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THE ROD TALLIS MEMORIAL AWARD

This award was set up in memory of the late Rod Tallis, a young Sydney nurseryman who had been very active in IPPS.

The award is offered each year to persons under 25 in the State where the Conference is being held. Young people in nurseries, educational institutions, and government departments, who have an interest in plant propagation, are invited to apply.

The applicants, who need not be members of IPPS must outline why they should be given the chance to attend the IPPS Conference. They also need to present a biography and to outline their interest in horticulture and plant propagation.

The winner of the award attends the Conference as a guest of the Society and must prepare a paper for presentation at the Conference. The winner also receives a book award.

In 1985 Peter J. Lewis, a recent graduate in horticulture from the Queensland Agricultural College won this year's award and presented the following paper:

THE POTENTIAL FOR GRAFTING IN THE PROPAGATION OF AUSTRALIAN NATIVES

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INTRODUCTION

Australia is the custodian of an amazing diversity of native plants. This diversity is linked with the widely varying

environments that cover Australia. From the tropics of the north, the deserts in the centre and the west, and the alpine areas of the south, the natural environment is constantly changing.

As a native plant collector, I would like to be able to collect selected natives from these environments and successfully grow them together in one place. By achieving this I can share with other people the beauty and distinctive habits of species such as *Eremophila maculata* from Western Queensland, *Prostanthera magnifica* and *Banksia coccinea* from Western Australia. If these species from vastly differing environments are to be grown together however nature alone cannot be relied on and it becomes necessary to lend a helping hand. One method that has proven effective is the ancient art of grafting.

The greatest value of grafting lies in the propagation and production of disease resistant plants. The root rot fungus, *Phytophthora cinnamomi*, has long been the scourge of the horticultural industry, particularly in the nursery and cut flower industries. Now native plant nurserymen and enthusiasts of Southeastern Queensland have been able to enjoy the spectacular displays of *Grevillea dryandri*, *G. longistyla*, and *G. wickhamii* simply by grafting these tropical and inland species onto the phytophthora tolerant rootstock, *G. robusta*.

Western Australian banksias have long been noted for their attractive foliage and inflorescences, but most of the desirable species are susceptible to the root rot fungus, *P. cinnamomi*. Researchers are now starting to obtain results from grafting projects however, as highly desirable species such as *Banksia occidentalis* and *B. speciosa* have been successfully grafted onto the tolerant east coast species, *B. integrifolia*. This is good news for the cut flower industry (3).

The cut flower industry could also benefit from other initial grafting experiments. *Chamelaucium uncinatum* (Geraldton wax flower) a popular cut flower in Southeast Queensland has its cultivation problems, notably longevity of shrub life after two years. However, it has been successfully grafted onto the tolerant local species, *Baeckea virgata*. This also indicates that some native plant species can be successfully grafted onto closely related genera.

Intergeneric grafting could prove to be a large plus for the native plant nurserymen who are continually seeking plants that are showy, unusual, and easy to grow. Two largely unexplored genera of native plants that fit this category are the eremophilas and prostantheras. For example, an *Eremophila* sp. from the McDonnell ranges grows to 0.5 x 1 m, and has

masses of dark blue flowers for most of the year; this is an ideal specimen for a rockery. This species has performed remarkably well in the sub-tropical conditions of Brisbane when grafted onto *Myoporum insulare* rootstock. *Prostanthera magnifica*, the species with the largest flowers of the genus is growing beautifully in similar conditions after being grafted onto a hardy local species, *Westringea fruticosa*. These are only two possibilities, out of many different species.

For nurserymen, the weeping standard, *Grevillea* 'Poorinda Royal Mantle' grafted onto 2 metre *G. robusta* rootstock is increasing in popularity every year, even though it is a high priced nursery item. They are reaping the rewards of work done on grafting native plants at the Australian National Botanic Gardens in Canberra in 1971.

Grafting can also be used for the preservation of rare and endangered species, such as Western Australian banksias. It can also be used for new plant hybrids or variants that are difficult to grow using normal macro and micro propagation procedures.

GRAFTING TECHNIQUES

Many of the different grafting techniques have worked successfully on Australian plants. The most popular techniques being the simple approach graft and the top wedge graft.

