



# Cave Creatures

Tasmania has one of the richest and most diverse invertebrate cave fauna in temperate Australia. Some cave creatures spend their entire lives in complete darkness while others, such as the cave cricket, may come out of caves at night to forage.

## Cave fauna

Tasmania's cave fauna is composed almost entirely of invertebrates. It includes millipedes, glow-worms, molluscs, segmented worms, slaters, flatworms, spiders, beetles, pseudoscorpions, mites, symphylids and springtails. New species are still being discovered.

Cave creatures play an essential role in underground ecosystems by decomposing organic matter and recycling nutrients through the food web. Many cave species are very rare, and include ancient, primitive forms no longer found on the surface. They provide important information in our studies of evolution and ecology.

## Troglobites

Troglobites are entirely dependent upon caves for their survival. These creatures have special modifications for life underground. Their eyes are reduced or completely absent and they have pale-coloured bodies as there is no need to be colourful in the dark. To compensate for lack of vision, they have evolved longer legs and antennae, sensory hairs and a better sense of smell than their surface-dwelling counterparts.

Generally occurring deep within caves, troglobites have low metabolic rates and can survive long periods without food. They rely on the dark, moist and stable cave environment and cannot survive for any length of time on the surface.

Troglobites have evolved in isolation from their ancestors. Often restricted in distribution, many troglobites are confined to a single cave system or karst area. Their surface-dwelling ancestors may have long since become extinct or been forced to move to new areas due to changing surface conditions.

These characteristics make them vulnerable to extinction from a range of threats. Some troglobites are described below in more detail.

## Cave harvestmen

Harvestmen are not spiders. Although they closely resemble spiders they do not possess poisonous fangs or silk organs. Instead they use a pair of large grasping palps to grapple with their prey.

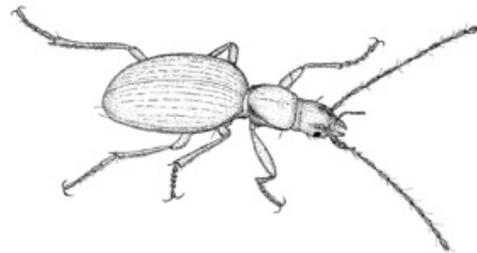
The long, spindly legged, straw-coloured cave harvestmen (juveniles are pale) include a number of troglobitic species.

Each species is more or less confined to a single, small area of karst. *Hickmanoxyomma gibbergunyar*, for example, is confined to the Mole Creek Caves. Close relative, *H. cavaticum*, occurs at Ida Bay and Hastings caves.

Harvestmen dwell on the cave floor and walls throughout the 'transition' and 'deep zones' of caves (dark areas). Care must be taken not to trample them underfoot.

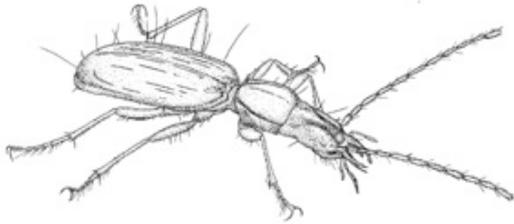
## Cave beetles

Many cave-adapted (troglobitic) beetles belong to the family Carabidae. Recognised by their reddish-brown colour (due to loss of pigment), each species is confined to a single karst area. For example, despite being only a few kilometres apart, *Idacarus troglodytes* occurs only at Ida Bay, while *I. cordicollis* is endemic to Hastings Caves.



*Ida Bay cave beetle*

No surface dwelling forms of *Idacarabus* are known today. It is likely that a once widespread ancestor of both these species originally colonised caves from the ground litter of cool, moist forest habitats. Climatic changes associated with several periods of glaciation and forest cover retreat, during the last two to three million years, probably caused extinction of the ancestral surface populations—allowing each of the cave populations to evolve separately in isolation to become new, distinct species.



