the bush. I also noted variations in the lobe length and colour of the leaves in the Tarin Rock population. (These were all *D. ferruginea* subsp. *ferruginea*).

I went on to describe some of my successes and failures with seed of various dryandras and wrote a report on the trip of 21st-23rd April. I will publish this and further correspondence in the next newsletter.

Margaret Pieroni 1/6/10

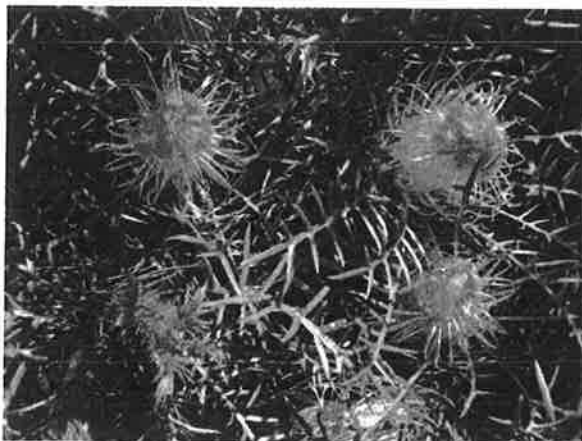
Illustrations for "Comments on *Banksia recurvistylis*"



D. aff. meganotia (Banksia recurvistylis)

D. meganotia

Leaves X 1, follicles and seeds X 2



Comments on *Banksia recurvistyliis*

In December 2003, Fred Hort told me about a dryandra he had just found which I could not identify. I wrote about it in an article titled, ironically, '*Not a new Dryandra*', which was my conclusion, at the time. The article appeared in newsletter no. 47. The following is a summary:

In mid-December, last year, Fred and Jean Hort brought me a specimen of a dryandra that they had collected a few days before. It had finished flowering – but only recently and they had not collected any seed follicles. They thought it looked like *D. fraseri*, albeit with wider leaves but the flowering time didn't match. I couldn't identify it so, thinking it might be a new species, we left at daybreak, the next day to re-locate the plants. (I was then still living in Perth).

We drove down Albany Hwy and turned on to a gravel track, south of Bannister and came to the Wandering Conservation Park, which is mostly Wandoo woodland and Jarrah/Marri forest with some areas of scrub and granite outcrops. On our way to the top of a hill, on a side track, we saw a population of *D. fraseri* var. *fraseri* in a belt, just below the outcropping granite. At the top, where the rock is mostly laterite and the area is quite open, were shrubs of the dryandra we'd come to see. They are dense and bushy, about a metre tall. Most are obviously quite old, with thick trunks and some were collapsing in the centre with the weight of low-branching limbs. It was gratifying to see an area that hasn't been burned recently – or otherwise disturbed.

The first thing I looked for was the fruit. There was no doubt about the identity when I found the tiny, hairy follicles among the old floral bracts, in the seed heads. It is *D. meganotia*.

The flower parts, leaves and follicles are larger than those of the plants in the nearest population that I know of, about 80 km away, east of Narrogin, at Yilliminning Rock. There, the plants are smaller and rather sprawling. Further south still, around Nyabing, leaves are smaller and denser and the plants are more columnar in habit. (*I had failed to observe that this taxon had no lignotuber, though Fred did, subsequently and we then referred to it as D. aff. meganotia.*)

In 2008, Fred found further populations, in the Monadnocks Reserve, closer to Perth. We published his report in newsletter No. 54, from an email in January 2008:

"I collected *Dryandra meganotia* just west of Albany Hwy – mid way between Sullivan Rock and Mt. Cooke. There were 186 mature plants in a shrubland fringed by jarrah and marri woodland. The shrubs were erect/spreading to 1.5 m high and some were up to c. 2.2 m wide. They were single stemmed and generally branched out from near the base. The plants were crowded with bundles of leaves, each to 7cm long. The seeds we found were in tiny, hairy follicles which are typical of *D. meganotia*.

Today, Sunday, we found another population of *D. meganotia*, 1.5 km south of yesterday's patch. We particularly noticed that the plants again, were single stemmed and that they branched from above ground level – definitely not suckering shrubs. Plants were to 1.8 m high and up to 2.4m wide. We counted 70 mature plants here, growing on and around granite outcrops. About double that amount were burnt out. Among the blackened stumps, we saw a few seedlings emerging".

I was more than a little surprised when I learned that Kevin Thiele had published this taxon as *Banksia recurvistyliis* – not at the genus but the species. Obviously, it is different from *D. meganotia* because it lacks a lignotuber but other differences are not great. The two taxa are about 80 km apart. *D. aff. meganotia* (as I still call it), grows in Jarrah forest but the type of habitat and the associated species are very similar.

Conflicting names: what do you do when your plant has alternative names?

