

Tropical Topics

An interpretive newsletter for the tourism industry



Birds of the savannas

No. 73 May 2002

Notes from the Editor

Birds living in the sometimes harsh conditions of the savanna lands have had to adapt accordingly. Nonetheless, there is a great diversity, particularly among seed-eating birds, a surprisingly large number of which are endemic (see box, this page). This suggests a great age for the savanna ecosystem which is, in fact, thought to be about 15 million years old – plenty of time for birds to have evolved specialised niches.

This issue of *Tropical Topics* cannot, of course, look at all birds of the savanna lands but instead draws together some common threads – problems facing the seed-eaters and the fruit-eaters – as well as taking a look at some of the more obvious and charismatic species found in the area.

I would like to thank Fiona Fraser, Northern Territory University, Keith Fisher, Greg Czechura, Queensland Museum and Steve Garnett, QPWS for their help with this issue.

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Seed-eaters in strife

The tropical savannas of northern Australia are home to a large number of seed-eating birds – 55 of Australia's 90 seed-eating species are found there. They include parrots, quails, pigeons and a particularly large representation of finches – 14 of Australia's 18 finch species inhabit the savannas.

However, studies have shown that many of these birds are in trouble, having disappeared from a number of areas. Seed-eating birds are in more trouble than any other animal group in the savannas and savanna seed-eaters are in more trouble than those elsewhere in Australia. Intensive studies of selected species (see pages 2 & 7 for details) have indicated some common problems.

The early wet season is a particularly stressful time for seed-eaters. Most grass seeds germinate with the early rain, making it difficult for the birds to find food. Many juveniles die at this time of year if they have not developed strategies for finding new food sources and learned to quickly identify ripe seed.

A common theme in seed-eater declines seems to be changed fire regimes. In the past, according to historical records, indigenous people lit fires at almost any time when it wasn't raining. Areas burnt at any one time tended to be relatively limited, resulting in a complex mosaic of small burnt and unburnt patches. The steady removal of fuel meant that fires over extensive areas were fairly rare. This pattern suited the seed-eaters well, leaving pockets of seed at different stages of maturity to sustain them throughout the year.

Fire regimes have changed with the advent of pastoralism, though patterns vary among landholders. The concentration of fire during the dry season means that areas burned are often extensive. This limits the amount of food available to the birds. As studies of the birds' requirements illuminate the need for patchy burning,

landholders are beginning to adopt new burning regimes. For graziers, this also has the advantage of halting the loss of grasslands, which are being invaded by woodland in many places. For the birds, it could mean a future.



Star finch

No fewer than 13 species, plus 10 additional subspecies, of seed-eating birds are endemic to the savannas, meaning that they live nowhere else in the world.

Chestnut-backed button-quail
Buff-breasted button-quail
Partridge pigeon (two subspecies)
White-quilled rock-pigeon (two subspecies)
Chestnut-quilled rock-pigeon
Northern rosella
Golden-shouldered parrot
Hooded parrot
Long-tailed finch
Masked finch (two subspecies)
Yellow-rumped mannikin
Pictorella mannikin
Gouldian finch
Sub-species:
Squatter pigeon
Little corella
Sulphur-crested cockatoo
Australian ringneck
Double-barred finch
Black-throated finch
Crimson finch
Star finch
Red-browed finch
Chestnut-breasted mannikin



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



Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

The fate of finches and pigeons

Several species of seed-eating birds have been studied in detail in order to pinpoint the reasons for their declines.

Crimson finch illustration courtesy Interpretive Birding Bulletin



Star finch

however, have reduced the availability of this type of vegetation in drier areas. In places other than Cape York, where the finches still thrive, they seem to have benefited from agriculture, particularly sugar cane, which provides a similarly sheltered habitat.

More profound changes in the vegetation, brought about by cattle grazing and altered fire regimes are also affecting the birds. Coastal grasslands in Cape York are being steadily taken over by woodland, dominated by melaleucas and eucalypts (see p7 for more details). In addition, the types of grasses are also changing, with species favoured by the finches being replaced by those which are more resilient to grazing but which do not provide the finches with food. On the other hand, introduced grasses in agricultural areas, where the finches are not in trouble, may help to feed them.

Until recently, mystery surrounded the whereabouts of star finches in the wet season, after they disappeared from dry season feeding grounds around Princess Charlotte Bay. Then, in late 1999, flocks were discovered feeding in unburnt grasslands on salt pans near the sea. Star finches on the western side of Cape York, however, have a different strategy. They move into casuarina woodlands where they sit up on the branches picking seeds from the cones.

