

Propagation of Australian Arid Zone Plants[©]

Jon Belling

Alice Springs Desert Park, PO Box 1046, ALICE SPRINGS NT 0871

Alice Springs Desert Park is situated 10 km west of Alice Springs, with a backdrop of the West MacDonnell Ranges. The park was constructed 5 years ago with the priority to educate the public about Central Australian flora and fauna. Local indigenous and non-indigenous guides integrate the culture of this area throughout the park with interpretive talks.

Alice Springs is situated in the centre of Australia. The elevation is 580 m above sea level. The average annual rainfall is about 240 mm a year, with some good years (such as last year) recording up to 800 mm. The evaporation rate per year is 3600 mm. In the immediate area there are approximately 2000 known floral taxa, but still new discoveries are being made.

Central Australia has a very unique flora, which is currently not well known to the horticultural industry. Perhaps as a result of this limited knowledge, Alice Springs has an unimpressive history when it comes to horticulture and the use of indigenous plants in the landscape. The most common species in cultivation, cotton palms, Athel pines, silky oaks, white cedar, and verbena to name a few, are all exotic flora to the Alice. Some species such as the Athel pines have jumped the fence and become weeds in the area. Although the local nurseries still sell plants from all over the world, the demand to sell local native flora is on the rise again.

When the Desert Park was first built, a first class nursery facility was provided. The next step was to propagate plants for the range of different habitats including Sand country, Woodland, and Riverine. Botanists provided plant species lists for each of the habitats and then the hunt was on. Seed collection trips covered anywhere up to a 300 km radius around Alice Springs, taking us into very different and diverse habitats.

Little was known of the propagation of many of the plants and this is still the case today. We relied on people like Peter Latz, a prominent botanist for more than 30 years in Alice Springs, to assist us with ecological information. The Olive Pink Botanic Gardens also assisted with their horticultural experience. The local SGAP group and Kings Park and Botanic Garden also gave us information on propagation of some similar species they had grown.

Moving from Melbourne to central Australia was not an easy transition when it came to propagation. The seasons in Alice Springs are very different, long hot summers with temperatures reaching above 40°C and winters dropping down to -3°C over night. Rain also plays such a huge part in seed production and cutting material being available for propagation.

We found that sowing seed at different times of the year yielded different results. Similar results were obtained with cuttings also. After 2 years a pattern began emerging that we could work with, many plants shut down over the long hot summers. Because of this propagation is not generally attempted over summer.

But there are a few exceptions to this. Rainfall from summer storms provides material and results out side of the "normal period" we would usually attempt to propagate. Many grasses of central Australia including *Triodia* species grow and respond to propagation in the hottest part of the summer. Kings Park Botanic

Gardens helped us with initial information on propagation of these plants, and we have since developed our own methods. Clumps of *Triodia* are divided and the divisions laid out in a single layer on wet newspaper. The newspaper is then rolled up and stored in a plastic bag at ambient temperature until roots form. The use of a misting bed provided exceptional results. Cuttings were tried as well but were not as successful as the other procedure. It normally takes about 8 to 10 days on the misting bed before roots start to emerge. We then leave them for a few more days before we tube them up.

Grevilleas are another genus we needed to propagate, as these were very prominent in certain habitats. The honey grevilleas, *Grevillea eriostachya* and *G. juncifolia* are two beautiful species and are also an important food source for the local indigenous people. We collected seed and sowed them with no results. We tried two treatments, hot water scarification or soaking in smoke water, with no germination. Then we used hot water with smoke water at 1:10 ratio and this produced results although minimal. Later we were asked to grow some *G. wickhamii* for Watarrka National Park, the rangers collected seed and sent it to us. The seed had been collected 6 to 8 weeks earlier. We treated the seed using the hot smoke water at 1:10 ratio and allowed the seed to soak for 12 to 18 h. This was done in November. The average temperature in the glass house was between 27 to 30°C. Within 2 weeks seed started to germinate and within another 2 weeks we had around 80% to 90% germination. We had never obtained that result before. About 95% of the plants were grown on, most were planted out at Watarrka and some went in to the Desert Park.

Eremophila is another widely represented genus in Central Australia with 34 species, many of which are not cultivated. We have so far had no success with seed germination. We have been able to propagate 18 species by cuttings so far; some of which have been difficult. All have been from tip cuttings. We have found a pattern forming with strike rate relative to time of year. Cuttings will produce roots from late March through to late August and we have noticed that from late May through to August seems to be the best time. But still many are not able to produce roots. In saying this sometimes summer storms provide a lot of rain in areas and suitable material is sometimes available outside the times we know to be successful.

All of these have been propagated by cuttings in a mix of perlite and coco peat (6:1, v/v). Cuttings are dipped into purple Clonex[®] (3000 ppm IBA), then placed onto a hot bed at 23°C with misting every 15 min for 20 sec. In the optimal season we can expect rooting to take place in 4 to 6 weeks. We have used a sand and peat mix but *eremophilas* have very brittle roots and too much damage was done at pricking out.

Indigofera leucotricha and *I. basedowii* are two extremely beautiful plants found growing around Alice Springs. Many people are constantly asking the nurseries for these plants, and up until recently we have not been able to produce them in any number. We tried tip cuttings of these plants at different times of the year and had only limited success. Rotting off was the main cause, as these plants are covered in very fine hairs. Due to recent wet years seed production gave us the opportunity to collect seed. We treated the seed by pouring boiling water over the seed and letting it stand for 24 h. About 60% of the seed swelled and were sown and the remaining seed was treated again resulting in swelling as well. Seed was sown into a seed raising mix consisting of graded sand at 8/16 mesh size and coco peat (6:1, v/v) in February. Germination (90%) occurred in less than 2 weeks. As this is the first time

we have grown these plants they will now be trailed for pot culture, although most will be planted straight into the Park.