Alex George

'Four Gables', 18 Barclay Road, Kardinya, Western Australia 6163

email a.george@murdoch.edu.au

(Editor's note: This is an expanded version of a paper that Alex George gave at a recent IPPS (International Plant Propagators Society) meeting in Fremantle. He has given us permission to publish it in the Newsletter, many thanks Alex. The paper will also be published in the Combined Proceedings of the conference and I would like to thank the editor, Ian Gordon, for allowing us to publish it here in advance. It is a wonderful summary of the current situation and gives us all much food for thought.)

We have to remember that a major reason for plant names—nomenclature—is to assist communication. The way plants are arranged or classified is taxonomy, and the names help to exchange information about both individual plants and the way they are classified. A scientific name (plant or animal) means the same thing anywhere in the world.

I am talking about what to do when the plant you are dealing with has more than one name, not new discoveries. And I am talking about the scientific names, not the common or vernacular names which are not governed by any rules and so can be used in whatever way you wish.

Because time is short, I'll talk only about changes due to research and the application of the *International Code of Botanical Nomenclature* (the *Code*) (McNeill *et al.*, 2006). The *Code* has been developed as an international 'standard' over some 150 years. Essentially, it sets down rules for publishing scientific names. It is reviewed at an International Botanical Congress every six years when changes may be made, but the essential rules remain constant.

Right at the start, I wish to point out that *there is no obligation to follow a name change simply because it is the latest word, or because organisations such as herbaria have adopted it.* Under the *Code* and the *International Code for the Nomenclature of Cultivated Plants* (Brickell *et al.*, 2004), scientific names of plants are available for use if they meet certain criteria, but these *Codes* give no further direction on how to choose which name to use, if a plant has more than one available name. So, how do you decide?

The problem is not new. Our current system of binomial nomenclature was devised by Carl Linnaeus, and for flowering plants it dates from 1753. Very soon afterwards, botanists began to change the names of already-published names. Linnaeus himself made changes by transferring some of his own species from one genus to another, an example being the widespread tropical paperbark *Melaleuca leucadendra* which he first published in the genus *Myrtus*. There are many reasons for changing names.

What happens is that a new species is described. In many cases, a new species is based on one or few specimens. As time goes by, more specimens may be collected, usually over a wider geographical range. Sometimes they indeed represent the same species, but quite often there is seen to be variation among these specimens. For a while they are still called by their original name, but at some stage a botanist studies them closely and decides that in fact there is more than one species in the complex. The original name is restricted to a subset, and distinct variants—that you have known by that name—are named as new species. In Australia, this has been a rather common situation since we have a very large flora and too few botanists to keep up with the research required. A good example is the honey myrtle *Melaleuca uncinata*, named by Robert Brown in 1812 from specimens that he collected on Eyre Peninsula in South Australia in 1802. The name was used for this and lookalike plants from all Australian mainland States and the Northern Territory, until it was studied by a small team of botanists who divided it into eleven species (Craven *et al.*, 2004).

I should point out that a properly or validly published scientific name is always linked to a specimen of the plant, usually a pressed specimen. It's called a type specimen. However the species is classified later, whether in its original genus or in another, or as a species or subspecies, its name remains linked to the type specimen, so the same name can never be used for another plant.

Refinement of the taxonomy can lead to new circumscription of named species, usually in conjunction with description of new ones. In my own work, examples have been the *sphaerocarpa* group of *Banksia*. Or it can lead to plants previously known as species being redefined as subspecies or varieties. Again, an example from my own work is the placement of *Calothammus homalophyllus* and *Calothammus asper* as subspecies within *Calothammus quadrifidus*.

New data, new insights or new discoveries can lead to redefinition of a genus in such a way that one or more species within it must be moved to another, or species in another genus must be moved to it. Large changes of this kind have been made by Paul Wilson, who realised that the Australian species of genera such as *Bassia* and *Helichrysum* were distinct enough from the original species in those genera (which grew outside Australia) that they had to be placed in other genera. So, our *Bassias* became *Sclerolaena* and most of our *Helichrysums* became *Ozothamnus* and various other genera.

Sometimes a name must be changed because we have been using it for the wrong plant. Under our type system (enshrined in the *Code*), each scientific name is associated with a specimen used by the original author to prepare his or her description, and the application of the name is always linked to that specimen—it's called a type specimen. In some cases the specimen has been lost or destroyed, and then we can use an illustration or choose a replacement specimen. Sometimes, in checking the type specimen, a researcher finds that we have been applying the name wrongly. In Australia this happened frequently because the type specimens were held in European herbaria and it was not always possible to see them—we had to go on the descriptions published in books and journals and, if we were lucky, an illustration, and often they included insufficient detail to decide which of two variations the name should be applied to. In recent decades this problem has largely disappeared because we have been able to borrow specimens or obtain high-quality images. But, if we find that we have been using a name wrongly, then a plant that has been wrongly named must be given another—either an already published but 'unused' name, or a new name altogether. In my own work in *Calothamnus*, I found that the type specimen of *Calothamnus oldfieldii* is, in fact, the plant that we have been calling *Calothamnus kalbarriensis*. As a result, the name *Calothamnus oldfieldii* must be used for this plant, and the one we have been calling *Calothamnus oldfieldii* must be given a new name.

