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Rainforest Plants

Rainforest plants have a particular attraction for many gardeners and architects. This is especially so in summer, when a dense canopy of shady trees can provide cool shelter from the hot sun, and reduce the time needed to deal with rank growth of weeds and grasses. This issue is therefore very timely. It includes down-to-earth information from Peter Radke, refuting some widespread misconceptions about the difficulty of growing rainforest plants, including tropical species, outside their natural environment. He explains how to choose suitable locations and conditions for rainforest plantings, to give them the best chance of thriving. Ideally, a re-created rainforest would eventually contain not just trees, but also their seedlings of various sizes, together with some understorey plants, epiphytic ferns, orchids and climbing vines, a sprinkling of lichens and mosses, perhaps with shade-tolerant scrambling native grasses along the edges.

Australian Plants has always encouraged readers to take advantage of the enormous variety and horticultural potential of native plants. Readers with both imagination and opportunity may welcome the challenge of selecting rainforest plants - perhaps including some described elsewhere in this issue - and creating a low-maintenance garden for enjoyment and relaxation during future summers.

Elwyn Hegarty

Plantchem Pty Ltd / SGAP (Qld Region) Inc. Technical Officer

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Front cover: ***Eidothea hardeniana* (Nightcap Oak)**, Photograph P. Weston
- see page 339.

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Growing Rainforest Plants

Peter Radke

There are three secrets to creating a rainforest garden, and no, they are **not** water, water, water! In fact, water is no more a necessity for a rainforest garden than it is for any other type of garden.

The three secrets are:

1. Dig up the garden bed thoroughly to provide as much loose soil as possible;
2. Provide a thick layer of organic mulch;
3. Protect from dry winds.

Soil Preparation

Rainforest plants, as a general rule, have very timid root systems. Unlike acacias, eucalypts and grevilleas that have robust root systems capable of penetrating hard ground, rainforest plants have timid, shy root systems that tend to stop dead at the first sign of an obstacle. Consequently, rainforest plants planted in hard ground simply will not grow.

Rainforest plants grow best when you garden in the traditional fashion - pretend they're roses or a vegetable garden, and plant them in a bed of thoroughly loosened soil. The ideal depth is about a foot (30cm). On a small block of land, this means rolling up your sleeves and getting stuck into the ground with the pick, shovel and elbow grease to physically break up the soil. You haven't finished until your original hard lumpy ground is nice and soft and friable.

If you are planting a large garden, it's well worthwhile to use a machine - a bobcat or backhoe, or even a small bulldozer with rippers can prepare a large garden bed in a flash. It's not expensive - for less than one hundred dollars you can prepare a garden bed which would take many days to prepare by hand, and the resulting plant growth will be spectacular to say the least.

Except on sandy soils, a rotary hoe is not good enough, since it does not dig deep enough, and the rotary action can lead to compaction of the layer immediately beneath the blade. Don't use a rotary hoe, unless you've dug up the ground first.

Post-hole diggers are also not a good idea - they dig holes that are too deep and not nearly wide enough and, except in very light soils, they produce holes with hard sides which roots find very hard to penetrate. Post-hole plants often look lanky and horrible, and they blow over easily, because their roots can't spread out to get a good anchorage. Spend the same amount of money on hiring a bulldozer, backhoe or bobcat instead.

Mulch

Mulch is essential to grow rainforest plants well. The mulch should be organic, and applied as a thick insulating layer on top of the soil much like a blanket covering a bed.



Grevillea baileyana

See page 338

Above:

K. Townsend

Below:

B. Jahnke





Backhousia citriodora

See page 359

B. Walters



Xanthostemon chrysanthus

Golden Penda

See page 337

B. Jahnke

Thick organic mulch is essential for several reasons:

1. It keeps the soil moist by reducing evaporation;
2. It controls weed growth;
3. It keeps the soil cool;
4. It provides a source of recycled nutrients;
5. It keeps the soil healthy by maintaining a balanced population of micro-organisms.

Unlike many acacias, eucalypts and grevilleas, rainforest plants are very surface rooted. It is therefore essential to keep the surface of the soil cool and moist, otherwise the roots will bake and dry out.

As I said before, rainforest plants have timid roots; give them an obstacle and they give up very easily. If you allow weeds or grass to grow around the base of rainforest plants, they cannot compete - weeds and grass will severely inhibit the growth of rainforest plants. A thick application of mulch will keep weeds and grass at bay.

For rainforest plants, it is important that the mulch be organic, since the recycling of nutrients is very important for their growth.

The type of mulch you choose is not important, so long as it is organic. You can use anything, so long as it was a plant once. In north Queensland, bales of mulching hay are popular. In some areas, peanut shell may be available. Many shire councils sell mulched-up garden waste. Wood chip is fine. Newspaper and cardboard are OK, but it is best to shred them first - if you spread them out in sheets they act as a thatched roof and prevent water penetrating the soil beneath.

Make sure that the mulch you use is clean. If you apply mulch which has dirt mixed in with it, you will defeat your purpose, since weeds will establish in the dirt. And if the mulch contains weed seeds, you've lost the battle before it even starts.

Some types of mulch last longer than others. The short-lasting ones decay and enrich your soil, but will need to be topped up. The long lasting ones may look good for longer, but your soil stays poorer. In the end, it's a matter of what's available locally at a price you can afford.

Some mulches are quite dusty or contain a lot of fungal spores, so wear a mask while spreading them, and make sure the wind is blowing away from you. Once the mulch is spread and watered down, there is no more risk.

When applying the mulch you can either plant your plants first and then spread the mulch around them, or you can spread the mulch first and plant later. Both ways have their pros and cons. If you choose the former, be careful not to trample your plants or compact the soil as you walk around. If you choose the latter, be very careful to keep the mulch clean and free of dirt when you dig the holes to plant your plants.

Mulch should be applied as a clean blanket on top of the soil surface. It should never be dug into the soil - this is for compost, not mulch.

Things such as black plastic are no substitute for organic mulch. Black plastic does not allow the soil to breathe, and it does not allow the recycling of nutrients that is so important. In warm climates, it can cause the soil to overheat. Don't use black plastic. If you really think you need to, don't. Make your layer of organic mulch twice as thick instead.

Watering/humidity

Provided you have a thick layer of organic mulch, you will find that you don't need to water your rainforest garden any more than a normal garden, although it will love any extra water you can give it. Of course, your rainforest plants must be watered for the first few months until they are established, just like any plant, be it a wattle, grevillea, rose or camellia.

However, rainforest plants as a rule cannot tolerate dry winds. Unlike acacias and eucalypts etc., which have a thick waxy cuticle over their leaves (among other adaptations) to prevent excessive moisture loss in dry times, rainforest plants have little protection against evaporation since they have had no need for it in their natural habitat. It is more important to maintain a reasonable humidity level in the air than it is to apply water to the roots.

In drier areas, such as areas which experience an annual rainfall of only 700–900 mm, you will need to trap humidity around your plants, say, by planting a shelter belt of local natives, or by creating a courtyard.

Fertiliser

Rainforest plants love to be fertilised - fertiliser brings out the lovely foliage colours that make rainforest plants such a delight to grow. The rules for fertilising rainforest plants are the same as for ordinary natives - check the N:P:K ratio to make sure the phosphorus is low - less than 3% is best. Water in well, and don't overdo it. Like medicine, a little is good for you, an overdose can easily kill.

There are a number of myths and old wives tales regarding rainforest plants that need to be put to rest.

Myth: Rainforest plants need to be planted in the shade.

Wrong! Just because the rainforest is a shady place to walk in, does not mean that rainforest plants need shade. What it means is that rainforest plants cast shade. In fact, if you walk through the rainforest you will notice that the seedlings on the floor of the forest in the dense shade are not growing - they are sitting in a dormant state waiting for a gap to form in the canopy so that the sunlight can stream in. It is only when they receive full sunlight that they start growing.

If you plant your rainforest plants in the shade, they will grow slowly, and they will become thin and lanky as they struggle upwards to the light.

Rainforest plants can, and should, be planted in the full sun, where they will grow thick and bushy and flower young. In their natural habitat, most rainforest plants do not flower until their canopy is in the sun. By planting them in the full sun from the start, you will trick them into believing they are already at the top of the canopy.



Above: ***Syzygium australe***
 See page 338 B. Jahnke
 Right: ***Syzygium paniculatum***
 See page 338 B. Jahnke
 Inset: ***Syzygium paniculatum*** fruit
 D. Jenkinson



Left: ***Syzygium leuhmannii***
 See page 338 B. Jahnke
 Below: ***Syzygium leuhmannii***
 Street Tree
 See page 338 D. Jenkinson



Of course, what I have said above does not apply to the shade dwelling understorey shrubs of the rainforest - these naturally need the shade.

Myth: Rainforest plants are too large for ordinary gardens.

Wrong! Most rainforest plants grow in the garden to only about a quarter or a third of their height in the forest. By planting them in the full sun from the start, they have no need to grow taller and taller to reach the sunlight, since they think are at the top of the canopy already. I wonder how many of you have an Ivory Curl (*Buckinghamia celsissima*) or Golden Penda (*Xanthostemon chrysanthus* - see photo on page 333) in your gardens? Would you have planted them if you had known that they are rainforest trees from north Queensland, where they commonly grow 20–30 metres tall in the forest? In cultivation, however, they are rounded shrubs of only about 5–6 metres, and this is true of most rainforest plants, with the exception of plants such as the Kauri Pine and Bunya Pine.

Myth: Rainforest plants should be planted under a canopy of existing trees.

Wrong! Plants planted close to existing trees generally do poorly due to root competition and lack of sunlight. Take the plunge, and plant your rainforest trees in the sun from the start.

Myth: Rare plants are difficult to grow.

Wrong! Some rare plants are quite hard to grow, but many are surprisingly tough and hardy. Rarity is often more related to habitat isolation, than to any intrinsic feature of the plant itself.

Myth: Rainforest plants can only be grown in soil that matches the soil type in the wild.

Wrong! Rainforest plants can be grown in almost any type of soil. Mulch and loose soil are the main requirement; fertilise if necessary.

Myth: Rainforest species from the tropics will not grow in southern Australia.

Wrong! While the climate of north Queensland is hot, inside the rainforest it is really quite temperate compared with outside. Therefore, many rainforest species actually find the more temperate climate of southern Australia very much to their liking. Provided your air is relatively humid, you can grow a surprisingly wide range of tropical rainforest species.

Planning your rainforest garden

If you try to create a rainforest garden using only rare or 'collector's' plants, the chances are that it will look awful. A rainforest garden needs a basic structure against which to display the rare and unusual.

To create an attractive rainforest garden that is pleasing to the eye, you need to use a fair proportion of hardy, bushy species that will give the garden its basic structure, bulk and backbone. There are many species that fit this bill, but some are the hardier, tougher *Syzygiums* and *Acmenas*, and plants like *Flacourtia*, *Scolopia* and *Xanthostemon*.

