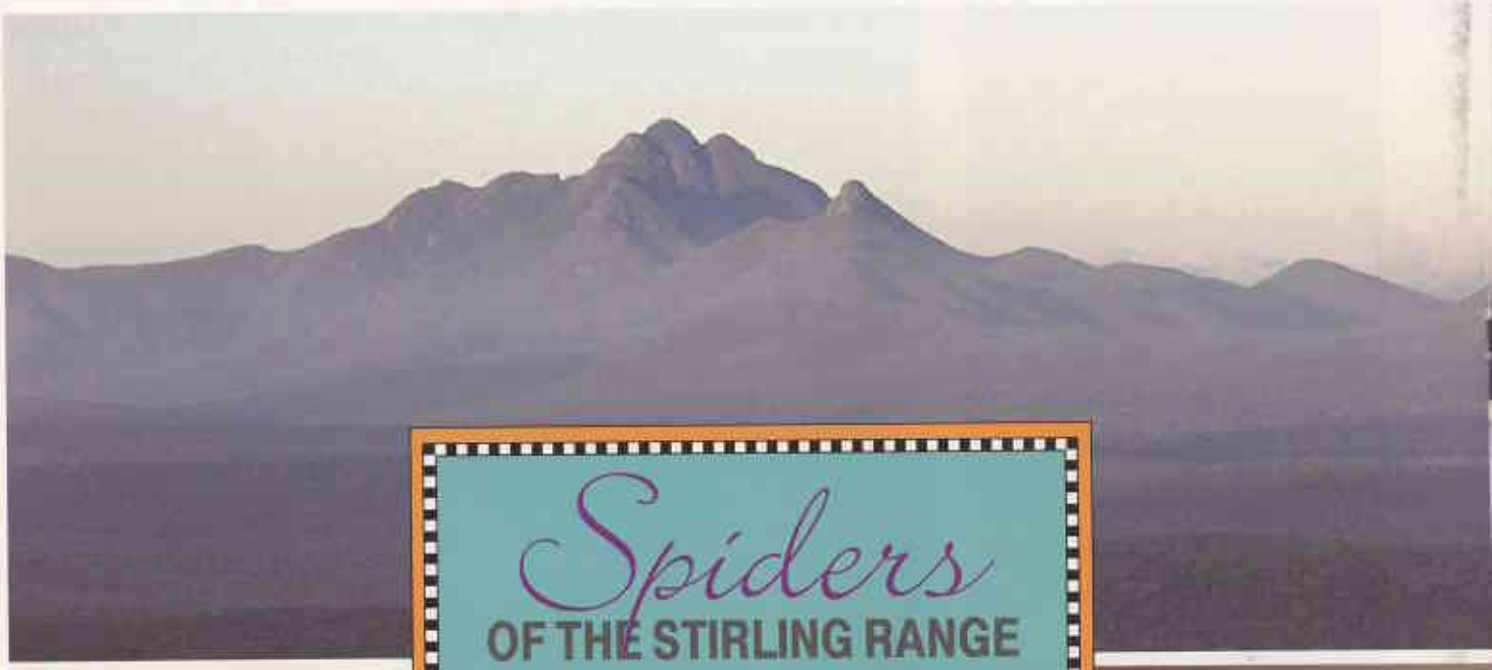
