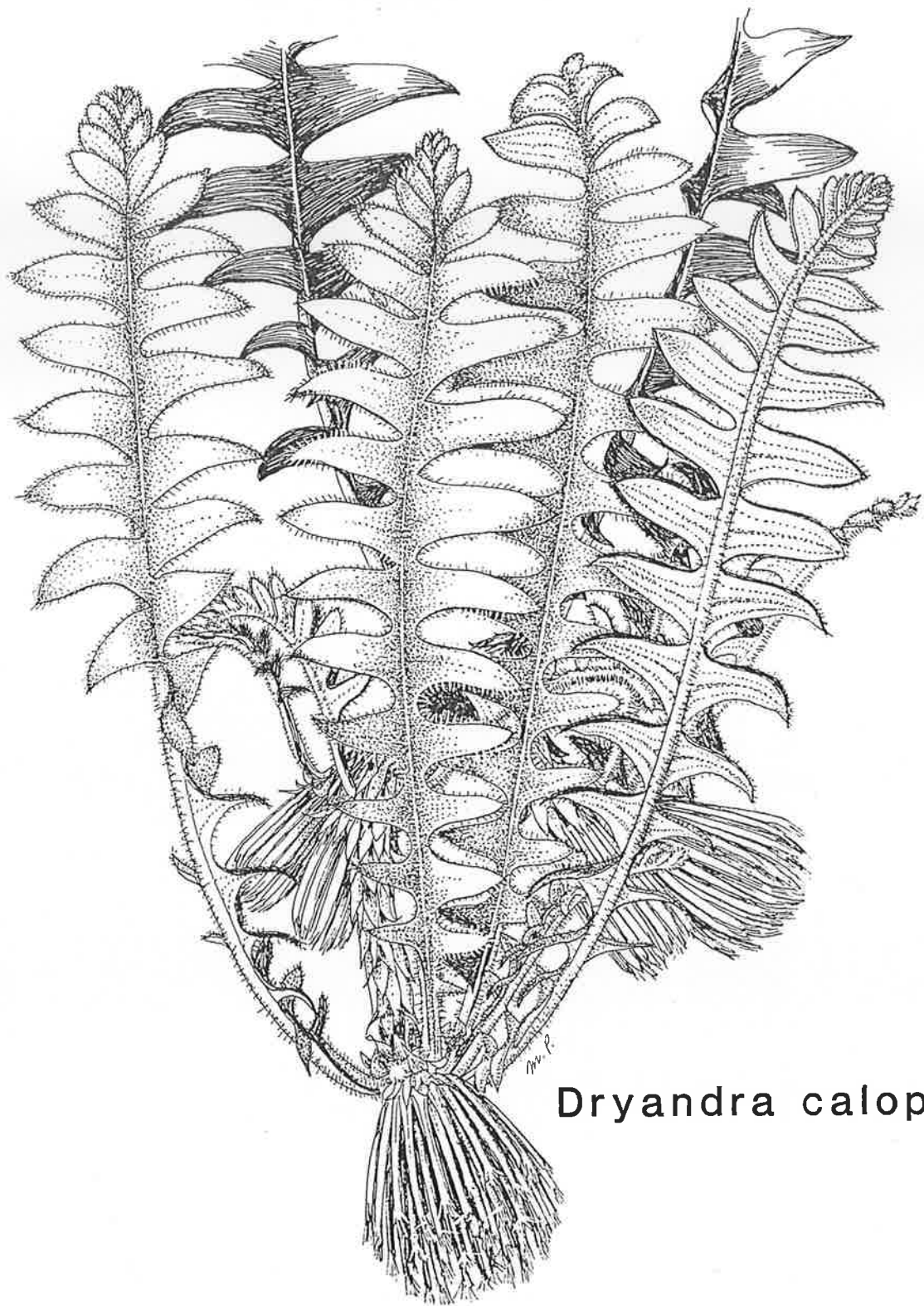


# DRYANDRA STUDY GROUP

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NEWSLETTER NO. 19



*Dryandra calophylla*

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SOCIETY FOR GROWING AUSTRALIAN PLANTS

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Dear members,

Welcome to another year and I trust you will have success with your growing of dryandras and in fact, all the plants in your garden. I have been very pleased with the number of articles and notes you have sent both Margaret and myself, most of which I have been able to fit into this Newsletter. Keep up the good work - grower's experiences are always valuable in producing a complete picture of the horticultural potential of dryandras.

Keith Alcock sent me a tremendous article on all his germination work, including a detailed discussion of the implications of his findings. Because we need some drawings of seeds, capsules and seedlings to complete it, I will hold it for the next Newsletter and will publish it in two parts. I also intend to produce it in a bound volume as a special report which will be sold separately to the Newsletter. More about this in the July Newsletter.

I have two small projects that I would like members assistance with. In several articles in this Newsletter, growers have commented on the use of proprietary seed-raising mixes. I will be running some experiments myself in March, but would like to have members experiences - just a note on the type you used, any problems encountered, and general feelings on whether it was superior, inferior or about the same as any homemade mixes you have employed. Secondly, I have attached a Dryandra Survey Sheet and would like older member to update their data (I have all earlier report sheets on file) and newer members to complete the sheet. As a general guide, the plants should be at least two years old and be established in the garden. I am particularly interested in plants doing well in unusual areas - very hot/dry; hot/humid; cold/frost/snow; high rainfall. If I receive a sufficient response (and thank to those who have recently given me an update), I will produce a summary of the results for the July Newsletter.

Margaret mentioned a conference she is attending which is sponsored by the Australian National Botanic Gardens. It is on in Canberra from March 4th to 8th and will deal with aspects of conserving plants in cultivation in private and public gardens. It sounds quite interesting; if you require further information, the person to contact is:-

Mr Lyn Meredith  
Australian National Botanic Gardens  
Box 1777 (Phone 062671811)  
CANBERRA 2601

As I mentioned in the article on Cranbourne, members have expressed interest in regular get togethers. David Shiells has agreed to do some preliminary work for a weekend meeting at Shepparton in late August. The weather might be a little chancey but we are aiming for two or three garden visits, an informal get together on the Saturday night perhaps with members slides, and hopefully a bush visit, perhaps on Sunday. I will be contacting all Victorian members in the next couple of months and final arrangements will be given in the July Newsletter.

Finally, news we have all been waiting for. Alex George is hopeful of completing the Dryandra revision by May/June this year. There is a major Proteaceae conference being held at Kings Park in September and they are aiming to have the Flora of Australia Proteaceae volumes ready for that. Here's hoping!

All the best  
*Tony*  
Tony Cavanagh

## THE CRANBOURNE DRYANDRA COLLECTION

On a dull but fortunately rain-free day on July 8, some 18 Study Group members and friends gathered at the Cranbourne Annexe of the Royal Botanic Gardens to meet Margaret and to view the dryandra collection. It was the first get-together the Study Group has held for some time but it certainly won't be the last and plans are afoot for a weekend meeting at Shepparton in late August. I will be in contact with Victorian members when plans have firmed up and final details will be given in the July Newsletter. Everyone is welcome and we can look forward to several garden visits and at least one bush excursion (not to see dryandras but some of the wonderful wildflowers in this area of Victoria).

Margaret in her article has described her reactions to Cranbourne and it is indeed a little overwhelming for the first-time visitor to see so many dryandras of all shapes and sizes in the one area. Barbara Buchanan also kindly provided me with notes on the visit and these follow this article. I will be visiting Cranbourne in the next few months and will make a detailed survey of the situation for publication in the July Newsletter. In the meantime, for the benefit of newer members, I will give a little of the history and background of the planting.

The first dryandras were put in around June, 1980. Largely through the effort of Alf Salkin, the Study Group was given an area of several hectares in the "Scientific Study" section of the Cranbourne Annexe of the Royal Botanic Gardens, Melbourne. The area had been heavily "mined" for sand for more than 70 years and the Botanic Gardens are in the process of restoring it. In some parts, more than 30 metres of sand had been removed. The Dryandra area is on relatively elevated sand with "coffee-rock" (cemented iron-stained sands) reaching the surface in parts. The higher sections are windswept and bleak while the slopes are often subject to extensive wind and water movement of the sands. All this hardly makes for an "ideal" location for dryandras but it is weed-free, has near-perfect drainage and the sand makes it a delight to put plants in. As will become evident, most species have done extremely well there.