There are further variants of this situation but for the present this must suffice.

We must also use the first published name. There are many cases of the same species being given different names by different botanists (sometimes even the same botanist!). Occasionally a name published in an obscure, little-known place comes to light that is earlier than one in use. Under the *Code* we usually take up the earlier or earliest one, though there is now provision for very well-known names to be conserved. An example is the Boab of northern Australia, known as *Adansonia gregorii*, named in 1857. Twenty years ago a name that had been ignored since its publication in 1841 was discovered and put forward for use, but *A. gregorii* is so well known that it has been preserved under the *Code*.

The problem of a plant being classified in different genera, even different families, has become more common around the world in recent decades. It has become especially acute with the rise of methodologies known as cladistic analysis (cladistics) and DNA (molecular) analysis. Currently the two go hand-in-hand, the data from a DNA analysis being put through a cladistic program on the computer which produces cladograms or diagrams showing possible relationships between the plants analysed. The way these diagrams are interpreted is commonly different from the results of traditional taxonomy, and some are controversial.

A major difficulty for the non-specialist trying to understand molecular and cladistic work is the terminology. All subjects have their special terminology, including plant taxonomy. Molecular and cladistic work impose one that is almost impossible for the non-specialist to follow. I suspect that many current practitioners of these methodologies would themselves have difficulty explaining the full terminology, not to mention the philosophical concepts behind them. What do you make of this sentence, on a DNA analysis, from Mast *et al.* (2005): 'Mr Modeltest 1.1b chose the general time-reversible substitution model (GTR: Lanave *et al.* 1984; Tavaré 1986; Rodríguez *et al.* 1990) with among-site heterogeneity assumed to follow a discrete approximation of the gamma distribution (Γ ; Yang 1994) and a proportion of invariant sites (I) for the cpDNA dataset, the GTR+I substitution model for the ITS dataset, and the model of Hasegawa *et al.* (1985) with Γ for the *waxy* dataset'. Even our Prime Minister would be proud of the verbal gymnastics. But what it means is that we—the average users—are being asked to take their work on trust and believe the diagrams that they produce.

Taxonomists using DNA want their audience to believe that their data are all that is needed as a basis for a classification. Sometimes, morphological attributes are placed on a cladogram, showing where changes are thought to have occurred or what the uniting character is for a clade (branch of the cladogram). Occasionally a full morphological analysis is done as well. But it's the DNA that is paramount. When I discussed the situation in banksias and dryandras with an experienced botanist who is familiar with these plants, he said, 'If that's what the DNA says, then that's how it has to be'. An even more extreme view has been expressed in a paper by Mike Crisp and Bernard Pfeil at the Australian National University: 'we reject the idea that some kind of objective level of character difference or distinctiveness is an appropriate guiding principle for circumscription of the generic (or any

other) rank' (Pfeil & Crisp, 2005). In other words, it doesn't matter what they look like. The diagrams (cladograms) produced in a cladistic analysis of DNA are also taken by the practitioners as 'evidence' of how the plants are related and so how they should be classified when, in fact, they are only an hypothesis.

There are further problems with DNA analyses but I have time to mention only two:

- only small parts of the DNA are used, and they are commonly those that show general relationships, not those that have a large effect in controlling differences. To put it another way, the genes chosen for analysis are those that show how organisms are related, not those that show how they differ.
- usually only one plant of a species is sampled, and in order to repeat an analysis you would have to have access to the *same samples* used in the first analysis—this is possible if they have been preserved according to proper protocol—and samples from different plants of the same species might produce different results.

This means that the DNA database is good as far as it goes, but is very narrow. In contrast, in a morphological study, the characters used are expressions of scores or hundreds of genes, and we can look at multiple specimens going back several hundred years, including those that previous botanists looked at—such as (in the case of Proteaceae) Robert Brown, Carl Meisner and George Bentham in the 19th century, Lawrie Johnson and Barbara Briggs in the 20th.

There are also problems with the cladistic methods used to analyse the DNA data, and again I have time to mention only the major one.

