

DRYANDRA STUDY GROUP
NEWSLETTER NO. 56



Dryandra lepidorhiza

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ASSOCIATION OF SOCIETIES FOR GROWING
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Dryandra lepidorhiza is another dryandra with underground stems. It is known from just a few small populations between Cranbrook and Woodanilling. The flower heads, in late spring, appear at the ends of the scaly stems around the outside of the plant. Buds develop under the soil. It grows very well in the gravelly soils here in Denmark and at Mt. Barker.

DRYANDRA STUDY GROUP

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The Dryandra Study Group will continue

Welcome from heatwave Victoria to our first Newsletter for 2009.

As I write this, the temperature has dropped from 46 to 44° C, yesterday was 43 and tomorrow is expected to be 43° C – who says it doesn't get hot in southern Victoria! So far, my dryandras and most of the garden are holding up but if things go on like this much longer, I can see wholesale deaths. Our biggest trouble is trying to keep water up to our orchard and vegetable garden from tanks that are rapidly emptying and have had no rain since before Christmas. 2009 will not go down as a good year.

Many thanks to all members who wrote in or contacted Margaret or myself about the future of the Study Group. The written comments are included later in the Newsletter – thanks to David Lightfoot, Ian Anderson, Max Ewer, Kath Sykes, Hartly Tobin, Elizabeth George, Pat Laher (Urbonas), Dennis Craig, Rodney Tonkin, Don and Joy Williams. There was unanimous agreement that the Group should continue under its own name and I for one will continue to fight for the reinstatement of the name *Dryandra* in the botanical literature. I have published a short article from Barbara Buchanan which I inadvertently overlooked for the previous Newsletter. She is less pessimistic than many of us and suggests that some form of common names system might help to overcome the upheaval due to constant (scientific) name changes. It is obvious that the situation is not going to settle down any time soon.

Margaret continues her very interesting series "Looking back", which contains much interesting history of the discovery of new species and new locations for old species. The next article from Professor Niels Pedersen is somewhat technical but it does consider the very important aspect of genetics and genetic theory behind the use of DNA arguments to classify plants. His views very much favour many of our intuitive beliefs and certainly show that the "science" is not by any means clearcut. I commend his last three sentences to everyone. Kevin Collins prepared his article at my request. I asked him because he is in the unique position of knowing more about banksias and dryandras as garden plants than virtually anyone else. He also conducts tours at Banksia Farm and is constantly asked about the differences between the two genera, so I hope that his information gives us further material in the "battle". Margaret has also written about Fred Hort who has contributed so much to the WA flora by finding both new species and new and long-lost populations of rare and endangered plants. The picture of aff. *meganotia* in the photo page is from him. Margaret also has had a busy time showing visitors around the lovely My Lindesay area near Denmark, and increasing the number of dryandras in her garden. The pictures of the very healthy *D. lepidorhiza* in the photo page are from her. Thanks also to Hartley Tobin for bringing us up to date with his dryandras. We are always interested in learning of member's successes and failures so please drop us a line telling us how your garden is surviving the drought. Lastly, I have included information about the *Dryandra* Digital Archive, a project to collect pictures of all *Dryandra* taxa as digital images. We intend to put this together in the future as a CD/DVD once we have all taxa photographed. Please contact me if you have any questions.

Happy *Dryandra* growing



Tony

Looking Back (continued)

From a letter to Keith Alcock in Victoria dated 21/10/1985 from Margaret Pieroni in Perth. Updates of names and other comments are in italics, in brackets.

It's a long time since I wrote to tell you about my dryandra finds this year.

I hope you can use the slides. I have been taking two at once, so you may keep these. I am getting together my own collection of dryandra slides. I feel I am getting to the stage where I could give a talk on them at one of our (*Wildflower Society*) meetings. I'm gradually getting to recognise the different species. Each time I go on an excursion I learn at least one more. I have found the Study Group newsletters most helpful and more particularly, your letters. The leaf prints in the newsletters are invaluable as a guide to identification.

The Dongalocking trip went very well in spite of very bad weather. Fortunately we had the use of the shearers' quarters on a farm near the reserve. It would have been impossible to erect a tent or have a camp fire. Dryandras we saw there included *D. armata* (var. *ignicida*), and *D. conferta* in flower and *D. vestita*, *D. erythrocephala*, *D. seneciifolia* (*D. columnaris*), *D. nivea* and *D. cuneata* were also in flower. I have sent slides of these.

Just before we left the reserve on Sunday, I found the two plants of *D. drummondii* (on the slides), one with a couple of flowers on it. (*D. octotriginta*). Incidentally, my *D. drummondii* is in flower now. The buds are quite purple. (*D. drummondii* subsp. *drummondii*). I have photographed them and I am waiting for a flower to open fully. Nothing about my plant looks much like the Dongalocking or Badgingarra (Hi-Vallee) form. (*D. catoglypta*). I was disappointed in the slides from Dongalocking. I had them processed locally and never will again. I've used Agfa for thirty years and never under-exposed it but the slides were too dark and the reds and pinks were lacking. I've changed to Fujichrome, now and I am very happy with it so far. (*The Agfa slides faded subsequently and were useless for the book. I stuck to Fuji film.*)

The Jurien weekend was also very successful. Ted Griffin was an excellent guide to the flora of the area. We drove along Cockleshell Gully Road on the Saturday afternoon and the flowers were superb. I was particularly looking for *D. tridentata* and *D. subulata* because, according to *Flowers and Plants of Western Australia*, they both flower in September-October.

