Propagation of Rainforest Plants

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INTRODUCTION

As rainforests diminish, Public interest in growing them increases. This interest falls into three categories:

- Small-scale, usually urban, garden culture
- Landscaping
- Regeneration of forests

Vegetative propagation is used extensively for certain commonly grown species, such as some of the lillypillies, and the procedures used in such cases do not differ markedly from those used in producing more familiar plants (many of which are rainforest plants in their countries of origin). Many of the nursery techniques used to grow-on rainforest plants are familiar to most growers.

However, propagation of rainforest plants by seed is a relatively unknown field. Most rainforest plants in specialist nurseries are currently grown from seed, for a number of reasons:

- Where seed is readily available, large numbers can be grown economically.
- Many species are not easily propagated from cuttings, or little cutting material is available on stock plants.
- Root systems are stronger on many seed-grown plants than on plants produced from cuttings.
- Many growers are aware of the need to maintain the genetic diversity of a relatively small resource.

PROBLEMS

The problems involved in growing rainforest trees from seed accounts for the small, family-based size of rainforest nurseries:

- Seed is hard to locate, and where it can be found it may be difficult to access or illegal to collect, e.g. national parks. Commercial seed suppliers stock only a small range of the more easily stored species.
- Seeds are often viable for only a short period of time—in some species, seeds are viable for only a few days.
- Viability varies greatly not only between individuals, but between seasons.
- Seed production often varies annually, and massed fruiting of some species in some years may mean no fruit on those species the next year.
- Germination of many species is complex and requires labour-intensive and even painful processes. Some species such as the useful pioneer, crow's ash *(Pentaceras australis)* or the hardy coastal plant, beachacronychia *(Acronychia imperforata)* remain almost impossible to propagate.

GENERAL PRINCIPLES FOR SEEDLING PRODUCTION

Seed Collection. Collection by the grower is usually the only option for seed not available from the larger seed suppliers. As yet there are few small scale and botanically knowledgeable seed collectors who can provide adequate amounts of fresh, viable, correctly identified rainforest seed.

Seed is collected mainly from rainforest remnants, isolated plants on private property, or on roadsides in areas previously supporting rainforest, e.g. the northern rivers area of NSW. These are the best sources as plants are low, accessible, and fruit heavily in open conditions.

Collection from forested areas is more difficult as these are generally distant from nurseries, and the plants are either very tall or heavily shaded, hence producing few obtainable or uninfested fruits. Some growers with flexible morals frequently dig up wildlings, especially those of rare and endangered species.

Establishment of stock plants for rainforest nurseries is essential. For some species this may be a long-term project.

Collection of seeds from birds is a significant source that can be managed, e.g. by providing fruit trays to attract fruit eaters, with trays below to collect regurgitated seeds and droppings.

Seed Treatment. Processing immediately after collection is necessary for most seeds. Soaking in water for at least 24 h drowns seed predators and rehydrates any slightly dried but healthy seed. Dry capsules should not be soaked.

Removal of outer flesh is preferable, and in some cases obligatory, as in the case of most Lauraceae, such as the scented Oliver's sassafras *(Cinnamomum oliveri).* Soft flesh and capsules harbour insects which may destroy seed and may contain compounds which inhibit germination of seed. This necessitates laborious peeling, soaking to soften flesh, sieving and/or blasting with water, and, in a few cases, protection of hands against toxins (cunjevoi,*Alocasia macrorrhiza* var.*brisbanensis*) or fine spines (foambark, *Jagera pseudorhus).*

Initial drying for a few days is required in some species, particularly the Sapindaceae family, to assist removal of capsules or follicles. Care should be taken to prevent overheating when drying black seeds in full sun.

Seeds with hard seed coats, such as snowwood *(Pararchidendron pruinosum)* may need to be scarified. Heat treatment is rarely used as rainforest plants have no ecological connection between fire and germination.

Some of the most important species, especially the pioneer species with long-lived seeds such as brown currajong *(Commersonia bartramia)* and red ash *(Alphitonia excelsa)* as well as some mature stage species like white beech*(Gmelina leichhardtii)* and blue quandong (*Elaeocarpus angustifolius* [syn. *E. grandis*]), require idiosyncratic multiple processes.

Seeds with hard inner stones (e.g. red olive plum, *Cassine australis)* are a particular problem, usually requiring time-consuming treatment of rasping or cutting.

Germination and Growing-on. Germination times vary from a few days for peanut tree *(Sterculia quadrifida)* to 10 years for crabapple *(Schizomeria ovata)*. Most pre-sowing treatment is an attempt to hasten germination times. For long-term germinating seeds, dense sowing (up to 3000 seeds in a standard propagation

tray for some species) and oversowing saves space.

Management of germinating plants (e.g. housing, ventilation, watering, control of fungus and seed predators) is similar to that in production of other nursery species. However, the combination of extraordinary diversity, short seed viability, and irregular seed production of Australian rainforest plants requires unorthodox methods. The solution is seedling storage instead of seed storage.

Seedlings are germinated in coarse sand, gravel or other free-draining, inert, nutrient-free medium. Fine seed, such as that which habitually germinates on tree ferns, may require addition of fibrous material to the medium. After the nutrients available in the cotyledons are exhausted the seedlings cease growth and will survive indefinitely with only adequate water, and minimal pest, disease, or fungal control (usually none). This response reflects the natural strategy of rainforest seedlings in forest conditions. In contrast with most sclerophyllous Australian species, rainforest plants can tolerate overcrowding and lack of fertilizer without root deformation, damping-off, or over-growing. This offsets to some extent the unsatisfactory storage capabilities of rainforest seeds. Nutrients are added preferably some weeks prior to potting up so that the plant is induced to break its dormancy and begin active growth. No long-term effects have been observed from the initial inhibition of growth, although more research should be done on this aspect. At potting up, tap roots, if present, are heavily pruned to induce lateral growth. Tap roots do not persist in rainforest trees under natural conditions.

Growing-on techniques are standard as for other acid-loving ornamentals. Contrary to many prejudices, most rainforest plants, with the exception of the understory species which may require 50% shade, are proving to be fast-growing in the nursery and hardy in full sun.

CONCLUSION

Public interest in rainforest plants is growing steadily, but is not being matched by enough research either into the species and forms most suitable, or the best techniques for producing them. With only a limited amount of accessible seed available at present, it is important that losses due to ignorance of the correct seed treatment should be avoided. Very little information has been written about rainforest seedling production, although it is likely that there is a great deal of empirical knowledge on the subject. Many of the problems could be overcome with more dissemination of propagation techniques, an efficient seed-swapping network and more serious research into growing of rainforest plants, particularly for much needed large-scale reforestation projects.

FURTHER READING

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