



GREVILLEA STUDY GROUP

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JULY 1994

Newsletter N° 38

Group Activities New South Wales Group

AUGUST 27-28:

Plant sale and visit to Hunter Region Botanic Gardens and Grevilleas in the Newcastle area. HRBG is located adjacent to the Pacific Highway at Motto Farm about 3 km north of the Hexham bridge.

HUNTER REGION BOTANIC GARDEN VISIT

Heather Clarke is organising this weekend. She hopes to make it a friendly, informal and financially rewarding weekend both for the Study Group and the Gardens. A few points to note are:

- anyone is invited to bring plants for sale (10% of sales to be given to the Study Group). Members bringing plants will need to proceed to the end of No.2 car park.
- there will be a tent display of Grevilleas in tubes
- at 3 pm Saturday, afternoon tea will be served in the 2nd wedding area, followed by a meeting of the Study Group
- there will be a sausage sizzle in the Works Compound on Saturday evening – a small charge will apply, with 40% going to the Study Group for research, and 60% to HRBG (BYO drinks and fold-up chairs). Please phone Heather if attending BBQ
- there should be a Grevillea crawl on Sunday
- 10 caravans can be accommodated in the N° 2 car park
- other accommodation is available at Pacific Gardens caravan park (049 87 2224) or Motto Farm motel (049 87 1211)
- Study Group members are requested to wear a name tag with "Grevillea Study Group" clearly marked on it

For further information contact Heather Clarke,
31 Pokoibin St, Broadmeadow 2292.
Phone (049) 89 4405.

Group Activities S.E. Qld Group

JULY 31:

Incompatibility of grafted plants – Home of Graham Nosworthy, 609 Grandview Rd, Pullenvale. Phone (07) 374 2178.

SEPTEMBER 25:

Garden visit – Home of Dave Mason, Dibbs Street, Coraki, N.S.W. Phone (066) 832 583.

OCTOBER 30:

Good garden practices – Home of Merv Hodge, 81-89 Loganview Road, Logan Reserve. Phone (075) 46 3322.

NOVEMBER 27:

New introductions and garden visit – Home of Edgar and Pat Burt, Pikes Road, Glasshouse Mountains.

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ACTIVITY REPORT

Activities Report of S.E. Qld Group

by Lorna Murray

27 March 1994.

On a brilliant autumn day 39 members and visitors gathered at the property of Ralph and Margaret Hickling, between Kilcoy and Woodford, for another meeting of the Queensland Group. Although the gardens have been planted for only two years, many grevilleas were well established, and a very good collection of species is now being grown. The slope in front of the proposed house site, with a north-easterly aspect, would seem to offer ideal conditions for many grevillea species.

A discussion on *Kaolite* and *Zeolite* was ably led by Peter Beal. We thank Peter for the work he did in researching this topic, with information obtained from literature and from Queensland producers and distributors of these products. A summary of the information given to the meeting by Peter is provided in the Propagation section of this newsletter. Some members who have tried using one of these products in potting mixes provided details of their experiences. It was generally concluded that controlled trials need to be undertaken before it could be determined whether the use of either *Kaolite* or *Zeolite* would be of benefit to amateur growers.

Members were advised that slabs of oasis and flat trays are to be bought by the Sales Officer, and will be available for purchase at the next meeting. Several members reported that using oasis was a quick method of putting cuttings down, and that root production was faster than on cuttings struck in normal potting mixes.

After the usual raffle of donated *Grevillea* plants, mostly grafted ones, members enjoyed an inspection of the Hickling property.

29 May 1994.

Another successful meeting of Study Group members was held in S.E. Queensland at the home of Jan Glazebrook and Dennis Cox, Logan Village, with an attendance of 40 members and visitors. We were pleased to welcome Hess and Dot Saunders from Bulli and Heather and Raymond Clarke from Newcastle. Heather provided an up-date on progress at the Hunter Region Botanic Gardens, and reminded everyone of the Study Group meeting to be held there in August.

Graham Nosworthy reported on some aspects of the recent trip to the Kimberleys organised by Bryson Easton, mentioning in particular that a white flowering form of *Grevillea latifolia* had been seen. Norm McCarthy, who was not present

at the meeting on 28 November, referred to the previous discussion on the use of *Gramoxone* or *Roundup* for weed control. He disagreed with the conclusion reached previously regarding the relative safety of the two products, and this led to further discussion on this topic. In summary it can perhaps best be stated that these and other similar chemicals are potentially very dangerous to health, and that all of them should be used with the utmost care.

Merv Hodge reported that one of his large *G. wilsonii* plants had died recently, and it was found that one branch had touched the ground and layered. It is thought that the direct contact between the soil and this branch may have allowed the entry of fungi to which grevillea was susceptible. It was suggested that mulching with rocks or crushed blue metal could help to keep branches of grafted grevilleas from contact with the soil.