Cladists use similarity in the way that taxa have evolved to group them, and all taxa within a group that have a common ancestor are termed monophyletic. If, from such a monophyletic group, you take out some and classify them differently, it makes the remaining ones paraphyletic, and this concept is inadmissible in cladistics. In other words, strict cladistics does not allow a taxonomic group to evolve from another. This is not logical since, in a cladistic analysis of a whole family of plants—which evolved from a single ancestor—the only way the family can be monophyletic is to call them all a single genus. And then you should add other families, until you make all flowering plants one genus—then add the mosses, the green algae etc. OK, you could be logical and do that, but for communication by plant names it would be pretty horrendous. It's the major reason why cladistics is causing problems around the world, and why many taxonomists see it as a useful tool but not one to be followed blindly.

The *Dryandra* and *Banksia* case

As a practical example of the effect of these methodologies, I take the merger of *Dryandra* with *Banksia* since I have a fair understanding of the plants. *Banksia* was named in 1782 and true banksias now total 78 species and another 20 subspecies and varieties. *Dryandra* was named in 1810 and contains 95 species and 40 subspecies and varieties. Until Mast and Thiele's research over the past 15 years, there has been no suggestion that they should be merged as a single genus. There are four papers that provide the background to the merger and the major basis was a DNA analysis (Mast, 1998; Mast & Givnish, 2002; Mast *et al.*, 2005; Mast & Thiele, 2007). I believe that there are flaws in the scientific basis that weaken the case for this merger.

First, only 11 taxa of *Dryandra* (out of 135) were analysed for DNA, compared with 84 (out of 98) for *Banksia*. The authors considered the number of dryandras adequate because they sampled from each of the three subgenera, but there are 24 series—groupings within the subgenera—in *Dryandra*, some highly distinctive. It's a massive assumption to take a sample of 8% as the basis for such a huge reclassification. The small sample is possibly the reason why *Dryandra* comes out in all the cladograms as a single group while *Banksia* is a diverse group on several branches—morphologically, *Dryandra* is at least as diverse as *Banksia* and I would expect this to show up in *any* analysis. It is impossible to verify whether all the samples were correctly identified, since cultivated material with no vouchers cited was used for four taxa, and no source or voucher was cited for a further six taxa.

Second, the few characters imposed in Fig. 1 of Mast & Thiele (2007) show inadequate understanding of the morphology. Below the first branch they give 'Flowers in condensed heads' as a unifying character for the whole group, but above the fourth branch they have 'Capitate inflorescence' to distinguish dryandras from 'true' banksias—these phrases mean much the same thing (and true banksias don't have heads of flowers). Species on the first branch are said to be distinguished by having spatulate cotyledons, but spatulate cotyledons also occur in other species of *Banksia* and many of *Dryandra*. Then, above the first branch they give 'Beaked follicles' leading to the remainder of *Banksia* and all *Dryandra*—but not all species of *Dryandra* have beaked follicles. Finally, their 'Involucre of conspicuous bracts' as a unifying character distinguishing *Dryandra* from *Banksia* is incorrect. All species of *Banksia* and all species of *Dryandra* have an involucre of bracts subtending the inflorescence. It is correct that in most species of *Banksia* these are inconspicuous (in fact, in many they fall by anthesis), but in

several species such as *B. goodii* and *B. victoriae* they are conspicuous and persistent. Conversely, in most species of *Dryandra* the involucre is conspicuous, but in some it is not, e.g. *D. concinna*, *D. sessilis*. The appearance of a third branch on the cladogram compared with a similar one in the previous paper (Mast *et al.*, 2005) is not explained. Then, it is impossible to work out what species of true banksias are on each branch – this in a ‘classification’ claimed to improve our understanding of these plants. We are not told which species are included in their new subgenus *Spathulatae*—there’s a reference to a group called by an informal name */Phanerostomata* in previous papers, but those papers do not provide the full answer. The distinguishing feature of this subgenus—spathulate cotyledons—occurs in a number of species of *Banksia*, and also in *Dryandra*—they may be broad or narrow, but they are still spathulate. So, as described, it is rather meaningless. We are not told if *Banksia* subg. *Isostylis* is recognised by Mast and Thiele, or if they consider it part of subg. *Banksia*.

Thirdly, whereas Thiele and Ladiges previously gave a detailed analysis of the morphology of true *Banksia*, there is no such analysis for *Dryandra* in the papers on which the merger is based. Mast *et al.* (2005) acknowledged that ‘we do not have the morphological data that might help to place it [*Dryandra*] when analysed in concert with that sampled in *Banksia* by Thiele and Ladiges (1996)’.

Their results, in fact, confirm that *Dryandra* is a ‘good’ natural group, whereas *Banksia* contains several groups that come out as distinct—very similar to what I concluded in my revision, based on the morphology, published in 1981. Two features that provides clear unifying characters for *Dryandra* are the flat or slightly concave or convex receptacle on which the flowers are borne, and the loosely arranged common and floral bracts of the inflorescence (not to be confused with the involucral bracts subtending the inflorescence). These have been overlooked in all the cladistic analyses, including Thiele and Ladiges (1996).