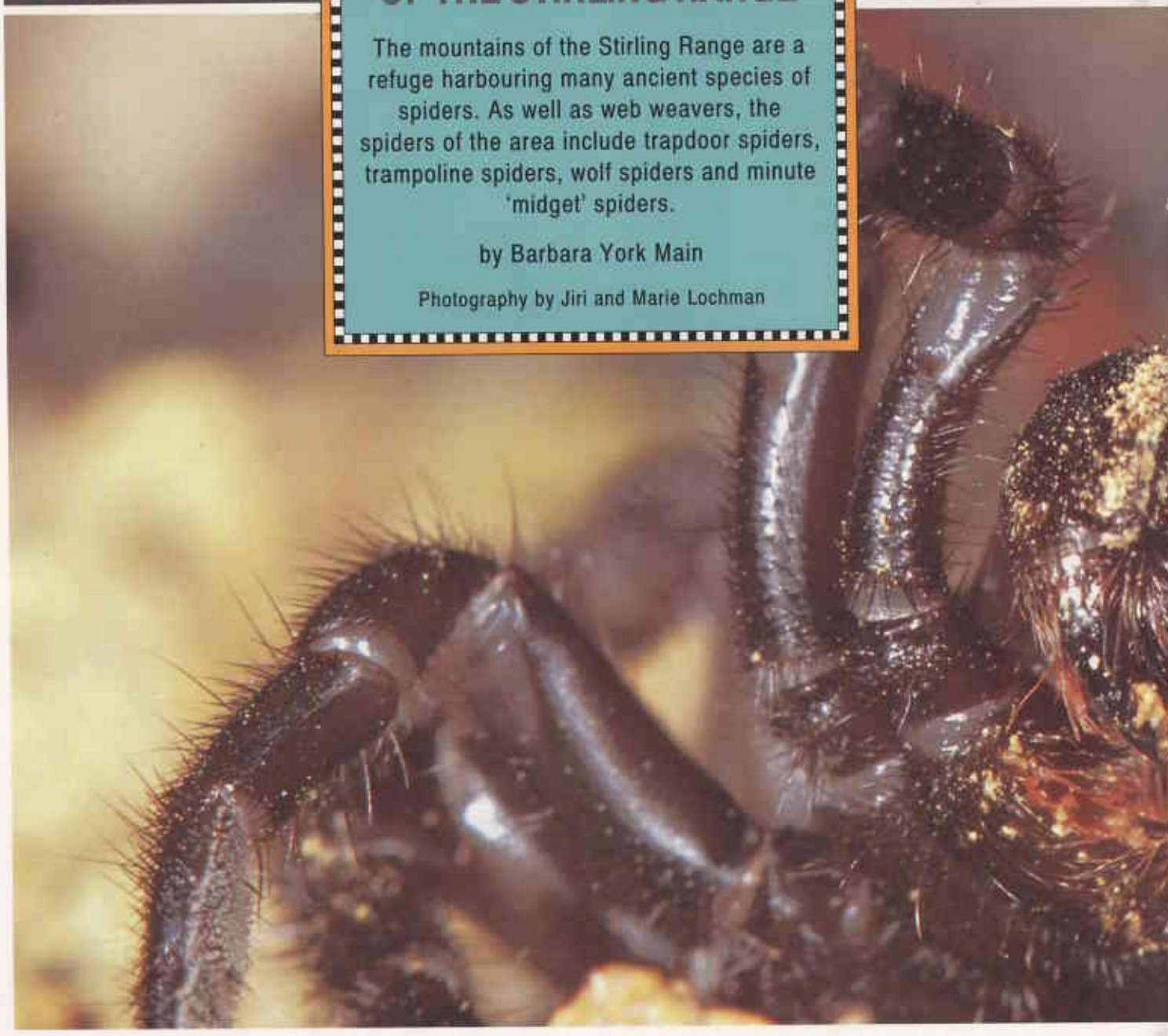