The main topic for discussion, "Water retention and the best use of available water", was introduced by Jan Glazebrook, with reference to practices which have been used, obviously very successfully, in the garden at Logan Village, where sandy well-drained soil is found in pockets between the sandstone rocks. The general points for conserving water were summarised as follows:

1. choose the right plant for the soil and environment.
2. plant when soil moisture is present and in cooler times of the year; autumn seems to be best here.
3. increase the organic content of the soil.
4. water deeply i.e. one good soak each week rather than a dribble each day.
5. remove weed competition and unwanted large plants.
6. if planting a large area, plant in one small section at a time, as it is easier to look after and water a smaller area.
7. don't plant young plants which are too small, as they may need more water to become established.

At the conclusion of the meeting, members were able to wander around the garden to view the interesting collection of plants which Jan and Dennis now have established, including over 200 species of grevilleas. Aspects of water control which could be observed in this garden included the use of hollows to collect run-off water to allow it to soak in, tracks on contours to prevent erosion, branches, sticks and logs put across the slope, and planting in a hollow, as there is never a problem with water-logging on this property.

More on Plants in Pots

by Norm McCarthy

Further to my recent article "Plants in Pots" (Newsletter N°35), from recent experiments using *Kocide* as a pot paint, a more economical and efficient formula has been developed.

The new formula is:

600ml white exterior acrylic house paint
100g *Kocide* (50% copper hydroxide)
125ml water
7ml detergent.

While this solution contains less *Kocide*, it seems just as efficient and is cheaper to use. The addition of water and

detergent aids in a more even distribution of the paint. It also helps to retain the *Kocide* in suspension. Previously, the *Kocide* and paint were inclined to separate and stay that way if not used fairly quickly.

If a large number of containers are to be treated, a spray gun is quicker and easier to use than a brush. Containers racked or stacked horizontally should make for quicker and more efficient application.

As far as I know, *Kocide* is only available in 25kg bags. Why not share a bag!



IN THE WILD



The Grevillea Revision

by Don McGillivray

Kerry Rathie has written a stimulating article about "That Elusive Species Concept" (Newsletter No. 37, page 2; March 1994). I feel I should respond to it, and try and give some idea of how Grevillea plants were divided into species for the revision ("Grevillea Proteaceae. A taxonomic revision" 1993).

In the classification of Grevillea, Peter and I agree to differ on a number of points but there doesn't seem to be a controversy, we just have different points of view, partly because we have come at it from different angles. As for "who is right?"; there are lots of people apart from Peter and me who have opinions about the naming of Grevilleas. Like us, they are sometimes right and sometimes wrong; but who is to say? Our ignorance about Grevilleas far outstrips our knowledge. There are many questions relevant to an improved classification that are still to be answered. Some of the poorly known aspects of the genus are: pollen/style-end structures and interactions; seed anatomy; patterns of variation in relation to geography, history sens. lat., agents of pollination; structure of inflorescences; types of hairs and their distribution within and between populations; patterns of development of flowers from meristem to fruits; patterns of colour within flowers; structure of seedlings. Genetic and evolutionary studies of Grevillea are almost non-existent.

I share concerns with anyone who is trying to decide on what name to use when recent authors differ. Whatever name is used, it is important to be certain that the plants are correctly identified; misidentifications cause misunderstandings, and can sometimes take a long time to correct. There will always be some plants that cannot be correctly placed within a species, e.g. "intermediates" and hybrids; in special circumstances these may need cultivar names.

In his first paragraph Kerry refers to "distinct to common sense" groupings; this is a very abbreviated version of Peter's species concept, and hardly fair to him. Botanists with differing points of view about the same plant group may agree that "their" species are "distinct to common sense groupings". Perhaps "uncommon wisdom groupings" is what is needed, and a goal to aim for. While it is fair to point out that a number of taxa Peter regards as species are treated by me as subspecies, it's a bit rough to suggest I ignored altogether the "species" whose names were placed in synonymy. For most of these, discussion in the revision gives reasons for synonymizing them; in fact there are a few that were raised from synonymy into the light of day!

In the second paragraph Kerry refers to 'the species concept of Ernst Meyer, who defined a species as a genetically distinct interbreeding group of organisms'. I suppose this could have been my working definition of a species, although I could not prove that plants within a species were interbreeding or that one species was genetically distinct from another. Some assumptions had to be made; the main ones were that the genotype (the genetic make-up) of a species could be "seen" as it was translated into the features of the individual plants, and that the genetic distinctness of a species was evident from its phenotype (which is all the features of the plants in a species, these features having developed through the controlled actions of the genes and the influences of the environ-

ment – sunlight, water, soil, temperature, atmosphere, symbiotic partners, predators). Another assumption was that plants growing together and looking alike were interbreeding; *G. infecunda* and *G. renwickiana*, for which seeds are unknown, may be exceptions to this.