The total annexe area is 334 hectares of which about 200 hectares are native bushland, heathland and swampland containing some of the last remaining natural vegetation in the district. A native botanic garden, due to open late this year, has been developed and will contain plantings of some 5000 species designed to blend in with the surrounding native vegetation. The Dryandra Study Group will be supplying seed of some of the smaller species for a Proteaceae bed and may be involved in other ways as the Gardens develop. The Stringy-Bark picnic area, an arboretum and the Special Collections of the Scientific Study Area complete this most imaginative project and I am pleased that the Study Group has been associated with it for so many years.

The 1980 plantings were basically of whatever species we could obtain, and most were grown from seed obtained from commercial seed suppliers and some collected by members. Due in some cases to mislabelled seed and to our own inexperience, there were a number of mix-ups (*D. polycephala* among *D. tenuifolia*, *D. calophylla* mixed with *D. drummondii* and *D. brownii* as *D. arctotidis*) but some worked to our advantage. After several years, we noted a spectacular, upright form of *D. subpinnatifida* among the *D. tenuifolia* and this has continued to flower profusely every year - a wonderful example of a very attractive dryandra. The other major find was the very rare "true" *D. pteridifolia* among our rather mixed bag of various *D. pteridifolia* forms (including of course, many *D. nervosa*). Keith was delighted when he found this in flower one year and I think it is still the only true *D. pteridifolia* in cultivation.

For the next couple of years, we had an annual planting day, usually in May or June. These were always well attended by members and we often put in 150-200 plants in a morning. We continually tried to replace ones that had died or

were swamped by moving sand but, in particular, we aimed to assemble a collection of all the named species (then about 59 species). By 1982, we had over 500 plants from about 43 species and six un-named taxa. Most were still grown from commercial seed or members collections but in 1983, thanks to a determined collecting effort by Keith Alcock, we were able to put in over 250 plants, almost solely grown from wild seed of known provenance in W. A. Keith continued to collect in subsequent years, notably in 1983 and 1986, and grew several thousand dryandra seedlings, most of which he generously distributed to Cranbourne and other gardens such as Karwarra Gardens in Victoria and the Burrendong Arboretum in New South Wales, as well as to interested private growers. Importantly, Keith also kept extensive records of all his germination work and has given me a detailed write-up of his results which I will reproduce in the next two Newsletters.

In 1984, we put in another 350 plants, bringing the count to around 1000 specimens. Both the 1983 and 1984 plantings were in relatively protected areas, while the original one, being in a fairly exposed position, had suffered somewhat due to shifting sand and wind. Tall species such as *D. squarrosa* and *D. hewardiana* had developed a lean or had blown over (but most continued to grow), while low growing species such as *D. nivea*, *D. bipinnatifida*, *D. nana* and even *D. fraseri* were often swamped by moving sand. An attempt to give these smaller species some protection by planting them inside 20 litre drums, part buried in the sand with top and bottom cut out, failed dismally. The sand simply banked up against the drums and eventually filled them, with the result that we still have no *D. nana*, *D. preissii* or *D. bipinnatifida*, and other small species in the main collection are struggling.

Keith's collections formed the backbone of plantings over the next few years, notably in 1985, 1987 and 1988. We continued to add to the main collection when plants became available but in addition, we were to make duplicate plantings of forms from different provenances of W. A. of variable species such as *D. nivea*, *D. armata*/*D. cirsioides*, *D. conferta*, *D. ferruginea*, *D. pteridifolia* and others. These provide a valuable field record for botanical comparison purposes and are especially useful for both educational and taxonomic reasons as this is after all, the largest dryandra collection in the world. Allowing for losses, there are probably between 1300 and 1500 plants from nearly 90 species and varieties but I will make a fuller assessment late this year. Unfortunately, in the July visit, I noticed two disturbing aspects which may have detrimental effects on the collection. Cinnamon fungus (*Phytophthora cinnamomi*) has been detected at Cranbourne and its insidious effects are already evident among the dryandras where most of the plants in rows along water run-offs have died. Even though the deep sand is well drained, the cinnamon fungus is still a major worry and it has had devastating results in the W. A. banksias as well. The second problem is due to water run-off and shifting sands in our 1987 and 1988 planting areas where more than 50% of the plants have disappeared. We have lost some valuable species because of this but will endeavour to replace them when possible over the next few years from seed in the seed bank and other sources. If you have spare plants at any time, please contact me and we will use them where possible.

I have elsewhere printed a summary of the holdings of the seedbank. Seed is available free to members but please enclose a stamped, self-addressed envelope with your order. Margaret is always happy to receive additional seed, particularly from wild sources, but remember that you need a permit to collect seed in the wild. Hartley Tobin recently told me that a permit is now \$10.00, not \$2.00, still relatively cheap, and is available from:-

The Department of Conservation and Land Management (C.A.L.M.)  
50 Hayman Road  
COMO  
W.A. 6152

You should ask for Form 19 - Application for a Licence for Scientific or other Prescribed Purposes.

If you are visiting the west, Margaret is only too pleased to provide

information dryandra localities and flowering times. Any spare seed you have will be useful for the seedbank and in this way we can continue to build up and maintain the Cranbourne Dryandra Collection.

Tony Cavanagh.

#### THE CRANBOURNE VISIT, SUNDAY JULY 8

The day was most stimulating and the following are just a few ideas and notes I jotted down after it was all over.

In the wild, dryandras are often part of the Kwongan and would very rarely suffer exposed roots. Could some of the deaths be due to this? Some Kwongan plants put out a dense net of lateral surface roots with deeper roots reaching water, and the plants are all crowded together with very little bare soil.

On the way home, Ray asked the question "What do you think was the best dryandra there?" It is a very good question and we decided it had to be broken down into easier bits. *D. drummondii* scored for foliage, probably *D. quercifolia* & *D. cuneata* for overall effect and *D. speciosa* maybe for individual flower heads. But then, the grey leaf *D. conferta*, the green bulge of good *D. foliosissima* or *D. nivea* or --. Eventually, I would have them all, if I could trust myself to name them all correctly.

We also spent a bit of time tossing around the eternal question "what makes a species"? Hats off to all who contributed to those plantings which show clearly what an arbitrary business it is. I doubt any other genus has such a living collection available for the botanists, if they use it, but it seems to me the only way to arrive at a satisfactory taxonomic system.

I certainly came home knowing a bit more, able to look more clearly for some of the distinctive features and am much less upset by the fact that I often can't decide just what species I've collected. With regard to publishing, I was also recently using the new book by M.I.H. Brooker and D.A. Kleinig Field Guide to Eucalypts 2 and frequently came out at unnamed species G or whatever. I'm quite happy with this if my specimen fits G, it's so much better than it not fitting anything at all. In due course, a name will hopefully become available for G. So if the revision is going to be a while yet, could you consider publishing dryandras with a similar system? (Editors note - Alex George has already put numbers to his possible new taxa but has not published descriptions of them nor listed their distinguishing characteristics. However he is aiming for May/June this year as the latest date to have the revision completed as they are hoping to have the Proteaceae volumes of the Flora of Australia available for the major Proteaceae Conference in Perth in September. Lets hope they can make it!).

Definitely, we are in favour of roughly annual meetings. While the winter flowering of so many species is one of their horticultural attractions, it also has its problems as regards a suitable time of the year! At least it is a quiet time for other gardening activities.

Barbara Buchanan

#### NOTES FROM MEMBERS

##### Dryandras and frost

This August, it has been exceptionally wet and overcast here in Armidale (NSW). It has been very cold as well, down to -5 C at night, with daily

maximums between 5 and 7 C below average. The average winter temperature has been about 12 C, with a few snowfalls thrown in for good measure! My experience with dryandras has been as follows:-

- D. bipinnatifida* (Northern sandplains) - good.
- Sp. K.A. 439 - Slightly frosted but okay.
- D. arctotidis* - Unaffected.
- D. praemorsa* (pink) - Not healthy.
- D. kippistiana* - Very sick, probably will die.
- D. quercifolia* - Sick.
- D. polycephala* (exposed) - Dead.
- D. polycephala* (overhead shelter) - Okay.
- D. sessilis* - Very sick, probably will die.
- D. proteoides* (overhead shelter) - Okay.

