Teachers Fact Sheet No 6
Cave Fauna

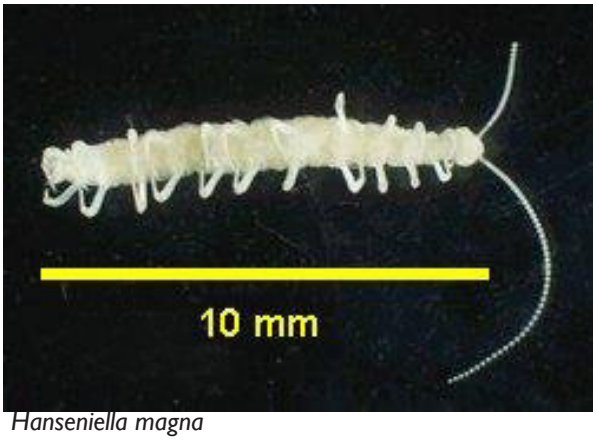
Caves are not the lifeless places one might expect and Tasmania has some of the most diverse and abundant cave fauna in temperate Australia. Over 150 species, from 130 families, have been recorded from Tasmanian caves. Lack of green plants in the cave environment means that cave systems are largely dependent on energy sources from the surface, including plant and animal debris washed in during flood events, and troglophiles which leave the cave to hunt.

In Newdegate Cave there are more than 40 fauna species. Some are very strange looking and unclassified and new species are still being found.

For example, in 1996, a new species of Symphyla, *Hanseniella magna*, was found. It is similar to a centipede but smaller, translucent and without eyes or pigment. This is the largest Symphyla ever described and has exceptionally elongate antennae, claws and cerci (appendages on the rear-most segments).

Virtually all Tasmanian cave fauna is protected by law.

Symphyla



Hanseniella magna
Photo: Bob Mesibov's website titled: 'Tasmanian Multipedes'

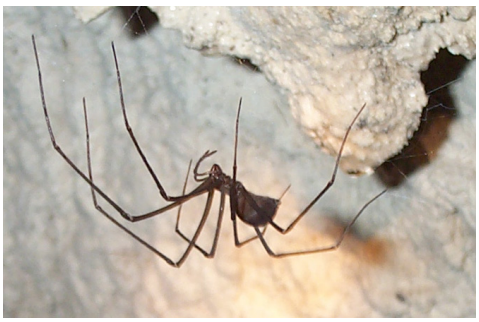
These cave-dwelling animals are small and are not commonly seen, but when observed are often mistaken for millipedes with long antennae. The symphylans are one of the numerous groups of many-legged organisms with elongated bodies such as millipedes, centipedes and onychophorans (velvet worms) that are generally lumped into the category of 'Multipedes'.

Symphyla are small, blind, fast-running animals which can be very abundant in soil and forest litter. They are generally white, but dark-coloured gut contents can often be seen through their body wall. Not much is known about the biology of Australian native Symphyla. They occur in a wide range of macro-habitats and are believed to feed on soil microbes, both 'free' and attached to decaying wood and vegetation. Silk glands open on the two tail-like appendages (cerci) at the rear end of the animal, but uses of the silk have not been well documented.

Tasmanian cave spider

This endemic spider is the largest in Tasmania. A troglophile (an animal that can and does live in caves, but is capable of surviving outside), it is common in the entrance, twilight and transition zones of caves. It also dwells in suitably dark, sheltered surface habitats such as in hollow logs or underneath buildings. It spins a large horizontal sheet web, around 1m across. The spider's main prey is 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 the female whilst gently tapping her with his front legs. This signal seems to deter the female from attacking and eventually the two may join together. On



Hickmania troglodytes

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 postnuptial 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 that make it very resistant to fungal attack. After they emerge, 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 ancestors of modem spiders. This group is characterised by the possession of 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 super-continent Pangaea. Its nearest relatives live in Chile.

These spiders are not aggressive or dangerous to humans. People entering caves, however, easily break webs constructed near cave entrances.

