



# GREVILLEA STUDY GROUP

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## NEWSLETTER NO. 24

Welcome once again to spring and what an exciting time it is. We seem to have had a particularly floriferous spring following our heavy rains in autumn and winter.

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One of our most interesting Grevilleas in flower at the moment is *G. leucoptervis*. Late afternoon in our backyard confirms that this species is very aptly named "old socks".

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At this point I would like to say some thank yous. Firstly, I would like to thank all those members who have contributed articles for the newsletter, some were solicited, others were a very pleasant surprise. These contributions certainly make my job a lot easier.

Thanks also must go to Alison Bailey who types up this information on her computer and presents it in such an outstanding and professional form — always at very short notice, and at a much discounted price. It would make her job a lot easier if articles submitted were on 5 1/4" IBM compatible floppy disk. Typing the information is the most time consuming part of the exercise.

Janice Hughes has kindly put our membership list on to her computer. This makes things a lot easier, instead of writing out all names and addresses by hand.

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In this newsletter, we feature *G. scapigera* and some more information on grafting.

### ACTIVITIES

#### REPORT ON ACTIVITY — WORKING BEE JULY 1989

Our working bee was well attended by about 15 enthusiastic members, some travelling from as far away as New Zealand. Merv Holland and his wife arrived on Peter's doorstep by co-incidence on the morning of the working bee and were immediately seconded to do some work. It was delightful to meet them and hear about their experiences with Grevilleas in New Zealand.

Two members went to the Grevillea Park to do some hard work on the fences, the rest of us remained at Ray's nursery to catalogue the Grevillea collection. This involved working out what was there, weeding the pots, pruning, labelling and arranging in alphabetical order.

Neil Marriott was up from Victoria. Once again, we mere mortals were humbled by his and Peter's knowledge of Grevilleas. Many of the plants were not in flower but Peter and Neil seemed to know the identity and origins of them all. For those of us writing out labels, it seems a mammoth task just to learn all the new names, let alone knowing which species is which.

It was a very successful and enjoyable day — rather hectic, but productive and educational.

It seems such a shame that we can't have more times when we meet together, but at the present time, Peter has many other commitments. If anyone would like to organise a walk or get together, please feel free to do so — just drop me a line and let me know so I can publish the details.

### NEWS in BRIEF

Angus Stewart has recently moved to Sale in Victoria where he is starting to explore for Grevilleas. One that he has located is *G. chrysophaea* found growing on sandy hills in the Gippsland Lakes National Park. The soil is derived from old sand dune systems and is quite close (a couple of hundred metres) from the beach. This is possibly a good Grevillea for coastal gardens.

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SGAP Tamworth Group is one of our new members. They have 50 acres of land for planting on the shores of Chaffy Dam, Dulegal Arboretum. They are hoping to get propagating material and knowledge from our group and various other study groups for their planting project.

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# IN THE WILD



## Grevillea scapigera

by Christine Guthrie

Following on from our last newsletter, we have yet another endangered Grevillea.

*G. scapigera* was named by Alex S. George, from the latin *scapiger*, bearing a scape, which is a leafless stem bearing flowers and arising from the rootstock. The flowers of this species are on a scape-like stem.

This plant grows naturally in gravelly sand and sandy loam, in heath.

It is a prostrate plant spreading to 1m. The greyish leaves are pinnately lobed into 5-7 segments, each of which is divided into 3-5 secondary, pointed, triangular lobes. The leaves are held erect from the prostrate stems and vary in length from 30 to 90mm. The long, leafless flower stalks are up to 3cm long and are held erect above the plant. The white flowers are held in a dense, head-like cluster about 40mm in diameter. They are seen in the late spring. The sweetly scented flowers open from the outside and the long styles curve upwards and inwards, giving a wheel-like effect. The narrow, smooth perianth is up to 5mm long and the curving style is about 18mm long.

The conservation status of this Grevillea is 2E. This means that the species has a very restricted distribution in Australia, with a maximum geographic range of less than 100 kms. It is an endangered species in serious risk of disappearing from the wild within one or two decades if present land use and other factors continue to operate.

In 1985, four plants of this species were known to occur around the Corrigin airstrip in W.A. One of our members, during a trip to W.A., went to collect cutting material and found that a track had been bulldozed beside the airport leaving only one plant alive.

In 1986 during his W.A. trip, Peter Olde went to locate the one remaining plant of *G. scapigera* and found that it had been run over by a car! Cutting material was sent back to various sources and C.A.L.M. (Western Australia's Department of Conservation and Land Management) was advised of the plant's location. One month later C.A.L.M. located the plant and found that it was dead.

Subsequently, all other locations given by Alex George were checked, but all that could be found were weeds – no *G. scapigera*!

*G. scapigera* is now thought to be extinct, although strictly speaking, to be classified as extinct, a species has to have been either not found in recent years despite searching, or not collected for at least 50 years and only known to have been found in well settled areas. At the present time there are no known extent specimens, although plants may yet appear after a fire or from seed present in the soil.

Cutting material that was sent back in 1986 was struck as cuttings and grafted by various members. Material sent to the Botanical Gardens in Canberra was struck, but the plants have since died, as has material sent to Queensland and to Ray Brown for our Grevillea collection at Bulli.

Most plants of this species in cultivation have a problem with the leaves going black and the plants deteriorating. There are a few grafted specimens at the Royal Botanical Gardens in Sydney but these are not healthy.