We found *D. tridentata* all right and I was surprised to see that it had terminal flowers on top of the bush. Later, we found some plants with both terminal flowers and, as you can see in the slide, some also right down on the ground. In a burnt area, we found *D. bipinnatifida* (subsp. *multifida*) just opening – my first chance to photograph it. That was just the first dryandra that I wasn't expecting to see in flower. The others were: *D. nana*, *D. tridentata* and *D. subulata*.

The Jurien Road, the next day was rich in dryandras. I forgot to mention the ones we saw on the way up on Saturday morning – *D. kippistiana* and the ? aff. *polycephala* (*D. echinata*), two km south of Mogumber and *D. carlinoides* on the North West Road, between Moora and Badgingarra. We also saw *D. kippistiana* and *D. carlinoides* in the Badgingarra – Eneabba area, but not such good specimens. They were poorer plants with sooty mould on them.

On Sunday (30th Sept.), we drove out along Jurien Road to Coomallo for lunch, stopping at various locations. About two thirds of the way to the Brand Hwy, we stopped on a laterite hill to look at the abundant Proteaceae species. Apart from dryandras, there was *Conospermum nervosum*, *Petrophile*

linearis and *P. brevifolia* and several beautiful hybrids of the two, apparently, with cream and pink flowers and one pure white one.

I was anxious to see *D. nana* in flower and, at last, there they were. I took several close-ups and the whole plant. There wasn't enough light without the sun so I had to use a flash. Then, when the sun came out, I took some more. They were not all very successful, though. We found *D. sclerophylla* there and *D. bipinnatifida* further out than the one of the previous day. They were the only two in flower of all the many plants of this species that we saw during the trip. Sp. C aff. *falcata* (*D. glauca*) was also there, still flowering well. I had already photographed it in July.

After lunch, we drove along Tootbardi Road, as far as Alexander Morrison National Park. Another exciting find was *D. serratuloides* (subsp. *perissa*). Ted pointed out the plants and, after a bit of searching, we found the buds opening that I photographed. It was growing with *D. speciosa* (subsp. *macrocarpa*). At the next stop, I asked Ted when I should start looking for *D. subulata* and he pointed out that I was just about to step on one! Sure enough, there it was, looking just like a clump of grass that, on closer inspection, had a wreath of spent flowers below it. I was disappointed to realise that the flowering period, according to my book, wasn't correct. I have since looked up Ken Newbey's *WA Plants for Horticulture* and he gives July as the month. At the same spot, I counted twelve species of dryandra. (Is this a record?) They were: *D. bipinnatifida*, *D. conferta* - a very fine leaf form, identified by Ted which looked almost like *D. seneciifolia* (*D. platycarpa*), *D. kippistiana*, *D. nivea* (probably *D. stenoprion*), *D. nana*, *D. sclerophylla*, *D. shuttleworthiana*, *D. subulata*, *D. speciosa*, *D. carlinoides*, *D. sessilis* (var. *flabellifolia*) and *D. vestita*. At our last stop, we also found the *D. pteridifolia* (subsp. *vernalis*), in flower.

On our way home, on Monday, I photographed *D. sp. I*, aff. *patens* (*D. stricta*) still flowering well, (since July) where it is growing thickly on a gravelly hill top. Closer to Perth, between Mogumber and Bindoon, I photographed *D. hewardiana*.

I didn't have an opportunity to visit the Williams. They were in Perth for the Kings Park Wildflower Show and they weren't able to join us at Jurien on the Sunday. In any case, I had to drive almost to Eneabba on Monday morning to collect a verticordia, *V. aff. nitens* (*V. aurea*), to paint.

For a few days, from 7th October, I took two friends from the Wildflower Society to the Stirling Ranges. My objective was to see some more dryandras and to collect two more verticordias to paint. Before leaving, I marked the locations of the dryandras, according to your article in the '84 newsletter, on my map of the Stirlings and planned our itinerary accordingly. We found every one of the dryandras, thanks to your excellent account and the leaf prints.

On Monday afternoon, I drove down to the southern boundary of the National Park and we found the ones you mentioned, though none were in flower. We looked in vain for *D. cuneata* and *D. falcata* flowers. On Tuesday morning, we climbed Mount Trio, finding some magnificent *D. formosa* in flower - most nearly spent. At the top, we found *D. concinna*, as you expected. All the flowers except the one I photographed were finished, however *D. foliolata* bushes were quite spectacular, with new growth but only just in bud. Once again, *D. falcata* had no sign of flowers.

In the afternoon, we drove along Stirling Range Drive and more *D. foliolata*, this time with the buds just beginning to open. *D. drummondii* was in bud - mine at home were further out - so I photographed the plants in their natural habitat.

Coming home on Wednesday, along Salt River Road, I was delighted to find, in a gravel pit along with the two verticordias, some magnificent, small plants of *D. falcata* in full flower. Also in the same spot were: *D. cirsioides*, *D. conferta*, (var *parva*), *D. plumosa*, (*D. pseudoplumosa*), and *D. drummondii* (subsp. *drummondii*).