Pat Urbonas

### Dryandras in southern Victoria

Firstly, I need to mention some general information about the weather which obviously affected the growth (or decline) of my dryandras. Locally it has been the wettest and coldest winter for 50 years, followed by September to February being the driest spring-summer period on record with only October being above average in rainfall. January was the hottest and driest on record and I was away overseas for three weeks with my plants being left to the mercy of an automatic watering system. Unfortunately, it was set for the normal January rain/temperature combination, not the abnormal one we had.

Coronet Bay:

102 *D. armata* and 307 *D. sp. H* had both been struggling with the competition of neighbours and finally gave up.

207 *D. tenuifolia* was well established when suddenly it just "cashed in its chips". Within the two or three square meters where it grew, I have had quite a history of sudden failures over the last 16 years. Plants have performed well for a couple of years, to be followed by sudden death. As far as I can work out, the death is related to a sudden change in moisture regime. The plants had survived both extreme wet and extreme dry but the sudden change over about two weeks from one to the other (usually wet to dry), caused the deaths. The dry - wet in May/June seems to have been responsible in this case. Seed collected from the plant produced only one seedling which did not survive the summer.

105 *D. nivea* (?) gave in to the competition for moisture during January. It was such a strong plant and had flowered well.

Since I collected the data, 302 *D. obtusa* has given up. It had been gradually shaded out by *B. solandri* and *H. victoriae*. Each year, the garden at Coronet Bay has been receiving less and less attention from me, which means that where there is crowding, the slower growers (especially dryandras) have not had my intervention to restrict (prune) the competition of neighbouring plants.

### The Gurdies

8208, 8209, 8210 and 8213, all *D. formosa*, have been severely pruned, and when I say "severely", I mean "SEVERELY"! I took to the plants with a brushcutter and levelled their tops at about 1.6 m. I want to see if the new growth produces long stems suitable for cut flowers. Unfortunately, 8213 has died since I collected the data - the competition of a *B. integrifolia* was too much for it.

The 8408, 8607, 8608, 8609, 8610 and 8612, all *D. bipinnatifida*, are still restricted in size because of the rabbits. By the way, 8610 was left off last year's report (it must have been missed among the grass and weeds!). 8630 *D. praemorsa*, the pink form, is still exceptional in its growth and flowering. I

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has now produced seed which I hope to harvest next summer. 8406 "D. ashbyi", 8403 *D. calophylla*, 8626 *D. nivea*, 8629 *D. hewardiana*, 8401 *D. praemorsa*, 8201 *D. pteridifolia*, 8811 *D. tenuifolia* and 8640 *D. sp. H* have all struggling in one way or another and gave up in the past twelve months. 8403 and 8401 have been completely shaded by more vigorous plants while the others just appeared to be weak plants.

8201 *D. ferruginea* produced more flowers this year but still no sign of seed. 8702 *D. polycephala*(?) is currently looking very sick as a result of the dry, but there are a few green leaves so I am hopeful that new growth will appear soon. One or two of the old flowerheads appear to contain a couple of seeds. I'll confirm this later in the year.

Of a large number of small plants put out in autumn, 1989, only four survived the extremes of the winter and summer. They are "D. Kamballup" and three *D. 1* which have been included in the records.

Hartley Tobin

(Editor's note - Hartley included details of all his other dryandras, some of which are up to eight years old. I have attached a survey sheet for both new and old members in this Newsletter and would welcome comments and details of members plants. Many of you have completed forms within the last couple of years so you need only indicate significant changes in your plants (eg deaths or first flowering etc) and new specimens. Over the last ten years, I have come to accept that dryandras were, in general, relatively hardy and reliable. However, some of Hartley's and Pat's experiences and my own more recent observations with small plants dying during dry spells (and even some 10 year old specimens) leads me to question this. Members experiences all help to build up a better picture of the horticultural merits and problems with dryandras.)

#### Experiences with raising dryandras from seed

I feel that my seed growing technique has steadily improved so that I am having greater success with germination and also an increased number of surviving plants.

While reading Tony's survey of methods of propagation in the last Newsletter, I was reminded that, in my last notes on raising dryandra seeds, I had, by mistake, said that I was using Yates Seed Raising Mix for raising my March, 1989 batch of dryandra seedlings. I had in fact used Hortico Seed Raising Mix

This was impressed on my mind when I read the analysis on the side of the Yates pack which stated that superphosphate was added to the mix at the rate of 0.1 kg. per cubic metre. The Hortico mix does not have an analysis on the pack but from the wording, I assume that it does not have added fertiliser. Because of the added fertiliser I believe that Yates Seed Raising Mix would not be suitable for raising proteaceae.

A few words of explanation: when I first began raising Australian plants from seed many years ago, I was impressed by the logic of the statements appearing in most written articles that the soil must be sterilised - and that heating was the most effective way of doing this. I can recall to this day the stink that filled our house when for the first and last time I placed a tray of compost-filled soil in the kitchen oven and heated it to about 120 C for about 30 minutes. Some time later I was allowed back in the house! Subsequently I have read about other methods of heat sterilising soil and have seen others in operation, but most are too cumbersome for the private user wanting a bucket or so of soil. More recently I decided to take the easy way out by using Hortico Seed Raising Mix which I assumed would be properly sterilised and to date it has been satisfactory.

Having said all this, I must now tell you that in the present batch of seed raising, I decided to try a more open seed raising mix and this time made my own. What I used was remarkably like the mix recommended by Tony. It consists

of three parts river sand, one part peat moss, and one part pine bark (up to 8mm.) and no attempt was made to heat sterilise the soil.

After sowing the seed on March 5, 1990 in the slightly moist mix in small containers, one species to a container, they were watered in thoroughly with 'Fongarid'. The containers were then placed in a sheltered position where they would not dry out too quickly. After about three weeks when a few seeds had germinated, they were placed in the open where they received direct sun for about three hours per day. They were only watered when necessary.

Sowing the seed in autumn has the advantage that as days go by, the weather becomes cooler and there is less need for watering; also 'damping-off' is less of a problem. After eight weeks, the tops of all pots were sprayed with 'Mancozeb' and again after four weeks.

The plants continued to prosper through the winter, exposed to the rain and as much winter sunshine as possible. They looked so healthy I was reluctant to disturb them by transplanting to separate containers but eventually this was done on August 3, 1990. These were transplanted into 12.5 cm. deep square tubes using a mix which was similar to that recommended by Tony ie 80% river sand, 10% peat moss and 10% pine bark (up to 8 mm.) It is interesting to note that no plants died as a result of the transplanting operation.

Ron Pearson

(Editor's note - Ron gave details of his results which I have retained for record purposes, along with those from Claire Lithgow and Pat Urbonas' group at Armidale. Some plantings were in winter (July and August) and results were in general, relatively poor. Plants kept for periods in shadehouses also fared badly, while some species such as *D. serratuloides*, *D. tridentata*, *carlinoide* and some forms of *D. polycephala* again proved difficult to keep alive for any period of time in pots. Best results are still achieved with seed sown in the open so that the pots receive maximum sunshine, leaving the transplanted plants in the sun and sowing in a cool but not cold period of the year (early to mid March [later in hotter areas] or early September).

#### Growing dryandras in north-central Victoria

I live at Myrree, north-east of Mansfield having moved from Melbourne several years ago. I have room for plenty of plants and currently (October, 1990) have over 100 small plants to go out.

Margaret supplied me with a good selection of seed and I had collected hakea, banksia and isopogon seed from the Esperance area some time back. My technique of opening the follicles was simple - I just sat them on the flat top of our enclosed fire and in a few minutes, they would start to open, often with a little noise and jumping about. I removed them as soon as they split and it was then easy to extract the seed.

The seeds were put into individual, smallest sized tubes until they germinated and were then transferred to three inch tubes, covered with a layer of coarse gravel and put out into full sun. They had been watered as necessary but now that the weather is hotting up, they need to be sprinkled but as I do it in the morning, the leaves soon dry. I used a commercial potting mix (Debco) but found it became non-wetting very easily. There were a couple of batches in the last lot of seed which I felt were non-viable but I forgot to take a note of them. I'll keep closer records in future.

I now have over 100 plants and the losses to date have been minimal. One batch of dryandra "X" from Cranbourne that I could not identify at home went into a community pot and came up well but damped-off almost entirely when transferred



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 to community pots. A few of the seedlings have yellowed a bit so I used iron chelates. My mix for potting up was a commercial one to which I had added about 50% granitic sand. I also included Osmocote with no phosphorus but I think that I had added a small amount of hardwood sawdust to an earlier batch of soil and this could have been the cause of the yellowing. Next watering, they will all have Aquasol (dilute) as well.