Fourthly, in assessing a cladogram, the researcher decides where to draw the ranking line across it and what rank to give each group above the line. Mast and Thiele (2007) drew it low down, choosing to regard the whole lot as one genus. A line marking genera drawn higher on the cladogram would have left *Dryandra* as a genus and left *Banksia* in several groups, the upper three of which are ‘unresolved’ branches and further work should have been done to clarify these. We have been given no explanation why this was not done—there is a mention of ‘fine-scale taxonomic sampling’ being carried out in Mast’s laboratory, without explaining what they meant by this.

Finally, as is common in cladistic analyses, the published background papers abound with statements of uncertainty that you might expect with an hypothesis—this may/might be the case, this suggests ..., this seems/appears ..., this could have ..., if such and such The paper by Mast and Givnish (2005) that provides most of the DNA analysis on which the *Dryandra/Banksia* merger is based contains more than 20 such uses—not a convincing argument for such a major change.

Going back to the taxonomy—information in a classification—Kevin Thiele claims that combining the genera gives us a ‘new understanding’ of their relationships (Thiele, 2008a. 2008b). In fact, we already knew that *Dryandra* is closely related to *Banksia*, and their new classification obscures relationships because they have placed all 95 species of *Dryandra* in a single series within *Banksia* while retaining a comprehensive infrageneric classification for the taxa of *Banksia* in the strict sense.

Likewise, their claim that an expanded *Banksia* is ‘a single, easily recognised genus’ (Mast & Thiele, 2007) makes no sense to those who have no difficulty recognising a *Banksia* or a *Dryandra* when they see one, even if it is a species that they have never seen before. In the 1980s, the *Banksia* Atlas project involved 421 people recording banksias across Australia. Of these, 185 were in Western Australia, making 5143 records. No-one ever recorded a *Dryandra* in mistake for a *Banksia*.

Thiele (2008a) argues that, because some species of *Banksia* are related more closely to *Dryandra* than to other banksias, keeping the genera separate is a ‘serious anomaly’. This is nonsense—it’s obvious that, when a new organism evolves from a member of a large group, it is going to be more closely related to that member than the others. At some point it may then become different enough to be called a new genus, and this is what has happened with *Dryandra*.

Finally, they even acknowledge that their results are preliminary, stating (Mast & Thiele, 2007) that their new classification ‘is the least disruptive option at present’—in other words, try this for size, spend hundreds of hours and thousands of dollars changing all your labels, your conservation lists, your databases—but we may change the classification again later. The least disruptive option was to retain the status quo. Despite more than ten years’ work, they have made no advance in our knowledge of taxa below generic rank in *Dryandra*.

In short—this research has, essentially, confirmed a taxonomy that we already had but, by making unjustified changes to the names of dryandras, has confused the nomenclature and the taxonomy—and the users.

The Australian Plant Census

Now I turn to the acceptance of the merger of *Dryandra* with *Banksia* by Australian herbaria. Because botanists sometimes have different views on the correct names, and each herbarium takes an official line, the Australian herbaria have established the Australian Plant Census in order to provide a nationally agreed list of names. It's a database of the accepted scientific names for the Australian vascular flora, both native and introduced. In 2004, the herbaria established a committee to 'make judgements on any contentious conflicts' (Orchard, 2006). The committee's decisions are meant to represent the considered opinion and nomenclatural research of about 35 people in Australian herbaria and user groups.

Guidelines were developed for the Census. In a paper published in 2005, discussing alternative taxonomies, Tim Entwistle and Peter Weston wrote that "for day-to-day business and pleasure, we [I assume that they meant the above committee] must deliver 'what the customer wants'" (Entwistle & Weston, 2005). Note those words—what the customer wants. This means you. Five of the guidelines are relevant to this discussion:

Guideline 1 *Where possible, named taxa should be monophyletic based on current reliable evidence.* This is qualified by Entwistle and Weston: '... there are times when we need to accept higher taxa [above species] that are not monophyletic, at least in the short term [earlier defined as 'e.g. 10 years'] ... [such as] when different lines of evidence (especially molecular v. morphological) are in conflict.' In the case of *Dryandra* and *Banksia* this guideline was not followed. There *is* conflict, and the merger was adopted less than five months after it was published.

Guideline 2 *Minimise taxonomic change (across Australia as a primary focus).* In their discussion, Entwistle and Weston (2005) say that 'accepting stability ... should result in both information gain and minimisation of nomenclatural confusion'. The transfer of *Dryandra* has done just the opposite—established some 135 new name combinations and lost information—all the subdivision within *Dryandra*.