Last week, our Hyden – Frank Hann National Park – Newdegate Wildflower trip with Kevin Coate was a fitting climax to a year of wonderful wildflower trips. Once again, I was on the look out for dryandras and I wasn't disappointed. As well, though, we saw many outstanding and, to us, new grevilleas. Other genera such as verticordias were flowering profusely. One of the highlights was a plant I'd seen many photographs of in books and was always keen to find – *Eremophila calorhabdos*. It was stunning. Everyone on the bus was thrilled when we saw it in Frank Hann NP. It was almost three metres tall with four spikes of beautiful, red flowers on the top.

East of Hyden, we found *Dryandra conferta* (var. *conferta*), a form similar to the Stirlings one but taller, some of them were perfect columns with many flowers, most of them almost spent.

I've got ahead of myself a bit; on the way to Hyden we revisited a lovely reserve at Corrigin, where we'd had lunch on the last day of the Flinders Ranges trip I did with Coates Tours, last month. At the time, I'd seen *D. cirsioides* and *D. conferta* (*D. fasciculata*) in flower and another dryandra in bud which I decided must be *D. ferruginea* – the small-flowered form. I was anxious to return to see it in full flower. (*D. ferruginea* subsp. *obliquiloba*). The buds, last month, were quite visible, among the foliage but now, the leaves had grown so as to completely hide the flowers. Nevertheless, they were there in all their glory and everyone was delighted to see them and many photos were taken.

When I planned the trip with Kevin, we intended to take the road, marked on my map, from the junction with the Hyden – Norseman road, south, past Hatter Hill to the Lake King – Norseman road (*Forrestiana – Southern Cross Rd*) and then east, through Frank Hann NP. I happened to be looking at a more recent map, however and discovered that the road no longer exists from north of Hatter Hill. I tried to find out about it from the RAC, Main Roads etc., but they couldn't help. So Kevin said he'd check it out. Little did I know that he intended to drive all the way out there and look at all the roads to see if it was possible to get through, but that's exactly what he did, in the couple of days that he had free, just before we left! He had even checked up on our camping site and had decided on driving to the end of the park and camping at the 90 mile tanks. I was resigned to not being able to get to Hatter Hill to see *D. sp. D*, aff. *nivea* (*D. viscida*).

We went as far as the turn - off to Forrestiana Rd and found a brand new sign erected, since we passed through a month ago and the road south was sign-posted 'Lake Varley'. The road has been re-routed and we had to go via Lake King but it avoided having to backtrack almost to Hyden again. About half-way along we passed Middle Ironcap so we stopped to look for sp. D – and we found it! There were several small, sprawling plants on the slope, not far from the road. I found a spent flower to photograph which will give you an idea of its shape. We tried to find some seed but it was difficult because the old flower heads are extremely resinous and our fingers were getting decidedly sticky. About a kilometre further on, we stopped to photograph a spectacular dampiera and discovered some beautifully mounded plants of sp. D.

Just as we reached Frank Hann NP, we stopped to look at a grevillea and I found a prostrate dryandra which I now realise is another form of *D. ferruginea*. The leaves are much smaller and we could only find one plant in bud, only just opening, although we searched the area. The next day, we stopped at the vermin fence for lunch because there were many colourful plants there, especially

verticordias and there, near the road where there has been some disturbance of the soil was a much more robust plant with about 10 flower heads. (*D. ferruginea* subsp. *flavescens*). In my excitement, I did manage to think to collect a piece as well as taking several photos. Is it the same as your 'north of Hyden' form? (*It wasn't. I have recently established that the one north of Hyden is subsp. chelomacarpa*).

We met up with two members of the Wildflower Society at Newdegate on the Thursday and they showed us some beautiful wildflower spots on the way to the farm of one of them, Rosemary Cugley. She and her husband have fenced off a marvellous patch of many different species including a rare grevillea, *G. prostrata*. We had lunch there and a good look around the area. I found a dryandra there which I think is a form of *D. pteridifolia* (subsp. *inretita*) and one in flower to photograph.

One dryandra that we saw at almost every place we stopped at, on the trip was *D. erythrocephala* – one I still haven't seen in flower. At Tarin Rock reserve, I found plants of *D. ferruginea* (subsp. *ferruginea*), though not in flower.

Near Harrismith, we saw several dryandras including one I didn't know. Perhaps it was *D. armata* (upright), *purdieana* or *cirsioides*? (*It was probably the problematic, supposed purdieana X cirsioides*).

Altogether, I had a very satisfactory year as regards learning to identify dryandras, thanks to Ted Griffin at Jurien and your information from newsletters and personal correspondence. There are still many confusing ones, as you have remarked and I believe that Alex George, who has started to describe them, by the way, has said that there will be quite a few new species. There are at least 50 new verticordias, many of them discovered by Elizabeth and her collectors.

I still have seedlings of *D. arctotidis* (*D. brownii*), *D. preissii* (*D. shanklandiorum*), *D. aff. pteridifolia* Newdegate (*D. pteridifolia* subsp. *inretita*) and *D. ferruginea* North of Hyden (subsp. *chelomacarpa*). All but one of Don Williams' *aff. nobilis* (subsp. *fragrans*) have died. I just hope they will survive the summer.

I hope you received the last lot of slides and a drawing of *D. fraseri* and they will be of use. I'm looking forward to hearing from you and reading newsletter No. 13.

To be continued

Margaret Pieroni 1/12/08

Comments from members regarding proposed absorption of *Dryandra* into *Banksia* and the future of the Study Group

Thanks for the arguments for and against the name change. A change does not seem justified. The *Dryandra* Study Group should continue.

I do not agree with *Dryandra* being included in the *Banksia* genus and think the Study Group should carry on, provided Margaret Pieroni and Tony Cavanagh agree to. This seems like an ill-conceived idea to amalgamate the two genera, without due consultation with anyone else! Botanical names are supposed to make it easier for plants to be identified, not only by curators of Herbaria!

Please keep on keeping on in order to save the genus *Dryandra*.

Dryandra must remain *Dryandra*.

I, for one favour the status quo. That is, that we ignore the revision that sees all *Dryandra* reclassified as *Banksia*. I read Alex's article in the WSWA newsletter and agree with his views. Regarding Kevin's comments that all *Grevillea* will probably end up being *Hakea*, well this is getting ridiculous!

The name change seems a lot of rubbish

Stick to the name *Dryandra* – it's early days yet.

I agree with Alex, Kevin C. and Randy Linke's sentiments (and yours). Thanks for the great newsletter and, Margaret, for the trip back to the eighties – brought back some good memories. My *Dryandra catoglypta* was magnificent this year – so many tightly packed flowers I couldn't count them! I'm sure it likes the gravel/sand mix among granite rocks, raised about ½ a metre and very well drained. Apart from the first summer, when it received an occasional drink, it has not been watered even during 40° plus temperatures. I hope it isn't the last newsletter and look forward to reading the next one.

Newsletter no.55 was very interesting, as usual. I hope it will not be the last *Dryandra* Study Group newsletter. I have followed the articles, in relation to the *Dryandra/Banksia* situation, in *Australian Plants*, the state journals of WA and Victoria and this *Dryandra* newsletter and I do not feel that I could ever call a *Dryandra* a *Banksia*. With only a little background in taxonomy and none in cladistics, I would not attempt to get in the discussion any more than to say that the last two paragraphs in Alex George's article sum up my thoughts very nicely.

I have read with interest the articles in the latest bumper *Dryandra* Study group newsletter. I wholeheartedly support the retention of the study group and the name of the Genus. Like many of the correspondents, I think Mast and Thiele's work actually supports what we already knew, that *Dryandras* are closely related to *Banksia*. It's great that modern science supports what the taxonomists have been saying for generations. Indeed their work may result in a splitting of the genus *Banksia*, as was also alluded to by other correspondents. (e.g. The *Isostylis* group have always struck me as being very different from other *Banksias*). As I have mentioned to you before, one only has to look at the example of Humans and Chimpanzees, to see the danger in DNA work in isolation. These two species are clearly different and belong in different genera, but share something like 98% of their DNA. Yes they are related and share a common ancestor but they are clearly different. This could equally be said for *Dryandras* and *Banksias*. I worry that the WA herbarium has rushed in and (in my opinion prematurely) accepted the opinion of these two botanists whilst the jury is still out. I note that arguably the most prestigious botanical institution in the country, the National Herbarium of Victoria, has not accepted this opinion and retains the *Dryandra* genus. In conclusion I would say fear not *Dryandraphiles*, the jury is still out, and we should retain the genus' and study group's name.



Left and below right:
Dryandra lepidorhiza Sept. 08

Below left: *Dryandra* aff. *meganotia*
Albany Hwy site, near Mt Cook, Nov. 08



The "New Taxonomy" – another point of view

(Editor's Note: I recently received several emails from Professor Niels Pedersen of the University of California, Davis and have combined them to put an alternative point of view for the "technical" (genetic) aspects of the current *Dryandra/Banksia* controversy. Professor Pedersen is a specialist in animal and virus genetics but as a "hobby", has a long standing interest in Australian and South African flora (he has visited Australia almost every season for the last 20 years.) The following material is somewhat technical but supplies something that I have long wanted to see – some explanation of the genetics and genetic theory behind the use of DNA arguments to classify plants and animals. Professor Pedersen asked me to emphasize that he quoted and used many of the arguments which first appeared in a Commentary by A.R. Kruckeberg of the Botany Department of the University of Washington, Seattle entitled "Essay: Whither plant taxonomy in the 21st century?" (*Systematic Botany*, (1997), vol. 22, issue 1, pages 181-2), "because I thought that his comments were so appropriate".