Partridge pigeons

Partridge pigeons feed on the seeds of more than 60 plant species. They are found at the top of the Northern Territory, where birds have bright red skin around the eyes, and the Kimberley where a distinct sub-species has bright yellow skin around the eyes. Although able to fly, these birds opt to walk. Outside the breeding season they gather in groups of 30 or more, cooing softly as they trot together between waterholes and feeding grounds. If the grass is too dense, they will choose to travel along tracks. When disturbed the birds initially freeze, only at the last minute bursting up in flight with swift, noisy wingbeats in a manner reminiscent of partridges.

These birds are sharing the problems of other seed-eating birds in the savannas, having suffered a decline in the last century and become extinct in many parts of their previous range. Their ground-nesting habits have probably left them vulnerable to introduced predators but research indicates that grazing and changed fire regimes have also had a negative effect on these birds.

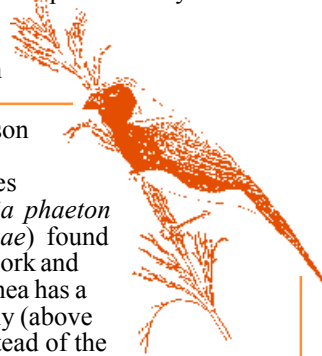
Compared with many other tropical seed-eaters, partridge pigeons have a small home range and seem to do best where there is variation in the physical structure of the vegetation

Sub-species of **star finches** and **crimson finches** which were once widespread in Cape York Peninsula are now confined to two small populations on the east and west coasts of the peninsula. Studies have shown that changes in vegetation on Cape York may be the cause. Both birds depend on very dense grass. Star finches nest in it and crimson

finches rely on it for shelter from predators while feeding. Trampling by cattle, and fires,

The crimson finch subspecies (*Neochmia phaeton evangelinae*) found in Cape York and New Guinea has a white belly (above right) instead of the black belly seen on crimson finches elsewhere in Australia. Differences in the subspecies of star finch (*N. ruficauda clarescens*) are more subtle. Curiously the bills of both these endangered subspecies are smaller than those of their cousins* elsewhere. This means they cannot handle larger seeds efficiently – husking them is too time-consuming – so the range of food available to them is more limited.

*Sub-species elsewhere in Australia (*N. phaeton phaeton* and *N. ruficauda subclarescens*) although also declining in numbers, are thriving in some parts of the Northern Territory and Western Australia.



The bright colours of **Gouldian finches** have led to extensive trapping of these lovely birds for the caged-bird industry. These finches were once widespread in woodlands across northern Australia, flocks of thousands providing a spectacular sight as recently as 50 years ago. They have now disappeared from nearly half their previous range and numbers are continuing to decline. Populations in Queensland have been particularly badly affected.

Grazing and changes in fire regimes seem to be affecting seed availability. In the dry season, the finches are able to find seeds on the ground in recently burned areas and in the wet season they like to feed in areas which were burned in the previous dry season, targeting perennial grasses. However, if the areas burnt are too large, they have problems finding food. Gouldian finches seem to be persisting best in rocky areas, such as the Kimberley, where pockets of grassland remain ungrazed. Diseases have also been implicated but are not considered a major cause of declines.

Twenty Gouldian finches were recently released into the wild at the Mareeba Tropical Savanna and Wetland Reserve in north Queensland. They are part of an experimental breed-and-release program which aims to re-establish populations in an area where they have been absent for 25 years. The birds quickly paired up and have been nesting.

within this limited area – they like to feed in recently burnt areas but nest among denser grasses. Their diet also varies. Speargrass is an important staple during the dry season. Its growth is encouraged by dry season fires. However, like all seed-eaters, the birds face a food shortage during the early wet season and, at this time, rely heavily on perennial grasses, such as cockatoo grass, which set seed when the seeds of annual grasses are germinating and sprouting. The amount of seed produced and timing of seed set of these grasses can be affected by previous dry season burning. These grasses are also less common in areas grazed by cattle.

Tracking of individual pigeons has shown that they respond to food shortage by extending their feeding ranges considerably – from an average 8ha to 31ha – in the early wet season. However, these birds do not, by nature, travel great distances. Extensive dry season fires therefore leave them with limited food for the wet season and reduced nesting opportunities. Patchy habitats, on the other hand, with small areas burned at different times, appear to be ideal.





The plight of the parrots

Golden-shouldered parrots were once found throughout Cape York Peninsula but have been declining in numbers for at least 80 years and now occur only in two small areas near Musgrave, in the centre of the peninsula, and to the west of Chillagoe. Changed fire regimes are considered the main culprit for a number of reasons.