*Blind cave beetle*

Other cave beetles include *Tasmanotrechus cockerilli* which is restricted to the Mole Creek caves, and the very rare Blind Cave Beetle, *Goedetrechus mendumae* at Ida Bay. This beetle has lost virtually all trace of its eyes.

Cave beetles may be seen on cave walls, floors and beside streamways, from the twilight zone to the deep zone, so be careful where you walk.

## Troglophiles and others

There are three other categories of cave creatures named for their degree of dependence on the cave environment. 'Troglophiles' are animals which spend their entire life cycle underground, while 'trogloxenes' spend only a part of their life cycle within caves (they periodically return to the surface for food). Both troglophiles and trogloxenes can also live outside caves in suitably moist and sheltered habitats.

"Accidentals" are species not normally found in caves but which have accidentally wandered, fallen, or been washed in. They are an important food source for the permanent cave inhabitants.

## Tasmanian cave spider

*Hickmania troglodytes*

This endemic spider is the largest in Tasmania. A troglophile, it is common in the entrance, twilight and transition zones of caves. It also dwells in suitably dark, sheltered surface habitats such as hollow logs or underneath buildings. Spinning a large horizontal sheet web, around one metre across, the spider's main prey are cave crickets.

Tasmanian cave spiders are believed to live for many years. Mating involves a prolonged courtship which begins with the male signalling his approach to the female by gently plucking the silk strands of her web.

He carefully approaches and taps her with his front legs. This signal seems to deter the female from attacking and eventually the two may join together. On the male's second pair of legs is a special notch which he uses to restrain the female while he transfers his sperm. During mating, venom may be seen dripping from the fangs of the female, and some males end up becoming a post nuptial snack!

The female constructs a pear-shaped egg sac suspended from a single thread. She closely guards the eggs for up to nine months (much longer than the usual one to two month period, typical of most other spiders). The silk of the egg sac has properties which make it very resistant to fungal attack. After emergence, the many hundreds of young spiderlings stay close to the parental web for a few weeks before dispersing to other parts of the cave. Few survive to adulthood.

The cave spider belongs to an ancient group believed to be ancestral to modern spiders. This group is characterised by two pairs of book lungs which are visible as brown patches on the underside of the abdomen. Modern spiders have lost one pair of these book lungs. The cave spider's ancestors date back to before the break-up of the supercontinent Pangaea. Its nearest relatives live in Chile, with other more distant relatives in China and the USA.

These spiders are not aggressive or dangerous to humans, however their webs, constructed near cave entrances, are easily broken by people entering caves.

## Cave crickets

*Micropathus species*

Cave crickets form dense colonies on cave walls and ceilings, close to the entrance. To prevent themselves drying out, they congregate in nooks and crannies away from air currents. Long antennae help them to navigate, find food or detect enemies in the darkness.

Tasmania has a number of species of cave crickets in the genus *micropathus*. All cave crickets are trogloxenes because they emerge from the cave to seek food when weather conditions are favourable. Cave crickets are omnivorous scavengers, browsing on mosses and scavenging on dead or injured invertebrates.

A female cave cricket has a long ovipositor projecting from her abdomen. She uses this to make a hole in soft, moist mudbanks and then deposits a single egg. Once hatched, juvenile cave crickets go through a series of laborious moults before reaching adulthood. These involve shedding the old exoskeleton, then growing as rapidly as possible in the short time before the new exoskeleton hardens.

*M. cavernicola* inhabits caves at Mole Creek and other karst areas in northern Tasmania, while *M. tasmaniensis* occurs in southeastern Tasmania.

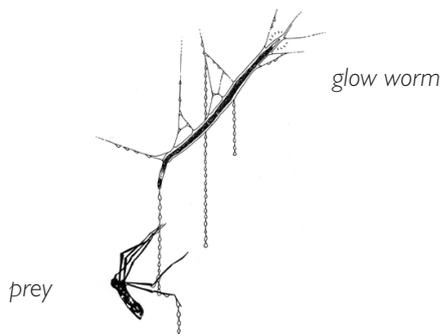
Cave crickets are easily disturbed and may panic when people pass close by, or shine lights on them, so care must be taken not to unduly disturb them.

