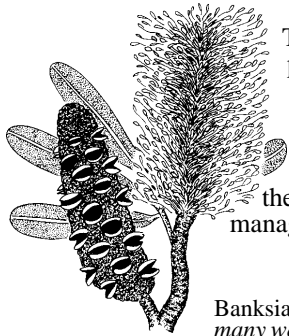


Wet sclerophyll and the rainforest invasion

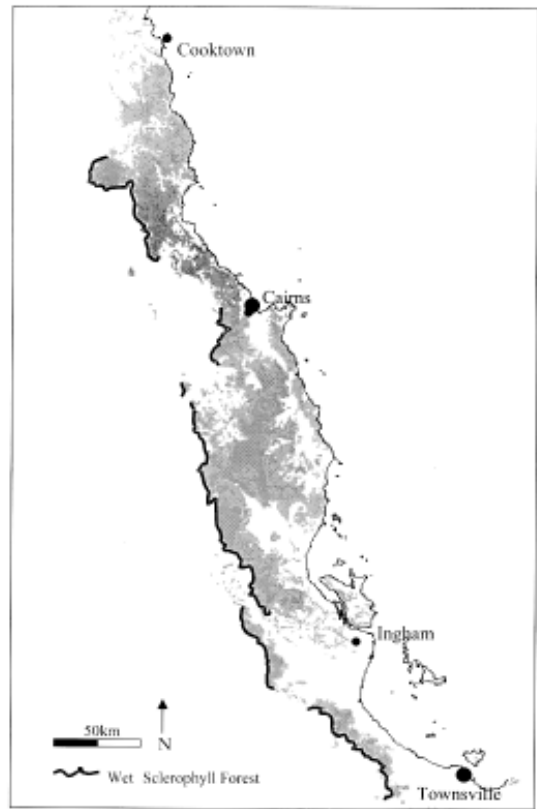
Although tall open woodlands cover fairly large areas elsewhere in Australia, in the Wet Tropics they are limited to a narrow, broken strip, 400km long, bordering the western side of the rainforest. Situated above 600m, this strip is 4km wide at most but often it extends for just a few metres – the accompanying map necessarily exaggerates its extent in places. Known as the wet sclerophyll, this forest type needs a wetter climate than the adjacent dry sclerophyll, but is characterised by the presence of eucalypts and other sclerophyllous plants.

The wet nature of the terrain occupied by wet sclerophyll is also suitable for rainforest – and rainforest is moving in. In many areas tall eucalypts, typical of wet sclerophyll forests, can be found towering above a younger rainforest understorey. Since the seeds of these eucalypts rarely germinate and seedlings do not thrive in the shady conditions created by the rainforest, there are no saplings coming up to replace their elders. It is therefore apparent that a change in vegetation type, from wet sclerophyll to rainforest, is taking place.



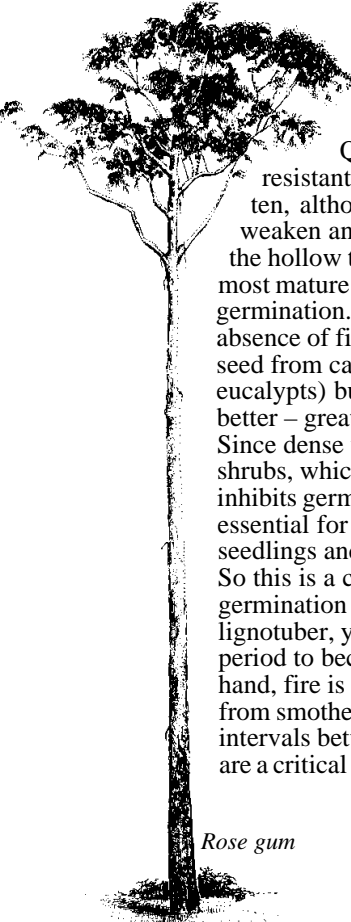
Banksia aquilonia flowers provide nectar for many wet sclerophyll animals.

There has been no significant change in rainfall patterns to trigger this change. It is thought that in the past, fires sweeping in periodically from the dry sclerophyll forests further west kept the rainforest at bay. A change in burning regimes and fuel loads since the arrival of Europeans and the disruption of traditional Aboriginal land management practices is thought to be responsible.



