Tropical Topics

An interpretive newsletter for the tourism industry

Woodlands of the savanna lands

No. 71 December 2001

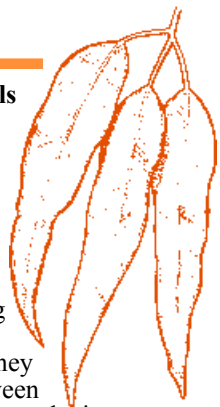
Notes from the Editor

Millions of years ago, much of the Australian continent was covered with rainforest. However, as the climate changed and the continent became more arid, a new type of vegetation evolved consisting of plants which adapted themselves to the new harsh conditions – notably eucalypts, acacias, melaleucas, grevilleas and banksias.

These types of trees now occupy much of the savanna lands. This *Tropical Topics* cannot, of course, describe them all but looks at strategies for living in an inhospitable environment, characteristics of the main groups and at some individual species which may be particularly common or have interesting features. A number of books, which are dedicated to identification of individual species, are listed in the Bookshelf on page 8.

Acknowledgements
I would like to thank John Clarkson, Eda Addicott and Ian Fox of the Queensland Herbarium (Mareeba) for their help with this issue.

Conserving moisture



Life is tough for plants living in the seasonally dry tropics. Soils are poor and for half the year the land is parched and prone to fires while for the other half it is inundated with water. Only plants which have been able to adapt to this punishing regime can grow here, having developed certain characteristics to make this possible.

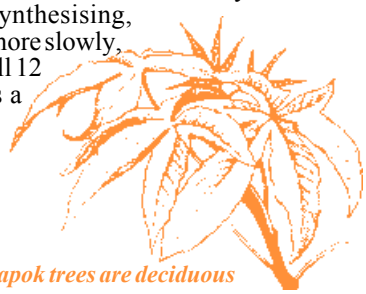
While trees in the rainforest tend to have spreading surface roots to make the most of nutrients available on the forest floor, those in savanna lands generally have deep root systems, to reach deep reserves of water. Some trees concentrate their resources in the early stages of growth on developing a deep and massive tap root.

Once obtained, water must be used economically. The thick bark on many tropical woodland trees, apart from giving protection from fire, can help to conserve moisture. Leaves, however, are a major 'leak' due to transpiration – the evaporation of water through the leaf pores (stomata). To minimise water loss, the leaves of many tropical woodland trees have a leathery texture, with a tough, thick, surface cell layer and are sometimes hairy or woolly. The stomata are often sunken below the surface. Leaves tend to hang down at angles, thus minimising exposure to the sun and encouraging convectional cooling. The grey-green colouring or pale undersides of some leaves also helps to reflect heat away.

Grasses and many other small plants simply disappear during the Dry, some dying after setting seeds and others persisting underground as dormant roots and tubers. It is fairly common for trees to also shed their leaves and 'play dead'. However, not all trees take this option – deciduous (leaf-shedding), semi-deciduous and evergreen trees co-exist throughout the savanna woodlands.

It seems that these trees are simply using different survival strategies. It is as if they make the choice between investing energy into producing a strong, long-lasting product or numerous poor-quality disposable ones. Studies have shown that the 'construction costs' to a tree for production of deciduous leaves are lower than the costs of producing evergreen leaves.

Evergreen leaves need more built-in defences, such as a tough structure or toxins, to prevent damage from leaf-eating animals over their relatively long life-span. These attributes are largely lacking in the disposable deciduous leaves. On the other hand, deciduous leaves photosynthesise more efficiently because they contain more nitrogen and are usually larger than evergreen leaves. The extra nitrogen makes them more attractive to leaf-eaters, but allows them to 'feed' more energy into the plant to compensate for their short working life. Evergreen leaves, conversely, repay the tree's investment by photosynthesising, albeit more slowly, for a full 12 months a year.



Kapok trees are deciduous

TROPICAL SAVANNAS CRC
Cooperative Research Centre for the Sustainable Development of Tropical Savannas

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

The big three

Eucalypts, melaleucas and acacias dominate the dry tropical woodlands. The first two are particularly common in areas where there is a reliable annual wet season, eucalypts favouring the drier situations and melaleucas preferring those which are seasonally flooded. Acacias predominate further south, in arid areas where drought may last for years.

Ubiquitous eucalypts

Eucalypt trees are synonymous with Australia – although a number of species also grow on islands to the north where they would have spread at times of lower sea levels.

Buds

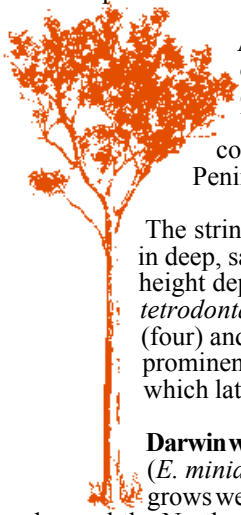
The name *Eucalyptus* comes from two Greek words – *eu*, which means 'well' and *kalyptus* which means 'covered'. This is a reference to the unusual flower buds which are covered with a little cap (or operculum) which is actually formed from the fused petals and sepals. When the cap comes off, the numerous stamens unfurl around the central pistil, or female part – eucalypt flowers have no petals as such.