Aluta maisonneuvei formally *Thryptomene maisonneuvei* is a plant that is predominantly found growing on sand dunes and provides a spectacular display in late winter. We wanted to grow this species for display in the "Sand Country" habitat. Several attempts were made over the year, getting cutting material when collecting trips took us down around the Uluru area. None of these ever rooted. We contacted a grower in Western Australia that didn't have any trouble with the species. He was using material collected in autumn and treated with IBA at 4000 ppm. He also said that we would have to look around for a population that could be propagated. We started to make trips down to Uluru in the autumn and after a couple of wet years found populations with material just right for cuttings. We used Clonex™ at 3000 ppm and 8000 ppm and placed these on a hot bed with misting. We observed after 2 months that callusing had taken place and redipped into Clonex™ at 3000 ppm and obtained root production within the month. The next stage was to cultivate them for planting out in the park. They are very slow growers and the potting mix needs to be extremely well draining. The plants did survive the rigours of the nursery and were planted out in the Park. These plants had survived for 1 year but rabbits ate them. We can now produce the plants a lot easier now, but we still have the rabbits!

Livistona mariae is a palm species endemic to central Australia. Its current status is "rare". Once more study on the plant has been completed, it could be grown in the future to replace exotic species presently used. We are presently growing this palm for use in the Park for habitats yet to be built.

Lomandra patens is a lovely species, ideal for landscaping, and yet another plant we had difficulty growing from seed. Fresh seed was sown at different times of the year, but none germinated. We then tried leaching the seed for 6 weeks in the toilet cistern prior to sowing. This seed was 3 years old when treated. Later information found on this genus indicated that the use of fresh seed may be the key to germination. Fresh seed was sown in our seed raising mix and the trays were placed on a hot bed under mist at 23°C. Sowing time was in late March. Within 2 weeks germination had started. This is the first time we had been able to raise this species from seed. Approximately 60% germination was achieved. We could also use division to provide the Park with planting material if required.

Halosarcia and *Tecticornia* are plants referred to as samphires. These occur naturally around salt lakes and claypans. Up until recently we have had difficulty with all propagation methods. A student from Flinders University, Belinda Davies, was doing a thesis on seed biology for the Granites gold mine. Belinda found that halosarcias have corky fruits and need a fermentation process to assist germination. We sowed treated seed of *H. halocnemoides* and *T. verrucosa* into a mix of perlite and peat (7:2, v/v), sprinkling the seed on top and then placing the seed tray onto the hot bed with mist; 4 weeks later germination occurred. Fifty seed were sown and about 80% germination was achieved. The seedlings were pricked out and held in the glasshouse; unfortunately we lost about 80% of these. The surviving plants will be planted out soon.

Although a lack of propagation knowledge has hindered us for many species, there are situations where we are lacking in other information about the plant. *Macrozamia macdonnellii* occurs throughout the ranges around Alice Springs and is considered a rare plant only occurring in central Australia. Seeds are half embedded into the

seed raising mix and left to germinate. Seedlings emerge in around 3 months. Watering at this stage is crucial as rotting off can occur. The seedlings are pricked out into large tree tubes and grown on. Currently this species is protected by CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and the effects of collecting seed from the wild are still under debate. As one of the very few growers of this plant, we would like to look into the production of this species in the future using tissue culture, so as not to put any pressure on wild populations. Making this beautiful species more readily available would hopefully see it used in the place of *Cycas revoluta* in landscaping around town.

Calytrix carinata is a species we haven't been able to grow yet. We have tried fresh seed, old seed, and cuttings. The only time we were able to achieve any germination the seedlings rotted off.

As you can see we are still a very new organization. Five years on and we have been able to grow around 500 of the 2000 taxa. A lot more work has yet to be done, we will make mistakes, but have some success as well.

Having established suitable propagation techniques for a range of central Australian plants and planted them at the Desert Park, we have created a considerable increase in interest in growing indigenous plants in Alice. Initially, local retail nurseries could not meet this interest, as very few species were being grown outside of the Desert Park. To meet this demand, the Desert Park now operates a wholesale nursery and supplies local retail outlets.

Pictures of the plants, and particularly flowers, of central Australia are not uncommon. But until fairly recently their use in horticulture, even in central Australia, has been rare. It is hoped that the work of the Desert Park will not only provide the information needed to grow our arid zone plants but will encourage people to see them as the preferred alternative to the exotic species.

Floradata[©]

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Floradata is an information system that will help you grow Australian Native Plants. It collates plant species collection and propagation information on how to use thousands of Australian plants, including how to collect, store, germinate, and propagate seed, and much more. This publication will assist in distributing the results of research undertaken by organizations, companies, and individuals to improve biodiversity in revegetation and to increase the efficient use of native seed. Floradata promotes the sharing of knowledge that, up to this point, may have been hidden in obscure references and scientific literature, or known by relatively few people.

While the focus is on species used in rehabilitation, Floradata will be useful to anyone planting native species, whatever the purpose. It will allow those interested in native species to effectively plan seed regeneration programmes using best practice information.

Floradata is due to be released in 2001 as a CD-Rom. The major contributors to this project are: Australian Centre for Mining Environmental Research, Bush care, Natural Heritage Trust, Greening Australia, Australian Commonwealth Scientific and Industrial Research Organization, and the Australian National Botanic Gardens.