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PROPAGATION OF ORNAMENTAL RAINFOREST PLANTS

F.D. HOCKINGS

41 Oxford St.
Wavell Heights, Queensland 4012

Any discussion about rainforest plants generally leads to some disagreement about which plants are truly rainforest species and which are not. The distinction is not as clear as one might imagine because some species, for instance *Lophostemon confertus* (better known as *Tristania conferta*), are prominent in some rainforests and can be equally prominent in some eucalypt forests.

The "Language of Botany" defines rainforest as "a closed community dominated by trees which form a two or more layered dense canopy in which lianes and epiphytes are usually conspicuous with a lower sparse assemblage of small trees, shrubs and herbs, including ferns".

Other definitions also include orchids, palms, wide-leaved forbs such as philodendron relatives, ginger relatives and bananas, special plant modifications such as trunk buttresses and leaf drip tips, and an absence of grasses, annual herbs, eucalypts, and acacias.

Rainforests are widespread in tropical and sub-tropical lands or parts of those lands which receive a fairly continuous and high rainfall. Rainfall is more important to the development of rainforest than soil type or soil fertility, although good soil drainage is usually an important factor. Provided topogra-

phy is favourable, areas receiving an annual rainfall of 1,275 to 1,500 mm or more (50 to 60 inches or more), develop rainforests, irrespective of whether the soil is basalt, andesite, granite, phyllite, slate, or beach sand.

At lower rainfalls, down to about 900 mm (36 inches), soil fertility is more important and dry softwood or vine scrub, which is a depauperate type of rainforest, develops on richer soils. Topography is important though, and patches of rainforest are usually developed where some geological feature helps to trap moist air.

The rainforests comprise an incredible diversity of plant life, not only in numbers of species but also in plant form. There are upper canopy trees and lower canopy trees; there are small trees and shrubs that do not enter into the competition for light but grow well as understory plants in low light. Some climbing plants scramble up to light in the same way as some epiphytes grow on the upper part of trees in strong light. Others of both groups grow on the lower trunks or rock faces.

The soil carries large-leaved forbs such as *Alocasia*, *Alpinia* or native banana. In addition there is a tremendous variety of ferns, from the most delicate and tiny filmy ferns to giants such as *Angiopteris evecta* which may have fronds up to 9 or 10 metres long, and from the soil and rock dwelling ferns to the epiphytic species in the tops of the trees.

In each of these categories of plant form there are many species with attractive flowers, fruit, or foliage — species with the potential to become valuable additions to the already immense array of commercial ornamental plants. I propose now to illustrate some examples of these various plant forms.

While many rainforest trees have inconspicuous flowers, others are quite spectacular. Outstanding flowering trees include *Baklya syringifolia*, *Brachychiton discolor*, *Buckinghamia celsissima*, *Darlingia ferruginea*, *Deplanchea tetraphylla*, *Doryphora sassafrassa*, *Elaeocarpus bancroftii*, *Oreocallis wickhamii*, *Sloanea australis* and *Xanthostemon chrysanthus*.

Smaller flowering trees and large shrubs are *Backhousia anisata*, *Cerbera manghas*, *Dillenia alata*, *Phaleria cleroden-dron*, *Pilidiostigma glabra*, *Pithecellobium grandiflorum*, *Quintinia sieberi*, *Turraea brownii* and *Zanthoxylum brachyacanthum*.

Other trees are notable for their fruit and include *Cupaniopsis serrata*, *Diploglottis cunninghamii*, *Dysoxylum fraseranum*, *Hicksbeachia pinnatifida*, *Ochrosia elliptica*, *Podocarpus elatus*, *Syzygium hodgkinsoniae*, but there are many more. The foliage of others is attractive, particularly in the juvenile

stages; *Geissois biagiana* and *Macaranga tanarius* are examples.

The understory trees and shrubs include some with remarkable foliage or unusual flowers or fruit. Besides having potential for shaded gardens some may also prove useful indoors. They include *Alyxia ilicifolia, Anopterus macleayanus* foliage and flowers, *Eupomatia bennettii, Fagraea racemosa, Fissistigma stenopetala, Pavetta australis, Randia chartaceae, Randia hirsuta* and *Triunia youngiana.*

Light-seeking climbers include: *Agapetes meiniana, Aphanopetalum resinosum, Faradaya splendida, Hoya macgillivrayi, Millettia megasperma,* and *Tylophora grandiflora.* Shade-loving climbers include *Capparis sarmentosa, Elaeagnus latifolia, Fieldia australis, Freycinetia excelsa,* and we have several *Raphidophora* such as *R. australasius* and *R. pachyphylla.*

The large-leafed herbs or forbs are represented by *Alocasia macrorrhiza, Alpinia caerulea, Cordyline canniaefolia, Dracaena angustifolia, Orthothylax glaberrimus* and *Tapeinocheilos queenslandiae.* Other plants growing in the same situation are *Bowenia serrulata* and *Lepidozamia hopei.*

Ground and rock covering plants include *Boea hygroscopica, Drymophila moorei, Kreyssigia multiflora* and *Peperomia spp.*

Ferns are many and varied — from the *Platycerium* spp. to the tassel ferns and tree ferns.