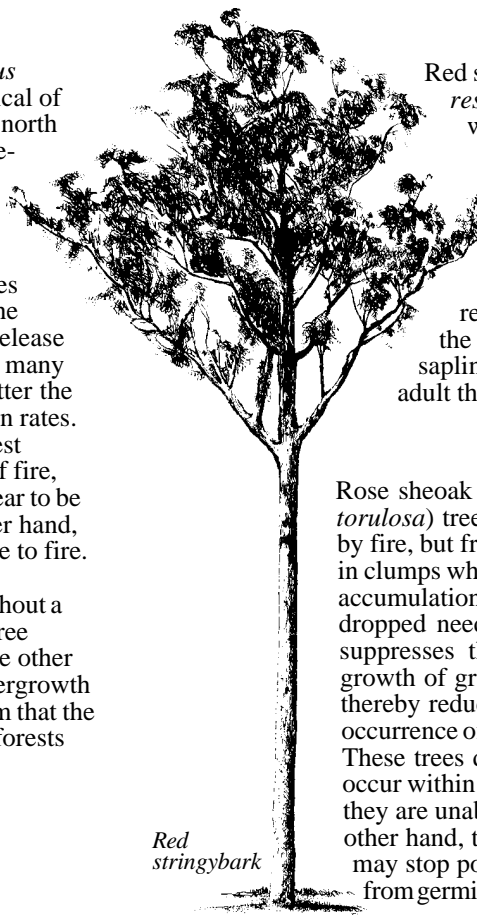
Fire and wet sclerophyll trees

Sclerophyllous trees are adapted to fire. They often have thick fire-resistant bark but, in the event of serious damage, many are able to produce new shoots from under the bark or from the roots (lignotubers). These forests are prone to fire because their open canopies allow grass to grow below, their leaves and twigs have inflammable oils and the abundant litter they produce burns easily. Rainforest, on the other hand, is relatively fire-resistant, but if it does burn, maybe on dry margins or disturbed sites, it is easily damaged. Wet sclerophyll trees – between the two – are ambivalent about fire.



Rose gum

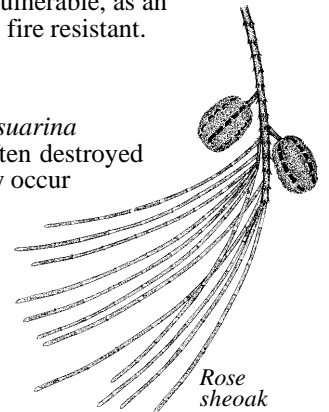
Rose gums (*Eucalyptus grandis*), the most typical of wet sclerophyll trees in north Queensland, are quite fire-resistant over the age of about ten, although successive burns weaken and eventually penetrate the hollow trunks which develop in most mature trees. Fire also stimulates germination. Some seeds sprout in the absence of fire (it is not required to release seed from capsules as is the case for many eucalypts) but a good burn – the hotter the better – greatly increases germination rates. Since dense undergrowth of rainforest shrubs, which grow in the absence of fire, inhibits germination, fire would appear to be essential for these trees. On the other hand, seedlings and saplings are vulnerable to fire. So this is a contradictory tree. Mass germination may follow fire, but, without a lignotuber, young trees need a fire-free period to become established. On the other hand, fire is needed to keep the undergrowth from smothering them. It would seem that the intervals between fires in rose gum forests are a critical factor for their survival.



Red stringybark

Red stringybark trees (*E. resinifera*) are similar in many ways, with ash beds formed after fire giving the young seedlings a good start in life. However, unlike the rose gum, this tree has a typically sclerophyll trick up its sleeve; it is able to resprout from lignotubers if the top is burnt off. Although saplings are vulnerable, as an adult this tree is fire resistant.

Rose sheoak (*Allocasuarina torulosa*) trees are often destroyed by fire, but frequently occur in clumps where the accumulation of dropped needles suppresses the growth of grasses, thereby reducing the occurrence of fire. These trees do not occur within rainforest – they are unable to grow in shade. On the other hand, their dense carpet of needles may stop potential rainforest invaders from germinating.



Rose sheoak

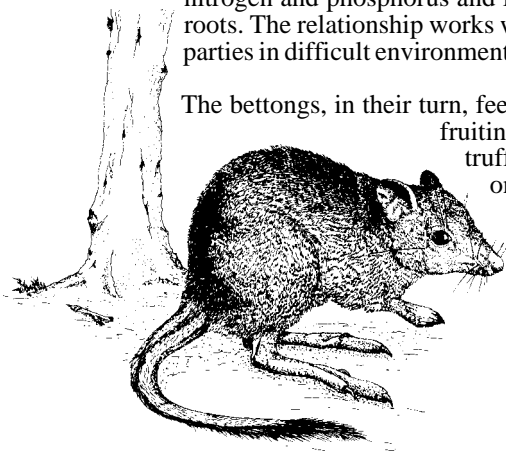
Bettongs, fungi and beagles

Where are the bettongs? It seems that two apparently unlikely factors are the key to bettong distribution – infertile soils and fire.

Studies have shown that distributions of northern bettongs are closely related to the poor, infertile soils derived from granite and metamorphic rock. This is in contrast to many other animals which do best on the better quality leaves and fruit produced on fertile basalt soils (see *Tropical Topics* 63). In the case of bettongs, however, infertile soils – particularly those which are low in phosphorus – mean more food.

The reason can be found by looking at ecosystem links. The trees which live in these nutrient-poor soils are particularly dependent on the contribution made by certain soil fungi. These organisms, known as mycorrhizas and ectomycorrhizas, wrap themselves around the tree roots. They feed on sugars produced by the trees but also make an important contribution to their host. With a network of filaments extending throughout the soil, they gather water, nitrogen and phosphorus and feed them into the tree roots. The relationship works well, benefiting both parties in difficult environments.

The bettongs, in their turn, feed on the underground fruiting bodies of the fungi – truffles. Since trees growing on poor soils are in most need of fungal assistance, it stands to reason that fungi, and therefore truffles, are more abundant in these areas. Bettongs play



their part in maintaining this useful relationship by dispersing the spores from the truffles in their droppings. These are not destroyed in the animal's digestive tract. In fact germination prospects are probably enhanced.