Some specific suggestions to start with are: *Acmena hemilampra*, *Acmena smithii*, *Syzygium australe*, *Syzygium fibrosum*, *S. paniculatum*, *S. tierneyanum*, *S. luehmannii*, *S. sayeri*, *Buckinghamia celsissima*, *Xanthostemon chrysanthus* and *Grevillea baileyana*. Photos on pages 332, 333 and 336.

Pay special attention to the plants that you place on the edge - these are the ones that hit you in the eye every time you look at your garden. On the edge, you should place the plants that have an attractive shape, attractive foliage or spectacular flowers, and the plants that could be smothered if placed in the middle of the garden. Good edge plants are the native Gardenias and Graptophyllums, *Flacourtia* sp. *Cleistanthus apodus* and *C. hylandii*, *Phyllanthus cuscuthiflorus*, Pittosporums, *Acmena smithii*, *Syzygium australe*, *S. luehmannii*, *Xanthostemon chrysanthus* & *Buckinghamia celsissima*.

Leggy plants are best in the middle.

Having taken this approach, then you can start placing the more unusual plants that have specific requirements in and amongst this basic backbone.

Rainforest plants have enormous potential in general horticulture in Australia. In the main they are very long-lived and attractive plants, and it is up to SGAP (APS and other variants depending on which State you live in - see the inside back cover) to show how they can and should be used correctly.

Further Reading in Australian Plants

Grevillea baileyana was used as outer foliage in the Sydney 2000 Olympic bouquet and the Paralympic bouquet. An article on *Grevillea baileyana* was included in issue 164 (Vol. 20: page 346).

Xanthostemon chrysanthus was discussed in detail, along with other *Xanthostemon* species in issue 129 (Vol. 16: pages 215–232).

The late Trevor Batty wrote about *Buckinghamia celsissima* (with some amazing photos) in issue 18 (Vol 16: pages 172–3).

Lillipillies were covered in issue 110 Vol 14.

About the Author

Peter Radke is a passionate native plant enthusiast. He has been a member of SGAP Queensland for 25 years, and during that time has travelled extensively throughout Australia (and particularly Queensland) observing native plants in the wild and collecting seeds and cuttings for growing in his garden, first in Brisbane and later in the tropics.

Peter started his working life as a maths teacher, but his hobby caught up with him 17 years ago when he and his wife Ann established Yuruga Nursery on the Atherton Tablelands to grow north Queensland native plants as a livelihood.

Peter has served on the State Council of SGAP as Excursions Officer and Loan Member Liaison Officer, and has held various positions in his local Tablelands Branch in North Queensland. He has written numerous articles and books on Australian plants.

Yuruga Nursery has now grown into a large business employing about 60 staff and growing not only natives for gardens, but also tea tree and timber species by the millions for agricultural projects. Nevertheless, the passion and enthusiasm for native plants continues and Peter loves nothing more than talking to people and encouraging them to plant native plants.

Eidothea hardeniana

Botany and Ecology of the 'Nightcap Oak'

Peter H. Weston¹ and Robert M. Kooyman²

A new species of *Eidothea*, a genus of rainforest trees that was only named in 1995, was discovered in the Nightcap Range, near Lismore in north eastern New South Wales in September 2000. *Eidothea* belongs to the plant family Proteaceae, which also includes more familiar members such as the waratahs, grevilleas, banksias, macadamias and proteas.

History of the Discovery

Lack of due recognition has long been a problem for *Eidothea*. The prickly juvenile leaves of the Nightcap species were first found in the 1950's and sent to the Queensland Herbarium in Brisbane, where they were incorrectly identified as belonging to the Corynocarpaceae, a plant family only distantly related to the Proteaceae. Over forty years later, one of us (RMK), then a forest ecologist with State Forests of New South Wales, also noticed the unusual juvenile leaves sprouting from the base of a large tree trunk but found them impossible to identify. After leaving State Forests, he was contracted by the National Parks and Wildlife Service to conduct surveys of rare or threatened plant species in Nightcap National Park, bringing him back to his mystery trees. The next time he encountered one, he noticed a patch of exposed dead wood on the trunk, which revealed the distinctive wood grain of the Proteaceae.

Kooyman collected foliage, wood and rat-gnawed fruits and sent them to the Royal Botanic Gardens Sydney for identification. The other member of our dynamic duo, Principal Research Scientist Dr Peter Weston, who specialises in the classification of the Proteaceae, was then able to confirm that the new species was an *Eidothea*.

We collaborated in writing a scientific paper describing and naming the new species (Weston & Kooyman 2002). The name *hardeniana* honours our friend and colleague Gwen J. Harden, whose career has been devoted to improving our knowledge of the flora of New South Wales (she edited the series of that name), particularly of the State's rainforest plants.

What does *Eidothea hardeniana* look like?

Photos of *Eidothea hardeniana* are shown on pages 329, 345 and 376. Here is a morphological description of *Eidothea hardeniana*:

Andromonoecious trees 15–40 m high, with one main trunk to 70 cm diameter at breast height, but often with up to 40 smaller subsidiary shoots branching from the base. Hairs simple. Leaves narrowly elliptical to oblanceolate or lanceolate, mostly 8–15 cm long, 1.7–5 cm wide, crowded in false whorls of 3–7 (occasionally with as few as 2 or as many as 17). Juvenile leaves (plants 1–1.5 m high) with spiny-toothed margins with 9–20 teeth, each bearing a spine 1–4 mm long. Adult leaves with entire margins.

¹ Royal Botanic Gardens Sydney, Mrs Macquaries Road, Sydney 2000

² Earth Process Ecological Services, 220 Dingo Lane, Myocum, 2482

Leaf venation more prominent on the upper leaf surface than the lower when dried. Inflorescences lateral, in leaf axils or on bare twigs, a shortly stalked, 7–11-flowered head, with one or two central flowers, one of which may be bisexual, surrounded by a false whorl of male flowers. Flowers $\pm$ radially symmetrical, creamy white, lacking nectaries. Male flowers with perianth 8.0–9.6 mm long, glabrous externally; basal tubular part of perianth 2.2–3.3 mm long; staminal filaments free or almost so, thread-like, not supporting the anthers, 3.7–6.5 mm long; anthers narrow-oblong, without terminal appendages, 4.0–5.0 mm long. Bisexual flowers slightly larger than the male flowers; ovary densely covered in ascending hairs; style terete, the tip not modified as a pollen presenter; stigma bilobed. Fruits drupaceous (having a structure like a plum), broad-ovoid to broad-ellipsoidal, 3.5–4.0 cm long, 3.0–3.7 cm diameter, green maturing to dull golden yellow; pyrene (stone) broad-ovoid to broad-ellipsoidal, with a rounded base and sharply pointed tip, with several longitudinal ribs on the inside of the endocarp (woody part surrounding the seed).

This description contains some botanical gobbledegook, which we try to explain below.

Hairs simple. This just means that the hairs are not branched, unlike, for example, *Grevillea*, in which many of the hairs have two arms.

Narrowly elliptical to oblanceolate or lanceolate. Widest at or slightly above the middle.

With entire margins. The margins lack spines or teeth.

Inflorescences. These are the flower clusters.

Flower structure. Most proteaceous flowers have four main parts: a **perianth** of four petal-like tepals, one to four **nectaries**, four **stamens** (the male organs that produce pollen in their **anthers**) and one pistil (the female part of the flower). The pistil is usually differentiated into a basal **ovary**, and a narrower, longer **style**, which bears the **stigma** at its tip. Pollination involves the transfer of pollen grains from anthers to the stigma, on which they germinate, pushing pollen tubes through the inside of the style to the ovary, which then develops into a **fruit**. In many Proteaceae, the tip of the style just below the stigma is swollen and functions as a pollen presenter. In these plants, the anthers open while the flower is still a bud, shedding their pollen onto the pollen presenter, which 'presents' the pollen to the pollinator. *Eidothea hardeniana* is very unusual in the Proteaceae in sometimes having bisexual flowers with five tepals.

Andromonoecious. Most members of the Proteaceae (indeed most flowering plants) have only bisexual flowers – flowers with both male and female organs (stamens and pistils respectively). *Eidothea* differs from these and resembles a few other taxa in the Proteaceae (e.g. *Placospermum*, *Sphalmium*, *Stirlingia*) in bearing two different kinds of flowers: male flowers (having stamens, but lacking pistils) and bisexual flowers, a condition called 'andromonoecy'.

Fruits drupaceous. This means that the fruits has a structure like a plum, with a seed surrounded by a woody layer (the endocarp), which together constitute the stone (pyrene in botanical jargon), surrounded in turn by a thick, fleshy layer (the mesocarp) and an outer skin (the epicarp).

Ecology of *Eidothea hardeniana*

E. hardeniana is a rainforest tree, occurring in upland cool and riparian simple notophyll vine forest (to notophyll vine forest) on soils derived from acid volcanic rocks (rhyolite lithology). Dominant tree species include *Ceratopetalum apetalum* (Coachwood), *Endiandra introrsa* (Dorrigo Plum), *Canarium australasicum*, *Schizomeria ovata* (Crabapple), *Austrobuxus swainii* (Pink Cherry), *Cinnamomum oliveri* (Oliver's Sassafras), sometimes with occasional emergents including *Lophostemon confertus* (Brush Box), *Callitris macleayana* (Stringybark Pine) or *Tristaniopsis collina* (Mountain Water Gum).

E. hardeniana flowers from mid October to mid November. The pollinators are not known, but preliminary study (P. Bernhardt, R.M. Kooyman and P.H. Weston, unpublished data) suggests they may include hover flies and beetles. The fruits take over one year to develop, reaching full size in about mid December, then changing colour from green to dull yellow over the following two to three months, falling from mid February to early March. The fruits are gathered by rats, which accumulate them in hidden piles, and which gnaw through the fruit wall to eat the seed.

E. hardeniana is listed as an endangered species on Schedule 1 of the *Threatened Species Conservation Act, 1995* and is known to occur in Nightcap National Park and in the adjacent Whian Whian State Forest.

Botanical Significance

E. zoexylocarya, the only other species of *Eidothea*, is known only from Mt Bartle Frere, near Cairns in North Queensland. The discovery of another species in NSW was exciting for a number of reasons.

The Proteaceae is a very old family of flowering plants that probably originated while the ancient supercontinent Gondwana was still in one piece. Gondwana consisted of what are now the continents of Australia, Africa, South America and Antarctica, as well as smaller bits and pieces such as New Zealand, New Caledonia and Madagascar. Gondwana began splitting up over 120 million years ago and the fragments carried a diverse array of plants and animals with them, including a variety of lineages of the Proteaceae. *Eidothea* is the only relic of one of those early lineages that has barely survived in the rainforests of eastern Australia. Other lineages went on to diversify spectacularly, resulting in hundreds of descendant species.

