Lacewings, Antlions and Allies - Neuroptera

of Belair National Park and Adelaide Hills

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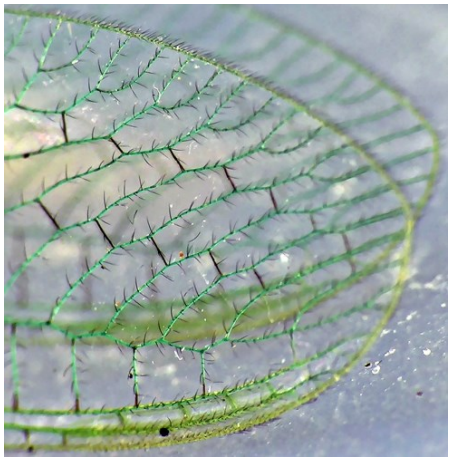
Neuroptera is an order of insects that includes Lacewings, Antlions, Owlflies and their relatives. Adults typically have two pairs of membranous wings which are very similar in size. The wings are usually held roof-like over the body and have dense, cross-linked venation.

The name **Neuroptera** comes from Greek 'neuron' which means nerve or sinew and pteron' which means wing. This refersences their net-like wings. Below left shows a section of the wing of a **Green Lacewing** and right is the wing of a **Tasmanian Lacewing**. They are however weak to moderate fliers compared with Odonata or Diptera.



Adult **Neuroptera** have chewing mouthparts and may be predatory of smaller insects, but some eat nectar or don't feed at all. Larvae are voraciously predatory and have highly specialized sickle-shaped mandibles that essentially work as predatory syringes: they don't chew solid food but rather inject digestive enzymes into their prey and then suck out the liquified juices. They commonly feed on aphids and other small arthropods. Right shows the mandibles of an antlion larva.

Acknowledgements

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Thanks to **Vladislav Grigorenko** from Crimea, who has offered many identifications and information on iNaturalist.

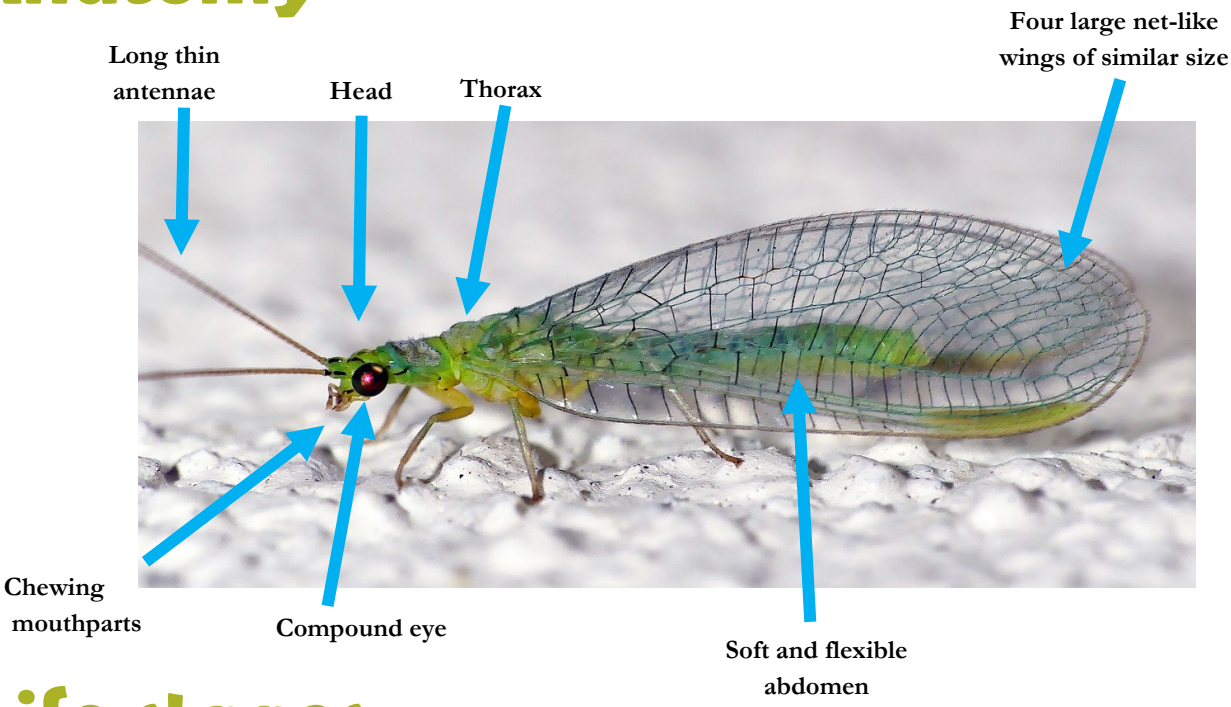
Thanks to David Akers, for his photo of a Chrysopidae cocoon used in the life stages collage on the adjoining page.

