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**CULTIVATION OF
AUSTRALIAN PLANTS—200 YEARS OF PROGRESS
GREG LAMONT¹**

*New South Wales Department of Agriculture
P.O. Box 581
Gosford, N.S.W., 2250*

The beauty and horticultural value of the Australian flora was first recognized by Joseph Banks (1743–1820), the botanist who accompanied Lieutenant James Cook on his voyage of circumnavigation of the world in 1768–1771. Banks and his assistants shipped large collections of seeds, living plants in tubs, and dried specimens to England. Many, of course, failed to survive but a surprising number did.

Banks, on his return to England became Director of the Royal Botanic Gardens at Kew and continued his efforts to introduce Australian plants, particularly with the assistance of collectors. A greenhouse known as the Botany Bay House was built to accommodate the living collections. Collectors such as Caley, the superintendent of the new Botanic Gardens at Parramatta gathered plants from the western parts of the Cumberland Plain and the Blue Mountains. Other notable collectors included Brown, Cunningham, and von Mueller in the east of Australia and Baxter, Drummond, and Molloy in the west. Wealthy noblemen and women often owned extensive collections of exotic plants, cultivating them in greenhouses because of the extreme English winter climate. Experienced horticulturists were in strong demand. Gardening journals such as Curtis's *Botanical Magazine*, first issued in 1787, recorded the early cultivation of Australian plants together with superb colour prints. The catalogues of several large English nurseries listed interesting selections of Australian plants, many of which are now lost. In 1870 James Veitch and Sons of Chelsea, offered various-sized *Blandfordia cunninghamii* for prices in the range 3s 6d to 31s 6d. In 1886 the list of William Bull, also of Chelsea, included *Davidsonia pruriens*, *Elaeocarpus angustifolius* [syn. *E. grandis*], and a double-flowered *Epacris* sp.

Australian plants also found their way into private collections

¹ Senior Research Horticulturist

and public gardens in Europe. *Lechenaultia formosa* and *L. biloba* were highly prized in France and Germany in the early 1880's as were everlasting daisies. In Mediterranean countries *Acacia dealbata* became commonly known as mimosa—a cut flower heralding spring and still enormously popular.

Early settlers in Australia failed to appreciate the horticultural merit of the native flora, preferring to bring from Great Britain plants with which they were familiar. So while Europeans struggled to grow Australian plants, Australian colonists struggled with temperate species. Many temperate species did thrive despite poor soils and the comparatively hot, dry climate.

One of the earliest nurseries in Australia was run by the Macarthurs at Camden Park. Their catalogue of cultivated plants published in 1857 listed numerous Australian epiphytic orchids, three species and one variety of *Calostemma*, and several native species of *Crinum*. Approximately 30 species of Australian trees and shrubs were listed among the thousand exotic species. Macarthur was probably the first Australian to create a hybrid involving an indigenous plant: *Crinum pedunculatum* crossed with the African species, *C. scabrum*. Another early nursery in Sydney, Darlings Nursery, was established by Thomas Shepherd at Darlington. He encouraged the cultivation of native plants from N.S.W. by propagating them and lecturing about their use. Notes from his lectures were published in the Sydney Morning Herald in 1834.

During the next eighty years there remained minimal interest in the cultivation of native plants and only popular lines such as *Acacia baileyana*, *Boronia megastigma*, and *Grevillea rosmarinifolia* were supplied by nurseries. In 1913 the Parry family, particularly Percy and Olive Parry, commenced cultivating Australian plants for cut flowers. They sold these (together with exotics) from Gosford railway station and in the Haymarket. Their cultivated and bush-picked flowers often adorned the international offices of Qantas Empire Airways and were displayed in Australia House, London, and at Royal functions.

Species included Christmas bush (*Ceratopetalum gum-miferum*), waratah (*Telopea speciosissima*), native rose (*Boronia serrulata*), *Helichrysum* spp., and *Helipterum* spp. and Geraldton wax flower (*Chamelaucium uncinatum*). Their nursery, "Florlands", was probably Australia's first specialist native nursery and today the Parrys offer a wide selection of plants.

In 1950, James Audus, former botanist at the National Herbarium lamented the lack of interest in the cultivation of native plants. Seven years later A. J. Swaby, a writer on Australian plants for "Your Garden" founded the Society for Growing Australian Plants (SGAP) in Melbourne. Other states followed suit and in December 1959 the first volume of "Australian Plants" was pub-

lished, providing a forum for the exchange of information on the cultivation of native plants. The active promotion of native plants through their theme "Preservation by Cultivation" led to a great deal of interest. Amateurs and nurserymen collected widely, specialist native nurseries began to appear, and general nurseries broadened their range of species. Bill Cane in 1964 wrote of the need to propagate superior selections of natives from cuttings and actively discouraged the propagation of certain natives, such as *Callistemon* from seed. At the same time nursery technology was experiencing great changes—soil-less potting media, root-promoting hormones, mist propagation, polythene pots, etc.