There is no shortage of food – grass seed – for the parrots, if the area is not overgrazed. Indeed, for much of the dry season they only need to feed for a few hours a day, eating the fallen seed of fire grass, a common annual. They prefer burnt areas where the lack of cover allows them to find seed on the ground easily. The rest of the time they perch, safe from predators, in the trees.

As the fire grass seed germinates with the first rains of the wet season, sprouting grass obscures seeds still lying on the ground. However, if this new growth is burned, ungerminated seeds which remain become visible to the parrots. Fires at this time seem to be vital for the parrots' survival, allowing them access to seed which will keep them going until the perennial cockatoo grass produces seeds about six weeks later. To complicate matters, cockatoo grass which is burned after the first storms produces up to 10 times more seed, later in the season, than the unburnt cockatoo grass. Evidently, a complex mosaic of small areas burned at different times is most likely to provide a sustained source of food for the birds. Early wet season burns are particularly important, but if extensive dry season fires have already used up the fuel, they may not be possible.

Another aspect is the trend for grasslands to be invaded by woodland, particularly broad-leaved ti-trees (*Melaleuca viridiflora*) where fires are infrequent. These trees have a tendency to sucker from the base. Frequent fires will keep the suckers below grass level but once the trees have had a long enough fire-free period to grow over a metre in height, only very hot fires will kill them. The presence of these trees affect the parrots in two main ways. Dense growth cuts out light, thereby reducing grass growth and food resources. They also provide nesting and perching sites for butcherbirds which are major predators of both young and mature birds.

Woodswallows stand guard

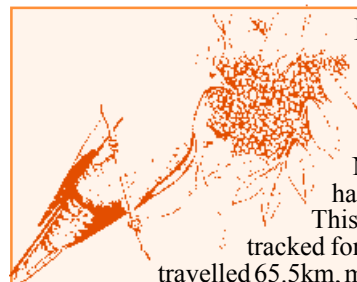
At first glance, it seems unlikely that seed-eating parrots and finches would have anything in common with insect-capturing woodswallows. However, researchers have noticed that golden-shouldered parrots and hooded parrots, (similar parrots found in southern and eastern Arnhem Land, Northern Territory) are often to be found feeding on the ground below black-faced woodswallows during the woodswallow nesting season from the late dry to early wet seasons. Finches too join in – Gouldians, long-tailed and masked finches alongside the hooded parrots in the Northern Territory with blackfaced and masked finches joining the golden-shouldered parrots on Cape York Peninsula. Even doves, trillers, sittellas, willie wagtails, leaden flycatchers and treecreepers have been observed joining the party.

It seems that the woodswallows act as sentinels. When a predator such as a butcherbird or kookaburra comes anywhere near their nests, these feisty birds mob and chase them. This serves as a warning to birds which have their heads down, intent on finding seeds on the ground. It allows them to spend more time on feeding and less on looking around for danger. Given that butcherbirds prey not only on eggs and nestlings but also on adult, breeding parrots, the woodswallows offer a very valuable alarm service. Whether they are repaid for this is not clear. Possibly the seed-eaters disturb a useful number of insects as they forage. Once the woodswallows have finished nesting, however, the other birds lose their alarm system, unfortunately at a time when food takes longer to find and entails a longer period spent, vulnerable, on the ground.

Curiously, one group of golden-shouldered parrots formed an association with grey-crowned babblers, relying on their alarm calls.



Black-backed butcherbirds (above), along with pied butcherbirds, are major predators of golden-shouldered parrots.



Flying tree-planters

In October 1996, a pied imperial-pigeon was captured in a small patch of rainforest in the Northern Territory where it had landed to feed on fruit.

This particular pigeon was then tracked for 78 days. In that time it travelled 65.5km, moving from one rainforest patch to another. At each of the numerous sites it visited, researchers estimated it deposited between 10 and 20 seeds in its droppings, many of them having been transported from the previous patch of forest.

Pied imperial-pigeons (also known as Torres Strait pigeons) migrate from New Guinea to northern Australia each summer to breed, and rely on a steady supply of fruit from rainforest trees to sustain them. In the Wet Tropics, rainforest occupies a fairly continuous strip, but in the savanna regions it occurs in patches where local conditions provide sufficient moisture. Averaging just 3.6ha in size, a total of about 15 000 of these patches in the

Northern Territory amount to just 0.2 percent of the land area.