Fire plays another part in this complex relationship. Studies have shown that there is a sharp increase in truffle production after fires. This means that bettongs are restricted to those forest areas where fire is still possible, not those which have been invaded by rainforest.

Since truffles are vital to the bettongs, their presence is seen as the key to the survival of this endangered animal. Researchers involved in the bettong recovery program have turned to beagles for help. Using trained truffle-sniffing hounds they have been searching for suitable habitat for the reintroduction of northern bettongs which have been bred in captivity. Since northern bettongs currently occupy only a fraction of their former range, it is hoped that recolonisations could prevent their slide into extinction.

Where are the bettongs?

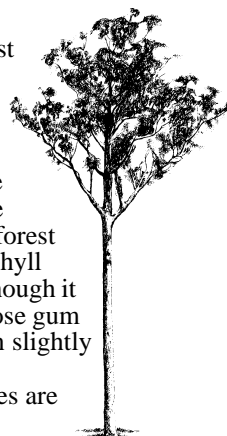
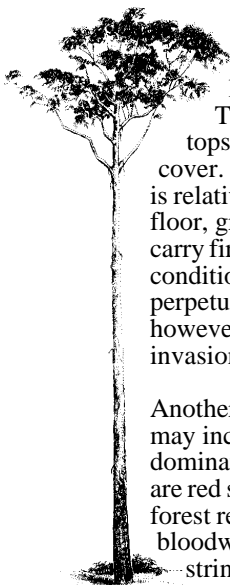
The distribution of northern bettongs is limited. They are found only in north Queensland, in a number of small pockets. Until recently they were known only from patches on the Lamb Range, west of Cairns, in the vicinity of Davies Creek National Park and Tinaroo Dam, as well as on Mt Windsor and the Carbine Tablelands. However, more have been discovered fairly recently in the vicinity of Paluma and Ravenshoe. These animals have been turning up in quite good numbers in drier sclerophyll forest thus extending the known range slightly.

Ten types of wet sclerophyll

Wet sclerophyll forest is not a uniform forest type – indeed researchers* have identified 10 different variations in north Queensland. There are two main types.

One, which generally fringes the rainforest boundary, is dominated by rose gums, otherwise known as flooded gums (*Eucalyptus grandis*) (left). These tall moisture-loving trees frequent the ridge tops and valleys, usually creating over half the canopy cover. However, since the canopy produced by these trees is relatively thin, allowing plenty of light to reach the forest floor, grasses are able to grow below these trees. Grasses carry fire, killing off rainforest seedlings, creating ideal conditions for the germination of more rose gums and thus perpetuating this forest type. In the absence of fire, however, this forest is most vulnerable to rainforest invasion.

Another main type of wet sclerophyll forest may include rose gums but is not dominated by them. Common species here are red stringybark (*E. resinifera*) (right), forest red gum (*E. tereticornis*), red bloodwood (*Corymbia intermedia*), white stringybark (*E. reducta*) and turpentine (*Syncarpia glomulifera*). This type of forest may have a grassy forest floor or a sclerophyll understorey, which is less flammable. Although it is often separated from rainforest by the rose gum forest type (above) and probably occurs in slightly drier areas, it is nonetheless vulnerable to rainforest invasion. The fact that these trees are never found standing in well-developed



rainforest suggests that even established trees die when invasion occurs.

Most of the other types of forests identified in this study are either variations on these two types, with degrees of rainforest invasion, or are drier sclerophyll types. These latter types occur in areas which are too dry for rainforest to invade.

*See Bookshelf page 8.

Threats to wet sclerophyll

In addition to the effects of rainforest invasion, wet sclerophyll forests have suffered from a number of other impacts. There has been intensive logging of those forests which are outside the Wet Tropics World Heritage Area. The fashion for pole homes has led to heavy logging of the tall straight turpentine trees which have the added advantage of being termite-resistant. Red stringybark and rose gum, those stalwarts of wet sclerophyll forests, have also been targeted.

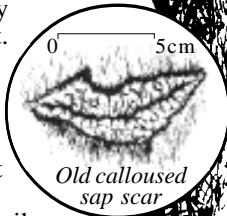
Collection of firewood for domestic stoves also affects the forest and its inhabitants. It removes nutrients from what is often a nutrient-poor situation and reduces fuel for fires which would serve to keep the rainforest intrusion at bay. Fuel collection also leads to a loss of shelter and nesting sites for animals such as bettongs which like to build their nests next to fallen logs.

In the wet sclerophyll

Some plants and animals are found only in wet sclerophyll forests while others are frequent visitors.

Red stringybark

(*Eucalyptus resinifera*) (right) is one of the most significant trees found in wet sclerophyll. A tall tree, reaching up to 45m in height on a straight trunk, it has a rough fibrous bark. The sap of this eucalypt is a major food source for fluffy gliders. At night they bite out small patches of bark on the trunk and branches, licking up the sugary sap which oozes out. A popular tree may become quite scarred from use.



Old calloused sap scar

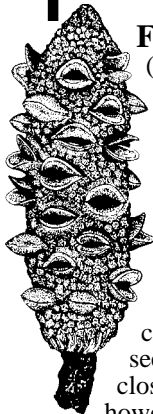
Fluffy gliders do not have this sap to themselves. Feather-tail gliders, sugar gliders, striped possums, common brushtail possums and yellow-footed antechinus often take advantage of the work done by the fluffy gliders.

During the day, other animals tap into the rich source of carbohydrate provided by red stringybarks. Up to 16 species of birds feed on the sap or eat insects which have been attracted to the sap. White-cheeked honeyeaters (left), those nectar-loving birds which feed on banksias, are among the stringybark's greatest devotees. However, a number of other honeyeaters as well as several parrot species – crimson rosellas are frequent visitors – and even satin bowerbirds, pied currawongs and Victoria's riflebirds, have been seen feeding on the sap.

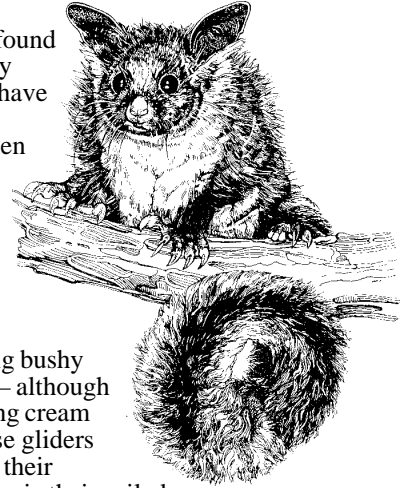


Forest banksia

(*Banksia aquilonia*) is a plant of the wet sclerophyll woodlands. It grows to 15m in height and has lemon-yellow flowers, particularly in autumn and winter. Most banksias retain mature seeds until a passing fire melts the resin in the cones which holds the seed-bearing follicles closed. This banksia, however, releases them as soon as they are mature. Forest banksia flowers produce a generous amount of nectar which is an important food source for many birds and other animals.

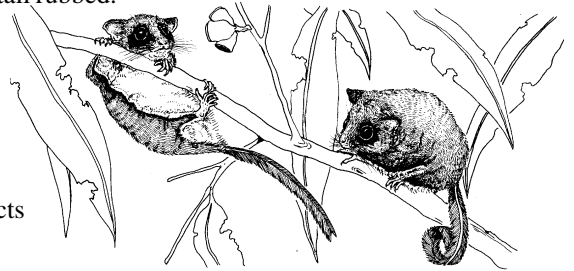


Fluffy gliders in north Queensland are found only in wet sclerophyll forests. Like so many animals found in this particular habitat, they have close relatives in similar habitat further south (southern Queensland to Victoria) but have been isolated from the main population long enough to become a sub-species. Elsewhere in Australia, fluffy gliders may feed from over 20 different tree species, but those in north Queensland eat sap only from red stringybark trees.



The fluffy glider, named for its particularly long bushy tail, is also known as the yellow-bellied glider – although the belly fur is white in younger animals, turning cream and yellow with age. In north Queensland these gliders rarely, if ever, have the bright yellow bellies of their southern counterparts. Fluffy gliders carry leaves in their coiled tails to line their dens, made in hollows in living rose gum trees. These dens are shared by some or all members of a group, generally consisting of one male, with up to five females and juveniles. Members of a group frequently exchange scents produced from glands on the top of the head and on the underside of the base of the tail. This is done during a head-to-tail manoeuvre, the animals of most junior rank in the group doing most of the head to tail rubbing and the dominant male having his tail rubbed.

Smaller than a house mouse, the **feathertail glider** zips around with astonishing agility and speed, feeding on nectar from blossoms, small insects and tree sap where larger animals have done the excavation work. Gliding up to 20m or more, these delightful little animals use both a flap which stretches from elbow to knee and their wide, flattened tails. Their aptly named tails have little fur on the top and bottom, but long stiff hairs on the sides. They are used to steer, balance and anchor the owner. Gecko-like pads on their toes, with fine grooves, allow them to cling to vertical surfaces, including glass.

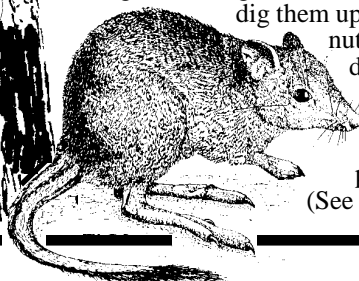


Brushtail possums are fond of visiting sap-producing sites on stringybark trees. Unlike the gliders which are able to hang upside-down to feed from the sap, and thus avoid gluing up their fur, these heavier animals must feed right way up and thus approach this sticky feed from below and to the side. Brushtail possums are widespread throughout Australia with one form, the coppery brushtail, living in upland rainforest. It is the common brushtails, however, which frequent wet sclerophyll.



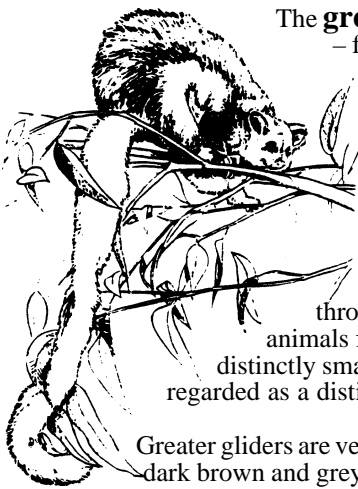
The **northern bettong** (*Bettongia tropica*) is found in the tall and medium tall grassy forests closely associated with wet sclerophyll. Occurring in only a limited number of pockets in north Queensland, this endangered little rat-kangaroo is pale grey above with cream on the belly and a short, black brush on the tip of its tail. Adults are a little smaller than the average rabbit.

Northern bettongs depend largely on truffles, the fruiting bodies of underground fungi, for food, using the strong claws on their forefeet to dig them up. Truffles are not generally a good source of nutrients for mammals but bettongs have developed a strategy for using them. Special bacteria in one part of the bettong's stomach consume the fungi. These bacteria and their by-products are then digested by another part of the stomach, providing a balanced diet. (See page 7 for more on northern bettongs.)



Sugar gliders have a much wider distribution than fluffy gliders, ranging through open forests from Broome, in Western Australia, right around the country in an arc to Victoria and Tasmania and into south-eastern South Australia. They occur in both dense forest – even rainforest occasionally – and in drier areas where trees are more widely spaced. They are able to glide from one tree to another using an extendable flap which extends from the fifth finger to the first toe on each side. Stretched wide when the animal jumps, this can carry it for at least 50m.

These gliders are often seen feeding alongside fluffy gliders at the sap on stringybark trees but also eat gum from other eucalypts and acacias as well as some invertebrates. In addition, they visit eucalypt, banksia, grevillea and even grass tree flowers to feed on nectar. Sugar gliders are sociable animals with up to seven sharing a den, usually in a tree hole.



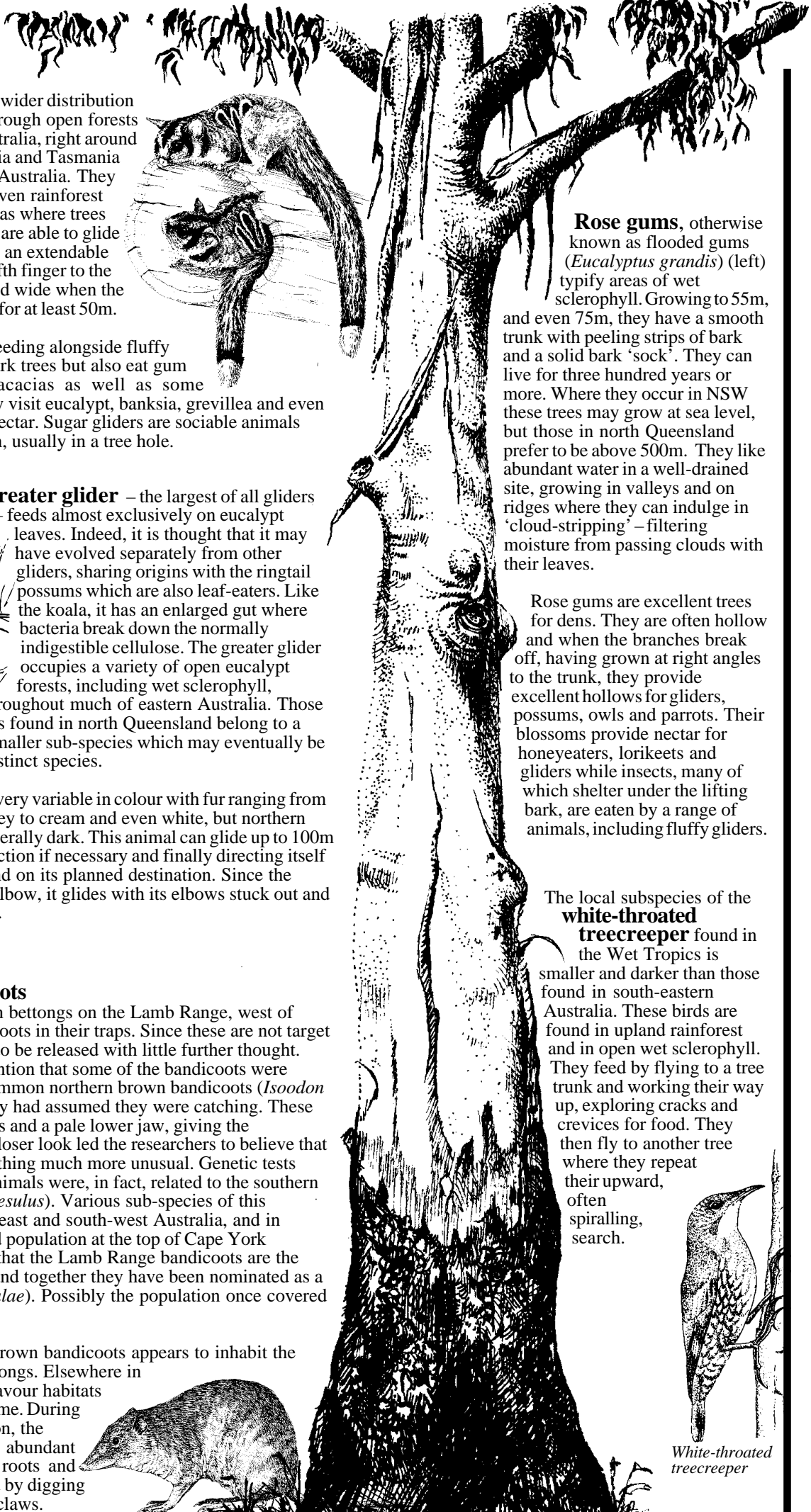
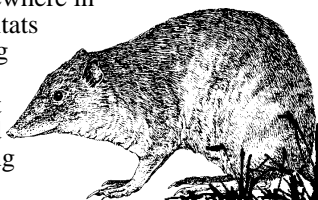
The **greater glider** – the largest of all gliders – feeds almost exclusively on eucalypt leaves. Indeed, it is thought that it may have evolved separately from other gliders, sharing origins with the ringtail possums which are also leaf-eaters. Like the koala, it has an enlarged gut where bacteria break down the normally indigestible cellulose. The greater glider occupies a variety of open eucalypt forests, including wet sclerophyll, throughout much of eastern Australia. Those animals found in north Queensland belong to a distinctly smaller sub-species which may eventually be regarded as a distinct species.