Thanks to **Brett Smith** of Ellura Sanctuary, for his expertise and the extraordinary database he has put together of all critters great and small **www.ellura.info.** Additionally, his personal help and suggestions are always very much appreciated.

To contact me: www.mariannebrougphotography.com

Front cover image: *Italochrysa* sp. Green Lacewing.

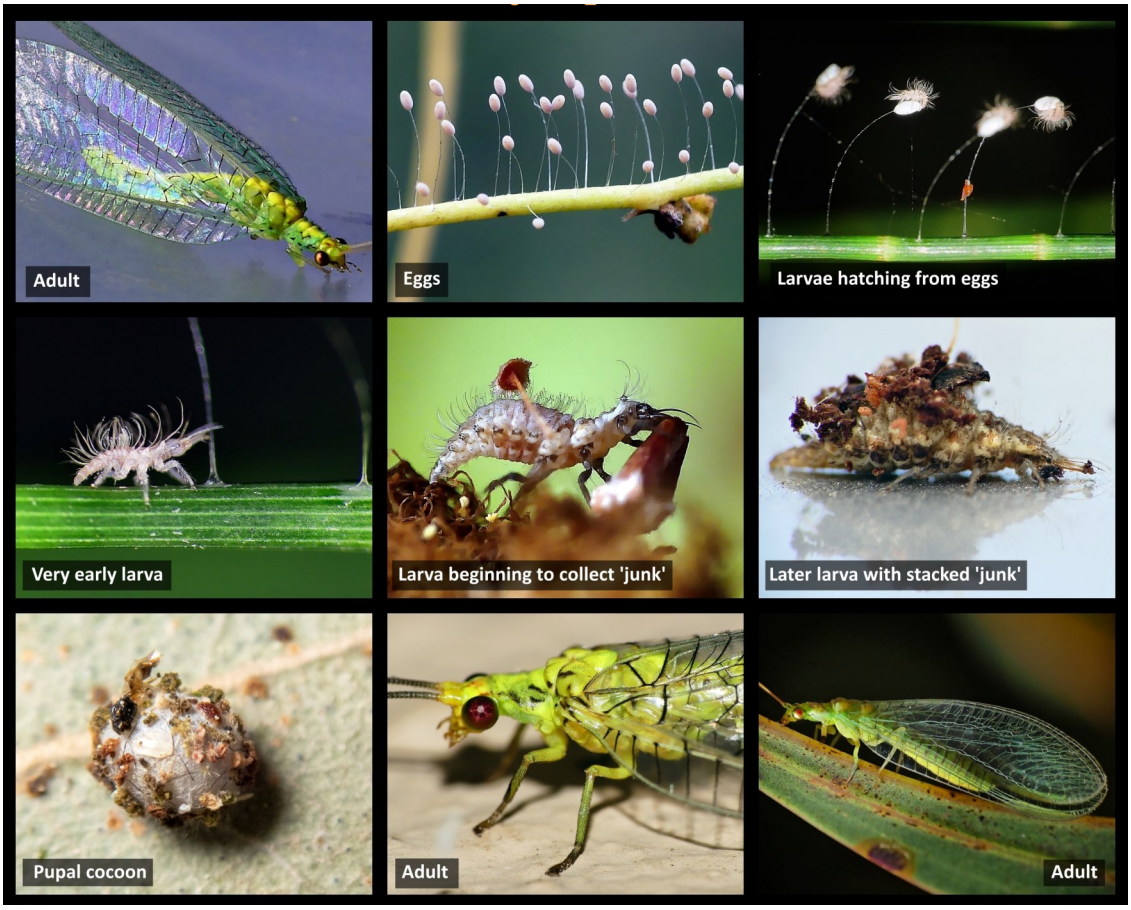
Anatomy



Life stages

Although these life stages are those of **Chrysopidae** or **Green Lacewings**, they are applicable to all Neuroptera. **Green Lacewings** are described more fully on the following pages.