Nevertheless, these little areas are vital for a suite of fruit-eating birds such as pied imperial-pigeons, rose-crowned fruit-doves, figbirds, yellow orioles, common koels and great bowerbirds as well as flying foxes. But, just as the animals need the forest patches, so the forest patches need the animals. They are essential dispersers for plant seeds, with an average patch receiving an estimated 190 seeds a day from their avian visitors. Researchers predict that the loss of too many patches would lead to a food shortage – and the consequent loss of these dispersers. The loss of dispersers would, in turn, lead to a gradual decline in biodiversity and, eventually, the loss of remaining patches.

This would be likely to have consequences elsewhere also. When rainforest fruit is scarce, the fruit-eaters move into surrounding habitats and probably play a dispersal role here too. Each patch of forest may seem insignificant, but together they play a vital role in maintaining the network of interdependence which keeps the ecosystem functioning.

Savanna characters

Birds are a prominent feature of the savanna lands. Some are secretive but some are significant characters.



Wedge-tailed eagles are impressive birds. The largest eagles in Australia, and among the largest in the world, they have wingspans of up to 2.5m. Often, all that can be seen is a small shape, high in the sky, gliding on the thermals with its keen eyes searching the ground for food.

The wedge-tailed eagle once carried a bounty on its head. Between 1927 and 1968, 150 000 bounties were paid in Western Australia. Ten thousand were paid in Queensland in a single year. The circumstantial evidence was not good for the eagles. Often seen feeding on newly-dead livestock, they were assumed to be a major predator. However, wedgies prefer fresh carrion, if it is available, to hunting and the livestock they have been observed eating was usually dead when they got there – or if killed by the birds, would probably have already been weak or orphaned.

Roadkills are a great bonus for these birds although, being slow to take off, they sometimes become the next victim, left for dead in the verge next to their erstwhile dinner. A wide variety of animals are also hunted, from lizards to ground-foraging birds as big as emus, and mammals – the main dietary item – including wallabies, kangaroos, possums and introduced animals. Rabbits are ideal prey making up to 90 percent of their diet in some areas, although the decline in their numbers, due to the release of the calicivirus, means that the birds have had to turn to other sources of food.

These eagles construct appropriately large nests, weighing up to 400kg, usually in strong trees. Maintaining a territory, and probably the same mate, for life, the birds build several nests, using them on a rotational basis. Usually two eggs are laid and if food is available both will survive. Otherwise, the older chick may kill the smaller one. At about the age of eight months the young birds

leave their parents' territories and go off travelling – a banding study in Western Australia indicated that they move an average of 228km from the nest. One adventurous youngster journeyed 748km in just 11 months while another, in Queensland, has been found 868km from its parental home.

Young birds are brown with golden-brown feathers on the nape and upper back. Most gradually darken with age, eventually becoming almost entirely black when mature, at about five to seven years of age. Some, however, retain their juvenile colours. Wedge-tailed eagles can live for over 40 years. Apart from its large size, its long legs with feathered 'trousers' and pale bill are distinctive features. In the air, its long diamond-shaped tail is distinctive.



Red goshawk: our most threatened bird of prey

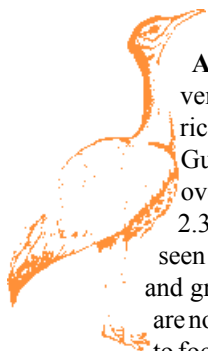
The red goshawk is Australia's rarest and most threatened bird of prey.

Favouring riverine forests as well as tropical and subtropical woodlands and open forests, it occurs across the top of Australia. On the east coast, it occurs as far south as New South Wales but has now virtually disappeared from this state. These birds are swift hunters using their strong feet and claws (the largest, proportionally, of any Australian raptor) to take live prey – mainly medium to large birds up to the size of Australian brush-turkeys and red-tailed black cockatoos. Each pair needs a large territory – up to 200 square km.

The main threat facing these birds is habitat loss and fragmentation, particularly around watercourses. Other threats include fires, lit late in the dry season, which destroy nesting trees and active nests of both the goshawks and their prey species, as well as shooting and illegal theft of eggs for collections.

If you see any red goshawks in Queensland, or just over the Northern Territory border, Greg Czechura, Queensland Museum would be keen to hear about it.

Contact Tel: (07) 3840 7642 or Email: gregc@qm.qld.gov.au. He is also happy to answer any queries about raptors.



Australian bustards are very similar to those in Africa, Arabia, India and New Guinea. They are large birds, over a metre in height with a 2.3m wingspan, and can be seen striding around grasslands and grassy woodland. Bustards are nomadic, moving according to food sources. They eat grass, fruit, seeds and large insects as well as mice and reptiles, and are able to survive for long periods without drinking. In north-west Australia they are very fond of moonflowers.