Guideline 3 *Change is more acceptable in groups that are not 'charismatic', not economically important, or do not have a substantial 'interest group'.* *Dryandra*s occur naturally only in Western Australia and are both charismatic and economically important, but it's possible that committee members in other States may not be aware of this, or even that there are significant 'interest groups' for *Dryandra* and *Banksia* (Australian Plants Society Study Groups).

Guideline 4 *The 'preferred name' should be as scientifically defensible as possible, but its acceptance does not imply that it is necessarily the 'best name' on scientific and/or social grounds.* As I have just pointed out, the merger of *Dryandra* and *Banksia* is not based on sound science.

Guideline 5 *Avoid epithets already in use in possible congeners.* Eighteen species names in *Dryandra* are also used in *Banksia*, so these have to be changed when all are called *Banksia*.

Guideline 6 *The preferred name is that used in most states and territories ('majority rules').* Fair enough, but the decision should still be based on good science. I'll comment further on this shortly.

Discussing changes in the nomenclature of orchids, Barker and Bates (2008) wrote that 'Herbaria ... tend to adopt a conservative approach in the adoption of new names, preferring to wait until there has been sufficient testing of new concepts and hence greater stability and acceptance of these names ... Rushing in and adopting name changes as they occur can lead to a later reversal of a decision and an unnecessary confusion of names.' A similar cautionary approach was given in regard to splitting taxa by Thiele and Brown (2008), who argued that the position accepted for the Census with respect to certain orchids 'is to retain the traditional genera ... until compelling evidence for the need to segregate is presented.'

All these guidelines and considerations advise caution when deciding whether to adopt taxonomic and nomenclatural changes for the Census, especially of large groups. Yet the Census committee has ignored them in deciding to accept the merger of *Banksia* and *Dryandra*. As far as I am aware, there has been no publicised report on how the committee reached its decision. I have been advised that the only herbarium where a discussion took place was the Western Australian Herbarium, where Kevin Thiele, one of the authors of the change, is director. The others all simply agreed in response to a request by email. No approach was made to what they call customers (users) such as those who know the plants well, the horticultural trade, the *Banksia* and *Dryandra* Study Groups (and other members) of the Australian Native Plants Society. It would be interesting to know if all those involved in the decision read the background papers? If they did—even worse if they did not—and still voted to accept the change, then all I can say is, 'heaven help Australian plant systematics until the cladistics fad passes'.

Many 'customers' are continuing to use *Dryandra*. The Banksia and Dryandra Study Groups have considered the change and rejected it. The Wildflower Society of Western Australia continues to use *Dryandra*. Very importantly, the Botanic Gardens of Adelaide list *Dryandra* in their 2010 catalogue of plants being grown there, despite the Garden's own herbarium accepting the merger 3 years ago. Clearly, many people with a working knowledge of these plants have rejected the merger. But we are left with the situation of Australian herbaria using one nomenclature and the 'customers' another.

The names of all species (except one) of *Dryandra* are valid under the *Code* in both *Dryandra* and *Banksia*, and you can choose whichever generic name you prefer. But calling a *Dryandra* a *Dryandra* tells you much more about it than calling it a *Banksia*, i.e. we have better communication of information.

Eucalyptus and *Corymbia* While the Australian herbaria have adopted the name *Corymbia*, many users continue to place all gums in *Eucalyptus*. The arguments for recognising *Corymbia* as a genus also take a cladistic analysis of molecular data as 'evidence' (Ladiges & Udovic, 2000) when in fact it is an hypothesis. A leading expert in eucalypts, Ian Brooker, is the only botanist I know who has studied all species, including seeing most species in the field. He considers that *Corymbia* is better classified as a subgenus of *Eucalyptus*. Because *Angophora* is part of the same morphological complex and has a similar position within it, he treats it, too, as a subgenus of *Eucalyptus*.

I note that the catalogue of the Botanic Gardens of Adelaide (2010) does not use *Corymbia*.

We even have the situation of the same author being involved in the transfer of species from one genus to another (Crisp & Weston, 1987) and then back again a few years later after further research (Chandler *et al.*, 2002), or revising a genus (Crisp, 1995) and then transferring it to another just seven years later (Chandler *et al.*, 2002)! Just watch this space for the next confusing instalment.

The views of users are important (Brickell *et al.*, 2008)—as happened in the case of *Chrysanthemum*. In some situations, the *Code* provides for a name change that may be necessary under its rules to be overturned. Some years ago, research showed that *Chrysanthemum* contained more variation than was considered acceptable in a genus and it was split into several genera. Under the rules, it meant that the 'florists *Chrysanthemum*' was placed in the genus *Dendranthema*. This would have affected thousands of people in the horticultural industry around the world, so a proposal was made, and accepted, to change the type or defining species of *Chrysanthemum* so that the generic name would remain in use for the 'florists *Chrysanthemum*'. No such case can be made for *Dryandra*. There is no 'court' to which any appeal can be made. Unless the Australian herbaria reverse their decision, it seems that they will follow the merger while many users continue to recognise *Dryandra*.

