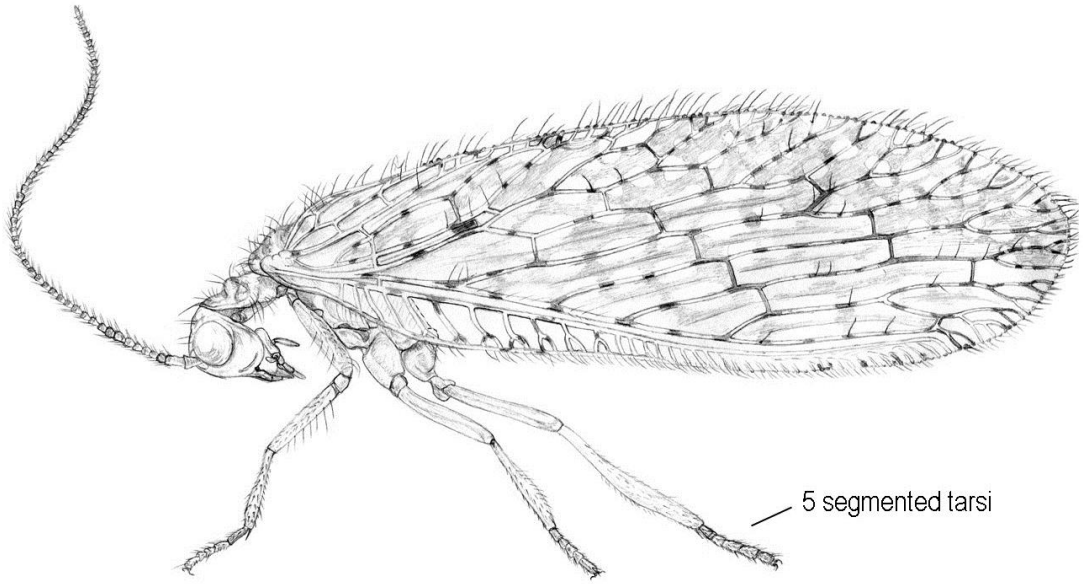
Order Neuroptera



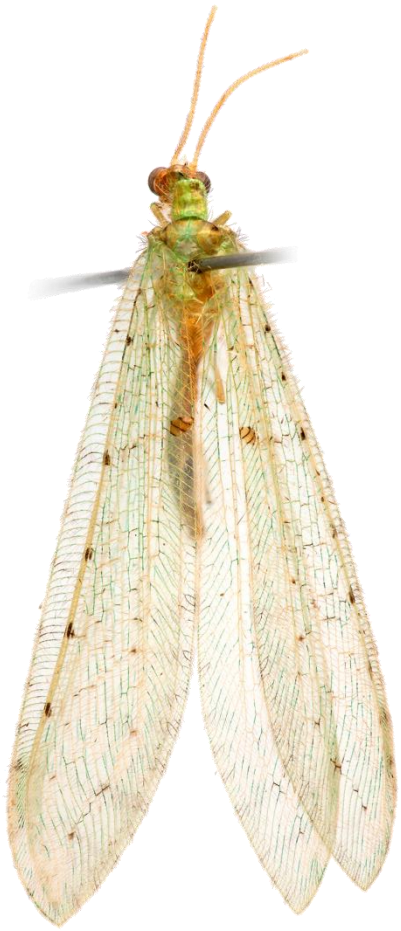
Common names: lacewings, antlions, dustywings, spongeflies, owlflies

Simple diagnosis. Neuropterans have unique larval mouthparts, with the maxillae and mandibles forming sucking and piercing tubes, and the maxillary palps absent. In adults the wings are large and membranous, with extensive venation, including cross veins, and the anal region is reduced, the ocelli are most often absent, the tarsi are five-segmented in adults and unsegmented in larvae.

Technical diagnosis. Adult Neuroptera are usually elongate and are most often large in size. The head is usually hypognathous (= directed vertically) and rarely prognathous (= directed forwards), the mouthparts are mandibulate (= biting and chewing), compound eyes are always present and ocelli usually absent. Also, the antennae are multi-segmented and usually are longer than the head, the pronotum is well-developed, sometimes elongate, and the meso- and metathorax are also well-developed. The thoracic pleura are directed upwards, but not posteriorly. Wings are membranous and large held tent-like over the body at rest, and fore- and hindwings are usually subequal in shape and length. Forewings and hindwings are never distinctly reduced, but sometimes differ in size, and one pair can be larger than the other. The anal region of the hindwings is not developed or only weakly developed. Wing venation is extensive, and veins branch distally, venation is rarely reduced, and in such species the wings have a white powdery texture. Legs are usually cursorial, but the forelegs are sometimes raptorial. The tarsi are five-segmented. Abdominal cerci are absent.