Bustards are generally seen on foot but can fly. If disturbed, they will at first freeze, then walk or run away, finally taking off with a heavy strong flight. At breeding times the male puts on an impressive display. He inflates his throat sac so that his long neck feathers spread out in a fan, droops his wings and, with tail splayed over his back, produces a series of roars. The female rewards his efforts by taking full responsibility for incubation of the eggs, on the ground.

There has been a massive decline in numbers of bustards in the southern

states of Australia where flocks of up to 1000 could once be encountered. This has been blamed on a combination of intensive agriculture, the invasion of pastoral land by woody weeds, predation of nests by foxes, pesticides and hunting – they were killed by the thousand from about 1860 until protected in 1935. The presence of cattle, sheep and humans also leads the birds to desert their nests. In the north, they have declined in some places, possibly due to woody weed invasion, but in other areas seem to have benefited from clearing.



Emu illustration courtesy Lynda Strahan/
Interpretive Birding Bulletin

Emus in the wild are a dramatic sight. Said to reach 70km/h at a sprint and able to cruise at about 45km/h, they are nomadic travellers, moving according to weather and food supplies. They have been observed moving towards clouds and seem to be able to detect rain from great distances. Records show that they can travel over 900km in nine months and one journey was clocked at 442km in just 80 days.

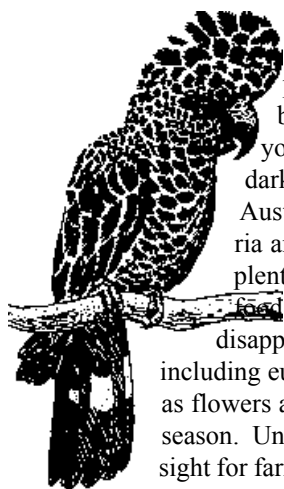
Avoiding thick forest and settled areas, emus are found throughout the rest of the Australian mainland, adapting to various environments and feeding on whatever food they can find – flowers, seeds, shoots, fruits, stems and insects, including grasshoppers when they appear in plagues. They even eat their own faeces to pick up nutrients which didn't get absorbed first time round. However, when the breeding season approaches emus go off their food. As the days begin to shorten, after the winter solstice on 21-22 December, the skin on the birds' necks becomes a brighter blue. It is the female who calls the shots. She develops a chest – a pouch and bunch of fluffy feathers – and struts about with the pouch inflated (see illustration above).

This acts as a resonating chamber amplifying her booming call so it can be heard 2km away. Males grunt in reply.

She chooses her male and courts him, chasing away other females who come near. The female is presumably looking for a mate with stamina. Like cassowaries, male emus do all the incubation and raising of the chicks. His mate simply provides the dark green eggs – up to 20 of them. Weighing 700-900g each, this is no inconsiderable contribution on her part. A male emu becomes obsessed with eggs – or paddy melons, oil filters or stubbies, if he has no eggs to sit on.

Once he has a reasonable clutch (about seven eggs) the male can be quite aggressive to his mate, or any other female, if they try to add more eggs. He then squats, incubating the eggs non-stop for 56 days without leaving to feed or drink. Stretching his neck along the ground, he does his best to imitate a rock or pile of vegetation and goes into a state of semi-torpor. By the end of his ordeal he may have lost up to 25 % of his body weight but he then has to care for youngsters, herding them with him for up to 18 months. Losses are high, with an average of two chicks surviving to adulthood.

Although numbers of emus are high, they appear to have declined in some areas, particularly inland and to the north. The reason for this is unclear. Emus are hardy and can survive drought, but they may be affected by pollution, intensive farming, hunting by farmers protecting their crops, and the effect of changed fire regimes on food resources. On the plus side, farming has benefited emus by providing artificial watering holes.



Red-tailed black cockatoos gather in massive flocks sometimes several thousand strong – a spectacular sight when these large parrots take to the air. The black males have startling bright red bands in the tail which splays out in flight. The females, and the young for the first four years, have yellow speckles and bars on their dark plumage and orange in the tail. There are several sub-species in Australia, with different feeding habits. Those in south-western Victoria are considered threatened but those across northern Australia are plentiful. Like many savanna birds, the cockatoos migrate according to food supplies. They are more commonly seen in the dry season, disappearing from many areas during the Wet. They eat a variety of things including eucalypt, acacia and banksia seeds, nuts, fruits and insects as well as flowers and nectar. They also feed in recently burnt areas during the dry season. Unfortunately the large flocks of cockatoos are not such a welcome sight for farmers when they descend on peanut crops. The birds have learned to pull the plants from the ground to get to the nuts underneath. Permits are issued to shoot 'scout' birds, in order to deter the entire flock and elaborate scaring methods have been used – but the birds simply move on to another field. As an experiment, a 'sacrificial crop' of 40 acres of peanuts was planted at Lakeland Downs on Cape York Peninsula in 1999. The birds were allowed to eat these but chased from other fields.