A very restricted application of this species definition would be to use it only for plants that grew together and looked alike. Very few of the accepted species would satisfy these requirements; examples are *G. rivularis*, *batrachioides*, *versicolor*; species with a compact distribution over a small area. Groups of more or less identical plants separated by distances that may or may not be within the range of their pollinators or seed dispersers, could be assumed to satisfy the definition if there are no definite indications of incompatibilities between groups. This would include species such as *G. laurifolia*, *glossadenia*, *annulifera*, *wilsonii*, *longicuspis*, *polybractea*.

Kerry mentions a hypothetical eucalypt species that shows clinal changes over its range from mountain to sea. In *G. hakeoides*, plants show gradual changes in leaf-shape and -size but I have no experimental evidence for a cline. While the plants at the morphological ends of this species' range are obviously different, the slight differences between one population and the next do not allow sufficient "space" for splitting into separate species. The assumed capacity of these populations to interbreed, and the togetherness of their features (genetic distinctness from other species), satisfies the species definition. *G. hookeriana*, *patentiloba*, *buxifolia* show some similarities in their patterns of variation to those of *G. hakeoides*.

Species composed of geographically isolated subspecies are like these gradually varying species but with some populations "missing", thus leaving morphological gaps between the subspecies. In the first paragraph of the right-hand column Kerry suggests that because 'Grevilleas have relatively large seeds, populations isolated geographically are likely not to be interbreeding, and so may often (almost always?) be distinct species'. There are many species of Grevillea that appear to have genetically isolating disjunctions within their overall geographical ranges but this does not mean that they must be split. The disjunctions between some populations of *G. goodii* ssp. *decora* is greater than that between ssp. *goodii* and ssp. *pluricaulis*. Geographical separation should not be equated with genotypic distinctness; isolation doesn't always lead to speciation. Although I have no proof, I believe that in species such as *G. victoriae* (Vic. and southern NSW/central Qld) and *G. anethifolia* (WA/SA/NSW) the genotypic differences between these widely separated populations (700-1300 km apart) are no greater than those in many of the straightforward species whose geographical ranges are more or less coherent and less than the disjunctions within *G. victoriae* and *anethifolia*. The possible closer relationship between *G. occidentalis* and *acerata* (c. 3000 km apart) than between *G. acerata* and *buxifolia* (less than 500 km apart) may give further support to this view. It seems that sometimes too much weight is given to geographical separation as an indicator of genotypic difference.

Some of the species accepted in the revision may seem to cover an unacceptably large range of variations, e.g. *G. an-*

(The Grevillea Revision continued)

gulata, *pungens*, *obliquistigma*. Within each one the floral structure and leaf form are variable, and there are distinctive individual collections or groups of collections that point to the possibility of separate species at the "morphological ends or edges" of these variable taxa. However, because of their remoteness and inaccessibility, there seemed to be the likelihood that future collections from now unknown populations could have intermediate features joining these distinctive populations more closely to the more morphologically coherent parts of these species from these variable taxa. As Kerry states in relation to forms of *G. arenaria*, 'it depends on how different they are'.

To give some idea of how I classified heterogenous species, for which there were more or less adequate collections, we could look at *G. buxifolia* and related species. The classification proposed is: *G. occidentalis*, *G. acerata*, *G. buxifolia* ssp. *buxifolia* races "a" and "c", ssp. *phylicoides* races "b" and "d", ssp. *sphacelata* (race "e"). With an extreme "lumping" approach, all these taxa would be treated as one species: extreme "splitting" would lead to recognition of the races in *G. buxifolia* as species. The features that seemed most significant in arriving at the proposed classification are: style-end and pollen-presenter, indumentum of pistil, and floral bracts. *G. occidentalis* and *G. acerata* were each relatively uniform in their features; differences in leaves, bracts and flowers were the main reasons for treating them as separate species. The longer floral bracts, the more uniform indumentum of the pistil, the unappendaged style-end and the unrimmed pollen-presenter of *G. acerata* separate it from *G. buxifolia*. The reasons for keeping *G. buxifolia* as one species are:

- the marked difference in the indumentum from the ovary to the style;
- the rimmed pollen-presenter; these latter two features are present in all races of *G. buxifolia*;
- the presence of intermediates between ssp. *buxifolia* and ssp. *phylicoides*, and between the two races of ssp. *phylicoides*;
- the unappendaged or shortly appendaged style-end shared by some of ssp. *buxifolia* and ssp. *sphacelata*;
- the extremes of posture of hairs on branchlets of ssp. *buxifolia* (almost appressed and spreading) being similar to the posture of hairs on ssp. *sphacelata* (appressed) and ssp. *phylicoides* (spreading).

Although the classification of species in this group still seems appropriate, the subspecific arrangement within *G. buxifolia* is very poor; it was adopted to maintain some continuity of nomenclature with the previous recognition of three separate species.

My notions about the nature of species in Grevillea were developed by working first with the uncomplicated species and from previous experience of other species and genera in Proteaceae and other families, i.e. from the ideas and concepts of other botanists, especially those I believed to be sound and knowledgeable. Delimitation of species was based on appraisal of similarities and differences within and between one group of look-alike plants and another. The basic process that maintains these groups is the effective transfer of pollen from one flower to another within a group, and the features that appeared to support this process were regarded as the most significant in deciding on what plants formed a species. Therefore the perceived degree of consistency in the structure of flowers and inflorescences was the main in-

fluence in making these decisions. Even though there was an existing classification, I tried to decide afresh on the composition of each species. In this I was helped by having many times more collections available to me than to previous students of Grevillea. However, the influence of the previous classifications is very significant.

There were many problematical species about which I felt a particular desire for more understanding but owing to my lack of ability as well as lack of collections, field knowledge and time, these species remained in my mind as unresolved problems. These species are: *G. agrifolia*, *albiflora*, *angulata*, some of the species in the *G. aquifolium* group (but not including *G. ilicifolia*), all the "species" of the section "*Manglesia*", *arenaria*, *australis*, *barklyana*, *beardiana*, *brachystylis*, *byrnesii*, *cagiana*, *chrysophaea*, *confertifolia*, *coriacea*, *depauperata*, *didymobotrya*, *diffusa*, *disjuncta*, *drummondii* (borderline - it seems a fairly clear species), *eristachya*, *erythroclada*, *fasciculata*, *fistulosa*, *floribunda*, *heliosperma*, *integrifolia*, *lanigera*, *leptobotrys*, *linearifolia*, *linsmithii*, *manglesioides*, *mimosoides*, *mucronulata*, *obliquistigma*, *obtusiflora*, *oncogyne*, *parallel*, *plurijuga*, *pterosperma*, *pungens*, *pyramidalis*, *ramosissima*, *rosmarinifolia*, *sericea*, *speciosa*, *synaphaea*, *trifida*, *triternata*, *victoriae*, *wickhamii*, *willisii*. Some of these unresolved problems are outlined in the revision, the remainder are various and not necessarily obvious.

As a general rule I believe it is better to keep together the components of a problematical species until there are adequate new data to give a clear enough picture of the patterns and nature of the variation for a formal subdivision to be attempted. (Unfortunately I didn't always follow my own advice.) It is more important to know the nature of the patterns of variation than it is to put formal names on selected parts of poorly known assemblages. Among the most conspicuous of these are:

- *G. linearifolia sens. lat.* - when working on this assemblage the plants placed in *G. sericea* and *australis* would also be considered.
- *G. mimosoides*, *erythroclada* and *pyramidalis*.
- The species in *G. section "Manglesia"* (tiny white flowers with swollen styles and erect conical pollen-presenters) - here it is as if one species had acquired some very successful basic aspect of its genotype that allows it freedoms in developing various successful distinct populations and individuals of uncertain status; the problems with *G. integrifolia* and *G. angulata* may be similar but less complex.
- *G. leptobotrys*
- *G. obliquistigma*
- *G. pungens*
- *G. trifida*
- *G. victoriae*

A few species are purposely classified contrary to my opinion and for unscientific reasons; these are: *G. johnsonii*, a subspecies of *G. longistyla*; *G. batrachioides* and *maxwellii*, subspecies of *G. asparagoides*. The latter relates to the protection of threatened species, a subject raised by Kerry at the end of his article. Taxonomists should never allow their delimitation of taxa to be influenced by such issues.

I've run out of steam now; anyway I've said more than enough already.

IN THE WILD (continued)

Rodger Elliot Honoured in New Grevillea Paper

by Neil R. Marriott

Well known authority and author on native plants, Rodger Elliot, has been honoured in a new subspecies of *Grevillea insignis* published in the latest *Nuytsia* Vol. 9 No. 2 (237-304). The paper is titled "New species and taxonomic changes in *Grevillea* (Proteaceae: Grevilleoideae) from south-west Western Australia" by Peter M. Olde and Neil R. Marriott.

Grevillea insignis ssp. *elliottii* P. Olde & N. Marriott is a distinct and isolated population confined to the Hatters Hill – South Ironcap area of southern W.A. It differs from the type in its non-glaucous branches, its smaller and more deeply divided leaves with a cuneate leaf base; and its redder flowers.

It is the common form of the species in cultivation, being regularly available at Australfora Nursery in the 1960's - 1970's (then owned by Rodger and Gwen). I bought my first plant of *G. insignis* ssp. *elliottii* from Rodger when I was 15 years old. It is therefore most appropriate that he be honoured with this lovely plant.

Other new *Grevilleas* described include the following:

Grevillea curviloba ssp. *incurva* P. Olde & N. Marriott. This is the new name for the common form of *G. curviloba* widespread in cultivation with rich green foliage. It in turn was incorrectly identified as *G. biternata* for many years.

Grevillea curviloba ssp. *curviloba*. This is the showy upright form of the species introduced into cultivation by Glynn Sago when he and Peg lived at Pomonal.

Grevillea rara P. Olde & N. Marriott. Discovered in 1986 by Peter Olde, this species has sadly been wiped out in the wild from flooding by the Harris River Dam. Fortunately it was propagated by the *Grevillea* Study Group and is now becoming available from a number of nurseries. It is most closely related to *G. curviloba* and makes a beautiful dense low shrub in the garden, with finely divided green leaves.