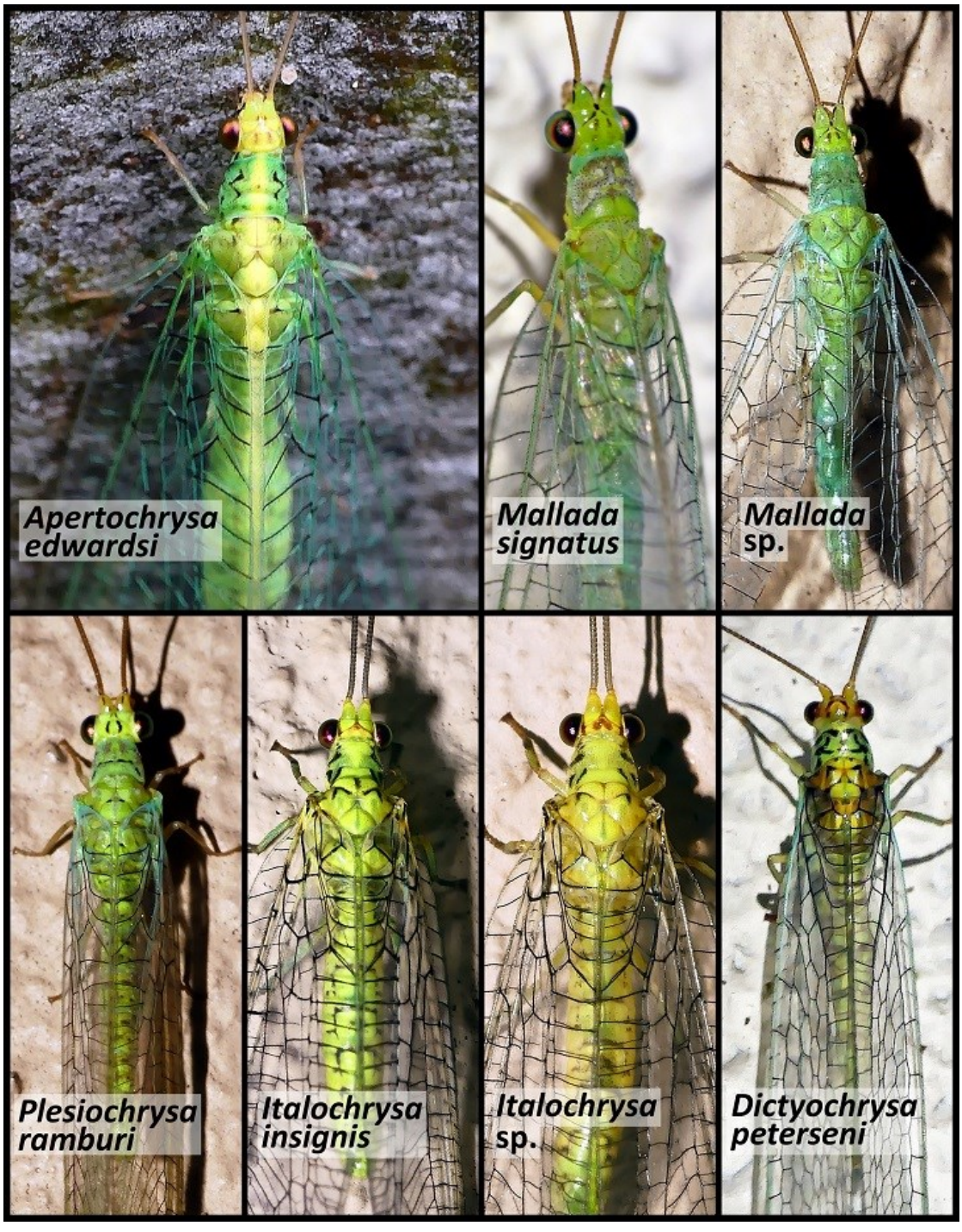
Note how the eggs are stalked. This protects them from predators. When the larvae hatch, they crawl down the stalks and begin their lives. The larvae are heavily haired. They collect detritus and exoskeletons of past prey on their backs attaching it to these hairs, presumably as a defense against predators. As a result, the larvae sometimes termed **'Junk Bugs'**. Not all Neuropteran larvae do this. The photo of the pupal cocoon is not mine; it is taken by David Akers and used with permission. Cocoons are very difficult to find.