Conclusion

Returning to the title of my talk, I may not have helped you to decide when there are alternative names for plants, but I hope you have a better idea of the issues involved. For native plants, the Australian Plant Census is a good guide but has no formal status that requires it to be followed. The biggest difficulty is understanding the scientific background and, as is clear from what I have said, this is extremely difficult even for those in the field. And I haven't even mentioned the arguments that go on between those on the cladistic bandwagon!! To a large extent it comes down to which argument you prefer, whose work you trust, even which name you like.

As a general rule I would say: 1, check what the most authoritative list for your state or country says; 2, ask two or more botanists (if possible, with different views) for their opinion; 3, if there is a controversial nomenclature based on a cladistic study (especially one that has not included traditional taxonomic research), follow the traditional nomenclature—it is likely to be more stable in the long run.

References

- Australian Plant Census, IBIS database, Centre for Plant Biodiversity Research, Council of Heads of Australian Herbaria, viewed 19 April 2010, <http://www.chah.gov.au/apc/index.html>
- Barker, R.M. & Bates, R.J. (2008), New combinations in *Pterostylis* and *Caladenia* and other name changes in the Orchidaceae of South Australia, *Journal of the Adelaide Botanic Gardens* 22: 101–104.
- Brickell, C.D., Baum, B.R., Hettterscheid, W.L.A., Leslie, A.C., McNeill, J., Trehane, P., Vrugtman, F. & Wiersema, J.H. (eds) (2004), *International Code of Nomenclature for Cultivated Plants (I.C.N.C.P. or Cultivated Plant Code): Incorporating the Rules and Recommendations for Naming Plants in Cultivation*, 7th edn. Acta Horticulturae 647, Regnum Vegetabile vol. 144, ISHS, Leuven.
- Brickell, C.D. *et al.* (17 authors) (2008), Do the views of users of taxonomic output count for anything?, *Taxon* 57: 1047–1048.

- Catalogue of Plants 2010: Adelaide, Mount Lofty and Wittunga Botanic Gardens* (2010), Botanic Gardens of Adelaide, Adelaide.
- Chandler, G.T., Crisp, M.D., Cayzer, L.W. & Bayer, R.J. (2002), Monograph of *Gastrolobium* (Fabaceae: Mirbelieae), *Australian Systematic Botany* 15: 619–739.
- Craven, L.A., Lepschi, B.J., Broadhurst, L. & Byrne, M. (2004), Taxonomic revision of the broombush complex in Western Australia (Myrtaceae, *Melaleuca uncinata* s.l.), *Australian Systematic Botany* 17: 255–271.
- Crisp, M.D. (1995), Revision of *Brachysema* (Fabaceae: Mirbelieae), *Australian Systematic Botany* 8: 307–353.
- Crisp, M.D. & Weston, P.H. (1987), Cladistics and legume systematics, with an analysis of the Bossiaceae, Brongniartieae and Mirbelieae, pp 65–130 in C.H. Sturton (ed.), *Advances in Legume Systematics* part 3, Royal Botanic Gardens, Kew.
- Entwisle, T.J. & Weston, P.H. (2005), Majority rules, when systematists disagree, *Australian Systematic Botany* 18: 1–6.
- George, A.S. (2008), You don't have to call *Dryandra Banksia*. *Wildflower Society of Western Australia Newsletter* 46 (3): 7–9 (reprinted in *Dryandra Study Group Newsletter* 55: 2–3, 2008).
- Mast, A.R. (1998), Molecular systematics of subtribe Banksiinae (*Banksia* and *Dryandra*, Proteaceae) based on cpDNA and nrDNA sequence data: implications for taxonomy and biogeography. *Australian Systematic Botany* 11: 321–342.
- Mast, A.R. & Givnish, T.J. (2002), Historical biogeography and the origin of stomatal distributions in *Banksia* and *Dryandra* (Proteaceae) based on their cpDNA phylogeny. *American Journal of Botany* 89: 1311–1323.
- Mast, A.R., Jones, E.H. & Havery, S.P. (2005), An assessment of old and new DNA sequence evidence for the paraphyly of *Banksia* with respect to *Dryandra* (Proteaceae). *Australian Systematic Botany* 18: 75–88.
- Mast, A.R. & Thiele, K. (2007), The transfer of *Dryandra* R.Br. to *Banksia* L.f. (Proteaceae). *Australian Systematic Botany* 20: 63–71.
- McNeill, J., Barrie, F.R., Burdet, H.M., Demoulin, V., Hawkesworth, D.L., Marhold, K., Nicolson, D.H., Prado, J., Silva, P.C., Skog, J.E., Wiersema, J.H. & Turland, N.J. (eds) (2006), *International Code of Botanical Nomenclature (Vienna Code)*, Regnum Vegetabile vol. 146, A.R.G. Ganter Verlag, Ruggell.
- Orchard, T. (2006), CHAH business: Australian Plant Census, *Australian Systematic Botany Society Newsletter* 126: 30–31.
- Thiele, K.R. & Brown, A.P. (2007), Recombinations in Western Australian Orchidaceae 1, *Nuytsia* 16: 473–474.
- Thiele, K.R. (2008a), Why dryandras have changed their name. <http://florabase.dec.wa.gov.au/articles/dryandra-banksia/> accessed 16 June 2008
- Thiele, K. (2008b), Dryandras are banksias! *Western Wildlife* 12 (3): 6–7.
- Thiele, K.R. (2009), *Banksia recurvistylis* (Proteaceae), a new species from Western Australia. *Nuytsia* 19: 277–281.
- Thiele, K.R. & Brown, A.P. (2007), Recombinations in Western Australian Orchidaceae 1. *Nuytsia* 16: 473–474.
- Thiele, K.R. & Ladiges, P.Y. (1996), A cladistic analysis of *Banksia* (Proteaceae). *Australian Systematic Botany* 9: 661–733.