"Here is an interesting article on modern plant taxonomy. What Dr. Kruckeberg is saying is that we sometimes get ahead of ourselves with science. Taxonomy was originally based on similarities in various structures, whether plant, animal, micro- or macro-organisms. This worked very well but there were a few organisms that did not quite fit right. A number of various "assays" were progressively designed to try to resolve these inconsistencies, and in many cases, they did so. However, there were still some inconsistencies left over. We are now in the age of molecular taxonomy, which Dr. Kruckeberg sees as another fad that will be replaced by something else. The problem with all bench taxonomists, is that they tend to be young-turks out to solve the inconsistencies and in the process to rename things. Renaming is like a dog peeing on a tree trunk; it establishes your dominance in the field. The young like nothing better than to prove the old wrong. The great limitation of molecular taxonomy is that it only compares a few basic genes, using a handful of procedures. If you looked at 98% of the genes of humans that are the same as those of chimps, you would definitely say that humans and chimps belong to the same genera because by modern genetic comparisons they have common ancestors that possess those identical genes. Note his statement – ["will the gel jocks be able to key out a plant or recognize a phlox from a penstemon? And even if they may still possess venerable skills, will they take the time away from electrophoretic grantsmanship to keep "field-fit."]. Alex George is the field guy that is saying to the gel jocks, why don't you just come out and take a look? Ultimately, correct classification will always be based on classical taxonomy and fine tuned by other techniques when necessary. I am surprised that the scientists chose *Dryandra* and *Banksia* to resolve, and not *Grevillea*. That is a genus that really could use some genetic input."

"I have never had a bit of problem discerning a *Banksia* from a *Dryandra* and was dumfounded when they decided to lump the *Dryandra* with *Banksia* on the basis of a few genes. They do this all the time in microbiology and we often have the same debates. Some seem to forget that there is both a **genotype** and a **phenotype** and that the same or similar genes in one species can manifest themselves differently, depending on the other genetic and epigenetic forces that are acting upon them."

"I do agree that we really should not make rash decisions when it concerns well established genera. There is no question that all *Banksia*, and all *Dryandra*, have distinct phenotypic traits that have placed them as closely related but distinct genera. Each of these unique phenotypic traits is under the control of a unique form of a gene that is common to one or the other genera. In other words, we need to look more closely to the genetic basis of phenotypes as well as to similarities of the genome as a whole. Most genes in the genome have a small and common effect on an organism and its close relatives. In contrast, the genes that determine phenotype are not numerous and they obviously have a large rather than a small and common effect. This concept of a small number of genes of

great effect has become widely accepted as the basis for breeds, species, and every other level of classification and of Darwinian evolution itself. Therefore, modern geneticists should concentrate on common genes of small effect for gross taxonomic classification and the small number of genes that have the greatest effect on the phenotype when considering fine classification. **The problem in this particular controversy (ie *Dryandra/Banksia* – editor) is that genes of small and common effects are being used to do fine classification.** (Emphasis mine, editor). I hope that people will back down for a while and let the new technology be slowly considered and integrated into all that has gone before. I also think that it should be applied first to situations where controversy or questions exist and not to situations where there is little argument. I suspect that this will happen in this circumstance, because common sense mandates it.”

Niels Pedersen

January 2009

Definition of “genotype” and “phenotype” and their distinction – from the online Wikipedia free encyclopedia.

“The **genotype-phenotype distinction** is drawn in genetics. "Genotype" is an organism's full hereditary information, even if not expressed. "Phenotype" is an organism's actual observed properties, such as morphology, development, or behavior. This distinction is fundamental in the study of inheritance of traits and their evolution.

The genotype represents its exact *genetic makeup* — the particular set of genes it possesses. Two organisms whose genes differ at even one locus (position in their genome) are said to have different genotypes. The transmission of genes from parents to offspring is under the control of precise molecular mechanisms. The discovery of these mechanisms and their manifestations began with Mendel and comprises the field of genetics.

It is the organism's physical properties that directly determine its chances of survival and reproductive output, while the inheritance of physical properties occurs only as a secondary consequence of the inheritance of genes. Therefore, to properly understand the theory of evolution via natural selection, one must understand the genotype-phenotype distinction.”

Dryandra Merger.

I thoroughly enjoyed Kevin Thiele's explanation of his position on the relationship between banksias and dryandras. I think it is one of the clearest explanations of the ins and outs of taxonomy that I have read, maybe helped by the use of Australian flora as examples.

I have one small niggle from the first page. The rule of the International Code of Botanical Nomenclature which gives priority to the first valid name allotted to a species. There are supposed to be possibilities to vary this rule, but it seems to be impossible to achieve this; I am thinking of the *Rhododendron lochae* situation a few years back when common sense counted for nought. It seems to me that Australian plants suffer under this rule when they have been described first in an obscure European journal no-one has read and then redescribed with a new name which is taken up and used for years. Then a current botanist revisits the group, perhaps as part of the work for the Flora of Australia, and finds the unused original which then immediately replaces the name in current use. If only botanists are involved I have no objection, but nurseries and gardeners have been trying to use the correct scientific name for plants too. I cannot agree that this a sensible rule as it is applied so inflexibly. There are enough changes due to increasing knowledge which are more than enough for me to cope with.

I taught Biology at first year tertiary level for some 15-20 years and encouraged the students, who were going to be chemists, not botanists or zoologists, to accept and use the scientific names for plants. There is a dilemma here, we never talk of *Tachyglottus aculeatus* only the echidna. It now seems this may be one way to cope with the latest research, to develop a set of common names which will stick with each plant whatever happens to its classification. This opens a Pandora's box and it could be an area where APS takes a leading role in establishing a standard. For it seems certain to me that dryandras and banksias won't be the only groups involved, eucalypts have also suffered and I gather melaleucas and callistemons and grevilleas and hakeas are also under study. These are some of the most obvious, familiar groups, there are sure to be plenty of less well known ones waiting to be recognised.