Gum nuts

Eucalypt fruits are also distinctive. After fertilisation, the cup-like base of the flower dries, enlarges and becomes a woody fruit – the gum nut. The roof of the ovary splits, in most species, into hard woody valves – which might poke out in the form of points, or may sink below the rim, out of sight. The various shapes of these gum nuts, along with size and shape of the buds, can help with identification.

Common eucalypts

Stringybarks (*Eucalyptus tetrodonta*) and woollybutt (*E. miniata*) are the most widespread tree species in northern tropical woodlands, occurring over Cape York Peninsula, the Top End and the Kimberley.



Although *Eucalyptus tetrodonta* (left) is often called the **Darwin stringybark** it is common right across northern Australia. Woodlands dominated by this species cover almost 37 percent of Cape York Peninsula. It can form dense patches.

The stringybark has a long tap root and does best in deep, sandy soils. It can grow to 30m, but its height depends on the depth of the soil. The name *tetrodonta* is composed of the Greek words *tetra* (four) and *odontos* (teeth) refers to the four prominent projections below the cap of the bud which later form four 'teeth' on the seed capsule.

Darwin woollybutt (*E. miniata*) also grows well beyond the Northern Territory and is commonly found associated with *E. tetrodonta* right across the northern woodlands. Growing to about 15-25m, this tree has earned its common name from the particularly spongy and fibrous bark which grows a quarter to half-way up the trunk. Above this, the bark is smooth and white. Flowers are a stunning orange with bright yellow-tipped stamens and are responsible for the scientific name: *miniatus* is the Latin word for 'flame'. The barrel-shaped, ribbed gum nuts, grow to 6cm in length and almost as wide. They are popular in flower arrangements. Native bees often nest in branches which have been hollowed out by termites, providing 'sugarbag' – a traditional source of honey.

Separated eucalypts

In 1995 all the bloodwoods were separated from the *Eucalyptus* genus into their own genus, *Corymbia*. There are now 550 recognised *Eucalyptus* species and 130 species of *Corymbia*. Bloodwoods are better represented in northern Australia than in the south. They are present, and sometimes dominant, in the northern eucalypt woodlands.

Bark

Eucalypts are commonly referred to as gum trees, but these trees with typically smooth barks are only part of the story. Other eucalypts have quite different barks.

In **gum trees**, the bark, or outer, dead layer of tissue is shed annually, exposing the new, inner bark below. This is often highly coloured and may be covered with a white powder. In some species, old bark remains attached in dangling strips.

Rough-barked species, by contrast, retain the outer dead bark allowing it to accumulate year after year. As the girth of the trunk increases, this bark splits longitudinally. The different patterns created depend on the varying nature and lengths of the fibres composing the bark.

Stringybarks (right) have a thick, spongy, fibrous bark which can be pulled off in long strips.

Ironbarks have a solid, thick, heavy bark with deep longitudinal furrows. It is often impregnated with sap (gum) from the tree, known as kino, which makes it very hard. It is generally very dark – grey or black.

Bloodwood (*Corymbia* sp) bark is often tessellated, or chequered. This is because the short fibres in the bark break into small plates which may be hard and woody, spongy or loose and flaky. The trunk may be patterned with different coloured plates. A blood-red sap (kino) leaks from wounds in the bark.

Box eucalypts have a firm short-fibred bark with narrow longitudinal lines or tessellations. It is relatively thin and may wear off, leaving a mottled appearance. These trees are named after the European box trees due to the similar pattern of interlocking grains in the timber.

Deciduous eucalypts

Although they are known as evergreen trees, in northern Australia a number of eucalypt species respond to the seasonally dry conditions by dropping their leaves. This is unusual in eucalypts. However, it enables certain eucalypt species to compete effectively in shallow soils. On deeper soils evergreen species dominate.

The degree to which a tree loses its leaves may be related to the situation in which it grows. For instance, poplar gum (*E. platyphylla*), found in eastern Queensland, may drop all its leaves in a dry situation but just some of them in a well-watered position.

Melaleucas

Melaleucas sometimes grow alongside eucalypts, but they tend to dominate in areas which eucalypts avoid – low-lying areas which are flooded in the wet season. Most species of melaleucas need some moisture below the surface so are often to be found where a clay subsoil exists below a sandy surface; areas where melaleucas grow should generally be avoided by drivers who do not wish to become bogged. Areas dominated by eucalypts are better drained and often sandy.

Some melaleucas, such as *Melaleuca quinquenervia* thrive in swampy areas where they grow, along with pandanus, in almost permanent water. However, other melaleucas are more at home in drier areas which are flooded only in the wet season. The thickly layered, papery bark protects the trees from moisture loss and from fire. Interestingly the name 'melaleuca' is derived from the Greek words *melanos*, meaning 'black', and *leucos*, meaning 'white'. The first specimens described by Europeans had probably been recently burnt and the white branches were contrasted against a black trunk. Paperbark is a commonly used name but the name 'teatree' refers to both melaleucas and to members of the *Leptospermum* genus.

The bark of melaleucas has traditionally been put to many uses by indigenous people, notably as roofing material for shelters. The aromatic leaves yield essential oils with germicidal properties. *M. cajuputi* is the source of cajuput oil which has many useful properties, notably as a powerful anti-spasmodic stimulant. However, the presence of a harmful compound, cineole, in many melaleuca oils limits them to external use.

The **broad-leaved paperbark** (*Melaleuca viridiflora*) occurs across northern Australia. Depending on conditions, it may be a small straggly shrub or a straight-trunked tree up to 18m tall. It is very adaptable, growing on steep mountain slopes on the edge of the Wet Tropics right through to swamps and coastal plains and most areas between. It can be a scattered shrub in a woodland, or a dominant species in shrubland.

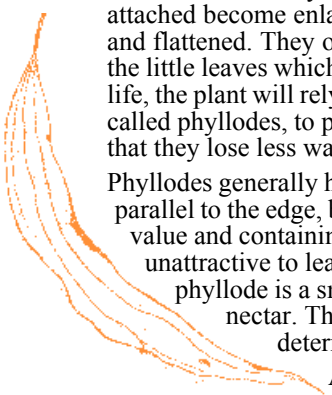
This tree has the largest and coarsest leaves and the largest flowers (stamens 2cm long) of all melaleucas. It flowers heavily with cream to yellowish-green 'bottlebrush' flowers (*viridiflora* means 'green flowers') which attract bees, butterflies, birds and flying foxes. The flowers are occasionally red.

Acacias

Acacias, also known as wattles, belong to the largest genus of flowering plants in Australia. One of the most widespread plant groups, they can be found growing in well-drained rainforest conditions but their main stronghold is the very driest parts of the Australian continent where rainfall is inadequate for eucalypts. Throughout the savanna woodlands, acacias may be found as an understorey or on shallow, gravely or sandy soils which are unsuitable for the more dominant eucalypts and melaleucas. They sometimes form quite large communities.

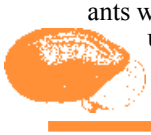
Acacias are well adapted to drought, poor soils and fire. In extremely dry times, acacias simply stop growing, and wait for rain. When it falls, water is directed by the branches towards the base of the trunk.

Most species, as adults have no leaves. They start life with small fern-like leaves (right) but as the little seedlings mature the leaf-stalks to which they are attached become enlarged and flattened. They outgrow the little leaves which eventually drop off. For the rest of its life, the plant will rely on these tough, flattened leaf stalks, called phyllodes, to perform as leaves. The advantage is that they lose less water than normal leaves.



Phyllodes generally have several main veins, running parallel to the edge, but no midrib vein. Tough, low in food value and containing unpalatable chemicals, they are unattractive to leaf-eating animals. At the base of each phyllode is a small gland which often produces nectar. This attracts ants, which act as an extra deterrent to herbivorous insects.

Acacias are legumes, so they have nodules in their roots containing bacteria which fix nitrogen from the atmosphere. This allows them to thrive in nutrient-poor soils. Many of the seeds have an attachment, known as an elaiosome (below), which is rich in protein and oil. This is attractive to birds which digest the elaiosome, and pass the seeds. It also appeals to ants which 'plant' many seeds by carrying them underground into their nests. The hard, water-resistant coat of these seeds can only be fractured by high temperatures or abrasion which means that they often germinate at the best times – when fire has produced a nutrient-rich ash bed.



Acacia flowers are tiny but cluster together in ball-shaped or elongated groups. Their colour varies from cream to gold. One acacia species (*A. purpureipetala*), west of Herberton in Queensland, has purple flowers.

Australian versus African acacias

Acacias are found in all continents except Europe and Antarctica. They are particularly widespread in Africa – but close examination shows that these plants are very different, having evolved survival strategies which best suit conditions in their respective homelands.

- Few Australian acacias have leaves. The phyllodes are unattractive to herbivores. African acacias all have leaves, which seem designed for browsing herbivores. (The spines on African acacias are designed to protect the developing leaf buds, not the leaves themselves, which fall to the ground if not eaten.)
- Australian acacia seeds are sown by ants and birds, attracted by the elaiosome (not by the dry cast-off pods); in Africa, large mammals distribute their seeds after feeding on the nutritious pod (carob).
- Australian acacias have bacteria in their roots which fix nitrogen; African ones provide a shady canopy which attracts mammals which provide nitrogen in the form of droppings.
- In Australia, pods and litter around the acacias create intense fires which can kill the trees but provide good conditions for seeds to germinate and grow. In Africa, mammals attracted to the trees remove grass and keep fires mild.

Tropical woodlands

Although tropical woodlands are dominated by eucalypts, melaleucas and acacias, there are many other significant and conspicuous trees.

Palms

Corypha palms (*Corypha utan*) (left) grow, sometimes in extensive groves, where they are subjected to seasonal flooding. Reaching 20-25m in height, these palms may be 40 or 50 years old before they flower for the first and only time. They then die. The fan-shaped fronds begin to fall before this occurs so the multi-branched flower stalks, which can be up to 5m in length, appear at the top of a largely leaf-less trunk. The flowers are tiny but there are millions of them. Fruits take about 18 months to mature.

There are about 20 species of **Livistona palms** in Australia. They are about the most drought-resistant of all Australian palms and can be found growing, as single specimens or in groups, in open woodlands, alongside eucalypts. Some flourish in open sunny situations or as part of the understorey in open forest where they are subjected to, and survive, frequent fires. Others prefer wetter areas. They can even be found right in the driest centre of the continent where rocky areas ensure some permanent moisture. These are thought to be relicts, dating back to times when the climate throughout the continent was much wetter and palms would have been much more common

Grass trees

Grass trees (*Xanthorrhoea* sp) flourish in dry places. With their characteristic mops of spiky foliage, often fire-blackened trunks and long flower spikes, they are a common sight in tropical woodlands. Older plants may have branched trunks. Grass trees have a reputation for growing slowly but some specimens have been known to reach heights of nearly 2m in just 20 years, so the ages of large specimens may sometimes be exaggerated. The roots of young plants can contract, pulling the stem below ground level. It may be many years before it appears above ground to form a trunk.

Grass trees are well adapted to fire. The leaves, which are rich in resin, are highly flammable and fire seems to stimulate flowering. A long spike, covered with tiny flowers, grows up from the crown at a rate of 4-10cm a day, eventually reaching lengths of three or four metres. These flowers produce large amounts of nectar which attracts birds, insects and small possums. Resin is produced in the leaf base. It was used traditionally to attach spear heads to shafts and was an important trade item; analysis of resin on ancient spear heads has been used to work out trade routes. Hundreds of tonnes of the resin were exported to Germany and the USA in the nineteenth century. It was used in varnishes, metal lacquers, wood stains and explosives. The flower spikes make good lightweight spears and fire sticks.

Softwoods

Many woodland trees, such as eucalypts, are hardwoods, but there are softwoods among them, notably the kurrajongs. They are often found on rocky outcrops. They have links to rainforest trees and most have ancient Gondwanan origins.

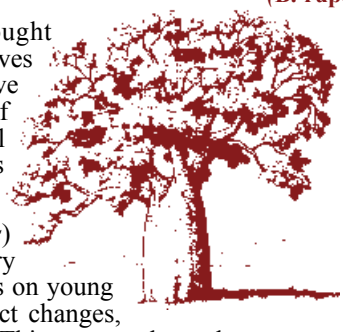
Boab trees (*Adansonia gregorii*) are distinctive features of the Kimberley region of Western Australia. They are also found in north-west Northern Territory. The immense, swollen trunks on older trees can measure over 15m around. Radio-carbon dating of a related species in Africa indicated an age of 1000 years. Given their slow growth rate and the immense size of some trunks, large Australian boabs are also likely to be very old. The large white flowers, which are pollinated by hawkmoths, appear on the spreading branches of the tree when it has dropped its leaves. The name boab is a shortened version of the African 'baobab'.

Boabs are a puzzle. In spite of their trunk shapes, they are not related to Australian 'bottle trees' (*Brachychiton* sp.). Their closest rellies are six species in Madagascar and one on the African mainland. It has been suggested that seeds, or even entire trees, arrived in Australian after floating across the Indian Ocean – but this theory runs into trouble because there are no closely related species in Madagascar, unless they have since become extinct. Alternatively, these trees may have been in Australia since before the break-up of Gondwana. If that is the case, however, why have they not spread further, since they are well adapted to drought conditions? Possibly the superior root systems of eucalypts have given them a competitive edge. Fire, however, may play a part. Studies have shown that although young boabs can resprout successfully from the roots after a fire, they bear very few fruits. On the other hand, in areas where overgrazing has led to a reduction of fires, boabs are spreading rapidly.

Kurrajongs

Most (29 of 31)) of the trees belonging to the *Brachychiton* family are endemic to Australia. They are found growing in a variety of situations from rainforest to woodlands but all seem to have evolved to cope with drought conditions. They tend to drop their leaves in the dry season and several species have swollen stems for water storage. Many of the species which grow in tropical woodlands are commonly known as kurrajongs.

Bottle tree (B. rupestre)

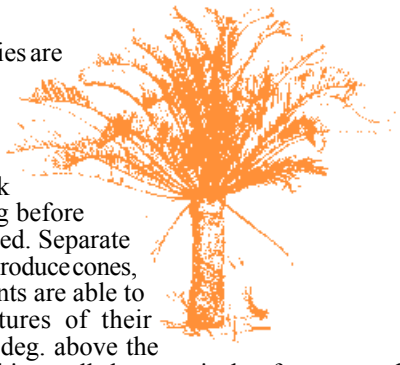


The **northern kurrajong** (*B. diversifolius*) is found across the north. Its leaves vary enormously as it grows. Simple leaves on young seedlings go through about six distinct changes, becoming more lobed as the tree grows. This tree spends much of its early life developing a huge, deep tap root.

The **red-flowered kurrajong** (*B. paradoxus*) (left) has, as the name suggests, beautiful red flowers which form clusters along the branches when the tree is leafless. Some of the flowers are male and some are female. This tree occurs in northern Northern Territory and Queensland.

Three species of **kapok** trees and bushes (*Cochlospermum* spp) are found across the north, in open woodland. They grow particularly well on rocky hillslopes and ridges. These trees drop all their leaves during the dry season but become covered at this time with bright yellow flowers. These result in large, green, barrel-shaped fruits up to 8cm long which, as they mature, become brown and split to release masses of silky hairs, embedded with seeds (right). Each seed has a little parachute and can be dispersed by the wind. The kapok has been used as cottonwool—for stuffing cushions—and in Aboriginal body decoration.

Cycads



Cycads of various species are to be found in the understorey of tropical woodlands. These are ancient 'dinosaur' plants which date back 230 million years, long before flowering plants evolved. Separate male and female plants produce cones, not flowers. These plants are able to increase the temperatures of their mature cones up to 17deg. above the local air temperature. This usually happens in the afternoon and may serve to attract pollinating insects (usually weevils) by enhancing the odours of the plant. It may also help the male cones to shed pollen.

Cycads have unique root structures, which look like corals. These contain symbiotic blue-green algae/bacteria which are able to fix nitrogen from the air, thus allowing these plants to thrive in poor soils. Studies in Western Australia have shown that cycads there can fix up to 35kg of nitrogen per hectare per year. Cycads in tropical woodlands are often burnt but respond with a crown of fresh leaves. Fire also seems to stimulate production of seeds: a comparison of burnt and unburnt areas showed that cycads in the former produced over seven times more seeds. All parts of the cycad are poisonous, the toxins including mercury which is obtained from small quantities in the soil. (For more on cycads, see *Tropical Topics* 59.)

Grevilleas

Dryander's grevillea

Although there are more than 20(species of grevilleas in Australia, they are poorly represented in the tropics when compared with the southern part of the continent. However, they can form stands where conditions are suitable.

Grevillea flowers are rich in nectar and attract a large number of birds and insects. Most flowers have a series of long, protrudin stalk-like 'styles'. Before the bu opens, the sticky end of this s collects pollen from the surro stamens. When the bud opens it i a prominent position, to deposit visiting honeyeaters, which then c plant.

Dryander's grevillea (*G. dryan* which is widespread across northern Australia. Its flowers vary in colour from cream to pink and red.

The **bushman's clothes peg**, (*G. glauca*) is a species found in Queensland. Its common name comes from the very hard, woody fruits which split partially to create ideal emergency clothes pegs, or paper clips. They are roughly circular with a diameter up to 4cm.

Serious chemicals

Seed pods

With their spreading crowns of bright green leaves, groups of **Cooktown ironwood** (*Erythrophleum chlorostachys*) (right) stand out from the crowd. In spite of its name, this tree is common throughout northern Australia, not just around Cooktown, growing on well-drained soils in association with bloodwoods, stringybarks and other eucalypts. It is a highly poisonous tree, known in parts of Western Australia as 'camel poison'.

All parts of the tree are toxic, even dry leaves, although it seems that little corellas can eat the seeds. Suckering shoots are particularly dangerous. Domestic animals have been poisoned by leaves accidentally trapped in the side of trucks which were transporting them; 50g of leaves is enough to kill. Do not tie your horse to this tree!

On the plus side, the hard timber, which is one of the densest of any Australian tree, is resistant to termites. It was widely used by early settlers for railway sleepers and fence posts. Traditionally, Aboriginal people have made good use of the hard timber. Infusions of the leaves have been used to cure scabies while burning green leaves repel mosquitoes and sand flies. The tree produces creamy green flowers in spikes which eventually turn into flat, brown, woody, seed pods up to 14cm long.

Heart-leaf poison bush (*Gastrolobium grandiflorum*) which is found across northern Australia, contains the poison 1080 (monofluoroacetic acid), which is extremely poisonous to many introduced animals. There are 27 species of *Gastrolobium* sp in Australia. All are thought to be poisonous and 18 are known to contain toxic amounts of 1080. All except heart-leaf poison bush are found in south-western WA (where the seven species of *Oxylobium* plants containing 1080 also occur). It seems native mammals and birds in this region are not killed by the toxin, having evolved alongside these plants. So 1080 is often used for fox-baits in WA because it is considered safe for native animals.

Heart-leaf poison bush is a straggly, multi-stemmed bush which grows to about 2m. Leaves are grey-green, often with a notch at the tip. The large flowers are red and 'pea-shaped'; a shrub in full flower makes a spectacular display.

Matchwood, or **turpentine** (*Erythroxylum ellipticum*) is a fairly unremarkable small tree found across the north but it has some notorious cousins – related species in South America are the source of cocaine. None of the Australian species produce this, but do contain some interesting compounds. The timber is very durable, burns when wet and yields a beautiful red heartwood which is popular with wood turners.

Fire!

Along with drought, fire is one of the greatest trials facing vegetation in tropical woodlands, and trees living in savanna lands had to evolve strategies for surviving it long before humans entered the equation with firesticks and matches. The thick barks of many trees are a good defence, while smooth ones give little for the fire to catch on to. Most sclerophyll trees have special epicormic buds protected deep below the bark which will sprout if the main foliage is badly damaged (right). Woody swellings around the roots – lignotubers – can also shoot if necessary and some species (such as Darwin stringybark) produce extensive root suckers. Fire-sensitive trees may avoid the problem by creating dense stands and dropping abundant leaves to suppress the growth of fuel (grass).

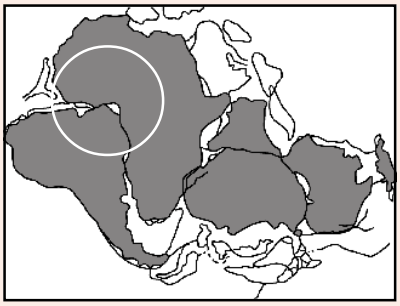
Many woodland species have woody pods which protect the seeds from fire, although the heat often stimulates them to open and release their seeds, at the appropriate moment, into a nutritious ash bed. Some hard seeds, such as acacias, need heat to stimulate germination. However, recent experiments have shown that it may be the smoke—possibly ammonia within it—rather than the heat which triggers germination in some species.

Questions & Answers

Q Could more specific information be given on how we know that flowering plants first evolved in western Africa?

A The oldest fossilised pollen, about 124 million years old, has been found in what is now western Africa. At that time the world's land masses, previously contained in the supercontinent, Pangaea, had split in two with Laurasia in the north and Gondwana in the south. Gondwana was composed of South America, Africa, India, Antarctica and Australia. A concentration of early pollen types in rocks about 120 million years old in western Gondwana suggests that this region was a major centre for the evolution of flowering plants. This centre was situated in an area where a vast rift valley was developing between northern South America and North Africa (see map). From here, flowering plants were able to spread across Gondwana. The oldest pollen found in Australia is about 110 million years old and comes from the Great Artesian Basin. It does not belong to any existing plant family.

Flowering plants seem to have diversified to produce many families relatively quickly. It is thought that the rift valleys, produced as continents pulled apart, would have provided good conditions for these plants to evolve. New environments created, and the microclimates present in these valleys, would have given the plants opportunities to become established while the variety of habitats would have encouraged diversity. Compared with the non-flowering plants, the new models had many advantages. They had the required genetic potential to adapt to new conditions. They also had better seeds and better distribution mechanisms. Rapidly evolving relationships with insects, mammals and birds, and the use of sophisticated pollination mechanisms, led to the speedy development of varieties available to take advantage of changing conditions.



Acknowledgements to The Nature of Hidden Worlds *by Mary E. White.*

Q I have been told that pythons in the Forsyth area breed with king browns to produce a particularly aggressive and venomous snake.

A This is absolutely impossible. They are completely different species of snakes. In fact, they belong to different families. If pythons and king browns could breed together, then so could dolphins and rats. Colour and patterns of snakes can vary greatly within the same species from one area to another, leading to confusion over identity. This may be source of some of these commonly believed myths. It is also rumoured that taipans can breed with pythons – an equally impossible idea.

Although they are not venomous, pythons will bite if provoked. Bacteria in their mouths could cause the bite to become infected, so it is a good idea to be cautious with all snakes, whether venomous or not.

Tourist talk

ENGLISH	GERMAN	JAPANESE	
woodland	Waldland	shinrinchi	森林地
drought	Dürre	kanbatsu	旱魃
leaves	Blätter	ha	葉
bark	Borke	juhi	樹皮
trunk	Baumstamm	miki	幹
stem	Ast	kuki	茎
bud	Knospe	tsubomi	蕾
thick	dick	atsui	厚い
transpiration	Verdunstung	hassan	発散
deciduous	jährlicher Laubfall	rakuyosei no	落葉性の

Facts and stats

Over 900 species of acacias have been recognised, but not all have been named. About 275 species occur in northern Australia.

Smooth-barked eucalypts earned the name 'gum trees' because they were the first recognised, by European botanists, to produce a lot of gum-like sap (kino).

Seeds of most acacia species remain viable for up to 20 years. Many require heat to germinate – in cultivation, seeds are sometimes dropped into recently boiled water to bring them to life.

Notable among deciduous eucalypts is the broad-leaved carbeen (*E. confertiflora*) which is widespread in tropical woodlands across northern Australia. New leaves sprout initially with an attractive purple colour. The large-leaved cabbage gum (*E. grandiflora*), found across the north, with its main distribution in the Northern Territory, and apple gum (*E. polysciada*), from the Top End, also drop their leaves.

Livistona palms belong to an ancient and primitive group. Fossils date back 65 and even 69 millions years.

Eucalypts, of about 40 species, cover 64 percent of the total area of Cape York Peninsula. Eighteen species of melaleucas cover about 14 percent of the area. Two species, *Eucalyptus tetrodonta* and *Melaleuca viridiflora*, dominate.

Sclerophyll plants include eucalypts, melaleucas, acacias, grevilleas and banksias. The word sclerophyll comes from two Greek words, *skleros* meaning 'hard' and *phullon*, meaning 'leaf'.

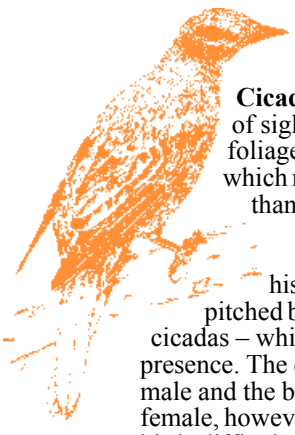
Researchers subjected the seeds of 94 Western Australian plants to cold smoke and to water through which smoke had been passed. Germination rates increased significantly after this treatment.

Sclerophyll trees in southern Australia seem to have a particularly strong relationship with fire – eucalypts there contain more flammable oils in their leaves than those to the north.

Acacias are not the only plants to dispense with leaves. A number of small shrubs of the *Bossiaea* genus (there are 50 species altogether) are common in tropical woodlands. Their 'green bits' are flattened stems, known as cladodes. These are not phyllodes, which are flattened leaf-stalks. They are grey-green and have prominent notches where the remains of the leaves may be seen. These plants are known locally in some parts as 'ferns', but the pea-shaped flowers, which spring from the notches, show that they are flowering plants.

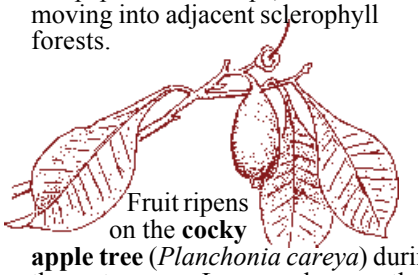
Out and about

A page of seasonal happenings and events, natural and otherwise, not necessarily related to the general theme of the newsletter.



Cicada birds tend to keep out of sight, foraging in the upper foliage for insects, a habit which makes them seem rarer than they actually are. At nesting time, however, the male suddenly finds his voice – a loud, high-pitched buzzing, reminiscent of cicadas – which gives away his presence. The dark plumage of the male and the brown feathers of the female, however, still make these shy birds difficult to spot.

Nesting can take place between October and March, but is mainly from November to January. A shallow cup of fine twigs and other vegetation is woven together with cobwebs and decorated with lichen and moss. Only one egg is laid, the female doing all the incubating. If the nest is disturbed the birds have been known to dismantle it and use the materials to build elsewhere. These birds are found across most of the north and down the east coast as far as Melbourne. They frequent mangroves, monsoon forests and paperbark swamps, sometimes moving into adjacent sclerophyll forests.



Fruit ripens on the **cocky apple tree** (*Planchonia careya*) during the wet season. Large and green, these fruits are more pear- than apple-shaped and contain a thick edible fibrous pulp. They are sometimes called billygoat plums, but this name is also used for several other species.

This tree flowers between July and November. The large white flowers have long stamens tinged pink at the base. They are short-lived, usually opening in the evening and dropping by the next morning – a strategy which would indicate nocturnal pollinators such as bats or moths. Cocky apple is widespread in tropical woodlands across northern Australia, growing in a variety of well-drained soils, including the fringes of coastal sand-dunes. The bark, leaves and branches have been used traditionally as a fish poison; chemicals released into the water interfere with the fishes' ability to breath and they rise to the surface, where they are easily collected.

The wet season sees the return of leaves to the branches of those deciduous trees which dropped them as a water-saving strategy during the Dry (see page 1). Those on the **batswing coral tree** (*Erythrina vespertilio*) have a distinctive shape which have earned the tree both its common and its specific name – *vespertilio* is Latin for 'bat'. The precise shape of the leaves varies, depending on locality, and this is a versatile tree, growing across the northern half of the continent from drier rainforest to desert.

The bare branches of this tree are covered with bright red flowers between July and November – a characteristic noted in the name *Erythrina* which comes from the Greek word for 'red'. Corkwood is another common name given to this tree; settlers used the soft bark as brake pads in their wagons. Branches often have thick black thorns which become smoother with age. A number of plants (for example *Capparis* and *Carissa* spp) have thorns while young. This is thought to deter herbivores and to date back to when the now extinct, browsing megafauna were a threat.

As days and nights grow hotter and more humid, insects of many types emerge in their adult forms. **Cicadas** spend their youth underground. After hatching from eggs, laid in slits in branches, the wingless young drop to the ground and burrow underneath. This phase of their life may last as long as 17 years as they gradually metamorphose, becoming more adult at each change. When mature, they climb out of the ground and up vertical supports where their skin splits and winged adults emerge. Discarded skins are a common sight. It is the adult male cicadas which make the deafening noise. An internal muscle pulls in a plate on the surface of a special drum-like organ on the side of the abdomen, causing it to click. It is rather like a tin lid being forced in, rapidly and repeatedly.

A **vegetation map of northern Australia** was produced recently. A Tropical Savannas CRC project, this map was created by botanists from Queensland, the Northern Territory and Western Australia.

The project involved integrating information from existing maps of various scales as well as filling in the gaps where no maps existed. In digital (1:1million scale) and printed (1:2million) forms, the maps are valuable for students, researchers and planners. Printed maps can be obtained from Kathryn Thorburn, Ph: (08) 8946 6754. For digital coverage, contact John Neldner, Ph: (07) 3896 9322. A technical report, in press, should be available as a CD-rom early in 2002; contact the Queensland Herbarium on (07) 3896 9326.

The draft **Hinchinbrook Marine Management Plan** is now available. This covers the Hinchinbrook Management Area and the Family Islands Management Area. This area is renowned for containing some of the most outstanding and spectacular islands, reefs and waters of the Great Barrier Reef World Heritage Area. The combination of the Hinchinbrook Channel, many and varied islands and reefs, and the adjacent mainland produces a unique environment. Publication of the draft management plan is a major opportunity for public involvement in helping manage these areas. Copies are available from EPA/QPWS offices in Ingham, Ph: (07) 4777 2822, Cairns, Ph: (07) 4046 6600 and Townsville, Ph: (07) 4722 5211 as well as Reef HQ in Townsville, Ph: (07) 4721 2399. It is also on the EPA website at: www.env.qld.gov.au/environment/park/managing/ Comments are due by 1 February 2002.

Bookshelf

Forest Trees of Australia
D.J Boland *et al.*
CSIRO Publications (1992)

A detailed guide to over 200 trees with useful introductions to major genera.

Plants of the Tropical Woodland
Mike Clark and Stuart Traynor
Conservation Commission of the Northern Territory (1987)

An introduction to 64 plants, aimed at the layperson/schools.

Native plants of Northern Australia
John Brook
Reed Book (1993)

450 species described in detail.

Common Plants of the Kimberley
Kevin Kenneally *et al.*
Bush Books: CALM

A pocket-sized booklet: illustrated guide to 32 species.

Native Plants of Queensland Vols 1-4
Keith A.W. Williams
CopyRight Publishing (1984-1999)

Trees and Shrubs of north-west Queensland
Jenny Milson
DPI Queensland (2000)

A Field Guide to Eucalypts Vol 3
Ian Brooker and David Kleinig
Inkata Press (1994)

A guide to 280 species north of 26deg. latitude.

Eucalyptus, an illustrated guide to identification
Ian Brooker and David Kleinig
Reed New Holland (1999)

A guide to 200 of the most common Australian species.

Cape York Peninsula – a natural history
Dawn W. Frith and Clifford B. Frith
Reed Books (1995)

Wildlife Australia Magazine Autumn 2001
A theory out of Africa: Acacias on two continents
Antoni V. Milewski

Australian Geographic No 61 Jan-March 2001
Great Australian survivor (wattles)

TREE Vol 14 No 1 January 1999
Ecophysiological traits of deciduous and evergreen woody species in the seasonally dry tropics.
Derek Eamus

Australian Journal of Botany 1997, 45, pp893-904
Observations on the demography of the Australian boab (*Adansonia gibbosa*) in the North-West of the Northern Territory, Australia.
D. M. J. S. Bowman

This newsletter is produced by the Environmental Protection Agency with funding from the Cooperative Research Centre for the Sustainable Development of Tropical Savannas, the Cooperative Research Centre for the Great Barrier Reef World Heritage Area, the Wet Tropics Management Authority and the Great Barrier Reef Marine Park Authority.

For further information contact...

Stella Martin
The Editor
Tropical Topics
Environmental Protection Agency
PO Box 2066
(10 - 12 McLeod St)
CAIRNS QLD 4870

Ph: (07) 4046 6674
Fax: (07) 4046 6604
e-mail: Stella.Martin@env.qld.gov.au

Tropical Savannas CRC
Northern Territory University
DARWIN NT 0909
Ph: (08) 8946 6834

CRC Reef Research Centre
PO Box 772,
TOWNSVILLE QLD 4810
Ph: (07) 4729 8400

Great Barrier Reef Marine Park Authority
PO Box 1379
TOWNSVILLE QLD 4810
Ph: (07) 4750 0700

Wet Tropics Management Authority
PO Box 2050
CAIRNS QLD 4870
Ph: (07) 4052 0555

Printed on 100% recycled paper.

Print Post Approved
PP434044/0034
Environmental Protection Agency
Northern Region
PO Box 2066, Cairns, Qld. 4870
Phone (07) 4046 6601 Fax (07) 4046 6604

SURFACE MAIL

POSTAGE PAID AUSTRALIA