Spiders
OF THE STIRLING RANGE

The mountains of the Stirling Range are a refuge harbouring many ancient species of spiders. As well as web weavers, the spiders of the area include trapdoor spiders, trampoline spiders, wolf spiders and minute 'midget' spiders.

by Barbara York Main

Photography by Jiri and Marie Lochman



Many species of spiders in the Stirling Range have a closer relationship to groups in mountainous areas of eastern Australia, Tasmania, New Zealand and other Gondwanan continents than they do to representatives living in the lower lying country around the Stirling Range. Although some have affinities with species in the wetter parts of the south-western forests, such as in the tingle forest near Walpole, such groups are not found in the intervening countryside.

The sheltered gullies and slopes of the Stirling Range provide refuges for invertebrates that can no longer exist in drier, more exposed sites. The rocky terrain of the Range limits many species to places where rocks have weathered to loamy or sandy soils. Nevertheless a few have adapted to living in deep recesses among the scree, while others live under bark and in the foliage of shrubs and trees.

There are two main groups of spiders: the trapdoor and funnelweb spiders, and others known as the 'true' spiders. Trapdoor spiders are an ancient group represented in Australia by 10 families, all of which occur elsewhere. They are easily recognised by the parallel fangs (like those of a snake) which fold underneath the jaws. Specimens are usually dark brown or black and range from less than a centimetre to more than five centimetres. Most trapdoor spiders are long-lived (females of some species live well over 20 years) and may take many years to mature, but a few complete their life cycle in one or two years. The juveniles of most species do not disperse widely - the spiders simply scatter on the ground instead of drifting off on silk threads like the true spiders. They therefore tend to be confined to favoured habitats and restricted in their geographic range. Several species are endemic to the Range.

Although none of the Western Australian trapdoor spiders are as dangerous as the eastern states funnelweb spiders, they should be treated cautiously.

True spiders have fangs that bite together like pincers or tweezers. They range from a few millimetres to the large huntsman and wolf spiders. They are not as long-lived as trapdoor spiders but some forms may live several years. Most of the 100 or so families of spiders are true spiders. Nearly 70 of these occur in Australia.

TRAPDOOR SPIDERS

At least 11 species of trapdoor spiders in four familes have been collected in the mountains of the Stirling Range National Park (additional species occur in the mallee flats around the mountains). Only three or four of the mountain-dwelling species have been named. Two of the genera in the Stirling Range have only been discovered in the last two years and there are possibly other genera yet to be found.

Many of the so-called trapdoor spiders do not build trapdoors to their burrows

Previous page
An undescribed species of *Eucyrtops* found on Bluff Knoll.

Left: Typical trapdoor entrance to the burrow of *Moggridgea*. Spiders feed at the entrance without leaving the burrow.

Below left: An undescribed *Moggridgea* species. Outside Africa, this genus is only found in the south-west of WA and Kangaroo Island, SA.

Below right: Moggridgea burrows in a creekbank. Unlike those of other species, the doors can be hinged at any angle.

The palisade spider (*Neohomogona stirlingi*). The nearest relatives of this relict species are found in mountainous areas of eastern Australia.

Below: The palisade entrance has a collar of leaves and debris.

or tubes. Some have silk tubes under or in logs or in the ground; others have well-defined burrows with simple collar-like entrances.

Door-building species belong to the families Idiopidae, Migidae and Actinopodidae, and the open-burrow or tube-building species to the Idiopidae and Nemesiidae. Another door-building family (the Barychelidae) occurs in the mallee at least to the north of the Range and possibly on the lower slopes.

Two of the Idiopid genera *Aganippe* and *Eucyrtops* occur widely throughout the Range. While *Aganippe* occurs widely across southern Australia, *Eucyrtops* is endemic to southern Western Australia. Each genus is represented by a distinct

species in the lower gullies and the higher slopes. Both genera have eight eyes grouped into three rows of two, two and four respectively from the front edge of the carapace (these can be seen easily with a hand lens). *Aganippe* is distinguished by a pair of button-like patches (sigilla) on the back of the abdomen. One species of *Eucyrtops*, with a rigid flap-like door to its burrow, occurs in the banks of Moingup Creek and elsewhere in the lower levels of creeks. Another species, which constructs thick, plug-like doors on its burrow, occurs in clay soils and at higher altitudes, and aggregations can be seen in the banks alongside the Bluff Knoll walking path.