Grevillea corrugata P. Olde & N. Marriott is also related to *G. curviloba* but differs in its erect habit, larger leaves winged at the base, and with a tomentose floral rachis. It is an extremely vigorous upright shrub to c. 2m with a massed display of white flowers. It is extremely rare in the Bindoon area of W.A., however plants are now establishing in cultivation.

Grevillea adpressa P. Olde & N. Marriott is closely related to *G. amplexans*, but differs in its hairy leaf undersurface, as well as shortly recurved leaf margins and obscure nectaries. It occurs naturally in W.A. from Arrino to Watheroo. Under cultivation it has proved to be a hardy and attractive shrub to 1m with lovely foliage and massed white flowers.

Grevillea uniformis (McGillivray) P. Olde & N. Marriott. Described originally as a subspecies of *G. acrobotrya*, our research has shown that *G. uniformis* is in fact just as closely related to *G. amplexans*, and therefore warrants recognition as a species. It is a most attractive shrub 1-1.5m high with distinct ovate leaves which are a rich bronze-red when young. Flowers are creamy white. A hardy and attractive shrub under cultivation.

Grevillea synapheae ssp. *pachyphylla* P. Olde & N. Marriott. Coming from the Cataby-Encabba area north of Perth in W.A., this subspecies differs in its persistent floral bracts, its coriaceous (leathery) leaves with strongly recurved to revolute margins, and its generally more robust habit. Several

attractive forms from the Mt Lesueur area have been introduced into cultivation by Jane and Phil Williams, Pomonal, and Tony Cavanagh, Ocean Grove. They make delightful free-flowering plants in the garden.

Grevillea flexuosa (Lindl.) Meissn. Treated as a form of *G. synapheae* by McGillivray, our studies have shown that it is most clearly a species in its own right. Presumed extinct for over 100 years, it was rediscovered at Stoneville in the Darling Range, W.A. in 1985. *G. flexuosa* is a robust open shrub 1.5-2m high with spectacular large, deeply divided flexuose leaves and showy large spikes of rich cream flowers. Grafted plants make a most attractive feature plant in the garden.

Grevillea prominens P. Olde & N. Marriott. This metre high *Grevillea* differs from its closest relative *G. trifida* in larger one-sided flower spikes, longer peduncles and shorter pedicels. It is confined to the Harvey area in the lower SW of W.A., where it grows along creeks in Jarrah forest. At present it is unknown in cultivation, but deserves to be introduced where it should make a showy divided leaf shrub for moist semi-shaded sites.

Grevillea thyrsoides ssp. *pustulata* P. Olde & N. Marriott. Not a new plant for cultivation, this new subspecies has been grown for many years as the "small leaf form" of the species. *G. thyrsoides* ssp. *thyrsoides* is the "large leaf form". The new ssp. *pustulata* has a curious "pimple" at the base of each leaf lobe on the undersurface, hence the scientific name. Both subspecies are a little touchy on their own roots; grafted plants are a better proposition.

Grevillea dryandroides ssp. *dryandroides*. This is the "small leaf form" of the species that is confined to the Ballidu area in W.A. It has small green divided leaves with lobes c. 5-10mm long.

Grevillea dryandroides ssp. *hirsuta* P. Olde & N. Marriott. This new subspecies differs in its vigorous root-suckering habit, its larger grey to grey-green leaves with lobes c. 12-35mm long which are persistently hirsute, its longer flower spikes and a number of other floral features. This subspecies is widespread between Cadoux and Corrigin in the Central Wheatbelt, where it has sadly been largely wiped out by clearing for agriculture. Fortunately several beautiful forms are in cultivation; grafted plants make stunning tub or feature plants in a rockery, where their trailing red toothbrush flowers can be shown to advantage.

Grevillea crowleyae P. Olde & N. Marriott. Named in honour of Mrs Valma Crowley who discovered this extremely rare species near her home in Darkan, W.A. Closely related to *G. calliantha* ("Black Magic"), "*G. crowleyae*" differs in its shorter flower spikes, its narrower and more closely aligned leaf lobes, shorter peduncles and several other floral features. At present only c. 10 plants are known to survive in the wild, however plants have been introduced into cultivation by the *Grevillea* Study Group, and grafted plants will soon become available for collectors. It is a species well worth waiting for, with a massed display of exquisite maroon-black and red toothbrush flowers and most attractive finely divided "fishbone" leaves.

Grevillea coccinea ssp. *lanata* P. Olde & N. Marriott. Another rare plant in the wild, this new subspecies is confined to the isolated Mid-Mt Barren area of Fitzgerald River National Park. It differs from the usual form in its lanate (woolly)

(new Grevillea paper continued)

outer perianth surface, its broader perianth and several other floral features. It makes a spreading shrub c. 1-1.5m high with grey-green simple leaves and attractive red toothbrush flowers. At present it is unknown in cultivation, but hopefully King's Park or Mt Annan Botanic Gardens will soon get permission to collect material and establish it in cultivation.