I'll give you a list later of successful germination and growing on. I expect my last batches to start showing through any time now - then I'll have to think where I'm going to plant them all!

Barbara Buchanan

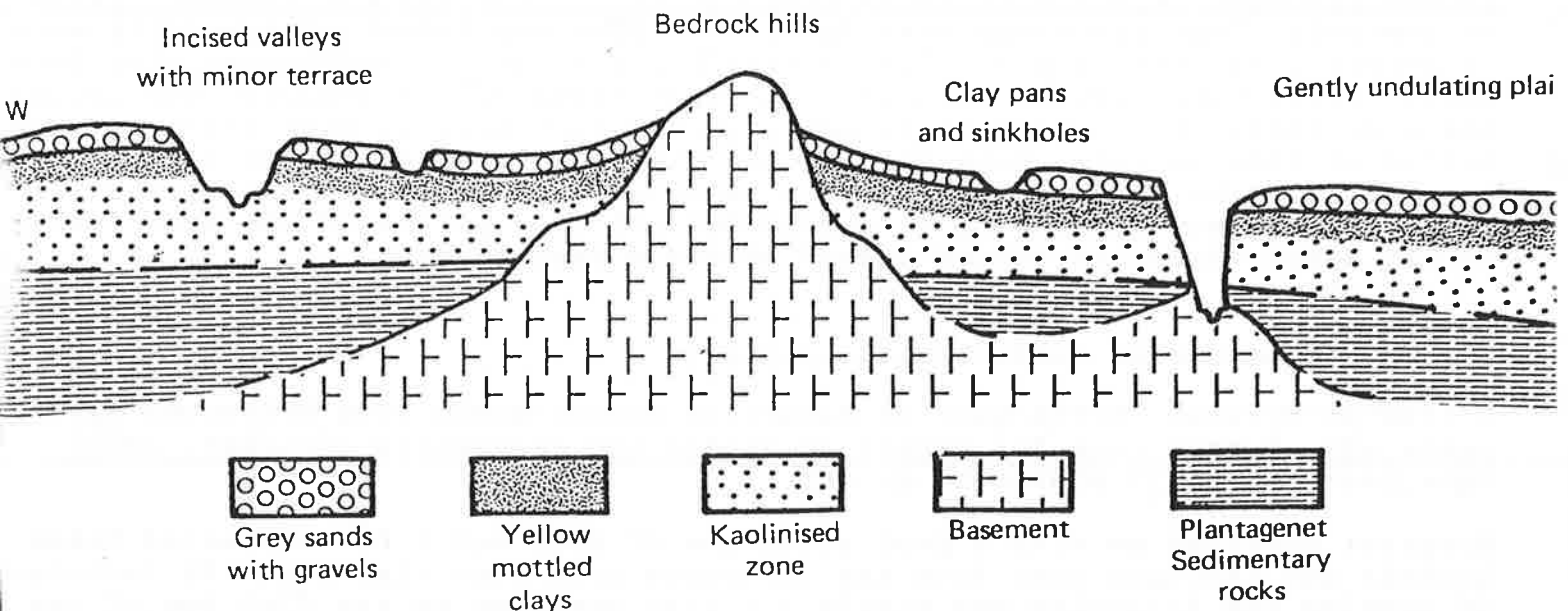


Fig. 3.4 Diagrammatic cross section, from west to east, of the Esperance sandplain.

The above diagram, from Kwongan: Plant Life of the Sandplain, is for Keith, article which begins on page 11. With the vagaries of my typing, I wasn't able to fit it there! However, it does give some idea of the complexities of the soils of the W.A. sandplain.

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## A TRIP TO THE EASTERN STATES

Early in July I set out on what turned out to be a delightful and interesting trip in every way. On arrival in the "eastern states" my first weekend was spent at the Cavanaghs in Ocean Grove, near Geelong. Tony showed me over his garden where he has a very impressive collection of dryandras and I saw the typical form of *Dryandra longifolia* in flower for the first time. It is indeed a very striking plant - one of Tony's favorites. *Dryandra subulata* was growing very well, a species I haven't seen before in cultivation. *Dryandra shanklandiorum* was just coming into flower.

Tony very kindly took me to see several other gardens, all of them different and fascinating. Glen Sago has a smaller area of garden beautifully designed with mostly small-growing plants and small W.A. eucalypts in raised beds. Doug McKenzie is doing amazing things with grafting, especially the rare W.A. darwinias and some verticordias onto *Darwinia citriodora*. His garden also has some fine dryandras.

A garden I was particularly interested to see was that of the Belins at Freshwater Creek. Until his death last year Rudy was a very active member of the Study Group who contributed much to our knowledge of dryandras in cultivation (see newsletter 14). Pat showed us the garden which is beautifully landscaped with a stunning view from a large window in the house, of the built up garden beds with grassy paths winding through as far as the length of the very large garden area. Among many dryandra species, *Dryandra formosa* was flowering with spectacular large flowering heads and a very attractive form of *Dryandra conferta* which has narrow-lobed blue-green leaves. The location of a small population of this plant was only recently identified by botanists who were obviously preceded by some enthusiastic "eastern staters" many years ago.

On Sunday 8th of July we met at Cranbourne to look at the dryandra plantings. It was good to see so many Victorian members, some of whom travelled quite a distance. I was sorry there was not much time to speak to all of you individually, there was so much to see and do, and photograph. Tony and I managed to label the most recently planted dryandras most of which are still un-named species and that was a most worthwhile achievement. Among the hundred of dryandras in the plantation, about 90 taxa are represented and, amazingly, 44 were in flower. I did a retrospective count when I reached my destination in New South Wales and had time to collect my thoughts - the visit to Victoria had been quite overwhelming! It was most surprising to see so many dryandras flowering out of season at Cranbourne and to see the size some can attain growing away from their natural habitat in W.A. Many plants have overcome the problem of the shifting sand by simply growing over or through mounds of sand. *D. fraseri*, which is normally quite hardy, wasn't coping so well and several plants were half buried. We found one plant of "sp. b" (aff. *polycephala*) which was almost prostrate although many seedlings were normal, upright plants. It would be good to get the sprawling form into cultivation - cutting material was collected for the purpose. I'll never forget the sight of a row of small mounds, only about 40 cms. high, of *D. subpinnatifida* in full flower while the adjoining row contained a much larger plant of the same species only just in bud as it should be at that time of the year. Even one of the *D. calophylla* plants was in full flower.

I hope it was helpful for members to see the "pteridifolia" types growing together, especially as *D. pteridifolia* and *D. blechnifolia* were both in flower and could be compared to one another.

On my way back to W.A. towards the end of July, I stopped over in Adelaide to meet still more Study Group members and to see more wonderful gardens. I stayed at the Carmans in the Adelaide Hills and Lloyd and Lorraine showed me their lovely garden with a delightful view over the city to the sea. They are growing many fine dryandras as Lloyd has had great success with raising many

species from seed. He showed me a shrub about 1.5 m. high which at first glance and from a distance, I took to be *D. proteoides*. It is a most attractive form of *D. tenuifolia* with large flower heads and bracts which open out in a similar manner to *D. proteoides*, altogether more showy than typical *D. tenuifolia*. Another species which was in flower and looking good was *D. obtusa*. Wittunga Gardens are nearby. We spent a delightful hour or so wandering around the beds of Australian plants of which a large number are Western Australian proteaceae. Again there were several dryandra species growing well. Wittunga was formerly the property of the Ashby family and it also features a marvellous collection of South African plants.

Lloyd and Lorraine drove me out to Claire and Bill Lighthow's farm at Parrakie, about two hours drive east of Adelaide. Claire is also growing many W.A. proteaceae, mostly hakeas. On a sandy hill, she has some dryandras and banksias doing very well, beautiful big plants of *D. sessilis* and the blue-leaved form of *D. conferta*, previously mentioned, both flowering.