Greater gliders are very variable in colour with fur ranging from dark brown and grey to cream and even white, but northern individuals are generally dark. This animal can glide up to 100m in one ‘flight’, changing direction if necessary and finally directing itself upwards to lose speed and land on its planned destination. Since the gliding flap is attached to its elbow, it glides with its elbows stuck out and its paws tucked under its chin.

Southern brown bandicoots

Researchers studying northern bettongs on the Lamb Range, west of Cairns, frequently find bandicoots in their traps. Since these are not target animals, the bandicoots used to be released with little further thought. However, it came to their attention that some of the bandicoots were somewhat smaller than the common northern brown bandicoots (*Isoodon macrourus*) which is what they had assumed they were catching. These bandicoots had pale, hairy tails and a pale lower jaw, giving the appearance of a white lip. A closer look led the researchers to believe that they may have captured something much more unusual. Genetic tests eventually revealed that the animals were, in fact, related to the southern brown bandicoot (*Isoodon obesulus*). Various sub-species of this bandicoot are found in south-east and south-west Australia, and in Tasmania, with a very isolated population at the top of Cape York Peninsula. Tests have shown that the Lamb Range bandicoots are the same as the Cape York ones and together they have been nominated as a new species (*Isoodon peninsulae*). Possibly the population once covered a much larger area.

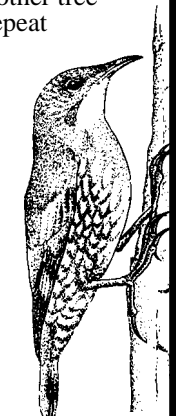
This population of southern brown bandicoots appears to inhabit the same area as the northern bettongs. Elsewhere in Australia they are known to favour habitats which are burnt from time to time. During the early stages of regeneration, the growing vegetation supports abundant insect food, as well as new roots and shoots, which the animals find by digging conical holes with strong foreclaws.



Rose gums, otherwise known as flooded gums (*Eucalyptus grandis*) (left) typify areas of wet sclerophyll. Growing to 55m, and even 75m, they have a smooth trunk with peeling strips of bark and a solid bark ‘sock’. They can live for three hundred years or more. Where they occur in NSW these trees may grow at sea level, but those in north Queensland prefer to be above 500m. They like abundant water in a well-drained site, growing in valleys and on ridges where they can indulge in ‘cloud-stripping’ – filtering moisture from passing clouds with their leaves.

Rose gums are excellent trees for dens. They are often hollow and when the branches break off, having grown at right angles to the trunk, they provide excellent hollows for gliders, possums, owls and parrots. Their blossoms provide nectar for honeyeaters, lorikeets and gliders while insects, many of which shelter under the lifting bark, are eaten by a range of animals, including fluffy gliders.

The local subspecies of the **white-throated tree creeper** found in the Wet Tropics is smaller and darker than those found in south-eastern Australia. These birds are found in upland rainforest and in open wet sclerophyll. They feed by flying to a tree trunk and working their way up, exploring cracks and crevices for food. They then fly to another tree where they repeat their upward, often spiralling, search.



White-throated tree creeper

Questions & Answers

Q In the Northern Territory, are permits allowed for estuarine crocodiles to be hunted, and are there numbers such to allow for this activity?

A People can get permits to harvest crocs in the Northern Territory but only on private land, not crown land. Landowners (Aboriginal and non-Aboriginal) can apply to the Wildlife Commission of the Northern Territory for a permit to harvest crocs and the Commission decides on an appropriate number for that particular permit based on knowledge of population sizes.

Acknowledgments to Dr Simon Stirrat, Parks and Wildlife Commission of the Northern Territory

Q How many species of velvet worms – peripatus – are found in the Wet Tropics? Is there a distribution map?

A Six species have been identified from the Wet Tropics. Another one has been recorded in the vicinity of Iron Range, a further one found near Bowen, another two in the Mackay area and another two inland from Gladstone. However, records are patchy, generally reflecting the areas which have been searched. Elsewhere in Australia these little creatures are usually found in damp rotting logs. However, in our wet climate they can live almost anywhere damp enough and possibly avoid rotting logs which may get too wet for them. Our peripatus are more

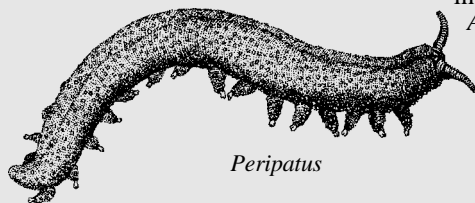
likely to inhabit leaf litter, making them that much more difficult to find. The six species in the Wet Tropics belong to three genera (one of these genera is represented by four species). Maps showing the location of these genera can be found in the paper: A. Reid 1996: Review of the Peripatopsidae (Onychophora) in Australia with comments on peripatopsid relationships. *Invertebrate Taxonomy Vol. 10 No. 4 pages 663-936*. If you would like copies of the maps contact the editor – details on page 8.

Undoubtedly more searching will reveal many more peripatus species. In addition, genetic studies are showing that animals which, on the basis of appearance, were thought to belong to one single species in fact represent several species. DNA from individuals living just 10 kilometres apart in a NSW forest showed that there were differences as great as those between a bee and a fly.

Peripatus are often referred to as ‘living fossils’. Although soft and worm-like, with many-segmented bodies, they also have walking legs, antennae and a breathing system like that of insects. They seem to represent an ancient link between the two groups. They also have an interesting sex life. Some males inseminate females directly through the skin while others, with a more up front approach, carry their sperm on their heads – and mate head first!

For more information there is an interesting article in *Nature Australia, Vol 27 No 1 Winter 2001: Tales of the Unexpected* by Paul Sunnucks and Noel Tait.

Acknowledgments to Noel Tait of Macquarie University for his help with this answer.



Peripatus

Facts and stats

It is estimated that wet sclerophyll forests and woodlands cover 54 000ha in the wet tropics region with 37 000ha (about 68 percent) within the Wet Tropics World Heritage Area. A comparison of maps from the 1940s with those of recent times has shown a 50 percent loss of this forest type in just 50 years, due to rainforest invasion. This figure rises to 70 percent for rose gum forest. There are nearly one million hectares of rainforest within the wet tropics.

The word sclerophyll is derived from the Greek *skleros* meaning hard and *phullon* meaning leaf. Sclerophyll plants characteristically have small, tough, dry leaves with a thick, leathery outer layer and sunken stomata, or breathing cells. The leaves also contain tannins, resins and essential oils.

Greater gliders are approximately 100 times heavier than feathertail gliders. The weight of an adult greater glider varies from 900g to 1700g, with those in the north weighing in on the lower end of the scale. Adult feathertail gliders weigh just about 10-14g. Fluffy gliders are large, weighing, on average, between 450g and 700g. Sugar gliders are relatively small weighing just 10 times more than feathertail gliders – the average adult is between 115g and 140g. By comparison, brushtail possums can weigh up to 4500g, although some adults tip the scales at just 1500g, which is slightly lighter than the heaviest greater glider.

At least 40 species of truffles are eaten by northern bettongs, making up between 30 and 70 percent of their diet. In addition, grass roots, herbs and lilies are eaten. Many of these store energy in the stem – the part targeted by the bettongs. A very few seeds, fruits and invertebrates are also eaten.

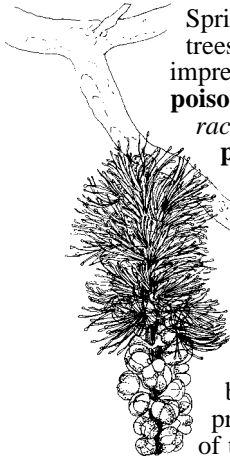
Australia consumes approximately 6.1 million tonnes of firewood a year, which is just slightly less than the 6.4 million tonnes consumed for woodchips. Most of the firewood comes from woodlands and this activity is listed ninth on the table of threats in the *Action Plan for Australian Birds*. Loss of nest sites and foraging habitat are the main problems.

In addition to the northern bettong there are four other types of bettongs in Australia. These are the rufous bettong, which is reasonably common in north Queensland, the brush-tailed bettong, the Tasmanian bettong and the burrowing bettong.

Tourist talk

ENGLISH	GERMAN	JAPANESE
truffles	Trüffel	torifu トリフ
hollow	Baumhöhle	kubomi 窪み
to bite	beißen	kamitsuku かみつく
sap	Saft	jueki 樹液
scar	Narbe	kizuato 傷痕
to glide	segeln	kakku suru 滑空する
nectar	Segler	hana no mitsu 花の蜜
undergrowth	Nektar	yabu 藪
invasion	Unterholz	shinnyu 侵入
fire	Feuer	kaji 火事

Out and about



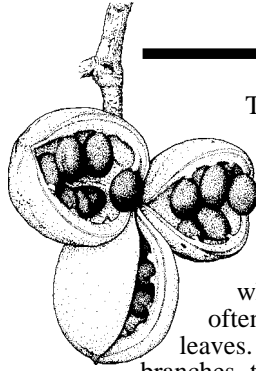
Spring brings blossom to many trees. Two particularly impressive ones are the **fish poison tree** (*Barringtonia racemosa*) and the **cassowary pine** (*B. calyptrata*),

otherwise known as the mango pine (left). White flowers cluster densely on long plumes up to 40cm in length. Looking like white bushy tails these racemes, as they are known botanically, hang in profusion from the branches of these trees attracting lorikeets and other nectar-loving birds. Growing to less than 10m in height these trees are good feature specimens for resorts where their unusual and spectacular flowers add a uniquely local flavour.