Why did *Eidothea* not flourish like those others? One possible explanation is that it was incapable of adapting to changing environments. We know that its appearance has not changed much for a long time because fossil fruits that look just like those of living *Eidothea* are known from rocks that are 15–20 million years old. These fossils were discovered in the 19th century in the Victorian goldfields by the State Government Botanist of the day, Baron Ferdinand von Mueller. The fruits are so unlike those of other Proteaceae that Mueller misidentified the fossils as belonging to something in the olive family. It was not until the fossils were matched with fruits from living *Eidothea* trees that their true identity was revealed.

That *Eidothea* has been found at localities as far apart as Cairns, Lismore and Ballarat, also underlines the fact that Australia's rainforests are tiny remnants of ancient rainforests that covered vast areas of Australia until only

a few million years ago. This makes them a particularly precious part of our natural heritage. Similar distributions are found in a whole range of other plants and animals that are now restricted to small rainforest pockets along Australia's eastern margin from Tasmania to North Queensland.

Perhaps the most important implication of the discovery of *E. hardeniana* is that New South Wales is still a fantastically exciting place to do botanical research. It is a large rainforest tree, growing to over 40 metres in height. It lives in a well-botanised area – some of Australia's most experienced rainforest ecologists have scoured the Nightcap Range over the last 50 years. It grows in a relatively accessible place - you can drive a family sedan to within 100 metres of a couple of the trees. It is a highly significant evolutionary relict. Isn't it amazing that such a plant could evade detection until now? If the Nightcap Oak could hide so effectively, how many smaller, or less distinctive, but nonetheless important plant species are still lurking in our wild places, awaiting discovery?

Is *Eidothea hardeniana* as significant a discovery as the Wollemi Pine?

This is a frequently asked question, the short answer to which is "no".

The main reason for saying this is that another species of *Eidothea* was already known from North Queensland when *E. hardeniana* was discovered. The botanical significance of the two genera is comparable but only one living species of *Wollemia* is known. Below are some useful points with which to compare the two genera.

Number of species:

Wollemia: 1

Eidothea: 2

Distribution of living species:

Wollemia: Wollemi National Park, central tablelands, NSW

Eidothea: Mt Bartle Frere and Mt Pieter Botte, NE Queensland
(*E. zoexylocarya*), Nightcap Range, NE NSW (*E. hardeniana*)

Closest relatives:

Wollemia: *Agathis* (kauri pines), *Araucaria* (Norfolk Pine, Hoop Pine, Bunya Pine, Monkey Puzzle, etc.) (see Gilmore & Hill 1997)

Eidothea: 24 genera in Proteaceae subfamily Proteoideae, including *Protea*, *Leucadendron*, *Leucospermum*, and most other South African Proteaceae, *Isopogon* (Australian 'drumsticks'), *Adenanthos* (Australian jugflowers), *Petrophile* (Australian 'conesticks'), *Conospermum* (Australian smoke-bushes) (see Hoot & Douglas 1998)

Estimated age of lineage (based on a combination of fossil evidence, the known evolutionary relationships of the two genera, biogeography and known timing of continental drift):

Wollemia: 90–200 million years

Eidothea: 90–130 million years

Continued on page 344

Propagation of the Nightcap Oak (*Eidothea hardeniana*)

Cathy Offord and Anthony Azzopardi

Mount Annan Botanic Gardens

The problem that usually faces us when new species are discovered is that there is often very little propagation material to work with. By definition, rare species are usually few in number and often somewhat inconspicuous, especially those that have eluded the sights of botanists for as long as the Nightcap oak (*Eidothea hardeniana*). Fortunately, this species has presented fewer problems than we expected, mainly because we were able to draw on experiences with other rainforest Proteaceae. *Eidothea zoexylocarya*, from Mount Bartle Frere in North Queensland, had been propagated from seed at Royal Botanic Gardens Melbourne, and they were happy to share their knowledge with us.

The fruits of *Eidothea* are drupes, basically round to ovoid in shape with a diameter of about 3 cm. The exocarp can be fairly easily removed, revealing a thick endocarp that is reminiscent of a *Macadamia* 'nut' viz. hard and impenetrable. To germinate *E. hardeniana*, the endocarp was filed down 2–3 mm on the widest sections until the seed was exposed. The seeds were then placed to half their depth in a tray containing seed raising mix comprising perlite and sand (1:1 v/v) and incubated in an air-conditioned glasshouse with daily watering. Although slow to germinate, after about six months, 40% of the seeds had germinated. These were all taken from the one tree; no seeds germinated from another tree or seeds picked up from the forest floor. We suspect that the seeds that did not germinate were not viable and this may indicate that certain trees may be contributing more to the seedling bank than others. Alternatively, or additionally, some large-seeded Australian rainforest species have short-lived seeds, and the Nightcap oak may be one of them. The presence of seedlings in the wild population is evidence that germination and establishment happening naturally, although at what rate we cannot determine currently.

As with most species of Proteaceae, *E. hardeniana* can be propagated by cuttings. Cuttings taken from adult trees in the wild either died or were slow to root and establish. Cuttings from juvenile plants e.g. the seedlings now in Mount Annan Nursery would be expected to perform better, and when they are of sufficient size we will try them.

The seedlings have grown 0.5–1.0 m in height in approximately one year (Table 1). This growth has been in potted plants grown in coir and sand mix (1:3) with added nutrients (Nutricote Total – low P, micronutrients and iron). Coppicing has occurred in about 50% of the plants at around six months of age. The secondary shoots arise from the level of the cotyledon or several cm above. Further up the stem, branches are produced that resemble the primary shoot. The coppicing habit seems to be characteristic of this species

and other emergent rainforest species such as *Eucryphia moorei* and *Wollemia nobilis*, although the Nightcap oak appears to have only one dominant trunk in the wild. See photos on page 345 and rear cover.

It will be possible over the next few years to make a representative *ex situ* collection of this species for display, study and conservation purposes. Another challenge will be to further investigate the seed biology, especially as it relates to long-term storage in the NSW Seedbank (located at Mount Annan Botanic Garden).

Acknowledgments

Robert Kooyman, Peter Weston and Richard Johnstone for collection of seed; Lotte von Richter and Joanne Tyler for technical support.

Table 1

Growth characteristics of 15 month old seedlings of *Eidothea hardeniana* growing in pots at Mount Annan Botanic Garden

Seedling	Height of main stem from base (mm)	Length of coppice stem 2 (mm)	Diameter of largest stem above cotyledon (mm)
a	1202	-	17
b	580	353	7
c	751	502	7
d	551	-	7

Eidothea hardeniana

Botany and Ecology of the 'Nightcap Oak' continued from page 342

Oldest known fossil:

Wollemia: 90 million years (fossil pollen of dubious identity)

Eidothea: 15–20 million years (fossils of the very distinctive fruits from Western Victoria)

Number of known adult individuals in the wild:

Wollemia nobilis: 41

Eidothea hardeniana: 93

Eidothea zoexylocarya: unknown, but probably hundreds, possibly thousands

References

- Gilmore, S., and Hill, K.D. (1997) Relationships of the Wollemi Pine (*Wollemia nobilis*) and a molecular phylogeny of the Araucariaceae. *Telopea* 7: 177–302.
- Hoot, S.B., and Douglas, A.W. (1998) Phylogeny of the Proteaceae based on *atpB* and *atpB-rbcL* intergenic spacer region sequences. *Australian Systematic Botany* 11: 301–320.
- Weston, P.H. & Kooyman, R.M. (2002) Systematics of *Eidothea* (Proteaceae), with the description of a new species, *E. hardeniana*, from the Nightcap Range, north-eastern New South Wales. *Telopea* 9: 821–832.



All photos on this page:

Eidothea hardeniana

Nightcap Oak

See page 339 & 343 P. Weston



Book Review:

Mangroves to Mountains

A Field Guide to the Native Plants of the Logan-Albert Rivers Catchments

..... Elwyn Hegarty

Authors: Fran Bright, Denis Cox, Jan Glazebrook, Glenn Leiper, Kerry Rathie and Ian and Carolyn Waldron. Containing 384 pages it is published under the auspices of Logan River Branch of S.G.A.P. (Qld Region) Inc. by Copyright Publishing, Brisbane.

Both novices and experts will welcome this book as an authoritative, easy-to-use guide to field identification of subtropical native plants. Although the authors have confined their attention to native plants of two river catchments bordering the Gold Coast and its hinterland, most of the species mentioned are also present in other coastal and sub-coastal areas on both sides of the State border.

The book has five separate sections: Tidal wetlands, Freshwater wetlands, Eucalypt forest, Rainforest and Mountain Tops, each with an introduction to its own distinctive features, local history, notable plant species and fauna. The excellent colour photos are mostly by Glenn Leiper, and Carolyn Waldron provided additional line drawings of flowers or fruits and foliage. Key features of each species are also briefly described. Approximately 900 species are shown on pages with colour-keyed edges. This allows plants having flowers or fruits of similar colour to be readily compared with others likely to be growing nearby.

While the book concentrates on identification of the flowering trees, shrubs and herbs which are likely to be of most interest to visitors and local gardeners, it also includes some of the more common grasses, sedges, ferns, mosses and rainforest plants, including orchids. There are also vegetation maps of the area, a list of ninety local protected (rare and endangered) species, a glossary, bibliography, and index, which lists both scientific and common names of the plants. The standard of production, layout, illustrations and text is impressively high, and great care has been taken to verify plant names and descriptions. Staff of the Queensland Herbarium assisted with editing for botanical accuracy, and provided the maps of the region.

Production of the book was supported by both the Logan and Gold Coast City Councils, Beaudesert Shire Council 'Land for Wildlife' and S.G.A.P. - Queensland Region Inc. It is available from the publishers (ph. 07 3229 6366) or Graham Forster, Sales Officer, S.G.A.P. - Queensland Region Inc. (ph/fax: 07 3265 1414, e-mail derforster@iprimus.com.au). Price (including postage): approximately \$50.

Brachychiton bidwillii

An Under-exploited species

Kerry Rathie

ASGAP Brachychiton Study Group leader

The Little Kurrajong (*Brachychiton bidwillii*) is a highly variable and underrated species. The best forms are among the most beautiful of native shrubs and are prized for their flowers. Unfortunately, the plants most often grown in gardens are the southern Queensland forms, with relatively small flowers and a short flowering period. These plants usually have deeply lobed leaves, while the 'Maroochydore' form has very hairy 5-lobed leaves, which are purple-brown when young. This form has pink flowers of a different shape from all others, with a long tube.

All forms are frost-resistant to at least -6 °C, and, like all members of the genus, are drought-tolerant from a very early age (little over a month), as they form tuberous roots at the same time as their first true leaves.

B. bidwillii's distribution runs from Boonah, close to the Queensland border with NSW, to Bowen in northern Queensland. The largest flowers in the species are found in some plants from the northern inland or Leichhardt Form (LF). Two popular clones are fairly widely propagated by grafting in southeast Queensland. They are known as 'Large Pink', or 'Beau Bells', and 'Large Red' respectively. The former is a deep pink, and the latter a clear bright red which fades to pink after a day or two. Both have leaves, which are lobed only slightly, if at all.

On the coast near Bowen is the utterly different 'Northern Coastal' form, with deeply 5-lobed leaves, and smallish (see table) bright red unfading flowers. It has a short but spectacular spring flowering period of 4–6 weeks. I have mostly used the clone 'Clayton' in any cross-breeding with this form.

The Leichhardt forms flower for 3 months starting in mid-spring, in cold years. In years with no frosts they can flower from July to February, this is a long time to be leafless, as they only have leaves as well as flowers for the last week or so of the flowering period. An aberrant clone flowers with full leaf cover all year, but never heavily, and is pale pink. All other types of *B. bidwillii* drop their leaves before flowering, and all flower every spring (or early summer).

As they age, flower production increases, and after 8 years or so they (particularly the Leichhardt forms) get bunches of up to 50 flowers coming directly from the trunk, as well as the usual flowers on twigs and branches. All Brachychitons seem not to worry what soil type they are in, provided it is well drained. All flower best in full sun, despite being 'dry rainforest' plants.

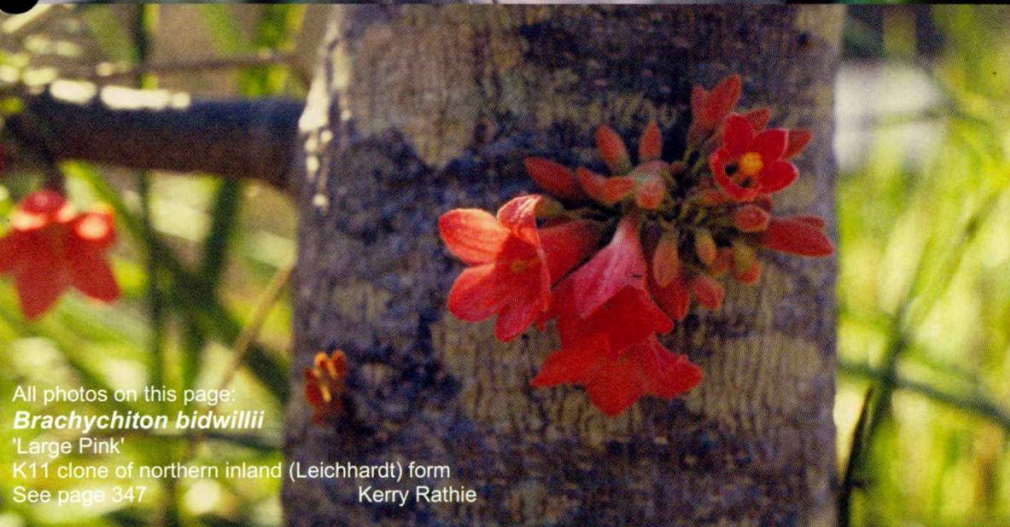
Some plants only have one stem, and are then technically small trees, but still stay at the usual size of 4–5 metres, with a spread of 4 m or so. Many are little over two metres tall. All are easy to graft onto flame tree, or on to many other Brachychitons. All respond well to pruning.



Brachychiton bidwillii
Northern coastal (Bowen) form
See page 347 Kerry Rathie



Brachychiton bidwillii* x *discolor
See page 350 Kerry Rathie



All photos on this page:
Brachychiton bidwillii
'Large Pink'
K11 clone of northern inland (Leichhardt) form
See page 347
Kerry Rathie



Hybrids with many other *Brachychiton* species have been made in recent years, to exploit the small stature and frost-hardiness of *B. bidwillii*. Several nice clones of *B. x excellens* have begun to flower. This is the hybrid with *B. discolor*, and will be a bigger tree than any *B. bidwillii*, but I don't know the final size. Flowers are mid to dark pinks, or red, and are *discolor* size (6 cm). Under dry conditions, these flowered after 6 years. Straight *Brachychiton bidwillii* usually takes 3 years to flower from seed.

Plants of *B. spectabilis* derived from material I brought back from Jasper Gorge about 6 years ago have been crossed with various forms of *B. bidwillii*. The first to flower was Merv Hodge's cross with 'Large Pink'. It only had a few flowers, and was quite a bit smaller than *B. spectabilis*, which has the largest flowers in the genus. But it is only a baby, and *B. spectabilis* itself had a very short flowering period when young, which in older plants seems similar to the better forms of *B. bidwillii*. *B. spectabilis* flowers are orangey-pink, while this hybrid had red flowers, unlike both parental clones. So the genetics of flower colour are not dead simple. Most, perhaps all, forms of *B. bidwillii* have some clones with a greenish colour inside the corolla (tube), some with white, and some with pink. Petals usually have pointed ends, but 'Large Pink' and 'Large Red' have a rounded end to their petals. Flowers are male or female, but almost all *Brachychitons* have most flowers at a given time that are all of the one sex. Some plants produce only one sex for a season, while other plants of the same clone will have flowers of the opposite sex.

Hybrids yet to flower include 'Clayton' x 'Maroochydore' (aiming at a stunning foliage plant), LF x *B. chillagoensis* (smallish tree, orangey flowers), LF x *excellens*, *excellens* x 'Clarabelle', LF x 'Clarabelle', 'Clayton' x 'Clarabelle', and LF x *acerifolius*. 'Clarabelle' is a good dark purply-pink clone of *B. x vinicolor*, which is *acerifolius* x *discolor*.

Species or clone	Average Flower Sizes	
	Width (cm)	Length of corolla (cm)
<i>B. bidwillii</i> average of species	2–3	2.5–4.5
<i>B. bidwillii</i> 'Maroochydore'	1.25	4
<i>B. bidwillii</i> 'Large Pink' & <i>B. bidwillii</i> 'Large Red'	3.5–4	3
<i>B. bidwillii</i> 'Northern Coastal'	1.5	1.5
<i>B. discolor</i>	5-6	3.5–5.5
<i>B. x 'excellens'</i>	5.8	4
<i>B. spectabilis</i>	4.5–6	4–5.5

There are a large number of spectacular species, hybrids and cultivars in the genus *Brachychiton*, many of which are rare and difficult to find.

Why not join the ASGAP *Brachychiton* Study Group and find out more?

Annual membership is \$5 – cheques payable to *Brachychiton* Study Group, 5 Salston Rd, Greenbank, Queensland 4124. Email: krathie@powerup.com.au

Some Southern Rainforest Plants

_____ Dr Geoffrey Long, Christine Hallahan & Joe Stephens (transcribed by Cas Liber)

Rainforests occur intermittently down the East coast into East Gippsland in Victoria and Tasmania. I asked some Society members of district groups in Australia's south-eastern corner for their ideas or experiences with local rainforest plants which appealed to them.

Dr Geoff Long and Christine Hallahan are long-time members of the Nowra District Group on the New South Wales south coast. Each lives on acreage, which contained rainforest plus cleared land, with the latter slowly and naturally reverting to rainforest with local plants.

Joe Stephens of Eagle Point is a member of the Bairnsdale District Group in East Gippsland (home of the Mitchell River National Park), who have been helping the Friends of Nyerimilang restore rainforest and establish the East Gippsland indigenous species garden at Nyerimilang Park near Lakes Entrance.

Why not try some rainforest plants local to your area? Check with your local Society group or Bushcare. Many of the species listed below are found over a large area of the eastern seaboard, even Tasmania, so may be found near you!

Dr Geoff Long reports:

The Red-fruited Olive Plum (*Cassine australis* syn. *Elaeodendron australe*, photo on page 352) is an attractive shrub or small tree which reaches 3 or 4 metres. Its most striking feature being fruits of a magnificent red colour, like a Post box, appearing in autumn. It has broad elliptic leaves to 10 cm with variable margins (entire or serrated) and occurs in littoral and warm temperate rainforest from Batemans Bay to Queensland. However, propagating remains difficult, as seeds may take several months to germinate, and plants have sometimes been difficult to establish.

Wilkiea huegeliana is a shrub of coastal southern NSW, which can reach 5 metres - it has attractive parchment-like leaves to 15 cm long.

The Bolwarra (*Eupomatia laurina*) is a spindly shrub or small tree with lovely shiny lanceolate leaves to 12cm. The unusual white flowers, which are fertilized by a beetle, have a lovely smell and have been described, with photo and recipe for jam in Vol. 18: pp 72-75.

Eucryphia moorei (photo on page 353) has magnificent white flowers in February and March, though can be difficult to establish.

The Black Plum (*Diospyros australis*) can grow to 15 metres high but has remained a 3 or 4 metre shrub here. It has a wonderful yellow underside to its leaves. (Notes on *Diospyros* appeared in Vol. 16: p 270.)

The Yellow Ash (*Emmenosperma alphitonioides*) is a wonderful specimen tree. In my yard on clay it reached 12-15 metres and flowered profusely from October, followed by attractive fruit until March.



Cassine australis

Syn. *Elaeodendron australe*

See page 351

M. Hancock



Synoum glandulosum

See page 354

M. Hancock



Clerodendrum tomentosum

See page 354

M. Hancock



Glochidion ferdinandi

See page 354
Hancock



Eucryphia moorei

See page 351
M. Hancock



Coprosma quadrifida

See page 355
M. Hancock

A curious plant in the Berry and Gerringong district is *Livistona australis*, tall old remnant specimens, which can still be seen in paddocks on farms (these plants were left when the land was cleared for agriculture).

Other plants include *Brachychiton acerifolius*, *Clerodendrum tomentosum* (photo page 352), *Omalanthus nutans*, *Rapanea variabilis*, *R. howittiana*, Bird-lime tree (*Pisonia umbellifera*) and the quick growing *Polyscias murrayi*.

Christine Hallahan reports:

Except for some clearing of lantana, about 2 1/2 acres of bush on my block at Berry has done its own thing for at least 26 years. The tall open forest of *Eucalyptus saligna/botryoides*, and *E. pilularis* with some rainforest plants now has a closed under-canopy of rainforest species, with vines and patches of ferns. A neighbour's forest adjoins mine on the longest boundary increasing the area to maybe 5 acres.

Lilly Pilly, *Acmena smithii*, is the dominant species, some being very large trees. The bright green foliage is always attractive and when covered in tiny cream flowers, then full fruit, is quite a picture. I have used it when on the church flower roster!