The most interesting Idiopid is the palisade spider (*Neohomogona stirlingi*). This species of spider is endemic to the Stirling and Porongurup Ranges, but has close relatives in mountainous areas in eastern Australia. It builds a shallow burrow with an open entrance surrounded by a palisade, or collar of leaves and twigs, which may project several centimetres above the ground or litter. Nests are in clumps wherever there is enough sandy or loamy soil but only on the higher elevations (particularly of Toolbrunup, Mount Hassell and Bluff Knoll) or the damp, shaded bases on the south side of the Bluff Knoll and Isongerup massif. Sometimes spiders can be seen sitting just inside the palisades waiting for prey.

The palisade spiders have not adapted to drier habitats and still depend on cool, wet, mountainous sites. Remarkably, they can survive bushfires and rebuild their palisades shortly after destruction by fire. However, populations are temporarily reduced after fire due to exposure (no litter or shade) and reduced insect prey. Possibly drought, and in extreme cases fire, has much the same effect as snowfalls, which can cause a shutdown of seasonal activity and foraging for months at a time.

Apart from *Neohomogona*, the open-holed mygalomorphs include several species of the genera *Aname* and *Chenistonia*, notably *Chenistonia tepperi*. This species ranges from near Adelaide to the Indian Ocean. It usually digs a deep, sinuous burrow (up to at least 30 cm) in friable soils. The spiders are at least two centimetres long, dusty brown in colour, with a speckled abdominal pattern and shining golden hairs on the carapace. The burrow entrance is a circular open hole, often sealed with a hymen of silk which opens into a horizontal sitting chamber where the spider waits for prey, sometimes with the tips of the legs projecting. The

species is common in the lower parts of the Range, including Chester Pass. Mature males leave their burrows to search for females and occasionally enter toilets and camps. Males can be recognised by the large, spined spur on the first leg and the swollen bulb and needlelike copulating structures on the feelers. When provoked, they become aggressive, and rear up on their hind legs with front legs raised and fangs opened in a threatening posture.

The black wishbone spider, an *Aname* species, is also widespread across south-western Australia, from Eyre Peninsula to the west coast. It occurs in the Range but not abundantly and only in patches of sandy soil. The spider is large and black and males have a spined spur on the first leg. The forked burrow has a Y or wishbone configuration and a wide, funnel-like opening from one of the 'arms'; the other arm is not open to the surface, but lies on the ground like a collapsed glove finger. Open funnels can be seen along the Bluff Knoll path near the car park. Spiders are mostly active in spring and summer and usually close their burrows during winter. Males usually run or wander before thunderstorms or during hot, humid weather in early summer.

Several other undescribed species of *Chenistonia* and *Aname* occur in the Range and are possibly endemic. These unnamed species are restricted to damp, shaded habitats. In contrast, *C. tepperi* and the black wishbone spider, which have broad ecological tolerances, have spread over a wide geographic area and are probably later invaders of the Range.

A rare trapdoor spider in the Range, a species of *Stanwellia,* is known so far from only one site in a creek on Bluff Knoll. Recently found and not yet named, the spider is about a centimetre long, and brown with lighter freckles on the legs and abdomen. It builds a shallow silk-lined burrow in damp shaded places. In Western Australia *Stanwellia* is known elsewhere only from the Porongurup Range, West Cape Howe and near the Mammoth Cave. Another relic, it probably parallels the former distribution of certain mammals such as the koala and Tasmanian devil, whose distributions in south-western Australia are known only from fossils in caves.

Finally, a species of *Teyl,* with an open-holed burrow, has recently been found in a gully running from the southern base of The Arrows. The genus may also occur in the swampy plateau areas of the Bluff Knoll massif.

The two families Migidae and Actinopodidae are both true trapdoor spiders and are also Gondwanan relics. The Actinopodidae comprises the Australian genus *Missulena* and two genera confined to South America. The double-door trapdoor spider, *Missulena,* is commonly known by the misnomer 'mouse spider'. *Missulena* has a two-doored entrance to a deep burrow which also has a side-shaft closed by a third door. Nests never occur in aggregations, partly due to their aerial dispersal (juveniles drifting on silk threads), so females are not often seen. However, males are frequently seen on the ground during winter, when they wander in search of females during daylight. Males often have red jaws and a bluish abdomen,

Right: Most of the palisade spiders survived a fire in this regenerated area of the Stirling Range.

Below: Barbara York Main examines a creekbank for *Moggridgea* trapdoor burrows.

Below right: Undescribed *Eucyrtops* species from Bluff Knoll. The light patch is the cover of the spider's lungbook - the breathing organ.




Top: The plug-like closed and open trapdoors of the Bluff Knoll *Eucyrtops* species. The ring of silk helps to seal the door.

Above: The Moingup Springs *Eucyrtops* species has a trapdoor with a rigid flap over the entrance.

so they are conspicuous when running on the ground or if they strike an aggressive pose. The spiders are reputedly poisonous so should not be handled.

The other Gondwanan family, Migidae, has specific counterparts in southern Africa in the genus *Moggridgea*. *Moggridgea* was only found in Australia a few years ago, in the tingle forest near Walpole, on Kangaroo Island, and most recently in the Stirling Range. It is believed to be a relict of Jurassic times (some 140 million years ago) when Africa was connected to Australia. The spiders are minute; adults have bodies less than a centimetre long and the burrow doors rarely exceed five millimetres in diameter. They are confined to very wet, permanently shaded banks of gullies and creeks where they occur in aggregations - the tiny disk-like doors packed close together. The spiders feed predominantly on flies, whose larvae are aquatic or which feed on damp rotting litter. The spiders lunge out of their burrows and, with their front legs, snatch the emergent flies roosting on the wet banks.

Moggridgea is vulnerable to intense bushfires, partly because the burrows are shallow and the spiders are killed by the heat. Its dependence on a permanently damp, cool, shaded habitat and prey associated with wet situations is much more restrictive than the requirements of most other trapdoor spiders in the Range.

OTHER SPIDERS

Other spiders of the Stirling Range include many species which also occur outside the Range. True spiders generally disperse on silk threads as spiderlings (a phenomenon called ballooning) and many species are thus spread a good distance by the wind. Apart from spiders which are very small as adults and those with very specific habitat requirements, most species are more widespread than many of the trapdoor spiders.

These spiders include web weavers, vagrant hunters, a few burrowers and some confined to permanently damp microhabitats. The web weavers include the typical orb weavers, such as *Eriophora* species, the ubiquitous Christmas spider or jewel spider (*Gasteracantha minax*), which often occurs in densely aggregated webs, and the leaf-rolling spider (*Singotypa melania*).

Other web weavers are the platform or trampoline spider (*Corasoides*), which builds a large sheet web that extends from a tubular retreat in the ground over tussocks and shrubs. The large spiders, greyish brown to greenish with white spots on the abdomen and with long thin legs, can sometimes been seen sitting in the funnel-like opening of the tubular retreat, sunning themselves or waiting for insects to fall on the platform. *Baiami stirlingi* makes a delicate sheet extending from a retreat in logs or under stones. *Baiami* is a forest-dwelling genus of southern Australia and occurs also in Victoria and South Australia. In Western Australia there are distinct species in the Stirling and Porongurup Ranges and several in the south-west forests.

'Sac spiders' (of the Clubionidae and Gnaphosidae families) live under bark, stones, logs and amongst litter. Some are found in foliage, where they sometimes roll leaves into retreats. They

are all small and forage at night. Jumping spiders (Salticidae) and crab and flower spiders (Thomisidae) also live under bark and amongst flowers and foliage. One particularly interesting thomisid spider is the social crab spider (*Diaea socialis*). This species makes communal nests by weaving eucalypt leaves into large bundles. The narrow jarrah leaves are favoured, as the young growing tips roll easily, in contrast to the broad, stiffer marri leaves. The nest is started by a fertilised female which curls a leaf tip and deposits an egg cocoon in this pocket, around which she webs additional leaves. When the spiderlings hatch they cooperate in the leaf-binding activity and share the insect prey, which is caught by one or more spiders on the surface of the nest. The species occurs throughout the south-west karri and jarrah forests with outliers in the Porongurup and Stirling Ranges, notably in foggy sites such as Toolbrunup and gullies on Bluff Knoll.

