FASCINATING *Phascogales*

BY SUSAN RHIND

If you go down to the woods today, you are very unlikely to come across a phascogale. These engaging creatures are among the most elusive of our native marsupials, but a researcher from Murdoch University is uncovering some intriguing facts about their unorthodox lifestyle.

Most Australians have never heard of a phascogale, let alone seen one. While in the bush, a man recalled spotting what he took to be an enormous black hairy caterpillar on a fence post. It was only when a small furry face appeared that he realised it was a very large tail attached to a small mammal. The brush-tailed phascogale of the South West (*Phascogale tapoatafa tapoatafa*) is a member of the marsupial group of animals known as the dasyurids. Its squirrel-like appearance and tree-dwelling habit have earned it the nickname 'native squirrel', but unlike squirrels, all the dasyurids are carnivorous. The scientific name is a combination of the scientific term 'phascogale', meaning pouched weasel, and the Aboriginal name *tapoa tafa*. In Western Australia, the animal is known by its Aboriginal name (wambenger), and in eastern Australia it is known as a tuan.

Phascogale tapoatafa is not a household name, not just because it does not exactly roll off the tongue, but because its owner is extremely elusive. There are several reasons for this. It occurs sparsely throughout the forests of Australia, and the fact that it is arboreal (tree-living) as well as nocturnal means that you have to be very lucky to spot one. Although the animals are small (females weigh only 100-160 g, males 140-280 g), they require large ranges and the females appear to be territorial. Each female seems to require a territory of 20-60 hectares. Although information on males is insufficient, their territories are even larger. At least one male in Victoria is known to have travelled a distance of 17 km in the breeding season.

Another reason why phascogales are rarely seen is the large annual drop in their population. In common with their nearest relative, the red-tailed phascogale (*Phascogale calura*), and a number of the smaller dasyurids (*Antechinus* species), the males adopt the somewhat extreme strategy of dying off each year at the end of the winter mating season. During the breeding season, large amounts of hormones flood the males' bodies. As well as preparing them for mating, the hormones have side effects: they cause bleeding, a tendency for gastric ulceration and suppress the immune system. This form of built-in obsolescence means that males die from gastric haemorrhage or stress-related illnesses after the mating season. In addition, in order to encounter as many females as possible, the males must cover considerable distances. In doing so, they spend less time than usual up in the trees eating, and more time moving on the ground, where they are vulnerable to predators. It is likely that many fall victim to the introduced fox and cat.

Phascogales are rarely caught during routine mammal surveys, partly because they are cautious about entering traps and partly because they are extremely good escape artists. Given this talent for escapology, their nocturnal and arboreal habits, the low density of the animals and the large annual changes in population, it is hardly surprising that phascogales are rarely seen. Those who have had an encounter with this extraordinary creature regard it as a unique experience. The animal is about 40 cm long, silver-grey with a cream belly, and has a magnificent black bottle-brush tail. When in action, it can be electric in its movement and remarkably agile, scampering upside down with ease.

A northern subspecies of brush-tailed phascogale is recognised (*Phascogale tapoatafa pirata*), but few of these have

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The phascogale easily clings upside down on trunk bark.
Photo - Jiri Lochman

Left: Phascogales climb with lightning speed, scaling the tallest tree in seconds.
Photo - Babs and Bert Wells

Far right: Jarrah and other trees provide the phascogale with bark, which the animal shreds. It then uses the strips to line its nest.
Photo - Jiri Lochman

been captured. Those that have been found in the Kimberley region of Western Australia, the Northern Territory and northern Queensland are smaller than their southern relatives, have slightly different dentition and are subtly different in colour.

After the winter mating season, the males die, leaving the females to rear the young. After a 30-day pregnancy, up to eight young are born, find their way to the pouch and attach themselves to the nipples. Seven weeks after birth, the young are deposited in a tree hollow by the mother, who returns to feed them in between her nightly foraging expeditions. The young begin to emerge from the hollow at about three-and-a-half months and start dispersing in early summer at five months of age. The young males disperse earlier than the females, and travel further before settling into an area, which may be kilometres away from the maternal nest.

After leaving the family nest, phascogales lead a solitary life. Although there are accounts of animals sharing a nest, this seems very rare. All phascogales are short-lived, but unlike the males that die after one year, it seems that about half of the females survive their first year and have a second litter of young in their second year.

The phascogale is one of the most arboreal of the dasyurids. It gleans insects from trees, and depends on trees for hollows in which to nest. The clearing of forests for farmland has reduced its range throughout Australia, and in New South Wales and Victoria its range has declined by 40 per cent. The last confirmed sighting of a phascogale in South Australia was in 1967 and they may be extinct in that State. In Western Australia, the brush-tailed phascogale is considered extinct in the Wheatbelt. Recent fossils found near Balladonia and at Coalseam Reserve near Geraldton suggest that phascogales might have been far more widespread in Western Australia at the time of European occupation than they are now. It is estimated that their range has contracted by about 30 per cent in Western Australia, and they are now confined to the jarrah and karri forests of the South West.

NESTS AND HOLLOWS

If we are to ensure the conservation of the species, detailed information on the biology and habitat requirements of phascogales is needed. In 1992, Murdoch University began a four-year research project to investigate these factors. Phascogales were known to use artificial nest boxes at the Perup Forest Ecology

Above left: Nest boxes being made from second-hand pine at CALM's Manjimup workshop.
Photo - Murdoch University

Above centre: The author identifying insect parts in phascogale scats.
Photo - Murdoch University

Above right: Habitat trees are located by searching out radio-collared phascogales during the day when they are asleep.
Photo - Murdoch University

Phascogales in Western Australia are now found only in the jarrah and Karri forests of the south-west.
Photo - Jiri Lochman

Centre near Manjimup, run by the Department of Conservation and Land Management (CALM), so this location became the starting point for the research. The nest boxes had originally been placed in trees to attract hollow-nesting birds, but phascogales obviously found them attractive too.

In order to catch animals in the numbers required for research, several study sites were established, more nest boxes were put in place and a trapping program was begun. Given the phascogales' talent for escape, traps were modified to include a lock mechanism designed by Todd Soderquist, who has been studying phascogales in Victoria for several years.

When animals are caught or retrieved from nest boxes, they are sexed, weighed, measured, individually marked with an ear tattoo and released. Some individuals are fitted with radio-collars before being released, and their movements followed. During the day, the phascogales nest in tree hollows and can be radio-tracked to these trees. Detailed information is taken on the location and characteristics of the trees that bear hollows suitable for phascogales. As the hollows cannot be assessed directly, the number of times that an animal uses the same hollow is taken as a measure of the quality of that hollow. Preliminary results show that all hollows are not equal. Young adults appear to use several hollows within their range (some only once), before settling down to use fewer, 'better quality' hollows. Typically, a 'quality' hollow is used for 3-5 days before the animal moves residence, but there are, of course, exceptions. One male was known to use the same hollow for at least 30 days in a row. The hollows that are used repeatedly are usually in much larger trees than those that are used only once, and the trees are typically mature or dead.

The nests that phascogales make in nest boxes are lined predominantly with shredded jarrah bark, although paperbark and feathers are added when available. The nests that females make in which to raise their young are extremely fine; they put considerable effort into shredding bark and collecting fur, feathers and wool. Ellis Troughton noted in his classic work *Furred Animals of Australia* (1941): 'On one occasion the disappearance of a pound-note caused a distinctly strained feeling in a timber-cutters' camp, until it was discovered in a brush-tail's nest when a nearby tree was felled'.

In addition to radio-tracking animals during the day, night-time radio-tracking is undertaken to record behavioural data. Unlike most Australian marsupials, phascogales are very tolerant of being quietly followed and watched under spotlight. With care, the animals can be approached as they forage and will continue to behave normally. If an animal is annoyed, it will either sit still and glare at the intruder or tap its feet loudly.

Phascogales are primarily arboreal insectivores. They explore the tree bark, examining all the crevices and bulldozing the bark off with their noses in search of the insects underneath. Sometimes they are meticulous in their searching and will cover even the tiniest twig on every tree limb, whereas at other times the search is cursory. The number of trees that are covered in a foraging expedition can vary enormously. In addition to tree insects, animals have been observed eating the brilliant red flesh of zamia nuts, and licking marri sap. There are accounts of phascogales creating havoc in chicken yards by killing chickens, but this is probably a rare event. They are undoubtedly opportunistic when it comes to food, eating whatever can be caught and subdued, but tree insects are clearly their staple diet.

Phascogales move from tree to tree, either by jumping short distances of up to two metres between the canopies, or by coming down the trunk and quickly bouncing along the ground to the next tree. The amount of time they spend on the ground varies considerably between individuals, and males certainly spend much more time on the ground during the mating season than they would normally. In general, an animal will spend only a few seconds on the ground between trees, but one night, I was watching a male who wandered around on the ground for at least half an hour, and on two occasions bounded over and circled my feet. This type of curiosity is not uncommon.

From radio-tracking information, data on activity is also being gathered. Phascogales emerge after dusk, forage for a couple of hours, return to the nest to rest, then re-emerge to hunt for several hours before returning to a nest at dawn. The amount of time spent resting depends on night-length: on long winter nights they appear to sleep for 3-5 hours. Many nocturnal species are less active on moonlight nights, perhaps to avoid predators, but phascogales do not seem unduly deterred by moonlight, and appear to continue their foraging regardless.