The rainforest is not a particularly good place to look at rainforest trees if you have cultivation in mind. You will be impressed by the tall trunks and more than impressed by the height of the trees. From a cultural point of view the most interesting place to see rainforest plants is in regrowth country where regeneration is taking place. Most rainforest trees when grown in the open are shorter with spreading crowns and flower more regularly and profusely.

The cultivation of rainforest trees is by no means a new concept and, in fact, many species were collected and distributed during the very early settlement of Moreton Bay. Some of these specimens are still growing in southern capitals and in overseas gardens because rainforest plants are the easiest to grow and most adaptable section of our native Australian flora.

Much is said at times about developing our rainforest plants as indoor plants. However, to gain acceptance in this well-supplied area our natives will have to be just a little better than or distinctly different from the established exotics because, in general, they lack leaf colours other than green

and they have long internodes.

Australian rainforest plants may be propagated by the same general methods as for other plants, namely from seeds or by vegetative means such as cuttings, grafting, and by tissue culture. There are a few with viviparous habits such as *Lomandra spicata* which, besides producing seeds, may also produce plantlets on the flower spikes. The rainforest *Pandanus monticola* may drop small aerial rooting shoots and *Remusatia vivipara* produces small burr-like bulbils on sterile stems. The seeds of some plants such as *Cordyline* may germinate on the plant.

Seeds of most rainforest plants are short-lived although some are remarkably slow in germinating. They do not dry-store but need to be kept moist in plastic where they will germinate.

Some seeds are light and windblown such as those of *Doryphora, Calducluvia,* and *Alstonia.* Many species have fleshy fruit and relatively large seeds that are eaten by cassowaries and wild pigs. The cassowaries pass the seeds and are important distributors as well as efficient collectors of seeds.

The slow germination of some large seeds is an interesting phenomenon. They need to be planted fairly quickly to retain viability but take up to 4 years to germinate. In my limited experience these include *Aceratium ferrugineum,* some of the Lauraceae, and possibly *Syzygium gustavioides.*

Other rainforest seeds have a strong tendency to rot if buried in the normal manner of planting seeds. They germinate on a moist surface, and, in nature, would be amongst a mulch of fallen leaves. These include *Bowenia, Lepidozamia,* and possibly the slow-germinating species mentioned earlier. Some growers have best success in germinating seeds of these species in plastic bags with slightly moist peatmoss.

Cutting propagation utilizes the standard tip and stem cutting methods and use of rooting hormones. Rainforest plants are high humidity plants and the best methods should be used to maintain high humidity over cuttings. Old, thicker stems seem to be most successful for *Tecomanthe hillii* and *Pandorea baileyana;* basal trunk suckers should be tried for species such as *Aceratium ferrugineum.*

Root cuttings are successful for *Pentaceras australis,* the *Austromyrtus acmenioides* and *A. bidwillii.* Surface roots of pencil to finger thickness, cut to 15 to 25 cm lengths are laid down horizontally in propagation mix. When the suckers that arise produce their own roots they can be potted individually.

Tissue culture has been successful with some native

plants and I am sure it could be used just as successfully with rainforest species.

A large number of rainforest plants have the potential to become important ornamentals. Propagation should not present any serious problems. The main limitations are in knowledge of the species and availability of propagation material.

COMMERCIAL PRODUCTION OF KANGAROO PAWS

G.M. LAWSON and P.B. GOODWIN
Department of Agronomy and Horticultural Science
University of Sydney
Sydney, New South Wales 2006

INTRODUCTION

There has been a rapid expansion of interest in the development and production of Australian native plants. One genus which has received a great deal of attention is *Anigozanthos* (kangaroo paws). Kangaroo paws blooms, originally all bush-picked, are currently available from commercial plantings. Now, the potential of kangaroo paws as "potted colour" is about to be realised.

Extensive work has already been done with *Anigozanthos* in areas such as taxonomy, ecology, evolution, hybridisation, plant selection, micropropagation, field cultivation, pathology, and flower production. However, much of the horticultural information has been published for the gardening fraternity or as a result of scientific investigations into the biology of the genus. With the introduction of kangaroo paws as cultivated cutflowers, information relevant to field production has been gathered by workers in Western Australia. Other information is less easily available as it originates from the experience and observations of gardening enthusiasts, plant breeding experts, and unpublished research work.

At the University of Sydney, work is aimed at the production and utilisation of new hybrids of *Anigozanthos* as containerised plants.

PLANT IMPROVEMENT

Many species of *Anigozanthos* are not well-suited to field cropping or nursery production methods. *Anigozanthos flavidus* is the most vigorous, reliable, and long-lived of the species but produces flower stems which are up to three metres in height and are generally unspectacular. *A. manglesii*, the red