Green Lacewings - Chrysopidae

See Life Cycle material on previous page for eggs, larvae and cocoon of **Chrysopidae**.

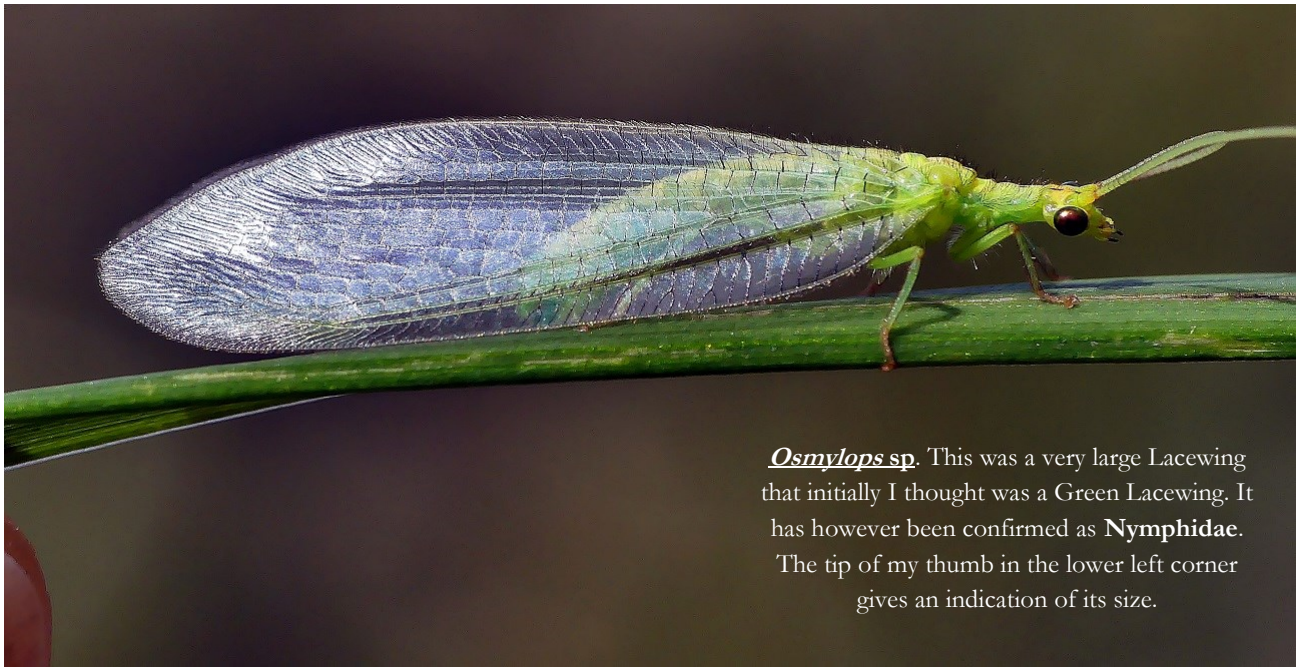
The name **Chrysopidae** comes from the Greek 'chrysos' meaning 'gold' and 'ops' meaning 'eye/face'. This refers to the metallic eyes of the adults (right).
They have slender, pale green bodies, two pairs of transparent wings that are held tent-like over the body and long, thread-like antennae. Adults feed on nectar, pollen and honeydew and sometimes small insects. Larvae are voracious and powerful predators of soft-bodied insects like aphids. Below is a table of the different species I have seen. For interest do note the differences between a species ID and one that just goes to genus ie. ***Mallada signatus/Mallada sp., Italochrysa insignis/Italochrysa sp***. Sometimes there are many species within a genus and a species ID often requires an expert to know what they're looking for or a very close examination of the actual specimen.