A.S.G.A.P. Dryandra Study Group
List of members as at 30/06/2010

Keith Alcock, Kalamunda, W.A. 6926
 Lyn Alcock, Burnie, Tas. 7320
 Ian Anderson, Hughes, ACT 2605
 John Armstrong, Rye, Vic. 3041
 Tony Cavanagh, Ocean Grove, Vic. 3226
 Kevin and Kathy Collins, Mt. Barker, W.A. 6324
 Dennis Craig, Bunbury, W.A. 6230
 Val Crowley, Darkan, W.A. 6392
 Judy English, Albany, WA 6331
 Max Ewer, Avenue Range, S.A. 5273
 Alex George, Kardinya, W.A. 6163
 Elizabeth George, Alexander Heights, W.A. 6064
 Melinda Johnson, Aptos, California, USA
 David Lightfoot, Surrey Hills, Vic. 3127
 Randall Linke, Davenport, California, USA
 Neil Marriott, Stawell, Vic. 3380
 Bob O'Neill, Wandin, Vic. 3139
 Margaret Pieroni, Denmark, W.A. 6333
 Zdenek Pompl, Plzen, Czech Republic, EU.
 David Randall, Cobram, Vic. 3644
 Erica Shedley, Bridgetown, WA 6255
 Jan Sked, Lawnton, Qld. 4501
 Kath Sykes, Hawthorn East, Vic. 3123
 Hartley Tobin, The Gurdies, Vic. 3984
 Rodney Tonkin, Stawell, Vic. 3380
 Phil Trickett, Ainslie, A.C.T. 2602
 Liesbeth Uijtewaal-de-Vries, Neer, The Netherlands
 Pat (Urbonas) Laher, Armidale, NSW, 2350
 Christene Wadey, North Eltham, Vic. 3095
 Don & Joy Williams, Badgingarra, W.A. 6521

Other groups and organizations
 Battye Library, Perth, W.A. 6000
 Library, Australian National Botanic Gardens, Canberra
 Library, Deakin University, Geelong, Vic.
 Library, National Herbarium, South Yarra, Vic.
 Editor, *Australian Plants*, Sydney, N.S.W.
 Editor, *Native Plants for New South Wales*, Sydney, N.S.W.
 Editor, *ANPSA Newsletter*
 Editor, *Australian Plants On-line*, and ASGAP
 Webmaster, N.S.W.
 Study Group Co-ordinator

S.G.A.P. Regional and State Groups

Armidale and District, N.S.W.
 Blue Mountains, N.S.W.
 Fleurieu, S.A.
 Latrobe Valley, Vic.
 Maroondah, Vic.
 Melton and Bacchus Marsh, Vic.
 New South Wales.
 Queensland
 South Australia.
 Tasmania.
 Victoria
 W.A. Wildflower Society

A.S.G.A.P. DRYANDRA STUDY GROUP

SUBSCRIPTIONS FOR 2010- 2011

The group's year runs from July 1, 2010 to June 30, 2011. Subscriptions are \$8.00 for Australian members and \$10.00 for overseas. Please make cheques payable to the Dryandra Study Group and forward to Margaret. Thanks to all those who have paid.

Name :

Address :

COMMENTS OR SUGGESTIONS FOR INFORMATION:
