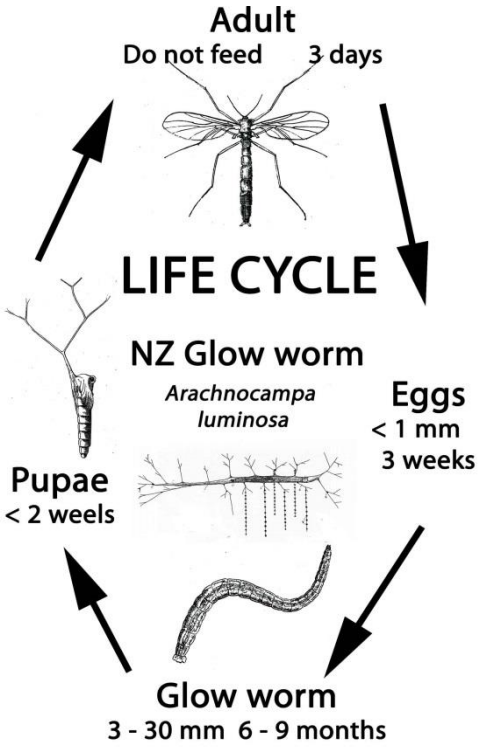
GLOW WORM INFO SHEET

There are **glow worms** in the CYC bush track are readily accessible for all who are using the campsite to visit and enjoy. Glow worms are widely distributed in this country, and can be found on damp sheltered banks, caves etc. in many places in New Zealand.

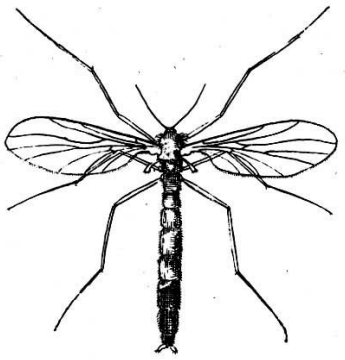


HISTORICAL.
Early entomologists believed the NZ Glow worm was a relative of the European firefly. Interestingly, the European firefly is not a fly, but a beetle. The name game is further confused when it is appreciated the NZ glow worm is not a worm, - but a fly!!

The scientific name of the New Zealand glow worm is *Arachnocampa luminosa*, a crude translation being '*glowing spider bug*'. The reference to spiders is in regard to their 'spider web' snares produced by the larvae.

The Maori have named these insects '*titiwai*' meaning '*projected over water*', which describes their general habitat along streams. The name '*pura toke*' is also used, meaning '*one eyed worm*' or '*blind worm*' .

The European settlers found the glow worms when they arrived in the country and were immediately fascinated with them. The earliest published reports were of insects found in drives in the Thames Goldfields.



Glow worm adult fly
(Female)
Original drawing by
George V. Hudson 1890

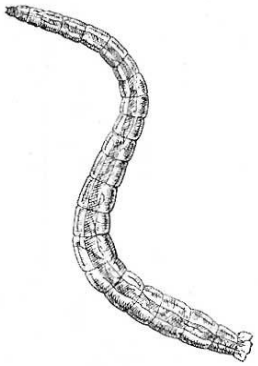
LIFE HISTORY

The Glow Worm adults live for a short time only; 1-2 days for the female and 3-5 days days for the male. The adults cannot eat, only the larvae being able to ingest food. The adult is slightly larger than the mosquito, about 15 mm long. The 'self adhesive' eggs are laid in clusters of 30-40 on banks and in crevices, each female laying on average 130 whitish eggs which darken with age. They are some 0.75 mm in diameter and hatch in about 3 weeks.

On emerging, the larvae light up immediately, and are the stage of the insect that most people will see. They are about 3-5 mm long, and grow over the next 6 to 9 months to 30 mm long, the length of a match stick. In caves with a more assured food supply they can grow to 40 mm long. The larva is the only stage that feeds on small insects, midges and flies, and even other glow-worms. There are 5 instars; the larvae molts 4 times during this period.

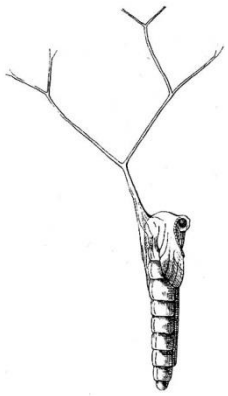
At night it is difficult to appreciate their homes, but with a torch you can see the interesting structures they have built. They form a horizontal suspended tube of silk and mucus from which they suspend their silk fishing lines, with droplets of a sticky mucus to catch small gnats and flies, attracted by the glowing lights. These lines can be up to 50 cm long in protected caves, but in the bush are normally some 20 to 50 mm long because of the wind. The lines are coated with globules of sticky mucus which traps any insects that comes into contact with it. It is thought the globules also contain a paralyzing chemical to stop the trapped insect struggling and causing damage to the snare.

The larvae pupate for about 12 days. Both the pupa and adult are able to continue glowing. The pupa is transparent, and is some 12-15 mm long. The female in the pupa can glow very brightly during the last 2-3 days before emerging to attract males. A number of males are often seen on the pupa awaiting the female to emerge, mating often occurs immediately the female emerges. During this time the male flies around in search of the female, who produces the brightest light to attract them. On emerging from the pupa the adults move around the habitat, but neither are strong flyers, the weighty female carrying her load of eggs can travel short distances only.



Glow worm larva
Original drawing by
George V Hudson 1890

The brightness of the lights can vary,. When the insect is hungry it will generally glow more brightly. Females in the pupa can glow very brightly, and also female adults, in both cases to attract mates. Occasionally two larvae will fight over space, and will glow very brightly in an attempt to assert their dominance.



Larvae in particular are terrestrial, and will fight if they believe their space is invaded. Often the looser will be the winners dinner. This territorial display results in the insects being quite evenly distributed in colonies, a feature which is readily apparent when you look at their display of glowing lights.

The light emitted by the insect is bioluminencence, the result of a chemical reaction that involves several components- luciferin a waste product, luciferase an enzyme that acts on luciferin, and ATP (adenosine triphosphate), an energy molecule, and oxygen. These combined form an electronically excited product capable of emitting light.

Bioluminescence of glow worm
LUCIFERIN + LICIFERASE +ATP + OXYGEN
= EXCITED PRODUCT + LICIFERASE
= LIGHT

GENERAL COMMENTS

You will see plenty of larvae. You may see some pupa, especially from April to July, but adults, because they are so small and short lived, are rarely seen unless caught in a snare or spiders web. In caves the greatest number of larvae have been identified from October to February, and this seasonality is likely to exist in the Garden. Glow worm colonies are found over quite extensive areas in the Wellington Botanic Garden. George Hudson noted that the best displays were seen under humid conditions with a light north west wind.