Lacewings play a vital part in the ecosystem.
Below left: **Green Lacewing** caught in the sticky glands of a ***Drosera*** **(Sundew)**. I have seen this frequently.
Below right: **Green Lacewing** caught by a small Crab Spider, ***Australomisidea*** **sp.**

Split-footed or Large Lacewings - Nymphidae

The name **Nymphidae** literally means 'nymph-like'. They are a mostly Australian family, with a few species in PNG. **Nymphidae** are larger in size than Chrysopidae, the wings are a different shape and are held out roof-like over the body. They can also be different colours other than green. Wing venation is denser than Chrysopidae as can be seen below. 'Split-footed' refers to the tarsal structure: the last tarsal segment is partly divided, giving a distinctive cleft.



***Osmylops* sp**. This was a very large Lacewing that initially I thought was a Green Lacewing. It has however been confirmed as **Nymphidae**. The tip of my thumb in the lower left corner gives an indication of its size.

Brown Lacewings - Hemerobiidae

The name **Hemerobiidae** comes from Greek 'hemerobios' which means 'short-lived' or 'living for a day'.

Hemerobiidae are small, plain lacewings that are generally easily missed in their habitat of trees, shrubs and low vegetation. The species described here is however very common and is considered a highly beneficial predator.

The larvae of **Hemerobiidae** do not stack 'junk' on their backs as do Chrysopidae. They look a bit like a 'naked' Chrysopidae larva (see image below).

All images are of **Tasmanian Lacewing, *Micromus tasmaniae***. Note its sizing on my finger (right).

Stream Lacewings - Osmylidae

The name **Osmylidae** comes from Greek 'osme' meaning 'smell' or 'odour' because adults have glands which produce foul-smelling compounds used to deter would-be predators. Some Chrysopidae also have these glands. They are given the common names **Stream Lacewings, Giant Lacewings** or **Lance Lacewings**. I have only seen one species which was medium-sized, but apparently the larger ones are the size of antlions. Larvae are semi-aquatic.

Both images are of ***Stenosmylus tenuis***. I have seen this species several times.

Spongeflies or Spongillaflies - Sisyridae

Rare and interesting

Above: A **Spongefly** or **Spongillafly** called ***Sisyra rufistigma***! I had never heard of this family until recently, when I actually saw one. They are from Australia or New Zealand.

Interestingly larvae live and feed on **freshwater sponges**, using long stylets to suck out sponge cells; they then leave the water to pupate in a silken cocoon. The adults lay eggs in silken webs that overhang water and then the larvae drop into the water. A very unusual ecological niche! I didn't even know there was such a thing as a freshwater sponge.

Dusty-winged Lacewings - Coniopterygidae

The name **Coniopterygidae** comes from Greek 'konis' meaning 'dust' and 'pterygion' meaning 'little wing'. This refers to the fine white, waxy powder that coats their wings and body. These are very small Lacewings (usually 2–5 mm) which are easily missed. They have greatly reduced wing venation compared to other Lacewings. Both larvae and adults are predatory, feeding mainly on aphids, scale insects, mites, and small arthropods.

All images are of this family. It is not possible to identify any to genus with any sort of confidence.

Mantidflies - Mantispidae

Mantidflies are fascinating little insects that frankly I didn't know existed before I saw one! I recall at the time I was puzzled by what I was looking at because they seemed like a mix of various insects! **Mantidflies** are named for their mantis-like raptorial forelegs which are like those of a Praying Mantis! They also have an elongated prothorax like a Mantis and are ambush predators. Their net-veined wings are however very much those of Neuropterans; the wings are held roof-like over their bodies when at rest. They are small and delicate and measure approximately 10 to 30 mm in length. Early larvae actively search for spiders, sometimes hitchhiking on them, and later stages feed inside spider egg sacs.