## Glow-worms

### *Arachnocampa tasmaniensis*

Glow-worms are a spectacular underground sight. In some caves they cluster on walls and ceilings in their thousands—a myriad of blue lights resembling stars in the night sky. Being troglophiles, they also occur in moist, sheltered surface habitats such as rainforest gullies.

Glow-worms are not really worms, but the luminous larval stage of a fungus gnat. A chemical reaction in their abdomen produces a cold blue light. They are able to switch on and douse their lights at will.



The larva builds a hollow, tubular nest of silk and mucous from which it suspends sticky threads up to 30 cm long. Flying insects, attracted to the lights, become trapped and are then eaten.

In stream caves, the main insects caught are stoneflies, caddisflies and mayflies. The aquatic, larval stages of these insects are carried underground by the stream. When they emerge from the water and metamorphose into adult flies, they are attracted up to the lights and become entangled in the sticky threads. Glow-worms quickly haul up the appropriate thread and consume their victim.

After several months of growth the glow-worm larva pupates inside a chrysalis, then emerges as an adult gnat. The adults live only a few days during which time they don't feed—they have no functional mouthparts. Instead, they mate. The female lays her eggs on the cave wall.

Glow-worm colonies are dependent upon the continued availability of flying insects for their food, especially aquatic insects carried into caves by streams. To preserve them it is important to maintain the natural conditions of stream flow and native forest within the cave catchment area. Glow-worms will stop glowing if people shine bright lights on them, or make loud noises. They are also disturbed by people passing close beneath them, and care must be taken not to brush or entangle the long threads.

## Cave symphylids

Symphylids are another example of troglophiles. We know very little about them. They can be found in Tasmanian caves as well as in rainforest litter. They are well suited to life underground because they are blind and lack pigmentation.



cave symphylid

## Mountain shrimp

### *Anaspides tasmaniae*

The mountain shrimp is commonly encountered in streams and pools in caves. A troglophile, this species is also common in surface waters above 300 metres elevation.

The cave populations show some loss of pigment as a result of living in complete darkness.

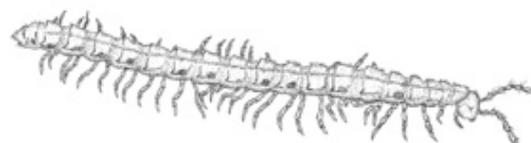
This shrimp belongs to an ancient group of crustaceans known as the Syncarida.

Living syncarids appear very similar to fossils found in Triassic rocks, and they are believed by scientists to be related to the ancestors of many other modern crustaceans, such as yabbies and crayfish.

## Cave millipedes

Cave millipedes are an interesting group. Some are troglobites others are trophiles whilst other species are accidentals. These detritus feeders scavenge on animals and plant remains.

Troglotic millipedes can occur in the deep zone of caves where food is extremely scarce.



millipede

## Fully protected

All fauna occurring in caves in State Reserves is protected. A number of cave dwelling species are protected under the *National Parks & Wildlife Act 1970* regardless of where they occur. These species include glow-worms, cave crickets, harvestmen, pseudoscorpions, and beetles. It is an offence to take, harm, or kill any of these species without a permit.

## Threatened species

Some twelve species are presently listed as rare or vulnerable under Tasmania's *Threatened Species Protection Act 1995*.

These species include the Mole Creek cave beetle, Mole Creek harvestman, and Mole Creek pseudoscorpion, as well as the blind cave beetle at Ida Bay.

One threatened cave beetle, *Geodetrechus parallelus*, has only been found at Junee-Florentine caves in the southwest. Many other cave species, not included on this list, are quite rare.

## Further information

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- Karst Officer, Biodiversity Conservation Branch, GPO Box 44, Hobart 7001. Ph. 03 62334 6556
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