As a biologist, although a very out of date one, I am intrigued and delighted by the work of Kevin Thiele and his collaborator. It represents evolution in action, a welcome boost when the concept is denied by many on religious, not scientific grounds. As a still active gardener I have taken longer to accept it fully but I now feel we must make the adjustments and find our own naming system. Apart from setting up common name standards we could possibly use trinomials based on scientific ones. This would continue the pronunciation problems, still be subject to updates, and be very cumbersome.... think of writing the labels. Most exotic plants are widely grown under common names although keen gardeners add the scientific for all but the most common.

When a favourite plant dies, we cope by looking on the space created as an opportunity. This new view of dryandras and banksias also creates opportunities; I envy the young biologists the chance to be part of the action. We gardeners also have a chance to be part of posterity, establishing a practical acceptable naming system which will simplify life for our gardening descendants.

Barbara Buchanan

Some major differences and distinguishing features between the *Dryandra* genus and the *Banksia* genus

From Kevin Collins, proprietor with wife Kathy of Banksia Farm.

Banksia Farm at Mount Barker in Western Australia is currently the world's only complete arboretum of *Banksia*. Our three hectare property also contains an extensive collection of *Dryandra* with the majority of species and infra-generic taxa along with many other Proteaceae and showy native species.

Our planting on a bare farm paddock commenced in 1985 and on achieving all *Banksia* species by 1993, we decided to share our plants and expertise with the wider public and opened as a tourist botanical garden. All the plants are professionally labelled and walk paths established.

During our operations over the past fifteen years we have concentrated our education on the Proteaceae family of plants with specific focus on *Banksia* and *Dryandra*. Other genera such as *Grevillea*, *Hakea*, *Adenanthos*, *Petrophile*, *Lambertia* etc are used to show the linkages between genera and to point out the specific differences to assist in easy identification. The different genera show great examples of the diversity of foliage, placing them aptly in Proteaceae, which was named after Proteus, the Greek sea god and a God of "many shapes and forms".

We explain that all Proteaceae have winged seeds that fly. The aerodynamic features vary across the genera with winged seed that spin and fly with wind, to transport and spread seeds eg. *Banksia*, *Dryandra* & *Hakea* to genera such as *Petrophile*, *Isopogon* having parachute-like wings or attachments on the seeds to disperse them. Examples are shown to visitors with demonstration of flying techniques.

I, Kevin, a plant enthusiast and educator strongly disagree with the DNA re-classification of *Dryandra*, and their absorption into the genus *Banksia*. I, along with many others including pre-eminent botanists, researchers and plant enthusiasts, do not accept the new naming and the deletion of the genus *Dryandra*. This is unprecedented and not warranted. The DNA observations are interesting and noteworthy but serve no useful purpose for plant observation and identity. It is undoubtedly a useful tool for scientists and should remain in that realm.

For identification purpose, the previous taxonomic classification is excellent. Combining the two genera without any consideration of sub-genera, section or series division makes it a daunting and confusing genus, impossible for the non-scientist. The public do not have DNA kits to enable any conclusion on identity.

Some Botanical and other Differences between *Dryandra* and *Banksia*

In my daily operations in talks and with hand out sheets I show the clear differences between *Banksia* & *Dryandra* as this is a question often asked.

The first and key difference is the **seed holding mechanism** which is also relevant to other genera of Proteaceae.

Pollinated *Banksia* flowers produce a follicle that is imbedded deep into a dense wooden core. These follicles cannot be pulled from the fruiting cone. The sub-section *Isostylis*, are only slightly imbedded, but are still more firmly attached than in *Dryandra*. *Dryandra* follicles are attached to a small wooden base by thin "umbilical cords" which can be easily broken by pulling with your fingers to remove them from the seed housing. The housing is not solid wood as in *Banksia*, but consists of retained dense florets, encapsulated by retained inflorescence bracts which often hide the follicles. They are typically in small vase like containers which can be readily cut open with secateurs from the stem side to find the follicles within and simply pulled away from the base. Some have inflorescence bracts totally encapsulating the seed holder

whilst others have shorter bracts that don't cover the follicles. Others have bracts that are insignificant, or fall away, eg. *D.sessilis*, in which the follicles are more visible, resembling those of the *Isostylis* group of *Banksia*. The follicles however can still be broken from the base by pulling with your fingers.

A second indicator is the **retention of inflorescence bracts**. The majority of *Banksia* have no visible or significant bracts whereas those in *Dryandras* are visible and often a key component of the housing mechanism.

A third clear difference explained is the **fire resistant characteristic** of the two genera.

Banksia fruiting cones are protected from fire by dense floral bracts forming the outer coating of the cone. This is a woolly coating, velvet like, that singes, blackens and goes out in a fire to save the cone. The seeds deeply imbedded within the wooden core are insulated against the severe heat and saved from being cooked. *Banksias* with exposed follicles (ones with dead florets that fall away) will often open, without fire. However, should a fire occur, the velvet floral bracts still act to save the seeds in the follicles.