Cryptocarya microneura (about 12 metres) has dark green leaves with a prominent yellow mid-vein and black globular fruit. Both of these trees grow thick and bushy on the exposed western edge of the forest. This shade helps to slow down lantana and keep weeds out of the bush.

Cheese Tree, *Glochidion ferdinandi* (photo on page 353), grows quickly into a shapely bushy tree with shiny leaves in two rows along the stem. It doesn't mind full sun. The seed capsules look more like tiny pumpkins and with the occasional red leaf it would be an attractive garden specimen, but watch out for unwanted seedlings!

Another shrub or small tree with great garden value is Scentless Rosewood, *Synoum glandulosum* (photo on page 352). It has dark green pinnate leaves almost to the ground, and small sweetly scented white to pink flowers. The interesting fruit is quite conspicuous, being 2–3 cm across, 3-lobed and a reddish-apricot colour when ripe. It is also useful for floral art.

Native Peach, *Trema aspera*, is a good pioneer and edge species, growing quickly into an attractive small spreading tree. Many birds including the Brown Dove and Olive-backed Oriole feed on the tiny black berries.

Orange Thorn, *Citriobatus pauciflorus*, is a stiff thorny shrub bearing small orange berries. It has formed thickets even in dense shade, and may be an alternative to lantana for the birds.

These are just a few of the 80 plant species I have identified so far on my 5 acres. I have also listed nearly 80 birds. And what a thrill to walk through the bush and find a new plant - Greenhood orchids last year, Parsley Fern - *Botrychium australe*, a rare plant (so I'm told), an echidna snuffling for ants, the Yellow Robin's nest, and of course, a black snake.

Three good local books, on the area are as follows:

1. Fuller, L. (1982), *Wollongong's Native Trees*
2. Fuller, L. & Mills, K. (1988), *Native Trees of Central Illawarra*
3. Mills, K. & Jakeman, J. (1995), *Rainforests of the Illawarra District*

Joe Stephens' notes:

Commonly cultivated plants that occur locally in Victorian rainforest areas include *Pittosporum undulatum* (which can become weedy), *Acmena smithii* lillipillies and *Tristaniaopsis laurina*, which can grow to a 30 m tree in rainforests but usually remains a 4–5 m plant in cultivation. The Kurrajong (*Brachychiton populneus*) also occurs locally as a dry rainforest plant, and is very slow growing initially and drought deciduous in East Gippsland. It flowers during November and December.

The Yellow Wood (*Acronychia oblongifolia*), which may grow to 30 m in the wild but only 15 m in a garden, has attractive shiny leaves and a lemon smell on misty days. The edible fruit may be made into jam.

Gum vine (*Aphanopetalum resinosum*) is a climber, which grows in East Gippsland at the southern most limit of its range, in shade or sun, though it is sun-seeking. It has shiny leaves and attractive red new growth, with masses of small creamish flowers in September. It occurs naturally on the Howe Range.

Pinkwood (*Eucryphia moorei*) is an attractive but slow growing plant and requires some shelter to grow well. It is only found on the Howe Range in far eastern Victoria. Marginal plants are valuable in initiating a rainforest garden as they help convert an area to a more sheltered environment which some plants, such as the Pinkwood, require. The Prickly currant bush (*Coprosma quadrifida*, photo page 353), a shrub to 4 metres, has small red translucent edible fruit. Viscid Daisy-bush (*Olearia viscosa*) is a locally occurring daisy bush to 3 metres, with large green leaves and masses of white flowers in November. *Beyeria viscosa* (also known locally as Pinkwood!) is a shrub to 4 metres with insignificant flowers followed by small, segmented, green and unusual looking fruit. Finally, *Rapanea howittiana* (Muttonwood) is a good pioneer plant for revegetation - it is food for the migratory Topknot Pigeon (*Lopholaimus antarcticus*) and Green-winged pigeon (*Chalcophaps indica*) (both rainforest birds) and the White Headed Pigeon (*Columba norfolciensis*).

Good local books for our area include:

1. Floyd, A.G. (1989), *Rainforest Trees of Mainland South-Eastern Australia*
2. Costermans, L. (1992), *Native Trees and Shrubs of South-Eastern Australia*
3. Peel, B., *Rainforests & Cool Temperate Mixed Forests of Victoria*
4. Gell, P. & Mercer, D. (1992), *Victoria's Rainforests: Perspectives on Definition, Classification and Management* (Monash Publications in Geography No. 41)

National Parks to visit and see Rainforest in East Gippsland

- Croajingolong National Park (Warm Temperate)
- Errinundra National Park (Cool Temperate & Mixed)
- Mitchell River National Park (Dry & Gallery)

Visitor information & Park notes - Phone Parks Victoria on 131 963



Above and above right:
Melia azedarach
See page 361

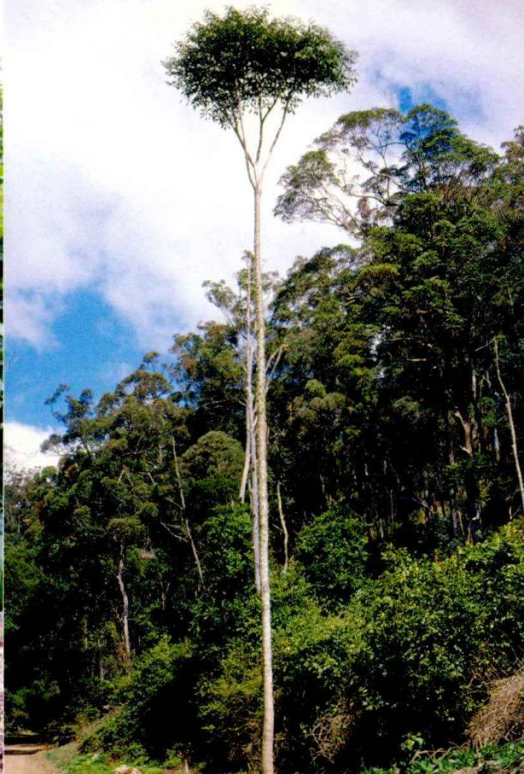
Right and inset:
Citrus australis
See page 359

Below:
Grevillea robusta
See page 359



All photos Barry Jahnke





Above and above right:

Polyscias elegans

Right:

Melicope micrococca

Below:

Pipturus argenteus

See page 359 & 361 B. Jahnke



Our Garden No 38

A Low Water Rainforest Garden in Brisbane

Reflections after Five Years _____ Colleen Keena and David Somerville

Introduction

The installation of water meters has heightened awareness of the cost of water, particularly as much of the water treated to the standard required for domestic consumption ends up on gardens. This has impacted upon gardening and publications are available which describe ways to design water-efficient gardens (1). This article describes the learning required to convert a weed-infested site into a 'rainforest' consisting of locally occurring species, edible when possible, and requiring virtually no water other than rainfall. It also notes that there has been regeneration of local area species on the site.

Background Learning

John Hunt (2) described the advantages of mounding and channelling: 'artificial watering is not required except in times of extreme drought; soil temperature remains cooler due to increased moisture level; plants will flourish and last longer than plants grown with more artificial watering'. This was the first concept to be incorporated. Experience suggested that, although necessary, something further was required. Recent publications include a discussion of the advantages of deep-ripping (3, 4, 5, 6). Some sites, e.g. steep creek banks, are unsuitable but where deep-ripping is possible, plants benefit from the release of soil nitrogen which occurs and assists in establishing seedlings (4). As well, finely cultivated soil improves both growth rate and survival rate as it allows the plant to produce the maximum number of feeder roots (3). One of the main advantages is that water then soaks in and does not run off. Soil preparation, including deep-ripping, therefore appeared to be important especially for rainforest species as they do not have the aggressive root systems of open forest plants and have an unsatisfactory survival rate if the root system is not adequate to sustain the plant after planting (3).

Another component is mulch as it reduces evaporation of water from the soil, thus reducing the amount of watering needed and it conditions and enriches the soil as it decomposes. It provides a nutrient-rich layer for surface roots to feed in; prevents the growth of weeds and grass; and keeps the soil cool. It also enhances the populations of soil micro-organisms which are necessary to recycle nutrients and keep harmful disease organisms under control" (3).

Selection of appropriate species appeared to be important as 'local native plants will be most likely to handle local climatic extremes' (6). Remnant vegetation on the site and adjacent block consisted of gums, *Mallotus philippensis* and *Ficus opposita*, suggesting the site would once have been rainforest.

This article has been adapted from an article published by Brisbane Rainforest Action & Information Network (BRAIN) which is a Brisbane City Council sponsored bushcare group in Newsletter Number 18 October 2000.

In the western Brisbane area in which the garden is situated, there are essentially two types of rainforest, termed subtropical rainforest and dry or depauperate rainforest. Dry rainforest is distinguished by a low tree canopy and ferns and palms are generally absent or rare, while vines are abundant (4). While rainforest species can be established in a wide range of conditions, best results are likely on sites to which they are naturally adapted (4). The presence of large numbers of *Ficus opposita* suggested that the original vegetation would have been 'dry' rainforest species. Plants were selected from lists of locally occurring dry rainforest species both because the remnant vegetation suggested that these were what had been on the block originally and also because of the ability of these plants to withstand quite long periods without rain once established.

The planting included 'must-have edible favourites' such as *Backhousia citriodora* (photo page 333), and locally occurring bushfood species, e.g. Acacias with edible seed, local *Acronychia* species, *Alpinia caerulea*, *Brachychiton populneus*, *Citrus australis* (photo page 356), *Diploglottis cunninghamii*, *Elaeocarpus grandis*, *Hibiscus heterophyllus*, *Lomandra longifolia*, *Pipturus argenteus* (photo page 357), *Podocarpus elatus*, *Rubus* sp., *Sterculia quadrifida*, *Syzygium australe* (photo page 336) and *Wilkiea macrophylla*. Although the planting was predominantly of local species, species from elsewhere in Queensland were included if they were edible, e.g. the northern form of Davidson's Plum, *Davidsonia pruriens*. 'Faunascaping' was intentional, with species such as *Ficus coronata* included as food plants for butterflies and their larvae and plants such as *Ficus opposita* to attract birds. Apart from any aesthetic appeal of butterflies and birds, plants which attract birds and other predators encourage natural pest control as the insects use the plant as a food source and are themselves controlled by a wide range of predators (7). Rainbow lorikeets have been observed harvesting scale on a large *Hibiscus heterophyllus*.

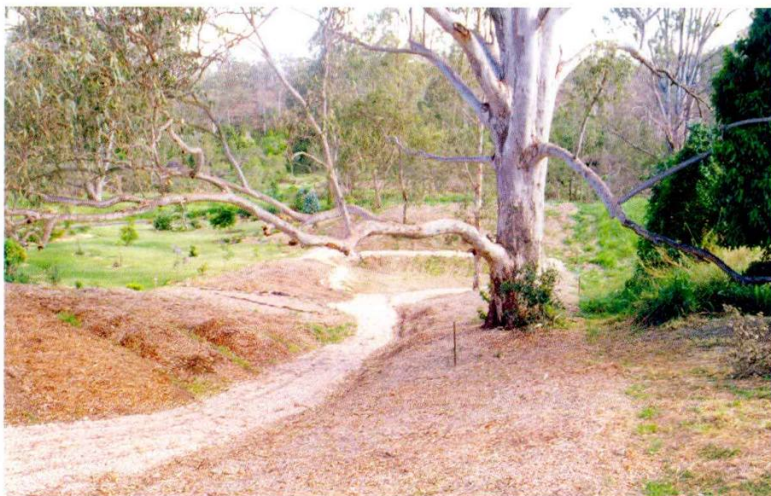
The Garden

The garden is almost an acre. The area nearest to the house site was designated as a bushfood area. This section was on a steep slope. After contouring, the hillside was terraced and overflow directed towards a dam at the bottom of the slope. All beds were mulched with 15 cm of mulch. The soil varied from a dark loam to sandy loam at the bottom of the slope. Mature gums were clustered at either the top or the edges of the site. Only local species were planted in the rear section of the garden backing onto land adjoining the Brisbane River. These included *Ailanthus triphyssa*, *Cupaniopsis parvifolia*, *Flindersia* sp., *Grevillea robusta* (photo page 356), *Hymenosporum flavum*, *Lophostemon confertus*, *Melicope micrococca* (photo page 357) and *Polyscias elegans* (photo page 357).

Planting and growth

Dry conditions and extreme weather were encountered soon after the initial planting at the top of the site in spring 1996. Of 170 plants less than 10 died. These were mostly small plants. All were replaced and no replacement died. There were virtually no losses in subsequent plantings in January 1997 (photo below). Plants were watered well at planting time and watered mid-week in the first week, again after a week, a week later and a fortnight later. Most

plants needed no further watering but some species such as *Backhousia citriodora* needed extra water during dry periods until they were established.



Photograph of garden taken January 1997

Growth has varied according to both the species and location. Fast-growing species such as *Pipturus argenteus* reached several metres in less than a year and other plants grew more slowly. Growth was affected by position with plants under the gums making less progress than plants in open sites and it was found that under dry conditions, plants adjacent to the gums required occasional watering in the first year or two to compensate for moisture removed by the gums. Five years after planting, most local species meet overhead, completely shading the paths. In contrast, plants from north Queensland have mostly grown to 3 to 4 metres.



Photograph of garden taken April 1999

Regeneration

Throughout the five and a half years since the garden was established, many plants have managed to push through the 15 cm of mulch. These have included species not on the plant list for the actual site but in the local area.

There are no adult plants of these species growing nearby so it is surmised that these seeds either lay dormant under the 2 metre high cover of weeds which spread over the whole site, or they arrived courtesy of the many species of birds which now frequent the trees on the block. Plants that have regenerated range in size from plants still less than one metre high, e.g. *Briedelia* spp. to 7 metre trees such as *Alphitonia excelsa*. Species which have regenerated range from ground cover plants such as *Geranium solanderi*, to climbers such as *Pandorea pandorana*, to trees such as *Aphananthe philippinensis*, *Melia azedarach* (photo on page 356), *Polyscias elegans*, and *Streblus brunonianus*. There have been less welcome plants such as *Lantana* sp. and the castor-oil plant, *Ricinus communis*, most of which were flourishing on the block prior to clearing.

Regeneration has not only resulted in greater diversity of plant species but has also increased the numbers of butterflies and birds attracted to the site. Any walk now is to the accompaniment of whip-birds calling, possibly chaperoned by a scrub turkey intent on diverting visitors from the nesting mound.

Summary

The garden described has 'worked' in that it now receives only rainfall. Even in drought conditions, water rates continue to be \$0.00. A visit during drought conditions will show some plants drooping, but experience has shown that all plants recover as soon as there is even a small amount of rainfall.

The garden has continued to flourish, although some watering was required during dry conditions during the first year or two for some of the plants under the existing gums or for some plants such as *Backhousia citriodora* that took longer to become established. These plants no longer receive supplementary watering even under drought conditions. Thorough soil preparation and choice of local dry rainforest species contributed to the rapid development and short time periods for plants to become established. Any plants that took longer to establish and so required additional watering are not from the local area.

In some areas the mulch had not been evenly spread and intensive weeding was required in contrast to minimal weeding elsewhere. The mulch not only reduced maintenance but also resulted in increased growth rates. An unexpected bonus has occurred, as there has been regeneration even in the heavy mulch.

In open areas where the mulch has broken down and not been replaced, there has been some weed growth.

The only losses in the last couple of years of drought have been where scrub turkeys made a mound that wrapped around the trunks of trees. The temperature needed to incubate eggs was too great for the trees within the

area of the mound and these trees have died. Self-sown seedlings of *Pipturus argenteus* at the base of the mound will soon fill the gap.

Lessons learnt are that with appropriate site preparation, selection of suitable species and adequate mulching, landscaping can become 'part of the solution rather than part of the problem by combining special cultural practices such as soil preparation and mulching with plants that need less water' (1). Providing such an environment has even led to greater diversity through the unexpected appearance of a range of local species not in evidence prior to the establishment of this garden.

References

1. Widlechner, M. (1990) Trends Influencing the Introduction of New Landscape Plants, p. 460–467 in J. Janick and J. Ed. Simon (eds), *Advances in new crops* (Timber Press, Portland, OR)
2. Hunt, J.M. (1986), *Creating An Australian Garden* (Kangaroo Press in association with The Society for Growing Australian Plants NSW Ltd.)
3. Radke, Peter and Ann and Sankowsky, Garry and Nada (1993) *Growing Australian Tropical Plants* (Frith & Frith Books, Queensland)
4. Hacker, B, Butler, R. and Rekdahl, R. (1994) *Putting Back the Forest* (Rural Environment Planning Association Inc, QUT Printing, Australia)
5. DPI Queensland Tree Note B18 and Tree Note B23
6. Bailey, Ralph and Lake, Julie (1994) *Creating an Australian Rainforest Garden* (Lothian, Victoria)
7. Hadlington, P. and Taylor, T. (1992) *The Native Garden Doctor* (Simon and Schuster, Sydney)

Appendix 1 - Plants regenerating

Acacia falcata, *Alectryon tomentosus*, *Alphitonia excelsa*, *Aphananthe philippinensis*, *Briedelia exaltata*, *Cassine australis*, *Casuarina cunninghamiana*, *Cissus opaca*, *Glerodendrum floribundum*, *Commelina cyanea*, *Cryptocarya triplinervis*, *Cullen tenax*, *Cyperus* sp., *Dianella revoluta*, *Dichondra repens*, *Eucalyptus tereticornis* (on site), *Ficus obliqua*, *Verbena rigida*, *Ficus opposita* (already on site), *Geitonoplesium cymosum*, *Geranium solanderi*, *Glochidion ferdinandi*, *Glycine clandestina*, *Grevillea robusta*, *Guioa semiglaucula*, *Juncus* sp., *Kennedia rubicunda*, *Lobelia purpurascens*, *Lophostemon suaveolens*, *Macaranga tanarius*, *Maclura cochinchinensis*, *Mallotus philippensis* (on adjacent site), *Melia azedarach*, *Oxalis corniculata*, *Pandorea pandorana*, *Parsonsia straminea*, *Polymeria calycina*, *Polyscias elegans*, *Pseuderanthemum variabile*, *Pteridium esculentum*, *Sambucus australasica*, *Sida rhombifolia* ssp. *retusa*, *Stephania japonica*, *Streblus brunonianus*, *Toeckia tenax*, *Trema tomentosa* and *Wahlenbergia gracilis*.

Appendix 2 - Weed species found

Ageratum houstonianum, *Anredera cordifolia*, *Bidens pilosa*, *Cardiospermum grandiflorum*, *Celtis sinensis*, *Eugenia uniflora*, *Ipomoea* spp., *Koeleruteria elegans*, *Lantana camara*, *Lantana montevidensis*, *Neonotonia wightii*, *Pavonia hastata*, *Passiflora foetida*, *Ricinus communis*, *Solanum nigrum* and *Solanum seafortianum*.

A Rare Honour for Gwen Harden

Merle Thompson

To have a new plant species named after you is a rare honour and this is of even more significance when the honour is bestowed because of the respect in which you are held in the scientific community.

At a ceremony to mark the centenary of the National Herbarium at the Royal Botanic Gardens, it was announced that the new species of rainforest tree, discovered in the Nightcap Range, near Lismore in north eastern New South Wales, in September 2000, was to be named *Eidothea hardeniana* in honour of Gwen Harden.

That this discovery is regarded as perhaps the second most important discovery in terms of plants of ancient origin, 'living fossils', after the Wollemi pine, *Wollemia nobilis*, enhances the honour paid to Gwen.

The Australian Plants Society in New South Wales acknowledges this honour and is proud that Gwen is a member of the Society.

Involvement with the Australian Plants Society

While Gwen's career as a professional botanist in both academic and herbarium contexts has been recognised as that of a scientist of international standing, her professional work has not made her aloof from the lay person.

She is a long-standing member of the Australian Plants Society and has been involved in the general activities of Sutherland district group for whom she conducted a plant recognition program and led tours to many areas of botanical interest.

Aileen Phipps described Gwen as a valued member of the Group, listed the many trips on which Gwen was their botanical guide and said of Gwen that 'always she has been fun to be with, most generous with her knowledge and very patient with our poor memories!'.

Over the years Gwen has spoken at various times at Region and Group meetings. In her activities with the Society she has readily shared her knowledge of, and enthusiasm for, Australian plants.

In October 1993 Gwen was the botanist accompanying the post-conference tour for the ASGAP Biennial Conference and Seminar in Sydney. Her expertise enabled tour participants to gain so much more from their visits to areas such as the Pilliga, and north coast of NSW. Gwen's friendly manner and understanding enabled participants to readily and confidently exchange ideas and seek information. Not only did Gwen give of her time and knowledge on the trip, but she had also planned in advance and took maps and references which added to the knowledge and enjoyment of all involved.

Contribution to the knowledge of Australian plants

Gwen Harden has contributed to new scientific knowledge of Australian plants and has shared her understanding and skills through publications and community education. Not only are her publications respected as being of

high scientific merit, they are also accessible to and readily usable by the amateur and enthusiast.

Her early work was as a tutor at the University of New England and the James Cook University.

From 1981 until her retirement in 2000 she worked as a botanist at the Royal Botanic Gardens, Sydney (RGS), where she was a skilled identification botanist with particular expertise in rainforest plants. For some years she was Curator Manager of the Herbarium.

Flora of New South Wales

The most significant project with which Gwen was involved was the *Flora of New South Wales* for which Gwen was editor and a major contributor. The *Flora* was published in four volumes (each in excess of 500 pages) from 1990 to 1993. It contains identification keys, descriptions and illustrations of all plant species in the state. The information is presented to be accessible to amateurs as well as having the detail required by professional botanists. To quote Tim Entwistle, Director Plant Sciences RGS, *the Flora has been justifiably praised as easy-to-use, with a 'minimum of botanical jargon'*.

World Heritage Assessment of the Blue Mountains

Another important project was involvement in the preliminary assessment of the Blue Mountains for world heritage listing.

Rainforest interest

Gwen's special interest is in rainforests and the plants which live in these habitats. She, in conjunction with John Williams, has published identification guides on the plants of rainforests of northern New South Wales and southern Queensland. Her early publications, to use Tim Entwistle's words again, were *characteristically, field guides and identification keys, ways to help people understand and appreciate plants in their environment*.

This interest also extends to regeneration of rainforest with the Wingham Brush as a particular interest.

It is not only rainforest in which Gwen has been interested. Other areas of special interest include the Warrumbungles and Mt Kaputah where there is a great variety of vegetation.

Community Education

Throughout her career Gwen has had a special interest in community education. This has involved conducting courses for adult education organisations on the identification of flowering plants, on the identification and ecology of rainforest plants, and on rainforest regeneration.

A fitting postscript

Several seedlings of *Eidothea hardeniana* have now been raised. It is fitting that one of these was planted by Gwen Harden on 29th November, 2002 in the Rare and Endangered Section of the North Coast Regional Botanic Garden at Coffs Harbour. This plant will be 'caged' in the same way as the Wollemi pine plants are protected in the botanic gardens in Sydney.

Book Review:

The New Nature

Winners and losers in wild Australia _____ Paul Adam

School of Biological. Earth and Environmental Science, UNSW

The launch of this book was accompanied by extensive media coverage, with major articles in the weekend press. Some of the coverage has given a simplified view of the book's themes, and this has generated a degree of controversy.

Low's thesis would not be surprising or new to European naturalists, but to an Australian audience it may challenge some conventional wisdom. Low argues that the environment we live in has been profoundly altered by our presence and that many species have responded to this. The adverse impacts of humans on many species are frequently stressed – the current decline in biodiversity world-wide can be largely attributed to the direct and indirect effects of human action. This is rightly a matter of great concern, even though globally the human response can be characterised as too little, too late.

Low, however, points out that not all species are adversely affected by humans; that some species are favoured by our activities, and that these positive interactions between humans and wildlife have developed ever since the origin of our species. The case is illustrated by many examples – indeed so many examples that at times the reader might feel overwhelmed. What is shown is that, what may be thought to be a local or relatively minor disturbance, can have far reaching consequences – none more so than with the former sewage outfall at Malabar (in Sydney) (prior to the construction of the deep ocean out-fall), which during winter attracted scavenging albatrosses from around the Southern Ocean.

The conclusion that has been drawn by some is that nature can look after itself and that we need not give so much attention to conservation. This is not the conclusion I would draw nor, I suspect would the author, as he strongly argues the case for conservation. However, Low challenges us to think more deeply about conservation objectives. Many will be offended by his contention that wilderness is 'an unhelpful idea'. Clearly if wilderness policies result in the conservation of large areas this is a very desirable outcome, but I would tend to agree with Low that it would be undesirable if pre-occupation with wilderness results in diversion of resources from other conservation or wildlife management issues.

Low, T. (2002) *The New Nature*. Winners and losers in wild Australia. Viking, Camberwell. ISBN 0 670 88466 9

It is available from all good bookstores

RRP \$29.95

Low provides a number of examples where species correctly characterised as threatened (and hence subject to legislative protection) either survive on highly disturbed habitats or have colonised habitats created by humans. This should raise warning flags for councils and other consent authorities. There is a tendency to discount the need for proper environmental assessment of proposals in urban or other highly modified sites. This may well mean that we are failing to detect populations of threatened species and thus not taking the appropriate conservation measures when developments are approved.

One concern I do have is with a throw-away line regarding biodiversity – ‘...*Tasmania's south-west, the great wilderness Mecca, is by some criteria a biodiversity desert*’. This, to my way of thinking, misconstrues the value of the concept of biodiversity. Species are but one of the levels of biodiversity, and while species richness is an attribute that conservationists value there are important ecosystems (like the button grass plains) which, at least for immediately visible taxa are naturally species poor. Our conservation agendas should not devalue the significance of areas of low species richness. (On the global scale, for example, there is justified concern for tropical rainforest conservation – but tundra has a much lower profile.)

The New Nature is an important book, which deserves to be widely read. You might not agree with the conclusions that some commentators have drawn, but it is important to continually challenge and test our views of the environment. Only by doing so will we be able to define and achieve our conservation goals, and develop rigorous arguments to counter those who are less inclined to acknowledge the importance of conservation.

Cultivation of Stenocarpus species

A few notes

Kerry Rathie

The genus *Stenocarpus* was covered by the late Alec Blombery in Vol 18: pp 341-345 (issue 148). Information on cultivation of species other than *S. sinuatus* and *S. salignus* is scarce, but more species are now making their way into cultivation. Kerry Rathie writes of his experiences outside of Brisbane.

I have several species of this interesting genus growing here and have found them quite hardy to light frosts and periods of dryness. *Stenocarpus* 'Doreen', a presumed hybrid of *S. davallioides* and *S. angustifolius*, has most attractive foliage in a lighter green than *S. davallioides*, but is much faster growing here, which may be of great interest to enthusiasts in southern states. *S. angustifolius* itself is hardy and can be quite variable in habit, with forms ranging from small trees to shrubs, & great variability in leaf shape.

I have also tried *S. verticis* and *S. cryptocarpus* (which sadly died during a dry spell), & sp. 'Tully River'. *S. verticis* from Cape York is very drought-hardy & frost resistant, like many plants from the cape.

A few years ago I tried grafting adult *S. sinuatus* scions onto juveniles. I did about 85 plants, and all the plant material looked perfect: it was spring. All failed, & on talking to Merv Hodge later, he had had a similar experience. Neither of us tried again.

Opisthiolepis heterophylla

(Blush silky oak, stream silky oak, silver oak) _____ John Wrigley
based on the text from *Banksias, Waratahs & Grevilleas* by John Wrigley & Murray Fagg, Collins (1989).

Taxonomic (or Scientific) Name:

Opisthiolepis heterophylla L. S. Smith (Family Proteaceae).

Meaning of genus name:

From Greek, *opisthen*, at the back, and *lepis*, a scale, referring to the solitary nectar gland (or scale) situated behind the ovary

Meaning of species name:

From Greek, *hetero-*, different, and *phyllon*, a leaf, referring to the difference between the juvenile and adult foliage.

Common Names:

Blush silky oak, stream silky oak, silver oak.

Distribution And Ecology

Grows in tropical rainforests between Cardwell and Mossman, Queensland at altitudes of 15–800 m.

History

This species was described by Lindsay Smith of the Queensland Herbarium in 1952, although sterile material (no flowers or fruit) was collected by C. T. White as early as 1918. The first flowering specimens were collected by the Atherton forester A. G. Hanson in 1950. Smith recognised the resemblance of his new genus to *Lomatia* but Johnson and Briggs (1975) place it in the subtribe Buckinghamiinae with *Buckinghamia* and in the tribe Embothrieae, which also includes *Lomatia*.

Description

A tall tree that has been recorded as growing to 30 m in height, with a trunk diameter of 75 cm. It is usually smaller than this.

The juvenile leaves are pinnate and up to 50 cm long. They have up to 18 elliptical leaflets, which are dark shiny green on the top surface and bronze or rarely silvery on the underside. Occasionally these leaflets are sparsely toothed. Adult leaves may be either pinnate or simple. If pinnate, the number of leaflets is usually reduced and the apical leaflet is often asymmetrically lobed. If simple, the leaves are ovate to oblong-elliptical and up to 25 cm long, with a leaf stalk up to 70 mm long. Adult leaves are bronze on the underside.

The small white flowers are borne in pendulous axillary racemes that may be up to 15 cm long but are usually shorter when near the ends of branches. They are sometimes branched. The flowers have male and female parts. The perianth is smooth and irregular, with 3 segments shorter and broader than the fourth. An anther is held in the concave tip of each segment. The perianth is only about 3 mm long. One forked nectar gland is present.

The flowers are held in pairs on a short common stalk. The style, which is bent at right angles, is only 2 mm long. The fruit is a leathery follicle up to 60 mm long, 35 mm wide and about 2 mm thick. It opens widely on maturity to release the many seeds.

Cultivation

This is a very handsome tree for parks and larger gardens in warm areas. It grows quickly. A specimen in the author's garden at Coffs Harbour has reached 18 m in 20 years and flowered in the fourth year. The foliage is the main feature, with the colourful underside of the leaves exposed as the wind moves the branches and contrasting well with the glossy upper surface.

Propagation is from seed or cuttings. A rich loam is preferred and young plants thrive in full sun. The flowers are insignificant. The tree has been used for its attractively grained timber. The foliage, which has an extended vase life, has been marketed for the florist trade and could be considered as having export potential. The tree is virtually pest free but may be susceptible to heavy frosts.

Opisthiolepis Postscript

Paul Dalley, of Mountain Nursery adds:

The Blush Oak is the hardiest of several Queensland rainforest Proteaceae I have been trialling in Kempsey on NSW's mid north coast. I recommend growing them in a pot until they are around 30 cm high or in a 150 mm (6 inch) pot before planting out, unless planting into a sheltered environment, when they can be planted out sooner. They prefer fertile soil with plenty of moisture and a good layer of mulch to avoid drying out. A range of aspects from half shade or more to sun is tolerated though plants can be hard to keep green in full sun (foliage looks better with shade). More importantly they need shelter from hot, dry winds.

Blush Oaks do not appear to be as phosphorus sensitive as other proteaceae - when I plant mine out I will place a large coffee cup of chicken manure around them, on top of the soil but preferably covered by a bit of mulch. They are moderately fast growing and can put on a metre a year in growth.