Neil Marriott in Victoria has the only healthy specimens of *G. scapigera* at the moment. Material has recently been sent to Kings Park in Perth – hopefully they will be more successful than we Easterners have been. All we need now is one bushy specimen for cuttings, to ensure the preservation of this species at least in cultivation.

When material becomes available, all study group members should endeavour to grow *G. scapigera*. It would make a very attractive rockery plant, with its trailing stems, grey leaves and unique flowers. Excellent drainage would be essential and full sun to partial shade desirable.<sup>1</sup>

*G. scapigera*  
at Royal  
Botanic  
Gardens,  
Sydney

*Grevillea scapigera* A rare plant, which would make a dainty rockery specimen (x..5)



Peter Abell has grafted some plants of *G. scapigera*

with some success, but found he had the problem of the plants going black. A specimen was sent to the Senior Plant Pathologist, J. Taylor, at the Biological and Chemical Research Institute and his response was as follows:

"I have looked at this specimen, and as I suspected, *Glomerella cingulata* was present in the diseased stems. *Botrytis cinerea*, *Epicoccum* and *Pestalotiopsis* sp. were present, but are unlikely to be pathogens. Daconil (chlorothalonil) is the best fungicide for controlling this disease and should be applied every 5 weeks from January to July.

At the same time, it would be good practice to look at environmental control, by removing all the dead leaves and twigs which otherwise will be a good source of inoculum. Do this just before the plants are sprayed, so that the wounds will be covered by the fungicide. Also, if possible, locate the plants where they will not be exposed to rain.

One problem with this species is that it grows like a carpet, which then keeps its leaves wet for a longer period. This of course makes infection with *Glomerella* much easier.

As it is reasonably important to keep these plants alive, when they are the only ones in existence, I suggest that next time they are grafted, they be worked into a short standard which will ensure a lower humidity than for plants at ground level.

### *G. scapigera* at Shepparton, Vic

David Shiells reports that he was the recipient of a plant of *G. scapigera*, but unfortunately the plant died in the pot, but not before two cuttings were taken. Both of these cuttings were struck but one died in the pot and the other planted out. Unfortunately the rabbits took a liking to this plant and promptly scratched it out, so consequently, *G. scapigera* is no longer at Shepparton.

### *G. scapigera* at Stawell, Vic

Neil Marriott has grafted *G. scapigera* onto *G. "Royal Mantle"*. It is interesting to note that all grafts onto *G. robusta* failed, which suggests an incompatibility problem.

At the moment, Neil has a couple of plants in pots, and one in the ground, planted in May 1988. This planted specimen is doing extremely well despite a cold, wet, cloudy winter which is usually disastrous for "touchy" plants, although there is a little blackening. There is a lot of new growth on this plant and when it firms up in a few weeks, Neil intends taking many cuttings.

After flowering last year, the plant also set a lot of seed, which Neil will propagate. This will allow us to increase the genetic diversity of this plant which is important, since if all our plants are merely clones of one plant, there is a danger that genetic diversity will be lost.

I'm sure we all look forward to hearing about the progress of *G. scapigera* in cultivation. If anyone else is growing *G. scapigera*, please let me know and I can pass on the information to our members.

1. Reference: "Banksias, Waratahs and Grevilleas" by John Wrigley and Murray Fagg

# TRIP REPORT

## Western Australia – 1988 – Part 3

by Peter Olde (Continuing his report of his visit to Queen Victoria Spring)

We eventually reached an area abundant with Proteaceae; *Persoonia* spp. *Banksia elderana* and other *Grevillea* spp. The country was beginning to change. *Triodia pungens* became common and vegetation generally became low and thinly spread. Almost at the entrance to Queen Victoria Conservation area, Neil spotted an unlikely, dead-looking clump. We piled out for the umpteenth time. Here at last was *G. secunda* but it was not in flower. Furthermore, it looked half dead. New growth was coming from inside the plant while most of the plant sported dead older branches. Wherever we searched the story was the same. No flowers. Rather disappointing after so much effort. We drove on to Queen Victoria Spring itself.

This is a most historic area. It was here that Giles' East-West expedition passed through in the late 19th Century. Camped beside the Spring was a tribe of Aborigines now extinct, revealed Richard. The expedition obtained water here and, interestingly, collected the first specimen recorded of *G. secunda*. The species does not occur right at the Spring itself, however. We found a low area which had recently been used. In dry weather, you have to dig for water. The holes were over a metre deep and dry at the bottom. We resisted the temptation to dig deeper, preferring the cup of tea on offer at the Althofer's van.

Suddenly, a shot rang out. A little earlier, we had noticed Richard and his friend, Reg, move off and light a fire. Richard suddenly reappeared with a rabbit, which he proceeded to throw onto the fire. I wandered over and observed him heaping the ashes over the small animal. "Good tucker", he commented. "Must get a bit gritty", I said. "You get used to it", he smiled. Not only had our party not observed any rabbits or signs thereof all day, but Richard had found one, shot it and had it cooking within ten minutes, about the same time it took us to get our sandwiches out. During lunch, Richard told of a trip to Germany he had made some time before.

Lunch over, we refuelled from our gerry cans before heading south, passing through a most unusual Eucalypt patch with interesting bark. A stand of tall *Xanthorea* spp. dominated a nearby area. We all trooped out the cameras again, marvelling at their beauty. Richard paused and then drove on. We never saw this smiling man of few words again. We had no time to say thank you or goodbye. He was gone.

### CAVE HILL

Next morning, we set off from near Kalgoorlie where we had spent the night. We headed south to Higgsville and then west to Cave Hill. This is a long drive over fairly bad road. It was here that Peter Althofer, rather more interested in the plants than the road, drove straight into a deep pot-hole, catapulting Hazel onto the roof. Despite a sore head, Hazel managed a smile all day. The country was very dry and plants had very few flowers, although we had expected that a wet winter might have refreshed the area. Apparently, the rain had not reached this far west. We eventually reached Cave Hill, a beautiful granite outcrop with its own reservoir and camp area. We were searching for *G. petrophiloides* subsp. *magnifica* and we were not disappointed. As we walked onto this granite massif, the beautiful plants appeared as sentinels overlooking the spectacular vista which they commanded. The subspecies was abundant here and the whole area impressed us greatly. *G. oncogyne* and *G. teretifolia* were also found in flower among *Calothamnus* and a beautiful *Acacia*. We spent the morning taking photographs. We could see other granite outcrops in the distance and we longed for the time to search them too but it was not possible.

Both *G. petrophiloides* subsp. *magnifica* and *G. oncogyne* have outstanding inflorescences. *G. oncogyne* has extremely

large red flowers with long styles and would make an excellent plant in horticulture. However, it is extremely difficult to strike from plants in the wild, although we know of some plants in cultivation. The specimens at Cave Hill were magnificent when we were there. It is a widely distributed species, occurring in a number of soil types in low-rainfall country. There are at least two leaf variants and it exhibits significant variation in habit. In sandplain, shrubs rarely exceed 1 m. while at Cave Hill they were up to 2 m. high. Notwithstanding the McGillivray revision, this species needs much greater study and collection. It is closely related to *G. plurijuga* and *G. pectinata*.

I wrote about *G. petrophiloides* subsp. *magnifica* after my trip in 1986. The inflorescences are larger and quite blue-grey/pale pink in colour. They inhabit the most inhospitable terrain, seeming able to survive in the crevices of pure rock. These areas must become insufferably hot and dry in summer and their resilience is astounding. The healthiest specimens were growing in the granite loam at the base of Cave Hill. Incidentally, this location is many hundreds of miles from the other only known location at Mt. Stirling and Mt. Caroline. Unfortunately, this subspecies is still proving difficult to tame and it does not grow reliably in cultivation. The flower colour is not nearly as intense and attractive as *G. petrophiloides* subsp. *oligomera* which has shorter inflorescences and inhabits the lateritic gravel soils north of Kalgoorlie.

### KALGOORLIE TO DIEMALS.

My last trip north of Kalgoorlie was in 1986 and I was stunned at the absolute devastation of the countryside now apparent because of goldmining. Wherever you could cast your eye, huge mountains had appeared, vast areas laid waste as overburden is cleared off and piled high. As the price of gold rises and extraction methods improve, even minute traces of gold-bearing ore are now sought and processed. And this is nothing compared to the super mines being developed. As one astute observer noted, we have got all our values wrong. The natural systems are laid waste, the flora and fauna destroyed, the earth polluted and bared, and what do they do with the gold? Make it into bars and store it in vaults. Forgive us, mother Earth, but money is the god of the world now.

Grevilleas, of course, tend to regenerate in disturbed areas, especially if the disturbance is minor and the topsoil is not removed or depleted. It is so hot and dry in this country, it is a wonder that things survive at all. Regeneration is slow, plants are widely spaced. There are quite a few Grevilleas north of Kalgoorlie; *G. juncifolia*, *G. acacioides*, *G. petrophiloides*, *G. nematophylla*, *G. sarissa* subsp. *sarissa*. Around the now non-existent town of Comet Vale, we found more plants of *G. sarissa* subsp. *rectitepala*. This has only been collected a few times and is known from very few sites. We turned west at Menzies, travelling on gravel road. Not far along, we located huge plants of *G. nematophylla* which had divided leaves. Some of these also bore exquisite flowering mistletoes, something which I had never observed on the genus heretofore. Unfortunately, this summer-flowering Grevillea had not yet begun to develop its flowering buds. Quite nearby, a pale pink form of *G. sarissa* subsp. *sarissa* was found. This subspecies has glabrous flowers usually of a rich red. Wherever the soil became lateritic, *G. petrophiloides* subsp. *oligomera* appeared, rich carmine-red flowers contrasting with glaucous, blue-green foliage.

The road is mainly flat with slight undulations. As we travelled over these rises, we tended to pick up different species of Grevillea. *Eucalyptus formanii* grows in this area. However, about 27 km. west of Menzies, we drove into what appeared to be a moonscape. Salted, dry barren

## TRIP REPORT (cont)

ground with surrounding lunettes of gypsum loam. This inhospitable terrain was the habitat of one of nature's toughest Grevilleas, *G. sarissa* subsp. *bicolor*. This subspecies has beautiful flowers, either red or yellow, covered with silky white down. The inner surface of the flowers is exposed at anthesis and is glabrous, usually rich in colour and serves as highlight and contrast to the dull outer surface. Borne on such gnarled, aged specimens in such desolate surroundings, they reminded me forcefully of nature's habit of selecting only those fit to survive.

About 100 km. west of Menzies, we came upon one of my favourite species, *G. erectiloba*. This beautiful Grevillea with its glaucous, blue-green finely divided foliage was relatively common in the area. Previously, I had thought it to be extremely rare because there had been so few collections. However, along parts of this road, it can be found in almost every gravelly rise. Many of the shrubs were in full flower; emerald green buds, ageing orange to red in large clusters. The flowers closely resemble those of the eastern species *G. longistyla* and *G. johnsonii* and appear to be related, notwithstanding the enormous distance between.

In this area, granite outcrops appeared. On Hospital Rock, in sandy depressions, we found an unusual form of *Kunzea sericea* with white flowers and stands of *Eucalyptus orbifolia*, with lovely, rounded leaves and large, yellow flowers. Rock types seem to vary a great deal in this country. One minute you're on granite, the next something different. Oh! to be a geologist or a naturalist! We spent the night near a salt lake far from civilization. We had not seen a car all day. So peaceful and quiet. By this stage, our routine consisted of pulling up around dusk at a likely site, searching for access and privacy from the road, unpacking the wretched van, cooking tea and preparing cuttings and specimens, and within one hour of nightfall, falling asleep. I could not help but feel that as creatures of the world, it is more natural to live in tune with the hours of dark and light. We were usually awake about dawn, refreshed and ready to roll. Except for Peter Althofer. He was usually awake about 3 a.m. listening for birds.

At breakfast, the conversation would be something like this. "Neil, did you hear the blue-faced speckled duck last night about 3 a.m.?" "Yes, Peter (Althofer), there were four of them about 200 m. to the west calling to three in the east", says Neil. "Wasn't it fantastic?" "Yeah!!" "What about the nightjars? Did you hear them?" "Yeah, they have a beautiful call, don't they Neil?" "They do, but I couldn't hear them properly for Oldie's snoring." And so it went on. "Did you see that Grevillea erection today?", enthused Neil, in his inimitable way. "Aren't they just absolutely hornerous?" Talk drifted between animals, birds, lizards, beetles, insects, geology, plants and back again. I realised that, as much as I knew about plants, I knew nothing about the natural world compared to Neil and Peter. It was like a student in the presence of great masters. I sat quietly and listened (and laughed).

### DIE HARDY RANGE.

Near Diemals, the road turns south towards Southern Cross. Nothing can prepare you for the sheer beauty of the rugged Die Hardy Range, when you reach it. As far as ranges go, it is a mere pimple on a pumpkin. But the country is so dry and harsh. The rocks sparkle with mineralisation and clink when you touch them. Already the shafts of the omnipresent miners are sunk into the depths beneath, their diggings lying beside the road in plastic bags, awaiting transport to the laboratory for analysis. As you climb the short distance to the top and survey miles into the distance, you are confronted by the most exquisite sight of hundreds of candle-like inflorescences of hugh red and cream flowers, *G. georgiana*. For those seeing it for the first time, it is without parallel. Peter Althofer felt it was one of the most memorable sights he had seen in a lifetime of wildflower expeditions. You can scarcely believe that plants could survive in this pure rock habitat. Peter and I found two plants with yellow flowers, just to add to the excitement

and wonder at nature's diversity. Later that day, just north of Southern Cross, we found flowers of *G. paradoxa* so pale pink that, to all intents and purposes, they could be described as white.

### PARKER RANGE.

Just south of Southern Cross, the Parker Range appears, somewhat similar in its abruptness and height to the Die Hardy Range. As you head south into the sandplain country, the flora becomes lower and more diversified, with many more species present. At Parker Range we searched for *G. fulgens* at which site there is a reported collection. We did not find it but we really needed several days in the area to be sure. The area is peppered with mining shafts and transects too. God forbid that they find anything. This beautiful area was characterized by chocolate-brown rocks, with laterite intrusions, (some of which had been mined for road-works). Contrasting against this is the most brilliantly-coloured flora. Grevilleas abound. *G. obliquistigma*, *G. acuaria*, *G. pterosperma*, *G. paradoxa*, *G. yorkrakinensis*, *G. integrifolia* subsp., *G. didymobotrya*, *G. acacioides*, *G. huegelii*, *G. eriostachya* subsp. *excelsior*, *G. hookeriana*, *G. pilosa*, *G. cagiana*.

We moved on to Mt. Holland in search of *G. lissopleura*. This species had been collected by Neil who had not recognised it, or so he believed. It proved elusive, even though he had found it only a year before. It took hours the next day to locate it but it was not as I expected. Although I had left the description at home, the fruit was wrong and the leaves had no ridges. Furthermore, they were not simple but divided, trifid. It was a new species. You could scarcely believe it. The more you looked, the more you could see it everywhere. How could this never have been collected before? Prior to their description in 1986, many species have been shown to occur here but been poorly collected. *G. lissopleura* has only been collected once and never re-found to date. *G. lullfitzii* was only collected once. So too, *G. pilosa* subsp. *dissecta*. This whole area is so rich. It deserves the attentions of collectors and botanists before the miners get it. Even while we slept, hugh convoys of buildings and mining equipment roared past and into the distance. We may not have long to explore this virgin area.

Further south we reached Digger Rocks, the site of *G. lullfitzii* which was in full flower along with *G. insignis*. We turned west here and headed out to the vermin fence. At this junction we found *G. decipiens*, growing in *Melaleuca* scrub with *G. oncogyne*, *G. huegelii* and *G. oligantha*. We followed the fence south until we met the ranger who quietly informed us that this was not a public road and we would have to get off it. Sad really, because the sandplain flora is quite exquisite and just metres to the west the whole country had been cleared and turned to farmland. We arrived at Lake King the next day and headed towards Newdegate.

The roadsides in this area are truly brilliant. *G. eriostachya* subsp. *excelsior*, purple *Cyanostegia*, bright yellow *Gliscrocaryon*, underscored by *Dampiera wellsiana* and assorted *Verticordias* and *Keraudrenia*. You can't imagine how stunning it is until you have seen it. The low heath around Lake King contains such gems as *Anigozanthus humilis*, *Chloanthes coccinea*, *Calytrix breyifolia*, *Verticordia roei* and *acerosa*, *Chamelaucium megalopetalum*. The list is endless. Merv was particularly impressed by massed stands of *Lechenaultia bilboa*, *G. wittweri*, *G. pilosa* subsp. *pilosa*, *G. cagiana* and many other Grevilleas were also present.

Near Newdegate, we checked out *G. involucrata*, a very restricted species which is known only from about 12 populations. By now, the hot, sultry weather had turned very cold and rain became the standard condition. Sleeping out under the stars did not have quite the same appeal and the tent was called into service.

.....to be concluded next issue as he visits Charles Gardner Reserve, travels from Perth to Willuna and travels the Canning Stock Route.

# IN YOUR GARDEN

## Report of Grevilleas in Heavy Soil in Sydney

H.M.Hewett

When I started my present garden in the spring of 1985, I was faced with the prospect of adapting to soil types completely different to those of my experience at my Mt. Ku-Ring-Gai address. The basic soil here at Cherrybrook is a heavy but relatively rich clay loam of shale parentage. Colour is dark brown. Unfortunately however, the previous owner had covered the entire area with 48 truck loads of sticky clay to a depth varying from 220mm to almost a metre.

With the help of a bulldozer, the clay at the shallow section was excavated off and the heavy loam from below same recovered. As much of the clay as possible was then pushed back into the hole and this area was reserved for a lawn. With such an operation, there is always an excess of material and this remaining clay was spread over the untouched clay section. This became the basic soil for many of my Grevillea species.

After breaking up the clay by rotary hoe, mounded beds were prepared leaving paths between, under which system of agricultural piping was laid to improve site drainage.

Humus was then dug in to spade depth and allowed to break down. Immediately prior to planting, a dressing of gypsum was applied and also dug in. All plants were watered in at planting but subsequent watering was virtually zero. No fertiliser was used.

Except as noted later, plants are in broken shade till mid morning and enjoy full sun thereafter. Also except as noted, mulch of quartz gravel was used.

I have been surprised by the growth of most of the following species which were planted in the summer of 1985/86.

*G. acanthifolia* Prostrate form. This is very dense to about 3000mm high and has required continual pruning to contain it to about 3 metres diameter.

*G. alpina* Small flowered form. It is 2 metres high with a spread of over 2 metres and flowers heavily from early winter till late summer.

*G. bipinnatifida* One metre high with a spread of 1.8 metres and flowers continuously throughout the year.

*G. brachystylis* 1.4 m high, flowers throughout the year.

*G. buxifolia* Approx 1.6 X 1.6 metres and is very dense to the ground. In this case mulch is vegetative.

*G. floribunda* Is 1.8 metres high and flowers heavily for most of the year.

*G. involucrata* is 1 metre high with a spread of 2.8 metres. Flowers heavily.

*G. juniperina* (red) is in broken shade for most of the day and consequently flowering suffers a little. Growth is vigorous however to 600mm high and a spread of 2.3 metres. Vegetative mulch is used.

*G. lanigera* (prostrate) 1.3m diam. Dense, long flowering

*G. leucopteris* very vigorous. Currently 4 metres high with over 30 flowering stems budding up. First flowering was in 1988 with 7 stems.

*G. macrostylis* (2) very vigorous to 3m high. The height of these plants has surprised me because the parent plant in my earlier garden was a more lateral grower to a height of about 600mm. The soil there was of light/medium texture.

*G. muelleri* (now *G. trifida*). This is in a rather shaded situation. It has grown very slowly although it appears healthy. It flowered last year and is currently (Aug 89) in flower again. It is yet only 300mm high.

*G. paniculata* is very dense but has produced little flower to date. It is currently 1 metre high with a spread of 1.8m.

*G. paradoxa* (2 years) appears healthy but has been very slow growing. Current height is only 300mm. It has not flowered yet.

*G. sericea* is 1.5 metres high and vigorous. Vegetative mulch is used.

*G. speciosa ssp speciosa* 1 metre high x 1.3m spread. It is very healthy but flowering to date has been a little sparse.

*G. thelemanniana* grey/green prostrate form is very vigorous and has been pruned to 2.3 metres diameter. Flowers well after rain.

There have been several losses in this clay section of the garden from *Phytophthora cinnamomii*.

*G. dielsiana* (orange form) was lost after one years vigorous growth to about 1.5 metres.

*G. dielsiana* (red form) (2) survived for about 3 years before succumbing to our wretched seasonal conditions last autumn. They were about 800mm high x 2.5 m spread.

*G. synapheae* was also lost after the recent autumn, after flowering well in the previous two seasons. It reached about 300mm high with a spread of about 3 metres.

Species which have been planted in the clay for about 1 year, but which seem to be progressing well are:-

*G. alpina* low growing form with large flower

*G. confertifolia* A further group of species has been grown in mounded beds of the basic heavy loam. Most of these have been planted for about 2 years with a vegetative mulch, but watering, as before, has been nil.

*G. beadleana* very vigorous and dense to ground 2m x 2m.

*G. bipinnatifida* (3½ years). 900mm x 1m spread. Flowers continuously.

*G. brachystachya* very vigorous. 300mm x 2.8m spread

*G. brownii* (3) prostrate, vigorous, flowers well. 1.5m x 1m

*G. crithmifolia* (3 years) has been rather slow growing and has only flowered sparsely. It looks healthy nevertheless. Prostrate x 600mm diameter.

*G. drummondii* As this species has a reputation of susceptibility to collar rot, I located it close to a *Persoonia pinifolia* in order to provide some early root association and hopefully reduce pathogen attack. To date (3 years) it has remained healthy but is of a rather sparse growth form and although it flowers frequently, these are not as spectacular as with full sun exposure. It receives morning sun only a few hours per day. It is about 1m high and as noted rather rangy.

*G. ericifolia* (?taxonomy) (2) vigorous and dense to about 150mm x 400mm spread.

*G. leucopteris* 3m and vigorous

*G. mucronulata* compact form. Healthy and dense. 450mm high x 1.3m spread.

*G. paniculata* very dense to 1m high x 1.5m spread. As with the specimen in clay, flowering has been very sparse.

*G. parviflora* spreading form. Vigorous. 400mm high x 2m average spread.

*G. sericea x speciosa* (Collaroy Plateau) Vigorous. Broken shade for most of day. Flowers well. 1.2m high.

*G. scortechinii* prostrate, 3½ yrs, vigorous, spread 3m x 1m

*G. speciosa ssp dimorpha* narrow leaf form, very vigorous. Flowers well. 600mm x 1m spread. A most attractive plant.

*G. speciosa ssp dimorpha* broad leaf form (1 year) Vigorous.

# PROPAGATION

## Grafting Australian plants – A research report

by Peter Abell (reprinted from *Australian Horticulture*, November 1988)

Australia contains some of the world's finest and most horticulturally desirable plants. The cultivation of many species outside their natural area has been difficult. These difficulties often centre around fungal pathogens (*Phytophthora*, *Rhizoctonia*, *Pythium*) and climate.

Most areas of Australia suffer from these pathogens, which can cause rapid death of established plants even under the best of care. When they combine with our warm and humid summers the results can be dramatic. Even under apparently ideal conditions of free drainage and regular drenches (fungicides) many plants, particularly those from the Western Australian sandplains and certain eastern species, will still prove to be unreliable horticultural subjects.

### Why graft?

To bring many of these plants into cultivation we must develop propagation techniques other than the more conventional seed/cutting methods. A plant that is susceptible to *Phytophthora*, for example could benefit from being grafted onto a resistant, hardy rootstock. Grafting may also extend the temperature range of tropical species, by eliminating the need to have warmer root zones.

Grafting has been used for centuries on plants like roses, citrus, stonefruit and nuts to either prolong the life or induce vigour in plants that may otherwise create problems in cultivation. By grafting Australian plants we may well be able to bring into cultivation plants worthy of space but at present difficult to establish.

### Methods

My early attempts to graft native plants were done with top wedge grafts using teflon plumbing tape sealed with bituminous paint. They were all placed under mist and with one exception all died soon after.

I feel that the reasons these failed may include:

1. Poor cuts - not straight and clean.
2. Poor matching of cambial tissue.
3. There may be adverse affects from using mastics?
4. No seal around graft? - (This may not be important.)
5. Mist wetting foliage causing fungal problems.
6. Inappropriate rootstocks, eg not compatible, no vigour.
7. Tape restricting union development.

These first attempts were with plants that were essentially of WA origin and often difficult to cultivate in Sydney. *Hibbertia miniata* and a few *Grevillea* and *Banksia* species failed. The exception was *Grevillea fasciculata* onto *G. laurifolia*. This union took about two months to take but encouraged me to continue. However, 18 months (in early 1987) after grafting this plant died.

At this early point all I really knew about grafting were the "cuts" and the types of grafts. Australian National Botanic Gardens had done a little grafting with natives but I knew nothing about their technique except that they "tied" the graft with Nescofilm, a stretchable plastic film used in laboratories. This sort of material is easy to use as you cut it to the size you want and it is self sealing and tying. (We obtained Parafilm M., a similar material.)

Harvey Shaw (from Society for Growing Australian Plants in Brisbane) provided a clue. He suggested using a very short piece of tip growth, about two centimetres long that was actively growing. This piece of apical meristem would not have differentiated its xylem, phloem and cambial cells fully. This should be an advantage, as one of the problems with grafting is that once the callus from both scion and rootstock have joined the xylem, phloem and cambium

tracts must align themselves. If the material is immature to begin with, the alignment problem may be reduced.

New problems however, could be created. The new growth could not be photosynthesising and therefore may die through lack of sugars as would the rootstock. This was overcome by leaving some foliage on the rootstock. Some grevilleas were tried using this new method but they wilted rapidly and died under the mist. While trying to work out why these failed, Peter Olde (SGAP NSW, leader of the Grevillea Study Group) suggested placing the grafts in a bell jar instead of under mist because the mist induced fungal problems in the graft.

A plastic bag over the plant and pot was my equivalent of the bell jar. The humidity remained high but the graft and foliage were no longer wet. Three to four weeks after grafting seedlings of banksia and dryandra a union had formed and growth had begun. These seedlings (taken at second true leaf stage) were wedge cut below the cotyledons and inserted into the rootstocks (seedlings) two or three nodes above the cotyledons.

Although this method has proven to be successful its use may be limited because:

1. Seedling number is scion number.
2. Success rate is low, estimated 10 per cent.
3. Very soft material is difficult to work and is easily damaged.
4. Callus formation in the union area is often limited due to formation of adventitious roots.

With a successful technique to work from I started to be a little more adventurous. Mainly working with grevilleas and hakeas, I tried a few different rootstocks and grafts. From this I believe that six important things were learnt:

1. Graft type for strength is important.
2. Rootstock selection is important for compatibility, vigour, adaptability, etc.
3. Cuts must be smooth and clean.
4. Rate of union formation can dictate strength.
5. Knife must be razor sharp. Single tapered blade recommended.
6. Some foliage should be left on the rootstock to maintain its vigour while union is forming.

All my early grafts were of the top wedge type. It is easiest of all grafts to do except for the side wedge. A side wedge graft is made by making two sloping cuts on the proximal end (bottom) of the scion and inserting this into the rootstock which had the distal end (top), cut off square and vertical cut made into it. Although a simple procedure, I do not recommend its use because:

- a. Spurious callus will separate the rootstock from the scion and hence weaken the graft. If you then tie the union with more tape you can restrict the growth of the union and 'choke' the graft.
- b. By cutting the rootstock off square there must be a total realignment of all xylem and phloem. This takes more time and forms a weaker union.

The graft I use now is the whip and tongue. It requires a little more care in preparation but I feel that this is outweighed by the speed of union formation and its greater strength. It is made by making a diagonally sloping cut across both rootstock and scion. These cuts must be of almost identical length for best results. A vertical cut must be made then into both the scion (proximal end) and rootstock (distal end). This cut should be made one third of the way into the rootstock/scion and be approximately a

# PROPAGATION (cont)

third of the diagonal cut's length. I feel that the advantages of this graft are:

- (a) Spurious callus actually strengthens the union at the centre of the graft and, although the 'tails' may separate, has little effect on the graft union.
- (b) There is much greater surface area in contact which helps both speed and union formation and strength.
- (c) Alignment of the xylem, phloem and cambial tracts are more direct.

The most important points to remember when doing any graft are:

1. Stock and scion must be compatible. Interspecific grafts are presently used in most cases. Intergeneric grafts have been successful, so the limits are unknown.
2. Cambial regions of scion and rootstock must be in intimate contact.
3. The rootstock and scion must be in the proper growth stage.
4. All cut surfaces must be protected from desiccation immediately.
5. Proper care for period of time after grafting: weaning from bell jar, gradual removal of rootstock foliage and removal of any shoots from rootstock.

## Results

I have done 380 grafts and recorded the results. (Remember failures are as important as successes). Approximately 50 of the successful grafts have been planted in the Royal Botanic Gardens Sydney and will be monitored regularly. The successful grafts at present (August 1988) come from five families and 16 genera (see table over).

Of note in these results are the intergeneric grafts (marked by \*). The dryandra grafts were made on *Banksia integrifolia* and the verticordia and calytrix on *Thyrtomene saxicola*. *Oerocallis* spp. were grafted onto *Telopea mongaensis* x *speciosissima* and *Gymnostoma* onto *Casuarina collina*.

Grafts of *Grevilla* spp. and *Prostanthera* were successful within 10-14 days. All other unions were successful within 25 days.

## Inferences

I have gleaned much valuable information from my work. This can be summarised as:

- Rootstocks may control the ageing/maturity of the scion as well as the physical vigour.
- More intergeneric grafts appear possible as suitable rootstocks are tried.
- Liquid hormones applied to the cut surface can help in callus production on some difficult species. Hormone burning is to be watched.

## NEWS in BRIEF

One of our members was wanting to know where to buy "Nescofilm", the tape used in grafting. It is available from Bacto Laboratories Pty Ltd, 310 Elizabeth Drive, Liverpool. (P.O. Box 295, Liverpool 2170) ph (02) 602 5499. Unfortunately it can only be purchased from here by the box (approx \$40.00). It is also available in small quantities through the propagation officer of NSW SGAP. Please send \$1.20 and a stamped self-addressed envelope to Pieter Ten Caten, P.O. Box 352, Coogee 2034, ph (02) 399 9133.

- Warm weather and long days accelerate the formation of unions.
- Indumentum (hairs) on either rootstock or scion can cause fungal problems. Fungicides need to be applied.
- Union failure may be influenced more by the graft type and quality than by incompatibility.
- Overgrown rootstocks or scions appear to be of little detriment to graft union.
- Commercial application may not be far away due to good successes (up to 100 per cent) and great speed (successful unions within 10-14 days) with some species.
- Budding has potential; both from simplicity and the saving on scion wood.
- Some rootstocks have a great tolerance for accepting several different species.
- Lack of rootstock vigour (no new root growth) after union formation could be indicative of incompatibility. Remember root growth is proportionate to leaf growth.

## Conclusion

Research into grafting Australian plants is very much in its infancy. Although there have been several small production runs with standard grevilleas, prostanthera, correa and eremophila, their quantities remain small. Given the time and work needed, a larger production run is possible in the future. It would need to be accompanied by a back-up advertising campaign, mainly for public education.

Grafting could also be used for stock plants. It would enable a nursery to have on hand a reliable supply of stock possibly growing under normally unsuitable conditions.

It has proven itself a useful propagation tool on a number of occasions. A graft will establish quickly, often from poor quality wood, or can be used when very little propagation material is available. It is a fast way of building up stock numbers of slow grower plants.

*Grevillea scapigera* possibly extinct in the wild, and of great horticultural merit is in cultivation at the Royal Botanic Gardens due to the persistence of enthusiasts and the preceding technique.

## TRIP RESULT

### Some results from Peter Olde's W.A. Trip

*Peter Abell*

Of all the *Grevillea* spp. Peter sent me last year from W.A. around 84% have been established — more than 1/2 of these being as grafts only with only 3 spp being established from cuttings only. Most collections allowed enough material for cuttings and grafts so such a comparison could be made.

In the past 10 months I have had flowers on *G. scabra*, *erectiloba*, *lissopleura*, *secunda* and *G. rosieri* with buds now obvious on *G. spinosa*. From my point of view, this trip of Peter's was a great success. Considering that by using cuttings only, we normally would expect to establish at best only 20% of collections made under similar field situations of difficult species.

I might add that some *Grevilleas* from this trip have not proven to be fussy about rootstocks eg *G. tetrapleura* — all grafts done on three rootstocks (*G. robusta*, *G. "Royal Mantle"*, *G. "Bronze Rambler"*) established and are growing at the same rate. *G. lissopleura*, *G. rosieri*, *G. spinosa* and others are all on two different rootstocks.

One final comment, if you're ever short of rootstocks to try, I have grafted Hakeas on *Grevilleas* and vice-versa.

# PROPAGATION (cont)

When doing any type of research involving grafting, it is important to keep detailed records including the following information:

**Scion** Date; family; genus; species; source eg Ex wild and where from or Ex cultivation; graft type eg whip and tongue or top wedge; number done; Notes eg comments on scion quality, wood type etc or conservation status if rare.

**Rootstock** Genus; species; source

**Comments** Notes on performance as grafted plant grows.

\* \* \* \* \*

### Seed Bank

Please send all requests for seed to Phil Congdon c/- Owens Road, Martinsville, 2265 and make all cheques etc payable to Grevillea Study Group. See Newsletter No 23 for a full list of seed available.

\* \* \* \* \*

### Cutting Exchange

*David Shiells has kindly agreed to supply cutting material for our cutting exchange. He has supplied the following information.*

It would not be wise to have requests for cuttings for at least 3 months, as the winters in our area (especially this year) completely stop growth and it takes at least 3 months for suitable material to be ready – the best time to take cuttings in our area is February/March.

Providing the plants are still alive (I expect to have big losses due to our very wet, cloudy, cold winter. Our drainage is poor due to soil type and flat aspect).

- |  |   |
|--|---|
| <p><i>G. acerata</i><br/> <i>G. alpina – Mt. Dandenong</i><br/> <i>G. alpina – Morri Morri</i><br/> <i>G. asteriscosa</i><br/> <i>G. "Black Magic"</i><br/> <i>G. crithmifolia – pink</i><br/> <i>G. erinacea</i><br/> <i>G. hookeriana var apiculoba</i><br/> <i>G. insignis</i><br/> <i>G. involucrata</i><br/> <i>G. obliquistigm</i><br/> <i>G. pectinata – entire leaf</i><br/> <i>G. pilosa</i><br/> <i>G. quinquinervis</i><br/> <i>G. vestita – Kalbarri</i></p> | <p><i>G. alpina – Pyalong form</i><br/> <i>G. alpina – Strathbogies</i><br/> <i>G. alpina – Chiltern Hills</i><br/> <i>G. beadleana</i><br/> <i>G. bracteosa</i><br/> <i>G. depauperata</i><br/> <i>G. fulgens</i><br/> <i>G. infundibularis</i><br/> <i>G. integrifolia ssp. biformis</i><br/> <i>G. monticola</i><br/> <i>G. paniculata</i><br/> <i>G. pectinata – divided leaf</i><br/> <i>G. plurijuga</i><br/> <i>G. tenuiloba</i><br/> <i>G. willisii</i></p> |
|--|---|

Please send all requests to David Shiells, Mason Court, R.S.D. Shepparton 3631.

Cutting material is available to active financial members only. On receipt of cuttings, please send a cheque for cost of postage plus 50 cents for packaging to David by return mail. If anyone else is willing to offer cutting material for the cutting exchange, please send a list of material available to the editor.

## FINANCIAL REPORT

### OCTOBER 1989

Income	Expenditure
Subscriptions            \$204.00	Newsletter Expenses            200.00
\$204.00	Postage                                78.00
	\$278.00
	Balance on Hand 1.10.89 <u>\$365.68</u>

## OFFICE BEARERS

**Leader:** Peter Olde, 138 Fowler Road, Illawong 2234. (02) 543 2242

**Treasurer and Newsletter Editor:** Christine Guthrie, 32 Blanche Street, Oatley 2223. (02) 579 4093

**Curator of Living Collection & Herbarium:** Ray Brown, 29 Gwythir Avenue, Bulli 2516. (042) 84 9216

**Seed Bank:** Phil Congdon, c/- Owens Road, Martinsville 2265. (049) 48 8576

**Cuttings Exchange:** Hessell Saunders, Box 31, P.O. Bulli 2516.

\* \* \* \* \*

If a cross appears in the box, your subscription of \$5.00 is due. Please send to the Treasurer, Christine Guthrie, 32 Blanche Street, Oatley 2223. Please make all cheques payable to the Grevillea Study Group.

1988

1989