The large glossy leaves which resemble those of the mango tree have earned the mango pine its common name. However, this native tree does not grow to be nearly as big as a mango tree. The fish poison tree is named because it is one of over 30 plant species used traditionally to kill fish. The bark is pounded and put into a pool or dammed water body where it interferes with the ability of the fish to breathe. The stupefied fish rise to the surface where they are easily caught.



Do you know where **platypuses** are living? This information would be greatly appreciated by organisers of the Great Queensland Platypus Search. This statewide project aims to build up a picture of platypus populations, their habitat range and how they might be affected by environmental issues such as poor water quality, degraded riparian habitat and alterations to waterways. If you would like to contribute news of platypus sightings, please contact Keith Smith at QPWS on (07) 4091 7763, or via e-mail: keith.smith@env.qld.gov.au

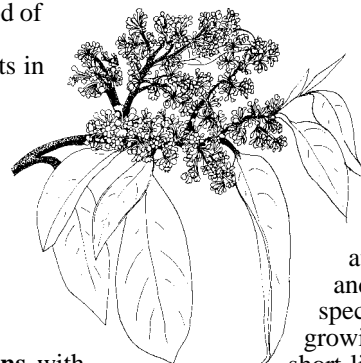


The colourful pods of the **peanut trees** (*Sterculia quadrifida*) appear at this time of year, when the tree has often lost many of its leaves. Clustered on the branches, the pods are scarlet when ripe. Each opens to reveal several satiny blue-black seeds which contrast sharply with the bright red interior of the pod. The seeds, which have a flavour similar to peanuts, can be eaten either raw or roasted.

This plant has many traditional uses. Apart from the edible seeds, the inner bark can be used to make string and the leaves used in cooking. They are also applied to various wounds, including those of stonefish and stingrays, while an infusion from the bark is used for sore eyes.

This plant belongs to the same family, Sterculiaceae, as the flame tree and kurrajongs. The name comes from Sterculius, the Roman god of manure heaps! This is because some other plants in this family have foul-smelling leaves and flowers.

Acknowledgments to Australian Rainforest Plants II by Nan and Hugh Nicholson.

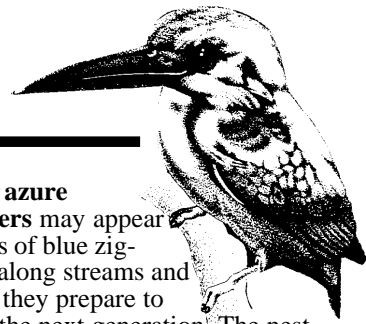


Sarsaparilla trees (left), also known as pink and white ash (*Alphitonia petriei*), cover themselves with blossom in springtime, the nectar and pollen attracting many birds and insects. This pioneer species is extremely fast growing, but relatively short-lived. It is one of the first species to establish itself in disturbed areas and is common along roadsides and other forest edges.

The leaves of this tree are silvery-white on the underside, the tree glowing distinctively when lit from underneath by a spotlight at night. These leaves are often chosen by tooth-billed bowerbirds to decorate their performing spaces and they are an important food source for Herbert river ringtail possums and Lumholtz tree-kangaroos. They are also a food source for the caterpillars of the small green-banded blue butterfly and eight species of moths. When crushed, the leaves, as well as the bark, smell like sarsaparilla.

About six months after flowering, dull black globular fruits, each about 1.5cm across, appear. These attract numerous birds including superb fruit-doves, Victoria's riflebirds, king parrots and crimson rosellas.

The 9th Ecotourism Association of Australia Conference
 When: 23-26 October
 Place: Rottnest Island WA
 More information: Tony Charters (Conference Convenor) Ecotourism Association of Australia, PO Box 328, Brisbane QLD 4001. Tel: (07) 3535 5493; Fax: (07) 3535 5445; E-mail: tony.charters@tq.com.au
 Website: www.ecotourism.org.au



Courting **azure kingfishers** may appear as flashes of blue zig-zagging along streams and rivers as they prepare to produce the next generation! The nest is built in a chamber at the end of a one-metre tunnel which both sexes help to excavate into the stream bank. This chamber is lined with fish scales, bones and crustacean shells and four to seven rounded white eggs are laid. This is a common type of egg for birds nesting in holes. They do not need to be pointed because they are not going to roll away and the white colour makes them visible to the parent birds in the gloomy chamber.

This lovely bird lives up to its name. It is indeed a most glorious colour of blue (the word azure is derived from the Persian word for the semi-precious stone lapis lazuli) and unlike many other kingfishers which feed on land, it frequents streams and rivers, perching above the water and diving down when a suitable fish appears. It also eats crustaceans and aquatic insects.

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Please call **urgently** to report injured, stranded or dead dugongs as well as dolphins, whales and marine turtles



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