Grevillea pilosa ssp. *redacta* P. Olde & N. Marriott. This most beautiful new subspecies is confined to a small area in the isolated Lake Cronin-Mt Holland area of W.A. It differs from the type form in its smaller, more divided leaves, and its smaller perianth with few hairs on the outer surface. A number of leaf forms have been introduced into cultivation where they have proven to be quite hardy, rounded shrubs to c. 0.5m with massed rose-pink flowers.

Grevillea dissecta (McGillivray) P. Olde & N. Marriott. Treated as a subspecies of *G. pilosa* by McGillivray, our studies in the field and the herbarium have shown that in our opinion the taxa warrants recognition as a species. It differs markedly from all populations of *G. pilosa* in its divaricately deeply divided leaves which are glabrous on the upper surface, as well as numerous other floral characters. Coming from the arid mallee scrub region south of Southern Cross to Mt Holland, *G. dissecta* has so far proven to be slightly touchy in cultivation unless given perfect drainage in a warm sunny site. When growing well, with its rich rose-pink flowers contrasting beautifully with the blue-grey foliage it makes a truly delightful specimen.

Grevillea haplantha ssp. *recedens* P. Olde & N. Marriott. Originally described as the "Avon District Race" by McGillivray, our continued studies have revealed further characters, warranting its recognition as a very rare subspecies. It differs from the type in its smaller shrubby habit to 1m with massed rusty-haired orange-red flowers, which are largely concealed within the foliage. It can be further readily identified by the lack of hairs on the apical 2-3mm of the style end. It makes a dense rounded grey-green shrub in the garden, and although the flowers are largely hidden, its long flowering period makes this subspecies popular with honeyeating birds.

Grevillea dolichopoda (McGillivray) P. Olde & N. Marriott. McGillivray treated this grevillea as a subspecies of *G. disjuncta*, however our studies have shown that *G. dolichopoda* is in fact just as closely related to *G. haplantha* as it is to *G. disjuncta*, and therefore warrants equivalent status.

Grevillea pythara P. Olde & N. Marriott. An extremely rare dwarf root-suckering shrub discovered recently on the property "Pythara" at Pithera, W.A. The showy red terminal flowers contrast delightfully with the ashy-grey foliage. This gravely threatened species appears to have no close relatives and urgent measures are required to protect it in the wild. Fortunately a small number of plants have been established by the Grevillea Study Group and Mt Annan Botanic Gardens. It will make a superb small shrub for the rockery, where it will require a very well drained, warm, sunny site.

Grevillea althoferi P. Olde & N. Marriott. Another extremely rare grevillea, this recently discovered species honours our dearest friend, the late Peter Althofer and his wonderful wife Hazel, who both accompanied us on a major field trip to the West in 1988, and who were driving forces in the development of Burrendong Arboretum. Closely related to *G. rudis*, it differs in its deeply divided leaves, and the erect creamy-yellow flower spikes that scarcely exceed the foliage. Unfortunately all attempts at propagating this threatened species so far have failed. Already one of its two known locations has been destroyed by sand mining near Eneabba, while the other site is on an unprotected roadside.

Grevillea superba P. Olde & N. Marriott. Treated as a form of *G. plurijuga* by McGillivray, who stated in his book "Grevillea" (1993) that future studies and "particular attention should be given to the populations located between Scaddan and Norseman". Our studies of these populations have shown that there are sufficient grounds for treating these as a new species. *G. superba* gains its name from the Latin *superbus*, meaning proud, in reference to the flowers standing proud above the shrub. In *G. plurijuga* the flowers are on trailing erect spikes on the ground around the low rounded bush. *G. superba* can be further separated by its robust upright habit, its leaves which are normally partially bipinnate, as well as numerous other foliar and floral characters. Seldom grown till now, *G. superba* is becoming more widely available through the efforts of the Grevillea Study Group. Grafted plants make spectacular large feature plants in the garden with deep green divided leaves and showy pink to red flowers on spikes above the foliage.

All the above new Grevilleas will be included, with full color photos of each, in our forthcoming publication "The Grevillea Book", the first of three volumes which will be out this spring.

Glyphosate or Gramoxone

by Norm McCarthy, Toowoomba

The S.E. Qld Activities Report in Newsletter No. 37, March 1994, carried an article which suggested that *Gramoxone* was a better and safer alternative for weed control than *Glyphosate* (Roundup).

Regarding *Gramoxone* as a safer weedicide than *Glyphosate* is quite incorrect and I was amazed at this misconception. *Gramoxone* is purely a knockdown, killing above ground foliage only.

Glyphosate on the other hand, translocates through the entire plant, thus killing it entirely. Once the chemical is applied to the weed it becomes harmless to soils and humans and with the addition of a suitable additive, is rainfast in one hour.