Kookaburras of two species have overlapping territories in the savannas of north Queensland – the laughing kookaburra and the blue-winged kookaburra. The latter is a tropical species with more blue on the wings and tail (male) and a raucous, screaming call in place of the cackling laughter. It is found across the northern savanna. Where the two species coincide, they exclude each other from their family territories, just as members of the same species would. (Different species of birds often disregard each other.) It is thought that the two kookaburras were separated for long enough in the past to evolve different forms, but that their nesting and feeding habits remained the same – thus making them competitors in the same environment.

Apostlebirds, so-called because they give the impression of appearing in groups of 12 (though there may be anywhere between eight and 16 in the mob) are a noisy feature of inland Queensland and the NT. They have several other names, notably CWA (Country Womens Association) birds because of the noise they make and also lousy jack, for their tendency to alert animals to the stealthy approach of traditional hunters. The groups are family clans that work together to build the mud nest and care for the young. The close-knit family feeds, drinks, roosts, preens and plays together. The birds spend a lot of time on the ground and fly weakly. In trees they prefer to hop from branch to branch on their strong legs rather than use their wings.

Black kites, known as fire hawks in places, are attracted by the smoke from bush fires. Large numbers can be seen circling on thermals above burning grasslands, keeping a sharp lookout for animals fleeing in panic. Reptiles, rodents and insects are taken. So useful are fires to black kites, there are unconfirmed reports of them dropping burning sticks to extend the fire.

The more solitary **brown falcon** also takes advantage of bush fires, pouncing on its victims from a perch where it has been waiting quietly. It rarely chases prey on the wing.

Questions & Answers

Q How dangerous are crocodiles?

A Everything is relative. You are over 6000 times more likely to die in a road accident than be killed by a crocodile. Between 1991 and 2000, 19,064 people died in road accidents in Australia. During the same period, only one person was killed by a crocodile in Queensland, two in the Northern Territory and none in Western Australia. Statistics show that more people die from road accidents, drowning, scuba diving accidents, bee stings, lightning strikes, shark attacks and box jellyfish stings than from croc attacks.

However, it is likely that croc attack statistics would be higher if people were not careful. These animals do pose a very real danger and the key to avoiding becoming a victim is to exercise caution and commonsense.

Estuarine crocodiles occupy estuarine and freshwater rivers, swamps and billabongs in a coastal strip around northern Australia between Broome in Western Australia and Rockhampton in Queensland. Their range can extend quite some distance inland, well into the freshwater reaches of river systems. They also travel along the coast and can be encountered on beaches, islands and cays of the Great Barrier Reef.

The key to avoiding a negative interaction with a crocodile is to be 'croc-wise in croc country':

- Obey crocodile warning signs. Just because you don't see any crocs, doesn't mean they aren't there.
- Don't go swimming, paddling or wading in areas where there are likely to be crocs and keep

well away from the water's edge.

- Don't camp within 50m of water.
- Don't sit on branches overhanging a croc creek. Crocs can jump!
- Be cautious when fishing; don't stand in the water.
- Don't share food scraps or fish guts with crocs: they may come back for more!
- Don't assume because someone else was safe that you will be also: crocodiles are aware of areas regularly used by animals seeking water. Remember you are an animal too!
- Be careful in boats. Crocs can overturn canoes or grab a foot dangling over the edge.
- Adults should supervise children when near water in croc country.
- Be moderate with alcohol intake in croc territory. As with road accidents, most croc attack victims have become careless while intoxicated.

Q I have read that leeches are closely related to earthworms. Like an earthworm, can a leech survive the removal of some of its body?

A No, leeches can heal from wounds, but they will not regenerate missing parts and will die if the wound is too bad. This is due to the specialisation of the leech body. Unlike earthworms and other oligochaetes, leeches always have a fixed number of body segments and have a reduced coelomic system. (The coelom is the body space or cavity between the intestinal canal and body wall.)

Acknowledgements to Dr Fredric Govedich, whose website on leeches is at: www-personal.monash.edu.au/~fgodevic/leech/index.htm

Facts and stats

Numbers of emus are estimated at 100 000-200 000 in Western Australia and 525 000 in the rest of Australia, principally New South Wales and Queensland.