The species with dead florets retained utilise them to block the sun, and as fuel to generate sufficient heat to split the follicles open during a fire.

Dryandras in contrast do not have dense wooden cones with velvety fire resistant bracts. They rely on the retained floral parts for protection. The bushes are denser in habit with foliage closer to the seed containers, which when burnt provides the heat sufficient to pop the top of the follicles open. The retained dense flowers surrounding the follicles are the fire protection as they singe and then stop burning. This is different to *Banksia* florets which burn mostly away generating the extra heat required to open the stronger wooden follicles in the cones. In fact most *Dryandra* follicles once removed can be snipped on the edges and prised open with fingers to retrieve the seeds. This is not possible with *Banksia* follicles.

Another general difference is the **nature of the plants**. *Dryandra*'s rarely exceed 2m shrubs and are predominantly 1m and less with many having underground stems with spreading habit or growing in small clumps. *Banksias* are, with the exception of a few ground creeping varieties, larger, more prominent upright shrubs with some species growing to very large trees, 30m tall and greater than 1m in trunk diameter.

A further difference is the **number of flowers & shapes of inflorescence** (flower head). *Banksias* typically range from hundreds to thousands in cylindrical, spherical or occasionally domed shaped inflorescences. *Dryandras* have smaller flower heads with tens to hundreds of flowers in small vase like containers (the receptacle). But they also have straight styled species (thistle like in appearance), looped styled species (Chinese lantern like) with other species having small cylindrical to ovoid shaped flower heads, quite different to *Banksia* inflorescences in appearance.

Some final thoughts

Taxonomy still requires visual traits for public identification. The focus of botany needs to remain in easily explained, systematic botany terms with visual traits to maintain public interest. The public interest provides the incentives for funding and preservation of our plants, animals and forests. Science based taxonomy does not provide the same stimulus and often is employed by multi-national enterprises as a tool to allow exploitation of our dwindling resources. eg. forests & minerals. Such exploitation may result in loss of natural habitat, although science based taxonomy may also provide techniques to identify and save rare plants and animals. There is thus room for traditional and the "new" taxonomy and in the particular situation of *Dryandra* and *Banksia*, more good is served by leaving them as two separate genera.

The Amazing Fred Hort

I first met Fred in 2001, when he gave a talk to the Wildflower Society about his explorations and botanical discoveries. A retired school teacher and volunteer collector for the WA Herbarium, he spends days on end exploring the bush, mostly off the 'beaten track' where he has made many new discoveries as well as finding new and long-lost populations of declared rare flora including *Dryandra aurantia* and *D. mimica*. His commitment and enthusiasm impressed and inspired us all.

At the meeting, Fred showed a new petrophile that he had discovered, since named *Petrophile antecedens*. I recognised it as probably one that Ray Garstone had found west of Woodanilling. He had drawn me a map showing the location of the plant at a reserve where he had shown Alex George and I *Dryandra lepidorhiza* in 1986. On various visits to the location, I failed to find it. I spoke to Fred after the meeting and he offered to take me to see it. Later, Fred and his lovely wife, Jean took me to what is now the Wandoo Nature Reserve, south west of York to see several populations of the petrophile.

Fred got in touch with me again when he found a new dryandra, named *D. prionotes* by Alex. (See Newsletter no. 44, January 2003).

A year or so later, in December, Fred phoned to tell me about a dryandra he had found in Wandering Nature Reserve, not far from Albany Highway, about 85 km. south east of Perth. We made plans to go and see it as soon as possible, although it was not in flower. On the top of a laterite hill and down into a valley was a large population of bushy shrubs which I identified as *Dryandra meganotia*. Typical *D. meganotia* is a low, sprawling or columnar plant with a lignotuber that occurs near granite in the 'Great Southern' region. (Hence the name *meganotia*, meaning great southern). I could see that these plants were larger and bushier than the type and they were growing in laterite in wandoo woodland and not in the Great Southern. I included the location in *The Dryandras*.

Last year, Fred contacted me to tell me that he had found yet more locations, closer to Perth. He sent me some photos of dense populations in jarrah forest clearings and mentioned that they were killed by fire – he'd found lots of seedlings after a recent burn. I was amazed that these plants hadn't been discovered earlier but also because I hadn't realised, when I first saw this dryandra, that it doesn't have a lignotuber and so must represent a new taxon.

I caught up with Fred and Jean when Kevin Collins and I went to Perth last month for the launch of *Orchids of Western Australia*. Yes, Fred has found some new orchids too. Kevin and I intended to have a look at the Wandering Nature Reserve on our way back to Mount Barker, in the hope of seeing the plants in flower for the first time but Fred advised us to visit one of his new populations that is much more accessible, instead.

We found the spot – just over 70 km from Perth and less than 100m from Albany Highway but we were just a week or two too early for the flowers.

Just before Liesbeth Uijtewaal and I went up to Perth, early this month, for another book launch, intending to call in once again to see the *D. aff. meganotia*, Fred emailed me some photos of it in flower. He had just collected the first flowering specimens for the Herbarium.