Neuropteran larvae have a well-sclerotised head, with the maxillae and mandibles forming two sucking and piercing tubes, the maxillary palps are absent, and the labial palps are three-segmented.

What can they be confused with? Small-bodied lacewings and dustywings (Coniopterygidae) can be confused with winged species of Psocoptera, with both holding their wings tent-like over the body at rest. However, in Psocoptera the wing venation is sparse, the mouthparts have the maxillae forming tubes, and the tarsi are two- or three-segmented. From Hemiptera they can be distinguished by mandibulate mouthparts.

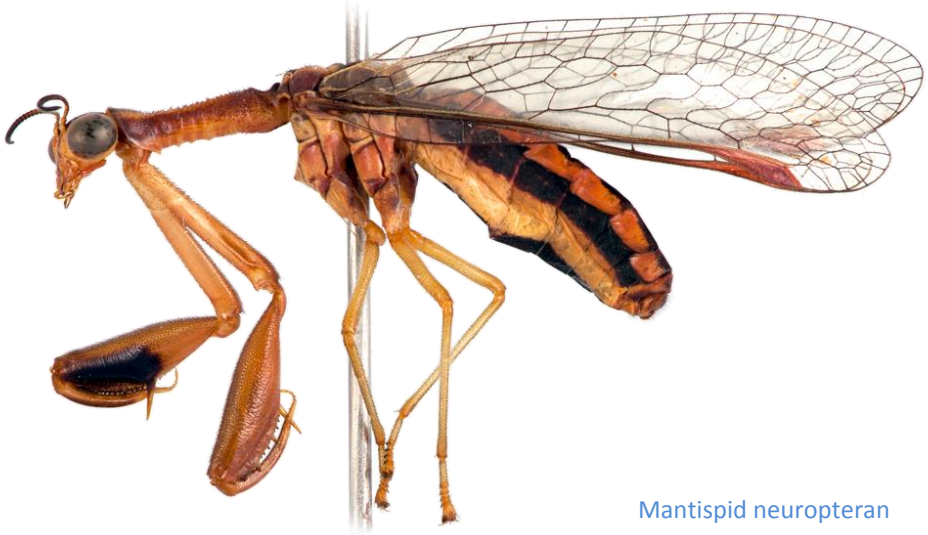


Lacewing (Neuroptera)

Large lacewing adults can be superficially mistaken for Odonata (= dragonflies and damselflies), as they also have an elongate body, mandibulate (= biting and chewing) mouthparts, and the fore- and hindwings are about equal in length, with dense venation. The Odonata can be recognised by the very short antennae, shorter than the head, thoracic pleura strongly directed posteriorly, and the wings are held upright or flat, and never tent-like over the body.

Lacewing adults can be confused with Plecoptera (= stone flies), as they also have dense wing venation, mandibulate (= biting and chewing) mouthparts, ocelli and multi-segmented antennae, but stoneflies differ in having the tarsi three-segmented and the hindwing has a distinct anal area, and the wings are held flat over the body when at rest.

The neuropteran family Mantispidae can be confused with the order Mantodea (= praying mantids), as they both have raptorial forelegs, as well as a subtriangular head, mandibulate (= biting and chewing) mouthparts, and five-segmented tarsi. However, Mantodea can be separated by the leathery forewings (if present), the hindwing has a large anal area, and the wings are held flat at rest. They also have ocelli and multisegmented cerci.



Mantispid neuropteran

The larvae of Neuroptera have very distinctive mouthparts. They can however be confused with some Coleoptera larvae, as their mouthparts can also form two long processes (families Lampyridae, Dytiscidae, Hydrophilidae). However, in the coleopteran groups the stylets are formed by the mandibles only.

Biology. Larvae are mostly terrestrial but can also live in cold streams. Adults and larvae are both predators feeding on soft-bodied insects.

Diversity in Papua New Guinea. Neuroptera inhabit all zoogeographic regions, but are most abundant in temperate regions. More than 5000 species are described worldwide. The New Guinea fauna is relatively well-known and described (Miller 2007).

Antlion (Neuropteran larva)

Key references for Papua New Guinea.

New, TR. 2003. *The Neuroptera of Malesia*. Brill, Leiden.