In 1976 about 100 000 emus – approximately half the Western Australian population – accumulated on the northern side of barrier fences protecting the wheat paddocks in the state's south-west. Most died as a result.

In the wild, colouration of Gouldian finches varies; in about 70-80 percent of birds the feathers of the face and crown are black, in about 20-30 percent of birds they are red and in a few, ochre-yellow.

Finches can drink with their heads down. They suck up water and therefore don't have to tip up their heads to swallow.

Crimson finches eat large numbers of spiders during the wet season, giving them a protein boost at breeding time. They have been observed collecting them from the eaves of buildings and even entering buildings in search of them.

Flock bronzewing pigeons once occurred in flocks many thousands strong but a combination of grazing, rabbits and drought led to a loss of food supplies in many areas. They still occur in reduced numbers – hundreds – particularly on Mitchell grass.

The red goshawk has been given its own genus (*Erythrotriorchis* rather than *Accipiter*). It may be better categorised as a hawk-eagle.

The squatter pigeon is very similar in many ways to the partridge pigeon but is found in the eastern side of Australia, while the partridge pigeon occupies areas in the Northern Territory and the Kimberley. There are two forms. Those in the north have red skin around the eye while in the south the skin is pale blue. However, some birds have been recorded with skin which was half red and half blue, sharply demarcated.

Emus have a wide diet. One shot in 1972 contained in its stomach, in addition to grass and other vegetation, 1 carpenter's steel-pointed plumb-bob, 2 plastic electric wall plugs, 1 wash-tub plug, 1 spring and 3 solid rubber door stops. Emus in captivity have been known to eat paper, bottle-tops, keys, coins, broaches, cement powder and broken glass – which emerged with smooth edges.

The word 'bustard' has links back to Pliny who, in 77AD, called these big birds *avis tarda*, meaning 'slow birds'. In time this became modified to *bustard*.

The word 'emu' has Portuguese origins in the word *ema*, meaning 'heron'. It was originally used for any large bird.

Tourist talk

ENGLISH	GERMAN	JAPANESE
finch	Fink	フィンチ
pigeon	Taube	鳩
parrot	Papagei	オウム
eagle	Adler	鷲
emu	Emu	エミュー
grass	Gras	草
seed	Samen	種
to germinate	keimen	発芽する
burnt	verbrannt	焼けた
cattle	Rindvieh	牛

Out and about



A number of **cycads** (*Cycas* species) are to be found in savanna woodlands. They are often burnt during the dry season but afterwards produce a fresh crown of light green fronds. Burning also seems to encourage reproduction.

These ancient plants have been around for about 230 million years, before flowers evolved, and produce cones instead of flowers. Plants are either male or female and pollen is blown from the male cone to the female one, although it can also be carried by insects, notably weevils. The temperature of mature cones may increase by up to 17 deg. above the local air temperature, usually in the afternoon. The breakdown of stored starch and lipids creates the heat and this may serve to attract pollinating insects and/or help the male cone to shed pollen.



Male cone

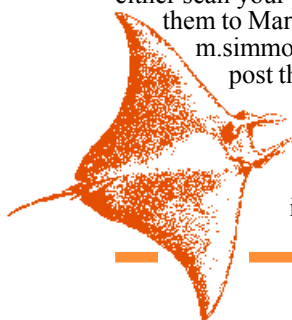


Cycas media Female cone

Do you have any photographs of **manta rays**? Mark Simmons would be interested to see them. Mark is studying mantas at Lady Elliot Island and recently had a major article, with his photographs, published in the March/April issue of *Australian Geographic* magazine. He has tagged a number of mantas and is currently concentrating on photo identification work. As a result, he is keen to see any photographs of these magnificent animals. They would be used only for research, not publication, and acknowledgement would be given when the project is finally written up.

Belly shots of the animals are particularly helpful. It doesn't matter when the photos were taken but it would be helpful if details of the location and time of year could be included. Mark would also be interested to hear of areas where mantas are regularly seen. You could either scan your photos and e-mail them to Mark at

m.simmons@gbrmpa.gov.au or post them to 26 Bultarra Crescent, Kirwan, QLD 4817 and he will scan and return them immediately.



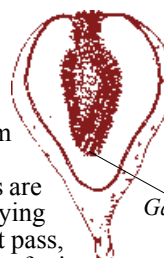
Happy birthday Tropical Topics

Tropical Topics is now 10 years old. It was started in 1992 in response to requests from tour operators who were attending workshops in interpretation and who wanted access to a continuing source of information. Funded by the Wet Tropics Management Authority and the Great Barrier Reef Marine Park Authority, the newsletters alternated between blue (marine) and green (rainforest) themed issues for many years. More recently the Cooperative Research Centre (CRC) Reef has provided funding and since December 2000 CRC Savanna has funded four 'orange' issues dealing with dry tropics (savanna) themes.