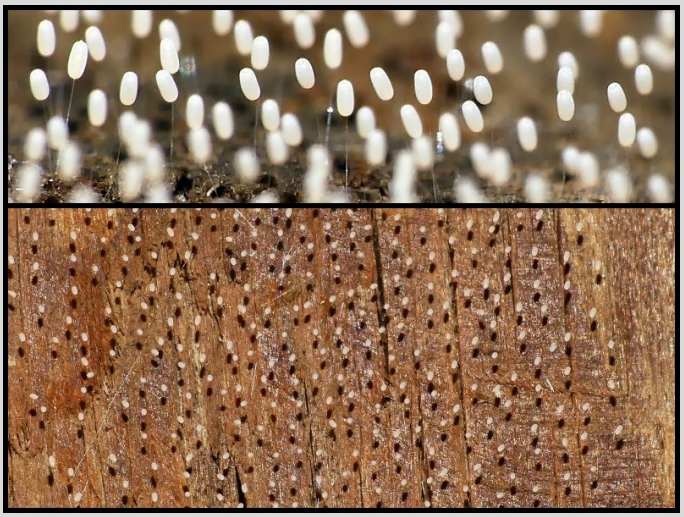
As with mantises, the name **Mantispidae** comes from Greek 'mantis' which means 'seer', 'prophet' or 'diviner' and refers to the upright posture and folded forelegs, which resemble the 'praying' or meditative stance of a religious person or prophet.

All images on this page are of ***Campion* sp**. Only the image directly below can be taken to species, ***Campion impressus***. Mantidflies can be identified quite readily by their facial markings which are different for each species. This is the only image in which I have managed a head-on shot.

Of note above are the folded raptorial front legs. These front legs are solely used for catching prey and NEVER used for walking. Mantidflies walk on four legs! Also note the iridescent colouring of the eyes, produced by 'nipple-covered' lenses, giving them extraordinary vision. Below is a sizing comparison with my thumb.

Mantidfly eggs

Below: The distinctive eggs of **Mantispidae**. Like Green Lacewings the eggs are stalked, but they are laid in great number and often in distinct but untidy rows.



Above and left: Both images are of ***Theristria* sp**. which is larger than ***Campion* sp**. on the previous page. Note my finger for comparison in the far left of the photo above. They are grey in colour and have different behaviours. Comments with regard to eye colour and raptorial front legs on the previous page apply here too.

Antlions and Owlflies - Myrmeleontidae

The name **Myrmeliontidae** comes from the Greek 'myrmex' meaning 'ant, and 'leon' meaning 'lion'.
(I do not cover Owlflies as I have never seen one, and there are virtually no observations in the region covered by this publication.)

Myrmeleontidae are best known for their predatory, pit-building larvae and their delicate, net-winged adults. However, many larvae do not build pits, but rather hide in loose soil, sand or leaf litter. Larvae have large sickle-shaped mandibles. Pupation occurs in a silk-and-sand cocoon. Adults are sit-and-wait predators with a strong bite and powerful digestive enzymes. Those I have seen are extremely weak-flying.

Left: A classic Antlion pit in my garden. It is a conical, funnel-shaped depression dug into loose, dry sand or soil by the predatory larva of an Antlion. It is an ingenious, low-effort trap for catching small arthropods, primarily ants.
Below and left below is ***Myrmeleon* sp.**, antlion larva that lies buried at the bottom of such a trap with its massive jaws at the ready. Once captured, the antlion injects its prey with a paralysing toxin and digestive enzymes, then sucks out the liquefied contents, discarding the dry carcass.

Below: The most common Antlion adult I see is ***Glenoleon pulchellus*.** The name 'pulchellus' comes from Latin meaning 'pretty' or 'dainty'. Of note are the clubbed antennae which are typical of Antlion adults, and the subtly patterned wings which provide extraordinary camouflage against bark and dry vegetation (see following page). Unlike the classic pit-building antlions (above), its larvae are free-living predators.

Left shows a close-up photo of the head and clubbed antennae of the Antlion on the previous page.

Right is a photo showing the extraordinary camouflage of ***Glenoleon pulchellus***. I would not have seen this Antlion had I not initially seen it flying. Antlions typically hang under small branches and twigs like this.

Camouflage

A rare sighting

Above is a selection of photos of ***Compsoleon* sp.** which I found on the wall of my house one morning, unable to fly because of a bent wing. It is a very rare sighting and currently the only sighting on iNaturalist https://www.inaturalist.org/observations/261386069. There is further discussion under this link. They are also non-pit-forming Antlions.