The following day, we all drove down to Ken Stuckey's place at Furner, near Millicent. I have been hearing and reading about Ken's garden for years, both before and after the disastrous fire of 1983 but nothing can prepare one for the beauty and vastness of his plantations. Various parts of the property have diverse habitats which could be described as native gardens (recent plantings), bush garden (where many dryandras, petrophiles and other W.A. species have now naturalised as a result of the fire and look quite at home among the indigenous species like *Epacris impressa*), and what Ken calls his arboretum (a thick woodland with many naturalised non-endemics). There are huge plantations of species such as *Banksia coccinea* for the cut-flower market and a magnificent *Dryandra formosa* thicket.

In a part of the garden with many plants which regenerated after the fire, Ken showed me the plants he thought were hybrids of *D. formosa* and *D. nobilis*. (See Newsletter No. 17 for Ken's article). On seeing the plants with fresh flowers, I would now agree that this would be the most likely explanation. Both of these species are growing in profusion in close proximity to the two "odd" plants. I sent Ken some seed capsules of an un-named species that I'd previously thought it was, on seeing a pressed specimen from Ken's plant. He compared the sizes of *D. formosa*, *D. nobilis*, his hybrids and the un-named aff. *nobilis* capsules and the results would confirm his original theory. The size of the hybrid capsules is half-way between the sizes of *D. formosa* and *D. nobilis* whereas the un-named species is only slightly larger than *D. formosa*. In his letter which I recently received, Ken also told me that he is harvesting his *D. formosa* flowers and a trial box had been sent to Japan. (Leaves from both *Banksia grandis* and *Dryandra drummondii* have apparently also been successfully marketed in Japan in recent years - Ed.).

Among the many dryandras Ken had growing, we saw the magnificent pink form of *D. praemorsa* coming into flower. Unlike other dryandras with pink forms, the styles are pink as well as the perianth parts. Also flowering were *D. quercifolia*, *D. brownii*, the prostrate *D. tenuifolia* and many more.

We reluctantly tore ourselves away hardly leaving enough time and daylight to see the garden of Paul and Thelma Roach at Lucindale on the way back to Parrakie. Theirs is a magnificent garden, planted around and on the slopes of a former sand quarry. Once again, we saw dryandras growing to perfection.

On Thursday, 27th and Friday, 28th, I gave talks on dryandras at the S.G.A.P. meetings in Adelaide and at Geranium (near Parrakie). There seemed to be quite a deal of interest in dryandras and I also met still more dryandra growers and a few more members of the Study Group. One woman at the Adelaide meeting (not a study Group member) "tabled" a large specimen of *D. shanklandiorum* and a pink *D. quercifolia* among others. The latter "stole my thunder" when it came to the "piece de resistance" in my slides! I showed slides of species proven in cultivation as indicated by reports from Study Group members over the year and, incidentally, confirmed by my own observations of gardens visited during

my trip. I also showed some of the "new" species and some that have been incorrectly named in the past.

The garden visits were a revelation. It astounded me to see so many Western Australian plants growing to perfection in Victoria and South Australia, especially the banksias some of which are very difficult to grow let alone get to flower here in Perth.

Among the dryandras which do well in the gardens I saw were the popular ones such as *D. formosa*, *D. quercifolia* and *D. drummondii* and others that deserve to be more widely grown such as *D. obtusa*, *D. subpinnatifida*, *D. brownii* and *D. shanklandiorum* (sometimes still labelled *D. preissii*, a species I've not seen in cultivation). Some members have plants of *D. brownii* which they bought as *D. nivea* or *D. arctotidis*.

I would like to thank very much all those people who made my trip so enjoyable by their warm and generous hospitality during my stay with them. Some Study Group members are coming to Perth for the A.S.G.A.P. Conference later this year so I'm looking forward to meeting them again. The program is very tight and the venue is no longer to be at Point Walter close to my home in Attadale. The theme for the Kings Park Native Plant Show will be "Proteaceae" so I will be involved in mounting a Dryandra display there during the conference. I would like to have some time to meet Study Group members, so if you are coming please let me know in advance.

If anyone is intending to stay on in W.A. after the conference, I have been thinking of organising a trip to the Stirling Ranges, leaving Perth possibly on October 9, visiting good Dryandra locations on the way, spending a day in the Stirlings, and, in the case of members who are not travelling in their own vehicles, returning to Perth on the third day. Those travelling in their own vehicles may then like to continue on from the Stirlings. I would need to know quite soon if anyone is interested in such a trip or would like to suggest some other type of "get-together" so that I can book accommodation.

If you are coming to Western Australia at any time and want information on the best places to see dryandras, I would be only too pleased to provide as much as I can. A rough idea of your itinerary and dates would be helpful for me to ascertain which dryandras would be in flower at the time.

I'll look forward to showing you around Western Australia.

Margaret Pieroni.

## "THE NORTHERN AND SOUTHERN SANDPLAINS OF WESTERN AUSTRALIA VEGETATION AND ENVIRONMENT

(Continued from Newsletter 18).

### *Environment*

The soils of the sandplains vary considerably in colour, depth, fabric, content and nature of gravel and in the nature of the underlying substrate. However, as described by Dr. E. Betlenaz of the CSIRO Division of Groundwater Research, the sandy soils carrying Kwongan can be reduced to two main types, differing markedly in terms of origin and, to a lesser extent, in chemistry. They are :-

- (a) Coastal Sand Heath
- (b) Laterite Sandplains

Along the coast is a belt up to 25 km wide of sand heaths formed on sand dunes of varying ages. The age determines the nature- from shelly, calcareous sands

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on younger dunes, through stripped, bare limestone and shallow brown sands on dunes of intermediate age, to leached and podsolized acid sands with iron and/or organic pans at depth on the oldest dunes. Most of the coastal heath sands overlay a darker brown B horizon containing varying amounts of organic matter and stained brown with iron and aluminium oxides.

Oxides and hydroxides of iron and aluminium dominate the soils of the second sandplain soil type, the lateritic sands. They occur away from the coastal influence and have quite different origins. Lateritic soils by definition are those with high levels of iron and aluminium. In the sandplains, they consist of sandy soils overlying cemented iron and aluminium-rich concretions, which can either be cemented into a solid mass (duricrust) or occur as secondary gravels in the form of ferruginous (iron) or aluminous nodules. This layer is in turn underlain by a mottled zone of iron-stained kaolinitic clay. Further down the profile is a deep pallid zone of grey to white clays, in which the original rock fabrics are largely preserved in the form of resistant quartz grains (sands) in a matrix of kaolinised minerals. Kaolinite (hydrated aluminium silicate, one of the major clay minerals) minerals are characteristic of highly-weathered, strongly-leached acid soils in areas with a warm, humid climate.

The formation of the lateritic mantle was an ancient process of weathering - the effect of climate on clay minerals and basement rock. Lateritic soils are characteristic of areas of the world with marked wet and dry periods and are most often located in the tropics. Clearly, the south west of Western Australia must have had a different climate in the past. The laterite soils of the west are formed primarily from igneous rocks eg granites, but also extend into sedimentary rocks such as sandstone to the north of Geraldton, the Dandaragan Plateau and the Esperance area.

Basement rock is broken down over eons by chemical and physical means which yield soluble salts, clay minerals, and, where present in granites and sandstones, quartz which persists almost unchanged. It is the further weathering of the clay minerals which forms laterite. Under the action of water, the soluble salts are leached away in groundwater over long periods of time, leaving the most strongly insoluble bases, silicon, iron and aluminium behind. The complex iron and aluminium hydroxides in laterite are subject to irreversible drying and set as hard crusts or nodules during the dry season. (The term laterite is actually derived from the Latin *later* meaning "brick"). Over millions of years of alternate wetting and drying, this process steadily builds up a zone of concretion at the surface of the clay, composed chiefly of brown limonite (iron oxide- ironstone), or of many ironstone nodules more or less cemented into a solid mass. In some of the lateritic sandplain soils, the proportion of iron and aluminium oxides is high enough for the hardening and concretions to extend through the mottled-clay zone and into the pallid zone material.

A further process of weathering takes place to modify the parent laterite material by erosion, breaking down the hardened surface layers and forming the current sandplain soils. Again, the periods of time have been vast, partly at least under the much drier conditions prevailing in the south west during recent geological times. Erosion and surface weathering have caused disintegration of the concreted layers and the release at the surface of the ironstone nodules, fine earth and unaltered quartz granules. The sand fraction in time is moved downslope under the combined influence of gravity and water to form sandy layers many metres deep while the higher ridges have only a shallow covering, or the laterite duricrust may appear at the surface. Still deeper erosion, particularly in steeper situations or where river systems have dissected the landscape, have swept away the duricrust and exposed the mottled and pallid zones which have varying degrees of hardness and resistance to erosion. The breaking-up of these layers have added to the sheets of sand in the valleys.