CONSERVATION

Predation of phascogales is difficult to determine in a study, unless radio-collared animals are killed. Of five such animals killed fairly recently, four deaths were attributed to a cat and one to a fox or dog. About 60 per cent of the phascogale specimens in the WA Museum were handed in following cat kills, and there are numerous anecdotes of phascogales being brought home by the family cat. Clearly cat predation is a serious problem (see 'Masterly Marauders' in *LANDSCOPE*, Summer 1992-93), but there are other, less obvious predators. Phascogale remains have been found in tiger quoll faeces in eastern Australia, and it is quite possible that our own quoll, the chuditch, preys on phascogales. In order to determine this, the faeces of chuditch (which also occasionally enter the phascogale traps) are collected for analysis. Other known predators of phascogales in eastern Australia include the powerful owl and the goanna. The feral motorcar also claims phascogale lives: 35 per cent of WA Museum specimens were killed on the roads. Deaths caused by both cars

Above: Unlike the solitary brush-tailed phascogale, the red-tailed phascogale shown here is a social animal. It is more at home in areas of allocasuarina (shown here) and wandoo rather than jarrah.
Photo - Jiri Lochman

Left: Radio-tracking collared animals provides an insight into their behaviour. The radio collar weighs only 4 g, and the whip aerial bends easily as the animal moves in and out of hollows.
Photo - Jiri Lochman

INFORMATION WANTED ON PHASCOGALES

The author would appreciate any information on sightings of animals around Perth, north and east of Perth, and any region east of the Albany Highway. The most important information is: exact location, date, description of the animal and its activity, surroundings, contact name and address.

Details should be mailed to Susan Rhind, School of Biological and Environmental Sciences, Murdoch University, South Street, Murdoch WA 6150.

and predators are greatest during the period of dispersal of the young in summer and during the mating period (May-July). Almost twice as many males are killed as females, which is largely a reflection of their greater ground movement.

The range of the brush-tailed phascogale has contracted throughout Australia. These animals need large territories, which cannot be provided by small, isolated reserves, and are strictly dependent on forest which contains mature trees with hollows. Proper conservation is therefore of great importance. As large-scale agricultural clearing has now all but ceased in the South West forests, timber cutting and predation by feral animals are the remaining potential threats to phascogale populations. Much work is being done to find controls for feral animals, and logging practices continue to be modified. Some measures are already in place, such as leaving habitat trees and strips of mature vegetation in areas where jarrah is harvested; the effectiveness of these will be monitored at least during the present research. Furthermore, large areas of mature forest have been set aside as parks and reserves, where timber cutting and mining are not scheduled.

With so much of the Wheatbelt devoted to farming, the forests of the South West are now the one habitat of the phascogale in Western Australia. It has been suggested in the eastern States, however, that phascogale populations may be particularly affected by some methods of logging. Similar information is needed for Western Australian conditions; the findings would help in devising harvesting practices that maximise phascogale conservation. For that reason, CALM is very supportive of the current research into the impact of logging on the phascogale. In co-operation with CALM, study sites have been established in an area designated for timber cutting in 1995. Detailed information will be gathered before, during and after logging to determine its impact and the measures to be adopted to minimise it.

Phascogale populations have already declined throughout Australia. More information on their habitat requirements is needed if we are to prevent future losses of this delightful creature.

Susan Rhind is a postgraduate student at the School of Biological and Environmental Sciences at Murdoch University in Western Australia. She can be contacted on (09) 360 2468.

This project has been helped immensely by numerous volunteers, the advice and support of Todd Soderquist at Monash University, the WA Museum, major financial assistance from *Australian Geographic* and the Australian Federation of University Women, and the practical support and co-operation of the Department of Conservation and Land Management.

Phascogales frequently nest in the hollows of dead and decaying trees. Photo - Babs and Bert Wells

The galah is just one of the many bird species that visit our urban and suburban gardens. 'Birds in the Garden' shows us how we can attract more.

In spring, the Wongan Hills are ablaze with wildflowers, but this 'island' sanctuary is also a home to a wide variety of animals. See page 21.

LANDSCOPE

VOLUME TEN NO. 2 SUMMER ISSUE 1993-94

Yanchep National Park is having a facelift. Our story on page 28 examines the history and rebirth of one of Perth's closest and most visited national parks.

Banksia gardneri *var.* brevidentata *is one of a number of plants named in honour of Charles Gardner. See 'Gardner's World' on page 41.*

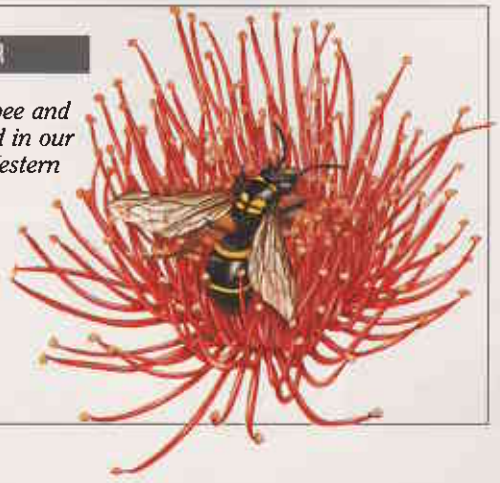
The Pinnacles is one of several destinations for licensed tours operating in WA's national parks. See 'Travel Companions'.

FEATURES

REGULARS

COVER

Hyleoides zonalis *is a solitary bee and one of the native bees described in our story about the 'real' bees of Western Australia on page 17.*
The illustration is by Philippa Nikulinsky.



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Finished art: Gooitzen van der Meer
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Cartography: CALM Land and Information Branch
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Colour Separation by Prepress Services
Printed in Western Australia by Lamb Print

Published by Dr S Shea, Executive Director
Department of Conservation and Land Management,
50 Hayman Road, Como, Western Australia 6152.