There are, however, other important considerations to be taken into account. The Qld Department of Primary Industries publishes a table indicating the Lethal Dose rating

for commonly used farm chemicals. Each chemical is rated according to its toxicity as a poisonous substance. The smaller the number, the higher the toxicity.

This table rates *Glyphosate* at 5,600 which can therefore be regarded as being relatively harmless. The same table rates *Gramoxone* at 150 which is 37.33% more toxic than *Glyphosate*. *Gramoxone* can be fatal if swallowed, can irritate eyes and skin and can cause nose bleeding. The DPI has found no ill effects from *Glyphosate* when correctly used and recommends its use.

Like all chemicals, reasonable care should be exercised during its use and it should be used strictly as recommended on the label. The above information is offered in the interests of safety to all those who sprayweed growth around the base of Grevilleas or any other native plants.

PROPAGATION

Zeolite and Kaolite

by Peter Beal, Redlands Research Stat, Cleveland 4163 (QDPI)

Zeolite and *Kaolite* (as *Kaolin*) are minerals which occur naturally in Australia. They are both mined, milled, and graded prior to being marketed for horticultural use. *Kaolite* is treated to become lightweight, hard and porous.

The horticultural value of these products primarily lies in their ability, as components of growing media, to retain cations and absorb water.

Handreck and others indicate that the value of *Zeolite* as a component in a potting mix is in:

1. A high Cation Exchange Capacity (CEC) and ability to increase CEC of the mix.
2. Reducing nutrient losses (ammonium and potassium).
3. Supplying calcium and potassium.
4. Use of 2-10% vol/vol being required to achieve a benefit.

Similar properties are claimed by Leake for *Kaolite*:

1. Value in nutrient retention - albeit with a low CEC.
2. A high water absorbancy (65% w/w) and value in retaining water and allowing fast rewetting.
3. Water holding capacity of a potting mix being improved by the finer *Kaolite* products.
4. Use of 20% by volume in a potting mix encouraging root growth & reducing clumping of roots round the perimeter

Marketers/suppliers of these products for horticultural use are *Amgrow* (*Kaolite*) and *Zeolite* (Aust) (*Zeolite*).

Available products include:

Kaolite: Orchid mix 10-12mm particles
Potting mix 3-6mm particles
Turf dressing 0.8-1.2mm particles

Zeolite: Coarse chips 2-6mm
Chips 0.5-2mm
Grit 0.5-1mm
Powder 75 microns

Kaolite and *Zeolite* products seem worth trying as components in potting mixes or as growing media. Their comparative position as practical substitutes for other media components is still being established. The system of management of water requirements and nutrition and the relative cost of the products will also influence their commercial utilisation.

The Seed Bank

by Judy Smith

I was pleased to receive donations of *Grevillea* seed from Study Group members. One of the donors is interested in obtaining seed of *Grevillea acerata*, *arenaria*, *diffusa*, *diminuta*, *juniperina* (yellow), *laurifolia*, *oldei* and *ramosissima*. Can anyone help by donating seed of any of these species to the seed bank?

Free seed is available from the seed bank by sending a stamped, self-addressed envelope to Judy Smith, 15 Cromdale Street, Mortdale 2223. Seed for sale is \$1.50 per packet plus a self-addressed envelope with a 70 cent stamp sent to the above address.

FREE SEED LIST

<i>G. banksii alba</i>	<i>G. banksii red</i>
<i>G. barklyana</i>	<i>G. dryandri</i>
<i>G. endlicherana</i>	<i>G. glabrata</i>
<i>G. glossadenia</i>	<i>G. juniperana red</i>
<i>G. pteridifolia</i>	<i>G. scortechinii</i>
<i>G. thelemanniana</i>	<i>G. venusta</i>
<i>G. victoriae</i>	<i>G. whiteana</i>

Hybrid Seed

<i>G. "Bronze Wing"</i>	<i>G. "Moonlight"</i>
<i>G. "Orange Marmalade"</i>	<i>G. "Sid Reynolds"</i>

SEED FOR SALE

<i>G. agrifolia</i>	<i>G. candelabroides</i>
<i>G. decora</i>	<i>G. didymobotrya</i>
<i>G. drummondii</i>	<i>G. dryandri</i>
<i>G. eriobotrya</i>	<i>G. eriostachya</i>
<i>G. formosa</i> (Mt Brockman)	<i>G. glauca</i>
<i>G. huegelii</i>	<i>G. integrifolia</i>
<i>G. juncifolia</i>	<i>G. leucopteris</i>
<i>G. monticola</i>	<i>G. nudiflora</i>
<i>G. paradoxa</i>	<i>G. polybotrya</i>
<i>G. pritzelii</i>	<i>G. pulchella</i>
<i>G. pyramidalis</i>	<i>G. refracta</i>
<i>G. stenobotrya</i>	<i>G. stricta</i>
<i>G. synaphaea</i>	<i>G. teretifolia</i>
<i>G. wilsonii</i>	

Cutting Exchange

by Dave Mason

Cuttings of the following *Grevillea*s will be available this spring/summer:

<i>G. acerata</i>	<i>G. banyabba</i>
<i>G. beadleana</i> Mole River form	<i>G. batrachiodes</i>
<i>G. calcicola</i>	<i>G. calliantha</i>
<i>G. crowleyae</i>	<i>G. erectiloba</i>
<i>G. guthrieana</i>	<i>G. haplantha</i>
<i>G. hockingsii</i>	<i>G. linsmithii</i>
<i>G. masonii</i>	<i>G. mollis</i>
<i>G. quadricauda</i>	<i>G. rara</i>
<i>G. scabrida</i>	<i>G. rhizomatosa</i>
<i>G. rudis</i>	<i>G. wilkinsoniana</i>
<i>G. williamsonii</i>	

Please send all requests to Dave Mason, Box 94 Coraki 2471. Cutting material is available to financial members only, cost \$6.50, payable with order, covers cost of packing and return via Express Post. Hundreds of other species etc available, please contact me, I may have the plant you require.

NEWS FROM MEMBERS

Some Grafting Successes (and Failures).

by Bruce Schroder, Montrose, Vic.

The attached list indicates a few recent successes, and even more failures, I have had grafting Grevilleas over the last 12 months. Most of the material was very kindly provided by Merv Hodge in November last year.

The failures have dampened my enthusiasm somewhat, but I must admit that I am delighted to now have a couple of rare and endangered Grevilleas in cultivation and doing well, namely *Grevillea sp. Tumut* and *G. flexuosa*.

G. scapigera, also endangered, was originally provided to me by Tony Blackmore of Wallan in Victoria. The original plant on *G. 'Poorinda Royal Mantle'* rootstock does not like winter at the foot of the Dandenongs here in Victoria. My one grafting success with this species is still very small.

G. flexuosa is in bud and will flower less than 12 months after grafting, having grown quickly to a slender 75 cm high.

I guess I was a little over-ambitious expecting northern species such as *G. angulata*, *G. miniata* and *G. formosa* to do well here. The first 2 got away well over summer but are looking much the worse for wear after a cold, damp winter. Grafting is obviously not the whole solution.

My failures with *G. 'Poorinda Royal Mantle'* as rootstock I put down to very poor stocks - root bound and hungry. I will endeavour to try the same species this year with fresher, healthier rootstocks.

Yes, my enthusiasm has been dampened but not extinguished!

Grevilleas Grafted - Season 1992/1993

Scion	Rootstock	Nº	Success
<i>G. agrifolia</i>	<i>G. Royal Mantle</i>	2	0
<i>agrifolia</i>	<i>robusta</i>	2	1
<i>integrifolia subsp. shuttleworthiana</i>	<i>robusta</i>	6	2
<i>miniata</i>	<i>robusta</i>	8	3
<i>georgiana</i>	<i>robusta</i>	3	0
<i>angulata (white)</i>	<i>robusta</i>	5	3
<i>deflexa (yellow)</i>	<i>robusta</i>	4	2
<i>decurrens</i>	<i>Royal Mantle</i>	3	2
<i>striata</i>	<i>robusta</i>	3	2
<i>stenomera</i>	<i>robusta</i>	2	2
<i>stenomera</i>	<i>Royal Mantle</i>	2	1
<i>refracta</i>	<i>robusta</i>	4	1
<i>banksii (prostrate red)</i>	<i>robusta</i>	7	6
<i>flexuosa</i>	<i>robusta</i>	6	3
<i>sp. Tumut</i>	<i>robusta</i>	6	1
<i>aff. angulata (orange)</i>	<i>robusta</i>	3	2
<i>wickhamii (orange)</i>	<i>robusta</i>	6	0
<i>beadleana</i>	<i>robusta</i>	4	0
<i>goodii subsp. goodii</i>	<i>robusta</i>	5	1
<i>stenomera</i>	<i>Royal Mantle</i>	2	0
<i>scapigera</i>	<i>Royal Mantle</i>	5	1
<i>circifolia (small leaf)</i>	<i>Royal Mantle</i>	7	0
<i>circifolia (long leaf)</i>	<i>Royal Mantle</i>	4	1
<i>lavandulacea 'Arkaroola'</i>	<i>Royal Mantle</i>	6	0
<i>leptobotrys</i>	<i>Royal Mantle</i>	11	0
<i>formosa</i>	<i>robusta</i>	3	0

FINANCIAL REPORT

JULY 1994

Income		Expenditure	
Subscriptions	\$309.85	Newsletter Expenses	200.00
Seeds	9.50	Postage	110.65
Donations	10.00	Stationery	2.00
		Bank Costs	3.50
		Seeds	47.50
	\$329.35		\$363.65
		Balance on Hand 11.3.94	\$501.67

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: Judy Smith, 15 Cromdale Street, Mortdale 2223 (02) 579 1455

Cuttings Exchange: Dave Mason, Box 94, Coraki, 2471. (066) 83 2583

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.

	1993	1994