The leaching of soluble bases from the clay minerals is so great that many

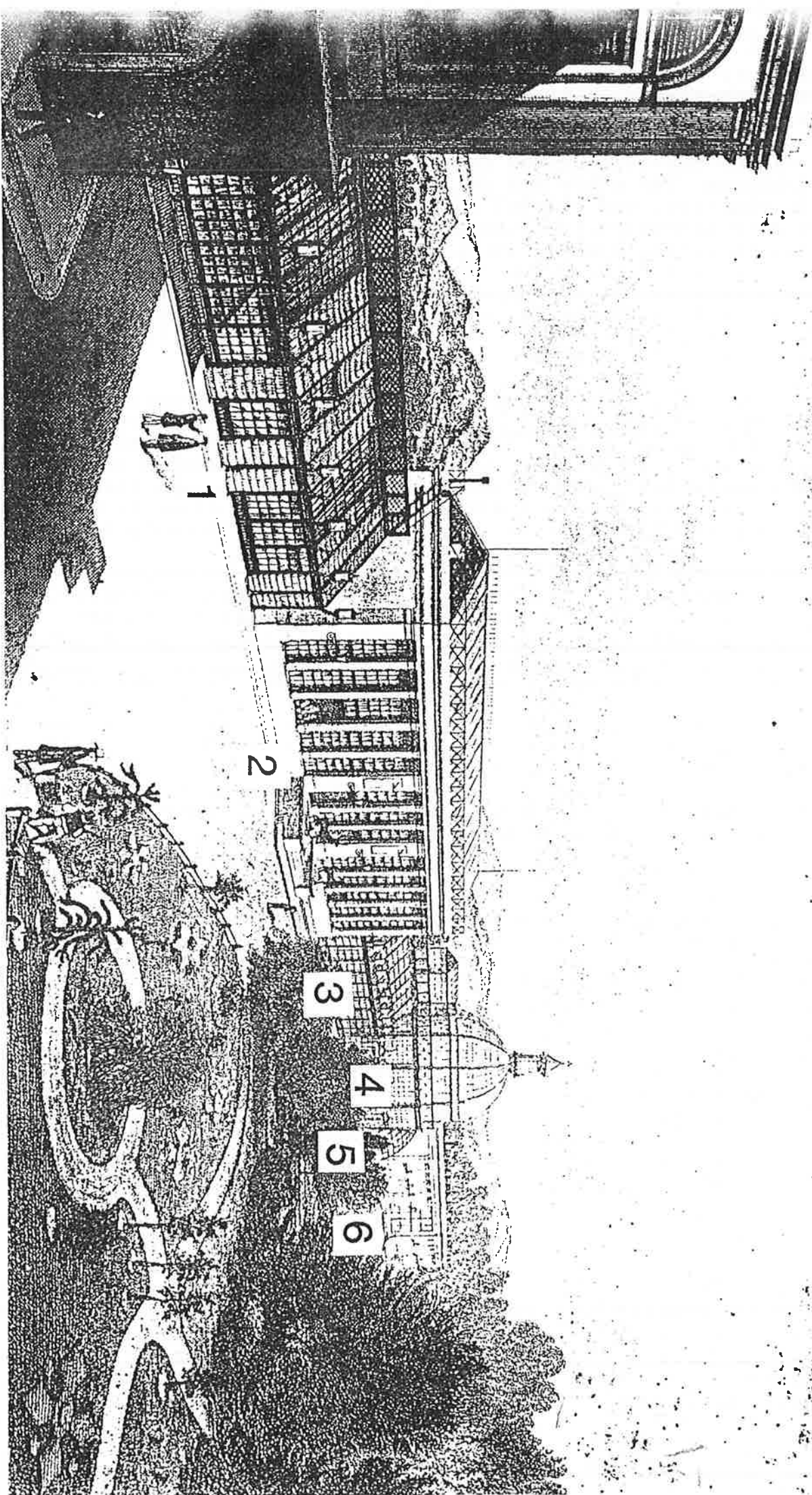
elements needed by plants are in short supply while others such as phosphorus and iron are precipitated as iron phosphates or other compounds, so insoluble as to be unavailable to plants. The laterite sandplain plants have thus evolved in soils depleted of the major plant nutrients nitrogen, phosphorus, potassium, calcium and sulphur and frequently in the trace elements copper, zinc and molybdenum. The soils are of acid pH, commonly falling below 5 in the sub-soils. In contrast, the coastal heath sands formed from dunes have high levels of calcium carbonate from the association with seashell fragments and the pH is usually on the alkaline side, up to 9.5 having been recorded. The coastal sands are usually deficient in the same elements as the laterite sands, although usually not to the same extent. The lime component means that they certainly don't lack calcium, and magnesium levels are also satisfactory. However, the higher pH in coastal sands can sometimes cause trace elements and iron to be tied up and lead to deficiency symptoms.

Nitrogen levels are low in both types of sandplain soil. Organic matter is usually apparent at depths no greater than 10-15 cm. and consists largely of leaves, twigs and organic carbon poorly incorporated into the soil. The low level of organic material produced by the small, narrow-leaved vegetation and the hot, dry summers and frequent bush fires do not encourage the soil microflora to produce much humus. Nitrogen is lost more directly by the action of summer drought and fire and the soils carry a proportionally lower level than even the low levels of carbon.

Neither type of sandy soil has good moisture holding capacity and this, coupled with summer drought, provides a severe challenge to Kwongan communities. The plants have adapted in a wide variety of ways including adaptation of the growth and reproductive cycles which best utilise the moisture available in winter, production of deep rooting systems to access water at depth and the production of specialised roots (the so-called proteoid roots in the Proteaceae) to help increase uptake of water and nutrients, or the development of lignotubers to enable reproduction after drought or fire. In the very definition of Kwongan comes another clue- the shrubland is sclerophyllous (having stiff, rigid and generally small leaves) and the key components have small, narrow leaves with surface areas ranging from 0.1 to 2.0 cms. Thus not only the roots but also the above-ground structures of the plants are adapted to periodic droughts. Sclerophyllous plants have hard, tough leaves, often with sunken stomates (perforations of a leaf to allow gas exchange and transpiration of water vapour) and a thick cuticle to reduce moisture losses. Kwongan plants mostly have these characteristics but also have greatly reduced leaf size. Other adaptations in individual species include reduction in number of stomates or their restriction to the underside of the leaf and the presence of a waxy bloom surface resin or a dense covering of hairs to restrict even further moisture stress and loss.

Most of the Kwongan plants are perennials so the plants stay alive for more than one season. However even the long-lived perennials of the Kwongan adapt to seasonal conditions by periods of inactivity and/or by reducing the volume of foliage needing moisture supply from the roots. Plants will shed a proportion of foliage, usually older, lower leaves. Just as often, whole branches sometimes with new growth at the top and old growth at the base, will be shut down and allowed to die off, to help the plant get through dry periods. Once more favourable conditions return, the plants renew growth from dormant buds either at the base of the plant or from axillary buds further up.

Existence for plants of the Kwongan is a very dynamic process as they undergo profound seasonal changes from winter wet to summer dry and need to be able to at least survive unfavourable seasons, especially drought conditions. In our gardens, we should perhaps be more aware of these adaptations and either change our cultural practices, or at the very least, change our expectations of excellent performance under conditions very different from their native environment.



The San Donato glasshouse  $\approx$  1858.

"FAMOUS GARDENS OF EUROPE - THE HUGEL-DEMIDOFF CONNECTION  
The Final Chapter

In the last Newsletter, I discussed the role of two European noblemen, Karl von Hugel and Anatole Demidoff, in growing Australian plants, particularly Proteaceae, in glasshouses in Europe last century. Both Hugel and Demidoff died in 1870 and I have been previously unable to determine what became of the plants and the glasshouses. A chance mention of an auction catalogue in an article on Demidoff gave me a lead and indicated that the plants were finally sold at auction in 1880 at San Donato. But, more importantly, the catalogue also listed the plants still growing in the glasshouses and while there were few dryandras by this time, the list of Australian plants is still impressive. Many would have been collected by Hugel, probably as seed, when he visited Australia in 1833-1834 and thus would have been more than forty years old. Others listed in Planchon's catalogue of the San Donato garden would have been at least 25-30 years old, thus showing it is possible to grow Australian plants as pot plants for long periods of time. In this final article, I will briefly review what is known about Demidoff's San Donato garden and trace its final years.

