

Fireflies of Townsville.

Fireflies are beetles that belong to the beetle family Lampyridae (well named I think) and can produce light from special light organs at the end of their abdomens.

We will talk about all the species around Townsville but here to begin with we are going to discuss **Joseph Banks' firefly**, our very first Australian firefly. Its scientific name is *Australoluciola australis*.

Why are they beetles? Because while they have two pairs of wings, the front pair is modified into a leathery protective device for the rest of the body, called an elytron, and it is not used in flight.

The pictures below show clearly the fore (front) wings expanded and also the larger more transparent hind wings (which are the flight wings) behind them. As a bonus the picture of the same firefly on the right has its light organs illuminated as well.

Thanks to Maureen Gubbels of the Gold Coast hinterland who took these wonderful pictures of an *Atyphella scintillans* male.



What makes them fireflies? That they can produce light which is an amazing phenomenon in itself, almost no heat produced.

Why do they produce light? If we consider all the amazing displays in nature, from the peacocks tail to the croak of a frog, it is all about getting the sexes together for mating.

Males produce the most light and in the picture above you can see that there are two segments (subdivisions) at the end of the abdomen where the light organs are. The light does shine downwards from these organs, useful when the male is in flight and trying to flash its signal to attract a female who is usually on the ground.

The flash is produced in a special pattern. When the male is flying looking for a female, which he will spot by her own light, he is flashing in a particular pattern of so much time flash on, and then another interval flash off. The intervals tend to be dependant on temperature and are characteristic of the species of firefly.

What about the female? If we consider only the species below for right now, she is a winged female and can fly so she looks a lot like the male. Her light organs only occupy a single segment (subdivision) of the abdomen so her light is not so bright, and she tends to display from ground level or often will crawl up a stalk of grass. If she is going to respond to a particular male she is capable of turning her abdomen around so she can aim her light

upwards. It seems that the critical aspect of all this that might tell the male he is the chosen one is the time interval between his flash and her response.

Many things will disrupt this flashing pattern especially if you have caught any and have them temporarily imprisoned. Street lighting interferes with their light production as often will a bright moonlit night, and wind and rain.

What happens then? After mating (and she may mate more than once) she has to find a suitable area to lay her eggs. In the case of *Australoluciola australis* the species we will talk about further below, this will be in an area of mangroves and in Townsville this will probably be along the Ross River.

And then? Their life cycle. Beetles, including fireflies, have a most wonderful life cycle. A life cycle is everything that happens from the moment the female has laid those eggs until another male or female emerges from the pupae say in a year or so. There are two main purposes of this life cycle and they are divided into quite different stages which do not even look like each other. The purposes are to eat enough to produce an adult, and for the adult then to be able to mate and produce the next generation, and so it all starts all over again. You might be more familiar with the life cycle of a butterfly in which once the eggs hatch a larva (grub, caterpillar) emerges with the sole purpose of eating as much as it possibly can. When conditions are right, and hopefully it is well fed, it will turn into the next stage which is the pupa or chrysalis. It is a big leap to turn from a larva, whose sole purpose was to feed, and which can't fly, into an adult butterfly, which is sexually mature with large flight wings, and that is why we have this pupa which permits that wonderful transformation.

Fireflies have the same stages. The larvae will be in the mud among the mangroves at the riverside, and clearly must be resistant to some immersion in salty water. They are the feeding stage and their choice of prey is usually small snails and slugs.

For all the year when you don't see the adults any more don't forget, the larvae are there, feeding away and hopefully surviving to produce next year's display. I do not imagine you will want a walk in the mangrove mud at night, but if you did you might actually see them as larvae also have light organs and turn them on and off occasionally. They then turn into the pupae and some time this year you will see it all start all over again when the adults emerge along the riverside.

So now to meet Joseph Banks's firefly. It was collected at the Endeavour River in an area of mangroves where Cooktown now is in 1770 by Joseph Banks himself. Cook had to stop there to clean the hull of the Endeavour, and Banks, although primarily a botanist, took himself and others off along the mangroves where he found this firefly. As was the case with those early explorations of so many countries not just ours, the specimens they collected were sent back in this case to England, and to an entomologist called Fabricius who published a description of them. He called this firefly *Lampyris australis*.

These early entomologists were generous with their specimens as was Banks and our first firefly ended up in the British Museum of Natural History as well as in other collections in Great Britain. Probably just as well as fireflies are soft bodied and the specimen or specimens in the British museum managed to fall off their pin and were lost!

So began a very long time where other people working on fireflies tried to identify just what they thought *Lampyris australis* really was, and of course they got it all wrong. An Australian entomologist called Olliff was close to the mark however. He thought that a species he had found in mangroves was quite distinctive and named it *Luciola pudica*. Remember in those days there was not the capacity to interchange information rapidly as we do nowadays.

Yes you guessed right *Luciola pudica* was actually *Lampyris australis*, but the only way to be sure was to find some of Fabricius's specimens for comparison. Finally, someone found a couple of very old discoloured specimens in a famous collection in Glasgow (the Hunterian) and the mystery was solved.

But what about its name? The very first name that was given to this species and properly published, was *Lampyris australis*. Occasionally insect taxonomists come along and decide that they want to place the species (which is *australis*) in another genus (which was *Lampyris*). So now we write its name *Australoluciola australis* (Fabricius) and writing it this way is a sort of code and tells us quite a lot. The species *australis* was described by Fabricius so he sort of owns the right to be associated with it. Having the () around his name tells us that while he described *australis* he did not place it in this genus. Someone else did but here the code is quiet as it does not tell you any more.

SO finally here is your local and impressive firefly *Australoluciola australis* (Fabricius)_

It is always found in association with mangroves.

It has an orange pronotum (the front body part which has the head beneath it) and the elytra (the wing covers) are almost black. So, it looks from above like quite a few other fireflies.

It is from beneath that you can distinguish it as most of the ventral (underneath) colour is golden yellow, with the light organs at the end of the abdomen white.

It occurs down the eastern coast of Queensland in mangroves as far south as Bundaberg, where I know of a population on an island in the middle of the Burrum River. It was the first firefly I ever saw at the Boyne River crossing near Gladstone. We do not have any records of this species from anywhere else it seems to be an exclusively Queensland species