Rock figs (*Ficus platypoda*) produce reddish purple 'fruits' during the dry season. This bushy tree, growing to about 8m in height, sprawls over rocks and is common in dry rainforest and vine thickets as well as coastal cliffs across northern Australia. It produces large numbers of aerial roots.

You will never see flowers on a fig tree – unless you cut open the figs. This raises the question of how they are pollinated. In fact, each fig tree depends on a particular species of tiny wasp (Agaonidae) to do the work. The process starts with a female wasp flying into a small hole at the top of the fig. Inside the rock fig she finds male, female and gall flowers. Before she dies she lays her eggs on the special gall flowers. When the eggs hatch, the males mate with the females and die. The females fly around inside the fig, carrying pollen from male to female flowers before escaping through a hole to start the process again in another fig. The actual fruits are tiny seed-like balls which form inside after the flowers have been fertilised. Figs are popular with birds and flying foxes which eat them but pass, or spit out, the tiny fruits undamaged.



Gall flowers



The charismatic caterpillars of the **four o'clock moth** (*Dysphania fenestrata*) can be seen throughout the winter months eating the leaves of their host plant, corky bark (*Carallia brachiata*). Bright yellow, and sometimes green, with black spots, they have a peculiar habit of standing erect for much of the time.

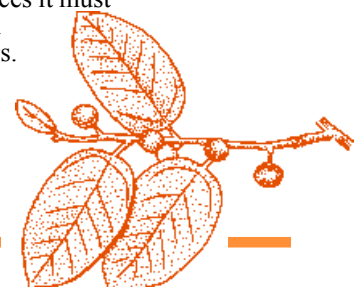


The adult is a day-flying moth. Queensland specimens have a yellow body and dark purple wings with transparent 'windows' and yellow spots. However, this varies across Australia. In those found in the Northern Territory and north-western Australia the purple tends to be duller and the yellow parts of the wing either orange, or absent.

The host plant, corky bark, is interesting in that it is the only member of the Rhizophora family which is not a mangrove. It is found in monsoon forests, vine thickets and in rocky outcrops in open woodland.



The **sandpaper fig** (*Ficus opposita*) is also widespread across the top of Australia where it is found as a common understorey tree in woodland and open forest. It has tough, very rough leaves (above) which have earned it its common name. Most of these fall off during the dry season if water is scarce. This fig has separate male and female trees which means that the species of wasp which services it must carry pollen between figs.



Bookshelf

Reader's Digest Complete Book of Australian Birds
Reader's Digest (1993)

Field Guide to the Birds of Australia
Simpson & Day
Viking (1996)

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

ARTICLES

Savanna Links – CRC Savanna Newsletter

Issue 3 November 1996

Project to save the Gouldian Finch
Issue 6 May-June 1998

Paradise falters for seed-eating birds
Don Franklin

& Rainforest patches provide the link
Issue 12 Nov-Dec 1999

Fire, grazing and partridge pigeons
Fiona Fraser

Issue 15 July-Sept 2000
Rank grass and sugarcane provide succour to north's endangered finches

Nature Australia
Vol 25 No 3 Summer 1995-96

Redgoshawk
Stephen Debus
Vol 25 No 5 Winter 1996

Golden-shouldered Parrot
Stephen Garnett and Gabriel Crowley
Vol 26 No 9 Winter 2000

KFC with a kick (emu)
Steve van Dyck
Vol 26 No 10 Spring 2000
Bold eagle (wedge-tailed)
Paula Winkel

Interpretive Birding Bulletin
Vol 2 No 6 April/May 1999

Behavioural Profile of the Crimson Finch

Michael Todd
Vol 4 No 6 May/June 2001

Emus: made in Australia, made for

Australia
Dominique Blache

Australian Geographic No 58 April-June 2000

Superbird (emu)
Ken Eastwood

Wingspan December 1994
Golden-shouldered Parrots
Stephen Garnett and Gabriel Crowley

GEO Vol 22 No 2
Where eagle scientists dare (wedge-tailed)
Monica van Wensveen

The ecology of the partridge pigeon and habitat impacts due to fire and grazing.

Fiona Fraser
Available on the CRC Savanna website at: <http://savanna.ntu.edu.au/education/students/current/fiona.html>

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For further information contact...

Opinions expressed in *Tropical Topics* are not necessarily those of the Environmental Protection Agency

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