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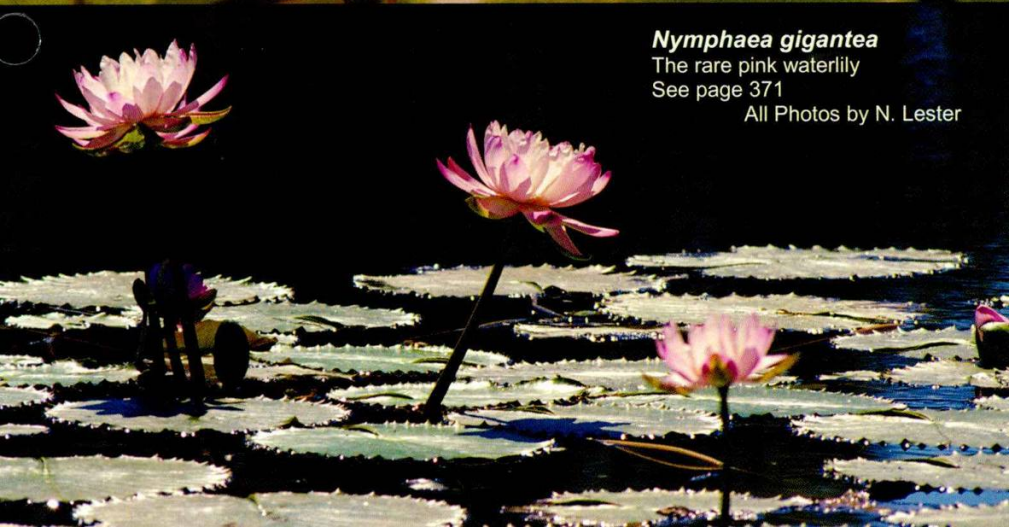
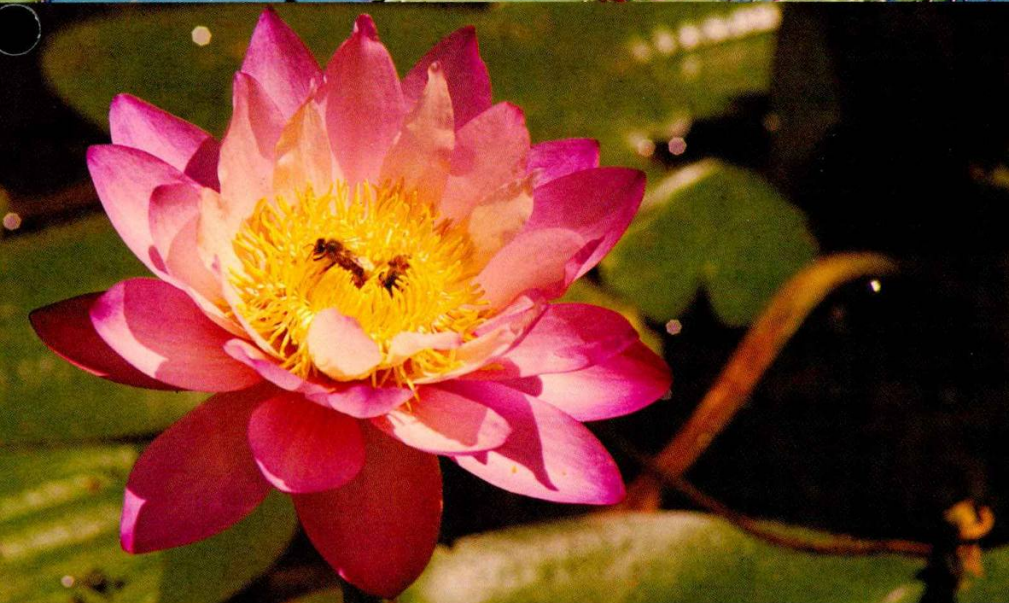
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Orders to Australian Plants Society NSW Ltd office (see inside back page).



Nymphaea gigantea

The rare pink waterlily

See page 371

All Photos by N. Lester

Tropical Waterlily - Nymphaea gigantea

Nita C. Lester

It is generally agreed that one of the most beautiful waterlilies in the world is the Australian endemic, *Nymphaea gigantea*. Its flowers can reach 30 cm in diameter, with up to seven blossoms at the same time. Blue is the most common colour of the corolla, but purple, mauve, white and pink are also found.

Characteristics of *Nymphaea gigantea*

Nymphaea - Nymphs is a group of semi-divine mythological beings. Imagine beautiful maidens often associated with water and other natural features.

Gigantea - Both the blossoms and the leaves are features to celebrate.

A perennial plant with a globular rhizome referred to as a tuber. Tubers can vary from 1.5 cm to 15 cm in diameter. The floating leaves are thick and orbicular to approximately 80 cm in diameter with margins regularly toothed to 5 mm long. Veins of the blade are very dominant and the underneath of the leaf is often shaded with purple tones. Submerged leaves are much finer and smaller and are spade shaped. New flowers can stand up to 50 cm above the water. Lasting three to four days the flower stem, peduncle, slowly bends over time bringing the mature flower to the water's surface by the fourth day. Up to 32 petals fading with age with a space between the petals and the stamens. Up to 400 very showy, golden stamens and four sepals up to 11 cm long. Green on the outside and may have small purple streaks. After the fourth day the flower dies and if fertilised a green, globose fruit to the size of an orange develops under the water (photo on page 372). Up to 2,000 small black seeds with more or less continuous rows of small hairs develop. Favourite food for the water birds. When mature the fruit peels back like an orange and releases the seeds. Seed float to the surface for a membranous sack of air, the aril, surrounds them. After four days the seed sinks.

Natural habitats and habits

Mostly in SE Queensland south of the tropics, NE NSW and scattered through the drier parts of Queensland just into the Northern Territory. Usually in more or less permanent water near the coast, but appearing occasionally in temporary water-bodies of the drier areas. A beautiful inland site of the pink waterlily is located on the southern outskirts of Miles, Queensland. For a rich blue form, one of the best in Australia is the Brigalow Creek, Meandarra, Queensland.

Tropical waterlilies flower most of the year but less commonly in cooler months. If located in a frost area, the plant dies back and the new floating leaves reappear when the waters reach 22° C. Flowers during the day closing at night. Generally the flowers open around 10am and close again by 3-4pm. This depends upon when direct sun is available to the plants. Petals fade over time to almost white as the flower matures. Photos on page 373.

How to grow these magnificent plants

Water temperature must reach 22° C. for the seeds or the tubers to sprout - 25° C is ideal for excellent flower size.

Water-body must have direct sun for at least six hours of the day.

They prefer stationary waters of a depth between 1–2 metres.

Substrata must have a depth of mud so that roots can take hold as *Nymphaea gigantea* is a very large aquatic plant. They are also very hungry plants so a rich environment is necessary.

Clear water was thought to be necessary but this feature does not seem to be consistent where successful colonies have been established.

The waterlily will in time select its favourite depth and this often creates a border of lilies in the pond/dam allowing other aquatic plants to establish themselves in the very shallows.

If establishing *Nymphaea gigantea*, a few practical hints may assist: if using tubers, they float so plant in a wire basket with mixture of very rich soil and manure. Lower this cage into water and wait. If using seed, you may wish to simply drop into water. If floating, place at up-wind side so seeds can float out across the water or planting in a container of water. Maintain temperature and plant out as seedlings. Photographs of Tubers and Fruits are shown on page 372.

Gardener's Tip:
Look for
shoots on
tubers and
plant with the
shoots up.

Possible success

From my research I have found the blues of *Nymphaea gigantea* the easiest to propagate. Up to 87% of seed germinate and all tubers have produced. The pink, *N. gigantea* var. *neorosea* is very difficult. Up to 34% of seed germinate but not all produced healthy seedlings. Most tubers produced. This pink waterlily is rare, extinct in its natural habitat, and when planted with the blues, the pinks do not often complete. The reason for this is unknown but maybe that is why the pink is endangered and needs a lot help from us. See photos on page 369.

Some pink forms of *Nymphaea gigantea* are unstable in colour for once removed and cultured elsewhere, they return to the blue. The pink plants at Miles and the material collected from these have proved to be stable to date.

Using tubers I have, in a summer period, produced three plants from each tuber. This has proved to be a very quick way to increase your waterlily colony and to have some to share with others.

Conservation

These plants are a wonderful addition to any tropical and sub-tropical garden. As they are endemic to Australia, they become a part of a stable aquatic environment with frog, bird, fish and insect. Imagine the sight of a lotus bird walking amongst waterlilies with a flock of dragon fly wings above. This could be yours.

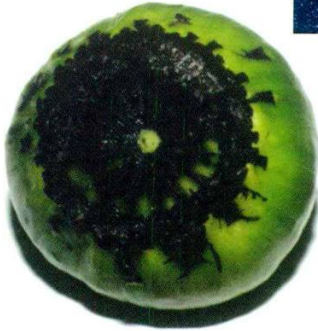
Nymphaea gigantea

Right: Waterlily fruit releasing seeds.
Seeds are the tiny black ovals

Below: Two Waterlily fruits.

See pages 370 & 371

N. Lester



Nymphaea gigantea

Left: New plant from a tuber

Below: Two tubers - new shoots can be seen on the right tuber.

See page 371

N. Lester

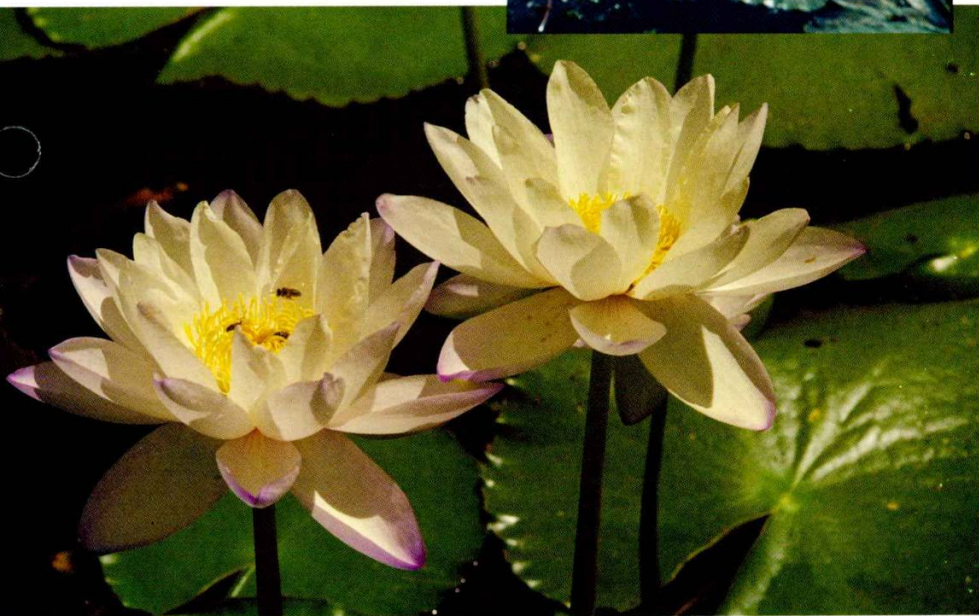




Nymphaea gigantea

Petals fade over time to almost white as the flower matures. White flowers are also found.
See page 370

N. Lester



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Eidothea hardeniana

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P. Weston