Cave harvestman

Harvestmen belong to a group of animals called Arachnids, which includes spiders and scorpions. Unlike spiders, harvestmen have a spherical or oval-shaped body (with no clear distinction between head and body), and they do not possess poisonous fangs or silk organs. Instead they have a pair of large grasping palps, which they use to grapple with their prey. Harvestmen appear to be the only arachnids capable of ingesting small particles. Spiders lack jaws and inject digestive fluids into their prey before sucking the liquefied remains into their mouths.

Hickmanoxyomma cavaticum

Harvestmen are predators, feeding upon small insects, mites, spiders, eggs, glow-worms and vegetable matter. The long, spindly legged, straw-coloured cave harvestmen (juveniles are pale) include a number of troglobitic species (animals that live permanently underground and cannot survive outside of the cave environment). Typically a species of cave harvestman is restricted to a particular karst area: Hickmanoxyomma cavatictim has only been found at Hastings and Ida Bay.

Idacarabus troglodytes

Cave Beetle

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

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 glaciations and forest cover retreat during the Quaternary era (less than 10,000 years ago) probably caused extinction of the ancestral surface populations, allowing each of the cave populations to evolve separately in isolation to become new, distinct species.

Tasmanian mountain shrimp

The mountain shrimp is commonly encountered in streams and pools in caves and is endemic to Tasmania.
A troglophile, this species is also common in surface waters above 300m 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.* One of the most noticeable differences between modern-day crustaceans and the primitive mountain shrimp is that the shrimp lacks a carapace and its legs extend along the full length of its body, whilst in modern crustaceans the legs only occur under the carapace. When it was discovered in Tasmania in the late 19th century, the only records were

Anaspides tasmaniae

from exotic fossilised specimens dating from about 270 million years ago, during the Permian and Carboniferous. The shrimp mainly feeds on algal slimes found covering rocks on streambeds.

Cave cricket

Micropathus tasmaniensis

Cave crickets are one of the most common invertebrates found in caves in Tasmania. They are mostly found on walls and ceilings around the entrances of Newdegate Cave.
Being trogloxenes (a species that uses caves but cannot complete its life cycle entirely in caves), crickets emerge from the cave entrance when weather conditions are favourable and forage for food in the forest.

Crickets are extremely important in delivering energy in the form of droppings, eggs and carcasses to other animals in the cave. Older females are distinguishable by a long ovipositor protruding from their abdomen. The female uses the ovipositor to make a slender hole in sediment mud on the floor and banks of the cave and insert a single egg in each hole.

Crickets are very susceptible to temperature variation. To prevent dehydration, they retreat into the crevices and cracks of the cave away from the drying winds.

Springtail

The most common animals found in the caves are tiny insects known as springtails. Although difficult to see with the naked eye due to their small size, Springtails are commonly found in rotting wood and mud floors, and are a primary component of the food supply of larger cave invertebrates.

Glow-worm

The Tasmanian glow-worm, *Arachnocampa tasmaniensis*, is one of seven described species found in Australia. Despite its name, the glow-worm is not a worm, but the larvae of a mosquito-like fungus fly. The blue-green light it emits is a result of a chemical reaction. This reaction takes place in modified excretory tubes called Malphighian tubes. This bio-luminescence is used by the larva to attract insects on which it preys.

Glow-worms only occur in caves that have streams which bring in insect larvae from outside the cave. When the larvae turn into adults they are attracted to the glow-worm lights. Typical glow-worm prey include mayflies, caddis flies, flies, moths and also adult glow-worms

The glow-worm creates a tubular mucus nest with dangling threads which ensnares passing insects. While the larval stage of the glow-worm's life cycle lasts from nine to 12 months, the adult (fungus fly) stage lasts only a few days. During this short time the female fungus fly must attract a mate using her bio-luminescence, and breed.

Widely distributed, the glow-worm occurs in caves and moist forest habitats throughout Tasmania.

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See also Teachers Fact Sheet No 5 Cave Biology

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Photos: Courtesy of Jason Gardner and Paul Flood