GLOWWORM INFO

Maori name: titiwai
English name: NZ glowworm
Scientific name: Arachnocampa luminosa

NZ glow-worms are the larvae (maggots) of a special kind of fly known as a fungus gnat. Fungus gnats look rather like mosquitoes, and most feed on mushrooms and other fungi. However, a small group of fungus gnats are carnivores, and the worm-like larvae of these species use their glowing lights to attract small flying insects into a snare of sticky threads.

New Zealand has over 300 species of fungus gnat but only one - Arachnocampa luminosa - that produces light.

TITIWAI - THE MAORI WORD FOR GLOWWORM

Glowworms in Maori are known as “Titiwai”. This loosely translates to “lights that reflect on the water”.

HABITAT

Glow-worms need damp places, where the air is humid and still, to construct their snares. Caves and old mining tunnels are ideal. In the forest glow-worm snares are commonest on moist banks beside a stream or in a ravine.

THE LIFE CYCLE OF GLOWWORMS

Glowworms live their lives in four stages.

1. First, the adult fly lays an egg which then takes 20-24 days to hatch.
2. When they hatch from an egg, they are larvae (maggots), which is when the glow-worm builds a nest, makes its lines, glows and feeds. Like all insects, glow-worms have an organ similar to kidneys. But glow-worms have a special ability to use this organ to create a glowing light. They usually turn the light on just after dark and shine all night long. This stage lasts approximately nine months – during which time they grow from about 3 millimetres in length to about 3-4 centimetres. Whilst growing they moult or shed their skin until they are ready to make a cocoon or pupae (stage 3).
3. After the larva stage the glow-worm becomes a pupae. This is when the glow-worm morphs into a fly over a 12 to 13 day period.
4. Finally, the glow-worm becomes a fly. The adults have an incredibly short life span, only a few days because their sole purpose is to reproduce and lay eggs. They don’t even have mouthparts. The females die quickly after laying their eggs, usually less than a day, while males can live up to five days

ONLY EAT DURING THEIR LARVAL STAGE

Glowworms have a pretty crazy life, during their larval stage is the only time they eat. This stage of their lifecycle lasts approximately nine months.

THE HUNGRIER - THE BRIGHTER IT GLOWS

Just as our stomachs will rumble as we get hungrier, the glowworm glows brighter the hungrier it gets. The female also glows brighter than the male during the pupa stage to ensure that it has a mate when it’s time to hatch.

THEY CATCH THEIR PREY IN STICKY LINES

If you look closely at a glowworm during its larval stage, you’ll see that there will be fine beaded lines dangling from the larva. Glowworms create as many as 70 lines measuring 20-150mm (0.7-5.9 inches). The beads are thick drops of sticky mucus used to catch small insects attracted by the glowworm’s light.

PREY

Small midges are the usual prey of glow-worms, but all sorts of flying insects get trapped in the sticky snares, including mayflies, caddisflies and moths. Forest glow-worms may also trap spiders, plant hoppers and even millipedes. The glow-worm simply cuts free any prey that is too large, or unwanted.

When insects fly towards the light and are caught in the traps, they turn out the lights and reel in the strand and eat! Each strand that has prey is also recycled to maximize energy savings.

When living in caves, food can be scarce, which is why Arachnocampa luminosa can go weeks or months without food and is why their hunting technique is incredibly energy efficient.

Adult glow-worm flies are never caught in the snares – they are not attracted to the light, and even if they brush against the sticky threads they are strong enough to pull free.

GLOWWORM NESTS ARE LIKE HAMMOCKS

Glowworms base themselves in individual nests attached to the roof of the cave, or vegetation. The nests hang like a hammock and are made of silk which can be repaired and reconstructed.

LIGHT DISPLAY

The glow-worm’s tail-light shines from an organ which is the equivalent of a human kidney. All insects have this organ but the glow-worm has a unique ability to produce a blue-green light from it. The chemical reaction that produces the light consumes a lot of oxygen. An airbag surrounds the light organ, providing it with oxygen and acting as a silvery reflector to concentrate the light.

A fungus gnat can glow at all stages of its life cycle (except as an egg), but the larva has the brightest light.

THE GLOW IS CAUSED BY “SCIENCEY STUFF”

So why does the glowworm glow? The glow is a result of a chemical reaction involving the luciferase enzyme acting on the luciferin substrate then combining with adenosine triphosphate and oxygen. Simple!

DISTRIBUTION

Glowworms are widespread in both the North and the South Island of New Zealand although they generally occur in cave systems and in native bush where prey species are available and humidity is high.

AN ADULT GLOWWORM HAS NO MOUTH

So why do adult glowworms in the fly stage live such a short life? Well, it might be partly due to the fact that the adult fly has no mouth! They basically just mate and die.


BROOK SANCTUARY GLOWWORMS
Photo: Andy MacDonald


Photo: Emma-Louise Crawford


Photo: Phil Bendle


Photo: Steve Kerr © Otago Museum

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