The San Donato property of Prince Anatole Demidoff was situated in open country to the west of Florence, about one mile from the city gate known as the Porto al Prato, and was noted in guide books to Florence from as early as 1830. Unfortunately, the guide books concentrate on describing the magnificence of the house (which was indeed one of the richest in the district and in 1880 was noted as having 109 rooms!) and little comment is made on the gardens. The house (and presumably the landscape architecture) were the work of the Italian architect G. Battista Silvestri, although Demidoff continued to improve the property through the 1840's. The improvements culminated in the purchase of the plants and glasshouses from Hugel in 1850 followed by their transportation from Vienna to Florence and their re-erection next to the house at San Donato.

The attached figure from Planchon's catalogue of the garden issued in 1858 gives some idea of the size of the glasshouses and the beauty of the property. What an immense task it must have been to dismantle, transport and re-erect them! - to say nothing of the cost. Planchon's catalogue lists around 1400 species being grown in the 1850's, including something over 200 Australian ones. Yet this total, impressive though it is, was less than three quarters of those actually under cultivation. Among the proteaceae were 14 Banksias, 11 Dryandras, 10 Grevilleas, 15 Hakeas, 2 Isopogons and other assorted genera such as Lambertia, Lomatia and Telopea. Most, if not all would have been collected by Hugel during his time in Australia in 1833-1834 although some may have been grown from seed subsequently sent to him from Australia. There was also a magnificent collection of orchids running to close on 1000 species. Orchids apparently especially interested Hugel and it was he who compiled the list for Planchon's book.

In order from the left, the glasshouses were:-

1 The Azalea House. As its name implies, this was primarily set up for Azaleas. However, it featured a considerable number of Australian plants, notably Acacias which when in flower contrasted well with the Rhododendrons and Azaleas. Many small Australian shrubs were also grown here including members of the Myrtaceae, Proteaceae, Epacridaceae and Leguminosae. So dense were the pots that the interior was described as looking "like a forest".

2 The Conifer House or Grand Orangerie. This was the largest glasshouse, measuring 44 m by 7.2 m and ranging in height from 9.55 m to 7.85 m. It was largely constructed from stone. Many of the largest plants were grown here (it was described as "full of trees") including various Araucarias, pines, Casuarinas, Eucalypts, Tristanias and Angophoras. The smaller plants were not neglected either and included "numerous species" of Melaleuca, Callistemon,



Leptospermum, Acacia ("a great number of examples"), Epacris and, perhaps somewhat surprisingly, most of the Proteaceae, 55 species in all being listed. Thirty two, including four Dryandras, were still listed in the 1880 auction catalogue.

3 Camellia House. While this contained a few Australian plants including Hardenbergias and some Leguminosae for background greenery, it was best known for its large collection of camellias, some of which were espaliered

4 The Tropical Pavillion. This was effectively a palm house and was octagonal in shape with a clearance under the cupola or dome of nearly 14 m. Thus a fine example of *Livistona australis* was grown here. Most of the remaining plants were palms and cycads of non- Australian origin.

5 The Orchid House. The orchid house was about 30 m long with a semi-circular roof reaching almost to the ground. Inside "the plants imitate the picturesque disorder of a tropical forest" with tropical orchids, bromeliads and lianas growing from trees which had ferns and mosses on their trunks. Palms, including Pandanus, were grown here and " a legion of epiphytic orchids" were suspended from the roof. While many of the orchids were undoubtedly Australian, the number of species concerned (approaching 1000) make it very difficult to provide a listing.

6 The old Orangerie and Special Glasshouses. These last glasshouses contained a traditional orangerie, an aquarium, a "water-house" for the growing of water lillies and several special sections for growing such specialised plants as Himalayan rhododendrons.

In the 1850's, the line of glasshouses stretched for 212 m. By 1880, the auction catalogue tells us they were nearly 400 m long with a median width of 8-10 m. Demidoff's gardeners continued to bring plants in until some time in the 1860's when the Italian Government, because of problems with the grapevine disease *Phylloxera*, forbade the importation of any plant material into Italy. The gardeners raised many plants themselves and letters from the head gardener Anton Steffatschek to Demidoff (who after 1859 lived mainly in Paris) talk of planting out 880 seedlings, including those of Epacris!. He also listed the plants in flower at various times including quite a number of banksias. Among the dryandras were *D. tenuifolia*, *D. mucronulata*, *D. fraseri*, *D. formosa* and *D. falcata*. Even *Telopea speciosissima*, the waratah was included.

It seems unclear as to how much Hugel had to do with the setting up of the glasshouses although the auction catalogue credits him as being mainly responsible, adding that he had done so "at the request of the late Anatole Demidoff who was one of his (Hugel's) personal friends". From 1849 to 1859, Hugel was Charge d' Affairs and later Ambassador to Tuscany. Being based in Florence, he had ample time to be involved with San Donato. He later spent ten years in Brussels, retired for a time to England and died in June, 1870 in Brussels. While in Brussels, he continued his interest in plants at the Botanic gardens there- all in all, a remarkable man who did so much for the cultivation of Australian plants but is almost forgotten today.

Demidoff left San Donato in 1859 and lived most of the rest of his life in Paris, dying there on April 28, 1870. The property and glasshouses were maintained in first class order, however, and a guide book of 1861 describes the area thus "the grounds -- are laid out with taste--; they contain a menagerie, artificial rivers, and very extensive hot and greenhouses filled with the rarest plants in the finest condition". The auction catalogue goes further- "The park which surrounds this princely dwelling complements it. Set out by the master hand, it is planted with trees and shrubs from the rarest and choicest species. Types of foliage predominate, such as giant magnolias, laurels, green oaks and Everymus of colossal size. The collection of conifers is without rival. -- The lawns, comparable to a velvet carpet, are dotted with plantings of azaleas, roses and (other) various flowers. As in the glasshouses, fountains, vases, marble and bronze statues are encountered at

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each step and contribute to the formation of an enchanting picture --." Even allowing for the auctioneering "hype", the property must have been well worth seeing. Certainly, in 1874 when an International Horticultural Exposition was held in Florence, the greenhouses at San Donato received universal acclaim and achieved the highest awards.

Upon Demidoff's death, his nephew Paul inherited the property. A former diplomate and Russian governor, he was also immensely wealthy and set about restoring the palace to its former glory. He was, however, less interested in the plants than his uncle and in 1880 decided to sell the plants and much of the art collection for which San Donato was renowned. (Part of the reason was that in 1873 he had bought the old Medici villa of Pratolino and had spent vast sums of money restoring it). From the 23rd of April to the 7th of May, the plants went under the hammer, in all realising about 110,000 francs. Much of the glasshouse ornaments and furniture were also sold but the house (and presumably the glasshouses) were left. A guide book of 1890 comments- "At the present time, while the magnificent gardens are still there, the whole place is abandoned". It seems that urban sprawl eventually caught up with San Donato and much of the remaining buildings were bulldozed to make way for housing development early this century. However, in Florence today there is a suburb of San Donato and a street called the Via della Villa Demidoff - at least some recognition for the work he had done in fostering an interest in the cultivation of Australian plants in Europe.

Tony Cavanagh

#### ANOTHER DRYANDRA SPECIES FOR PERTH

Soon after my return from a field trip in September, I had a call from the same man at the Agricultural Protection Bureau at Forrestfield who had discovered the new (for the Perth area) dryandra in the bushland adjoining their headquarters. (This was form 7 of the Dryandra "pteridifolia" complex - see my article in Newsletter 17 "A Dryandra Mystery Solved"). This time he had found a species that he had identified as *D. vestita*. I went out immediately to see the plant and, sure enough, it does seem to be *D. vestita*. So far, he has only found one plant though there are two more in the adjacent school grounds. The habit of the plants is not like typical *D. vestita* - there were no new branches shooting which are usually quite long and leafless and have woolly bracts (hence the name *vestita* "clothed"). The leaves are quite straight and upright, not curved, a characteristic which in the typical plant gives the effect of the leaves spiralling around the stem. Nevertheless, the shape of the leaves and flowers indicate that this is *D. vestita*. I am waiting for confirmation by Alex George on its identification but, in any case, it is a new recording, so far as I am aware, for the Perth metropolitan region. Once again, the nearest location that I have recorded is west of Mogumber where other plant species that grow in this marvellous, unspoilt area at Forrestfield also occur. They also can be found in Alex Morrison National Park east of Badgingarra. Who knows what other wonders are waiting to be found at Forrestfield? I call it the botanical equivalent of finding an un-plundered ancient treasure trove!