Botanic Gardens have also played an active role in the cultivation of native plants. The Botanic Gardens at Kings Park, Perth was first established in 1962 to specialize in the cultivation of West Australian flora; 1970 saw the opening of the National Botanic Gardens in Canberra, also devoted to the Australian flora. Both gardens have offered some outstanding selections of the flora to the nursery industry.

Apart from some early hybrids of *Epacris* spp. produced in England in the 19th century, the macadamia nut was the first Australian plant to receive attention from plant breeders. The two species, *Macadamia integrifolia* and *M. tetraphylla* were introduced into Hawaii a century ago where superior cultivars were selected and investigations made pertaining to their culture. It wasn't until the 1960's onwards, when ornamental native plants became popular, that selection and hybridization took place. In the 1970's there were numerous cultivars of *Grevillea* introduced to the nursery trade. The majority of these inter-specific hybrids arose from chance cross-pollination in gardens. There appeared to be little selection carried out and many of the hybrids either did not perform well or were inferior to their supposed parents. Some, however, were outstanding and have been successfully cultivated throughout Australia and in the warmer temperate or subtropical parts of the world, e.g. *Grevillea* 'Robyn Gordon', 'Sandra Gordon', 'Honey Gem'. These amply demonstrate the potential that exists for a well-directed breeding program in the genus *Grevillea*.

Kangaroo paws (*Anigozanthos* spp.) have received much attention from plant breeders since the 1960's. Keith Oliver and Stephen Hopper in W.A. and the late Merv Turner in Victoria deserve credit in this regard. Although the aims of these individuals differed (the Hopper hybrids arose from an academic study of breeding relationships), the basic objectives of the other two was to develop cultivars with the vigour and disease tolerance of *A. flavidus* combined with the outstanding colours of the other species (*A. rufus*, *A. pulcherrimus*, *A. humilis*, *A. manglesii* etc.). Some cultivars from all three programs have been immensely successful for both landscaping and cut flower production. Others, particularly non-*A.*

flavidus hybrids are still prone to ink disease and have given a disappointing performance in the eastern states. Obviously there is still considerable challenge in achieving the objective of disease tolerance.

Australia is currently experiencing a rapid expansion in the cultivation of its native flora for the domestic and export cut flower markets. Plants grown include waratah, banksia, dryandra, Geraldton wax, boronia, kangaroo paw and small-flowered myrtles. We are still, however, dependent on wild sources for numerous favoured flowers, especially verticordia, stirlingia and the many smoke bushes. Research is urgently needed into their propagation and cultivation.

We must also be prepared to undertake long-term breeding and selection programs to develop a range of superior cultivars. Such will not be an easy task because many of these plants are woody with protracted generation times, in contrast with the annual/herbaceous perennials that constitute the bulk of popular cut flowers.

During the last three years the N.S.W. Department of Agriculture has been engaged in a breeding program with one of the most successful cut flowers, Geraldton wax. In addition to assembling current cultivars an immense effort has been made to collect from the wild, species and forms hitherto not cultivated. The use of tissue culture techniques for germinating young hybrid embryos or seed and for rapid multiplication has significantly increased the chance of success and shortened the generation time in breeding wax flowers. This program is now in the early stages of cultivar evaluation. These techniques have also been successfully used at Gosford in breeding *Lechenaultia*.

Commercial row-cropping of Australian plants is occurring with success in other countries. New Zealand has mastered the culture of waratahs and researchers have selected some highly desirable cultivars. In the northern hemisphere Israel grows a range of Australian Proteaceae, kangaroo paw and Geraldton wax and in southern California there is much interest in Geraldton wax, kangaroo paw, banksias, and the numerous small-flowered myrtles.

Various reports have suggested that Australian plants have potential on the international market as flowering or foliage plants. The kentia palm is, in fact, a success story and the Lord Howe Island Nursery expects to export more than \$2 million worth of seedlings this year. Market research is essential, however, to determine what opportunities (if any) exist for other plants. Whilst some species do have desirable characteristics such as tolerance under indoor conditions, showy flowers, easily propagated etc., much effort is required into their breeding and/or culture in order to "tailor make" them for particular uses.

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REVIEW OF STOCK PLANT ETIOLATION—A "NEW" METHOD OF PROPAGATION

ROBERT BOLCH

*Victorian College of Agriculture and Horticulture
Burnley Campus
Burnley Gardens, Swan Street
Richmond, Victoria 3121*

Workers on stock plant etiolation at Cornell University in the United States have had outstanding success in improving rooting of many traditionally difficult-to-strike species. However, the practice of withholding light to improve propagation is an ancient one. Some of the most common cloning methods; layering, stooling and cuttings, involve keeping light from that part of the plant that propagators hope will form roots.

However ancient the practice, recent refinements are indicating that the technique will have realistic commercial viability. Etiolation is simply the growing of plants in the partial or total absence of light. Stock plant etiolation as a pretreatment to cutting propagation, generally refers to the initiation of new stock plant growth in the dark. These shoots are pale and succulent and they produce roots much more easily than do their counterparts grown in the light.

Banding is a pretreatment adjunct to etiolation, which excludes light from a zone of the cutting base. An opaque adhesive band (e.g. "Velcro") may be applied to the etiolated shoots, which subsequently are allowed to develop normally in the light, and thereby