So I finally got to see and photograph the flowers of what I believe will be a new taxon. (See photo page).

News from Denmark

This spring has been a very busy one, as usual. I was delighted to have five interstate Study Group members, including two new ones and Liesbeth Uijtewaal, from The Netherlands, visit me over the last two months. On three occasions, I took four of them to the Mount Lindesay area.

From the eastern approach at the end of a 7 km drive from the Denmark – Mt. Barker Road, it's a short walk to some outstanding granite outcrops. Neil and Wendy Marriott and Keith Alcock were thrilled to see two rare grevilleas flowering – *G. cirsiifolia* and *G. fuscolutea* as well as *Dryandra armata*, *D. lindleyana* and *D. formosa* – the latter in flower. Later in October, I took David and Paddy Lightfoot, there and in November, Liesbeth.

My planted dryandras are all doing well. *D. pseudophumosa* has recovered its vigour and has flowered. *D. lepidorhiza*, *D. drummondii* subsp. *macrorufa* and *D. blechnifolia* have flowered and they all look marvellous, at the moment, with new leaf growth. See photo page for *D. lepidorhiza* which is doing so well in the gravelly soil here compared with the sand in Perth.

Margaret Pieroni 20/11/08

My Dryandras at The Gurdies

Of two plants bought as *D. calophylla*, one is still surviving but not showing any signs of flowering. Another plant, bought as *D. nivea* is looking good and is about to flower for the second time. I must examine it closely to see which subspecies it is.

My two *D. polycephala* that are about ten years old are strong, healthy plants and flower well each year and produce plenty of seed – which I usually miss collecting.

The *D. formosa* which we use for cut flowers are down to four. The oldest is about 15 years old. I make a habit of leaving dead branches with seed heads in the flower rows and from time to time have had the odd seedling appear, but not survive the rabbits or adverse conditions. At the moment, there are two seedlings, one of which is looking very strong and healthy.

A *D. speciosa*, planted a couple of years ago is looking healthy and I thought it might flower this year but that's not to be.

Hartley Tobin 10/9/08

The *Dryandra* Digital Archive

I know that I have been a bit slow in setting up a digital archive of *Dryandra* pictures but I thought that we probably wouldn't need it once the book was published. I have now changed my mind. Once we have an image digitally captured, it can be sent easily anywhere by email or put onto a CD/DVD and many others can enjoy it on their computer or TV screen. It is also easy to add more images as they become available and it becomes easier to build up a complete set for the genus. I have set up a folder on my computer and we already have several hundred pictures. These have come from Margaret, myself, Lloyd Carmen, Jean Hort, Lyn Alcock and include both pictures taken in the wild and plants in cultivation. The list we have is included below and this will give us an indication of taxa that are still needed. However, don't let the fact that a species is listed deter you from supplying a picture if you think that it is a "good shot".

We are looking for pictures of the flower head ("flowers"), the plant form, flowering branches, plant habitat, new growth and any close ups showing any aspects of interest (even "arty" pictures will be considered). If you have it, include the date the picture was taken (month and year), the location (location in the wild or in cultivation) and any other relevant points. They need to be of good resolution, say around 1MB in size in the original picture, but it is preferable not to try to send more than a couple of such large pictures as email attachments. If you have photo editing software on your computer and can resize images, a good size for sending by email is to reduce the vertical dimension of the image to about 670-700 pixels as this will fill a computer screen and still be of satisfactory resolution. If you have a large number of pictures, it is probably easiest to burn them to a CD/DVD at full resolution and post it to me. Please contact me with queries. The email address to use is:

tonycav40@hotmail.com

List of *Dryandra* taxa already held in the digital archive (some names abbreviated to save space)

<i>anatona</i>	<i>meganotia</i>
<i>baxteri</i>	<i>mucronulata s retror</i>
<i>bipinnatif s bip</i>	<i>nervosa</i>
<i>brownii</i>	<i>nivea s nivea</i>
<i>calophylla</i>	<i>nivea s uliginosa</i>
<i>carlinoides</i>	<i>nobilis s nobilis</i>
<i>catoglypta</i>	<i>obtusa</i>
<i>cirsioides</i>	<i>plumose s plum</i>
<i>comosa</i>	<i>polycephala</i>
<i>cuneata</i>	<i>porrecta</i>
<i>drummondii s drum</i>	<i>praemorsa v prae</i>
<i>drummondii s macro</i>	<i>praemorsa v splendens</i>
<i>erythrocephala</i>	<i>preissii</i>
<i>falcata</i>	<i>prionotes</i>
<i>ferruginea s ferrug</i>	<i>quercifolia</i>
<i>ferruginea s pumila</i>	<i>sessilis v flabell</i>
<i>foliosissima</i>	<i>sessilis v sessilis</i>
<i>formosa</i>	<i>shanklandiorum</i>
<i>fraseri v ashbyi</i>	<i>squarrosa</i>
<i>fraseri other</i>	<i>stuposa</i>
<i>hirsuta</i>	<i>subulata</i>
<i>ideogenes</i>	<i>tortifolia</i>
<i>lepidorhiza</i>	<i>vestita</i>
<i>lind s lind v lind</i>	<i>viscida</i>
<i>longifolia s long</i>	

Tony Cavanagh