Margaret Pieroni

#### A DRYANDRA TRIP TO THE RAVENSTHORPE DISTRICT

Last month, Study Group members, Shirley Loney, Elizabeth George and myself joined four other friends for a four day field trip based at "Nordoo", a farm property mid-way between Newdegate and Ravensthorpe. We had excellent accommodation in an ideal position to carry out our various collecting and

photographing assignments.

We met some Wildflower enthusiast friends at Buckleys Breakaway, south west of Hyden for lunch and on our way explored this marvellous wildflower habitat especially above the "Breakaway" itself. There are many interesting and unusual proteaceae species growing there. Dryandras we saw included a form of *Dryandra ferruginea* with rather small flowers and brown, rather than rusty (ferruginous) hairs on the back of the pale bracts, and an unnamed upright-growing dryandra with leaves like *Dryandra armata* and pale yellow flowers which is very common in the area.

On our first day out we found some lovely plants of the prostrate form of *Dryandra ferruginea* with large colourful flowers at ground level and, growing with them, *Dryandra pteridifolia* identified by the wiry, curved styles in the dead flower-heads. From Narley we headed out towards the Southern Cross - Forrestiana Road and north towards Middle Ironcap. I was able to find the plants of the un-named dryandra, Ted Griffins sp. D which I'd seen in 1985. At that time, in October, the flowers were finished, so one of the objectives of the trip for me, was to photograph this species in flower. We were a month earlier, it was the 11th September and the timing was perfect. The flowers are a brilliant golden yellow and though they are closely surrounded by long stiff leaves similar to *Dryandra nivea* in habit, the flowers, nevertheless are quite showy. They are quite long, about 8 cms but only about 4 to 5 cms wide across the top as the styles are shorter when the flowers open. The seed capsules of this species are very long and the receptacle and capsules are covered in sticky resin.

Our second day was spent looking around Ravensthorpe in the morning and back to the farm via Fitzgerald. Our first stop was at Mt. Short where the un-named aff. *ferruginea* with very narrow leaves grows. This is the one I've mentioned as one possible parent of the hybrid plants at Mt. Desmond. At Mt. Short *Dryandra quercifolia* is absent, however, but *Dryandra foliosissima* can be found here and the un-named species that we'd seen at Buckleys Breakaway. The aff. *ferruginea* plants at Mt. Short are slightly bigger than those at Mt. Desmond - larger flower heads, wider leaves and taller plants.

We visited the Ravensthorpe Wildflower Show which was very enjoyable. I was surprised to see a specimen of sp. D on show, unfortunately labelled *Dryandra foliosissima*! I learned that some of the plants in the show had been collected at Hatter Hill, which is the type location for this species. There was also a form of *Dryandra cirsioides* which grows in association with sp. D which has small, pale, dull yellow flowers and is more thistle-like than typical *Dryandra cirsioides*.

We returned to the Mt. Desmond location where the aff. *ferruginea* plants were in flower but, once again I was too late to see the hybrids in flower.

West of Ravensthorpe we found *Dryandra cirsioides* and *Dryandra arctotidis* flowering and at Fitzgerald, after quite a search, found some *Dryandra obtusa* flowers. Most of the plants I'd photographed previously have been destroyed when the roadsides were recently graded.

We visited the property of Rob and Anne Smart. They had previously lived in South Australia and are friends of Study Group Members, the Carmans and Lithgows. They have a native plant nursery and garden well established and several uncleared natural vegetation areas. In all, we counted 9 dryandra species on their property which is quite remarkable. They included the prostrate *Dryandra tennifolia* and the "pteridifolia" form, Keith's form 5.

On the way home Shirley and I made a couple of "dryandra stops" and one diversion. At a favourite location east of Dumbleyung we found another population of my favorites, sp. J., as usual growing with *Dryandra fraseri* and *Allocasuarina huegellii*. The diversion was made towards Woodanilling to see the plant Ray Garstone had told me about. I had seen a specimen and a

photograph kindly sent by Ray earlier this year and I thought it was probably a cross between *Dryandra ferruginea* and *Dryandra preissii*, both of which Ray confirmed grew in the area. Thanks to Ray's precise directions we found the plant. It seems to be quite old as it has spread to more than a metre in diameter. The leaves are quite short, about 20 cms long and the plant has underground stems and flowers at ground level. The flower heads are more like *Dryandra ferruginea* than *Dryandra preissii* and both of these species are in very close proximity. The bracts were not completely spread out but the flowers were just beginning to open. The flowers have a yellow, curving style and a very hairy, purplish brown limb. The bracts are longer than the flowers, pale yellow with reddish-brown hairs on the outer surface. They are rather narrow and pointed, about 6 cms long. The leaves are similar to those of *Dryandra ferruginea* in shape.

As far as dryandras are concerned the trip was very successful. I now have photographs of all the taxa that I'm aware of, and additional locations of various species recorded. It was most enjoyable in many other aspects as well not the least being the company of dryandra (and other genera) enthusiasts and good friends.

Margaret Pieroni.

#### THE DRYANDRA SEED BANK

I have commented elsewhere about the seedbank which is available to all members, the only charge being for postage. Margaret has asked me to publish a list of the current holdings. Remember, this is a bank which requires some deposits now and then to keep it working. Any donations of seed are very welcome. Thanks to all those who have contributed.

When ordering seed, please send a stamped strong envelope (230mm x 100mm) with your order to Margaret Pieroni.

Species in adequate supply:-

*arctotidis*, *baxteri*, *bipinnatifida*, *brownii*, *calophylla*, *carlinoides*, *cirsioides*, *conferta*, *cuneata*, *cynaroides*, *drummondii*, *erythrocephala*, *ferruginea*, *foliolata*, *foliosissima*, *formosa*, *fraseri* (various forms), *hewardiana*, *horrida*, *kippistiana*, *longifolia*, *mucronulata*, *nana*, *nervosa*, *polycephala*, *praemorsa*, *proteoides*, *pulchella*, *purdieana*, *quercifolia*, *seneciifolia*, *serra*, *serratuloides*, *sessilis*, *shanklandiorum*, *shuttleworthiana*, *speciosa* (two forms), *squarrosa*, *stenoprion*, *stuposa*, *subulata*, *tenuifolia* (three forms), *tridentata*, *vestita*, sp. B, sp. C, sp. D, sp. E, sp. F, sp. H, sp. I, sp. J, aff. *pteridifolia* forms 5, 6, 7, 8.

Species in limited supply;-

*arborea*, *armata*, *blechnifolia*, *concinna*, *falcata*, *mimica*, *preissei*, *pteridifolia*, *subpinnatifida*, *tortifolia*, and all but two un-named taxa.

Species not held (seed needed):-

*comosa*, *lindleyana*, *sclerophylla*.

Tony Cavanagh

DRYANDRA SURVEY

Record in the spaces provided, details of all dryandras you are growing, or can provide adequate information on from friend's gardens. If you have species you can't name, give it a number on the form and send a labelled specimen(s) off to me with the form.

Name and address of grower, or locality grown :-

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Details of topsoil :- State depth, what type of soil/sand, whether it has been built up, or amended. Also describe subsoil

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Name of species	HxW Metres	Age Yrs.	Mulch	Moisture Win. Sum.	Drain	Sun	Flw	Set Seed

Height and Width to nearest 1/10th metre  
 Mulch :- Depth and type - sawdust, gravel, cover plants, etc.  
 Moisture :- W = Wet, D = Dry, M = Moist  
 Drainage:- G = Good, M = Moderate, P = Poor  
 Sun :- 1/4, 1/2, 3/4, Full  
 Flowered / Set Seed :- Y = Yes, N = No  
 Record any other information, eg. light or heavy frosts, exposure to high humidity in summer, or to salt laden winds.

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