(i) Approach Grafting. Approach grafting is the safest grafting method and the best to use on species that have been collected from their natural environments. The plants are transplanted into large nursery containers in such a way that root disturbance is minimized. In this state they can be transported to the nursery and maintained. A suitable rootstock is then introduced into the container and the approach carried out.

Approach grafting is a slow process taking approximately 8 weeks to complete under favourable conditions. After the scion has been cut away from its own rootstock, the grafted plant can be removed and planted in favourable local conditions. Most of the Central Australian and Western Queensland eremophilas and prostantheras have been introduced into Brisbane in this manner. This technique has given the best success for their introduction into the new environment. In their natural environment there is not the quality of material required for other grafting techniques. For example, *Prostanthera megacalyx* has been successfully approach grafted but not top wedge grafted. The plants we are using are original plants from their natural environment.

(ii) Top Wedge Grafting. Top wedge grafting is chiefly used to increase numbers of the species that have adapted and thrived in their new environment. The technique is very simple and straight-forward, though a word of warning is required for two steps. The matching of the scion and rootstock is vitally important. Without cambium alignment on both sides, grafting success is notably lessened. The scion and rootstock must have approximately the same stem diameter.

The ideal scion has only 2 to 3 dormant buds, with the top bud at the bud break stage. Trim all leaves off the scion so as to minimize transpiration loss.

For tying the graft, the use of Parafilm®, a biodegradable paraffin tape, is preferred over the conventional grafting tape. It is waterproof, gives a tight bind around the graft, and breaks down over time thus eliminating the need to cut the binding away from the graft. Two other grafting techniques as described by Burke (1) which could be applied to natives, are the top cleft cutting-graft and side cleft cutting-graft. These methods have been used extensively with camellias and hibiscus and have brought about a significant labour reduction in the mass production of grafted plants.

The grafting of the Geraldton wax was a special case. The best success was achieved when a large cutting of Geraldton wax was approach grafted onto the *Baeckea virgata* rootstock. The cutting was simply pushed in beside the rootstock with minimum foliage removal and grafted. With this graft technique a success rate of 90% has been achieved.

PROBLEMS

(i) Time of Year. For grafting to be economical, the graft success rate should be as close to 100% as possible. Each species has its peculiarities and it is only by regular grafting attempts and careful monitoring that the best time and appropriate techniques will be found. To give an example, *Grevillea dryandri* is difficult to graft while it is budding and flowering. This usually occurs in late autumn in Queensland.

(ii) Incompatibility. Incompatibility is beginning to show as a problem, especially when grafting different genera together.

Symptoms of incompatibility include;

- a) marked differences in growth rate or vigour of scion and rootstock.
- b) failure to form a successful graft in a high percentage of cases.
- c) overgrowths at, above, or below the graft union. (2)

The last symptom is becoming noticeable in the grafted *Eremophila maculata*. (2 year old) forms onto *Myoporum insulare*. The scion is approximately twice the diameter of the rootstock, so effectively the plant is becoming top heavy with the graft being the weak spot. The plants need to be staked in exposed areas to prevent graft breakage. We must now look for other compatible local rootstocks that will overcome this problem.

(iii) Rootstock Selection. We must select rootstocks that best suit our future cultural requirements. Where possible, choose a local species that has performed reliably in the intended environment. For Brisbane environments, *Grevillea robusta* is ideally suited as a rootstock for Grevilleas in home garden situations. It has displayed tolerance of high phosphorus levels, the fungus *Phytophthora cinnamomi*, has shown no noticeable incompatibility problems after 8 years, and grows well in the poor soil conditions of the typical suburban garden.

(iv) Scion Selection. Some species, even though grafted, still do not perform well. We must only select the species that grow well in their new environment. Continuing with poorly adapted species will only lead to a poor representation of it and disappointment. For a local example, the Western Australia *Eucalyptus ficifolia* is susceptible to leaf pests and diseases in Southeast Queensland even though they are grafted.

CONCLUSION

The ultimate potential of grafting Australian native plants has not been fully realized at present. A co-ordinated effort is required from research personnel and concerned industries on this conventional propagation technique. The potential benefits have been illustrated by the results achieved in the temperate and exotic tropical fruit industry, both in varietal and monetary terms.

Researchers in Western Australia (3) and many other individuals have shown initiative.

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