Males of the brightly coloured red-and-black spider, *Nicodamus*, run about during the day, usually in spring. They should not be confused with the similarly coloured *Missulena*. *Nicodamus* is widespread over Australia, but there are many undescribed species. The female makes a small irregular sheet among rocks or against logs.

Medium to large spiders frequently seen in the Range include wolf spiders (ground burrowers), huntsman spiders such as *Isopeda* (especially on the bark of trees) and the large sac spider *Miturga*, which makes bag-like nests of white silk in vegetation near the ground or under logs and rocks.

Minute, so-called 'midget' spiders, less than three millimetres long, are of special interest. Spiders of the families Microphotcommatidae and Anapidae live in damp leaf mould, where they make tiny sheet or orb webs. They lay few eggs and have low dispersal rates.

The Anapids (*Chasmocephalon pemberton* and *C. flinders*), though not endemic to the Stirling Range, have specialised habitat requirements. As end representatives of a food chain, their presence indicates occurrence of other tiny invertebrates, such as spring tails, fly larvae and mites. Relicts as they are of a former southern beech forest, these tiny spiders (and their prey) are now endangered by increasingly dry conditions and intensity of fires.

CONSERVATION

Many of the invertebrates of the Stirling Range are clearly remnants of a richer and more varied invertebrate fauna. Over time, this fauna has been increasingly subject to pressures associated with a drying of the climate, more intense and possibly more frequent fires, and, latterly, plant diseases like dieback and the impact of people. It is the shaded, wet gullies, the seeps on the mountain peaks and at the headwaters of creeks, the banks of creeks at lower elevations, rock piles in shaded valleys and certain scree slopes, that need special attention.

We must recognise that spiders have a fundamental value in an ecosystem and an intrinsic right to persist. The tiny trapdoor spiders are all as important as the western swamp tortoise or the noisy scrub-bird. They deserve a conservation effort to retain and safeguard their preferred habitats in order to sustain the relict populations. ▣

Left: Nest of the social crab spider (*Diaea socialis*). This species is common in the south-west forest but rare in the Stirling Range.
Photo - Barbara York Main

The males of this undescribed species of *Chenistonia* wander during the breeding season and sometimes enter buildings.

Barbara York Main is a world expert on spiders. This article is based on a chapter in *Mountains of Mystery: A Natural History of the Stirling Range*, a book due to be published by CALM this year.

LANDSCOPE

VOLUME EIGHT NO. 3 AUTUMN ISSUE 1993

'Where there's fire there's smoke'. We look at one of the lesser known and misunderstood products of bushfires on page 10.

The disappearance of the Zuytdorp *remained a mystery for many years. The story of its rediscovery and the formation of the Zuytdorp Nature Reserve is on page 42.*

Banksias and blackboys are normally associated with the sandplains of the coast and wheatbelt rather than the Great Victoria Desert. See page 22.

The mountains of the Stirling Range are a refuge harbouring many ancient species of spiders. Spider expert Barbara York Main shows us some of them on page 28.

A new book, Perth Outdoors, *aims to encourage people to get outdoors and enjoy nature and to learn more about Perth's unique natural communities. See page 35.*

FEATURES

REGULARS

COVER

*The palisade spider (*Neohomogona stirlingi*) is endemic to the Stirling and Porongurup Ranges. It builds a shallow burrow with an open entrance surrounded by a palisade, or collar of leaves and twigs, which may project several centimetres above the ground or litter.*

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