Neuroptera

Lacewings / Antlions / Dobsonflies / Alderflies / Snakeflies

The name Neuroptera is derived from the Greek word *"neuron"* meaning sinew and *"ptera"* meaning wings. The modern English translation "nerve-wings" is appropriate because it alludes to the extensive branching found in the wing veins of most Neuroptera.

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- ## Classification & Distribution

Holometabola

- complete development (egg, larva, pupa, adult)

Neuroptera is divided into three suborders:

- Planipennia (antlions, lacewings and their relatives)
- Megaloptera (alderflies and dobsonflies)
- Raphidiodea (snakeflies)

In adults, the suborders are distinguished by the shape of the wings and the length of the prothorax. In larvae, the suborders are separated by habitat and characteristics of the mouthparts.

Distribution: Common worldwide, but seldom abundant. Aquatic species are frequent inhabitants of streams and rivers.

	North America	Worldwide
Number of Families	**15**	**21**
Number of Species	**349**	**~5,500**

- ## Life History & Ecology

The order Neuroptera includes the lacewings and antlions (suborder Planipennia), dobsonflies and alderflies (suborder Megaloptera) and snakeflies (suborder Raphidoidea). "Splitters" prefer to assign each of these groups to a separate order (Neuroptera, Megaloptera, and Raphidioptera, respectively), based on differences in structure and development.

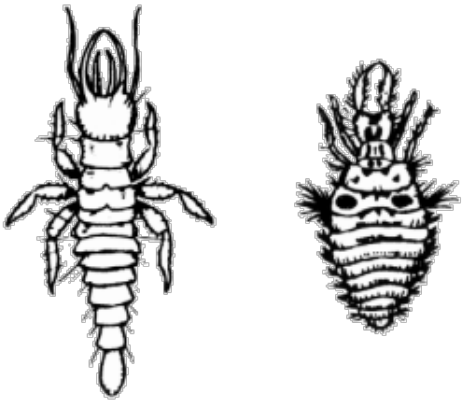
The Megaloptera are always aquatic as immatures. They live under stones or submerged vegetation and feed on a variety of small aquatic organisms. Large species, often called hellgrammites, may require several years of growth to reach maturity. Adults usually remain near water, although they are attracted to lights at night. In most species, the adults live only a few days and rarely feed.

Except for larval spongillaflies (family Sisyridae) which feed on fresh-water sponges, all members of the suborders Planipennia and Raphidoidea are terrestrial. Antlion larvae live in the soil and construct pitfall traps to snare prey. Lacewing larvae are usually found in vegetation where they typically feed on aphids, mites, and scale insects. Snakefly larvae live in leaf litter or under bark and catch aphids or other soft-bodied prey. In most cases, the adults of these insects are also predators -- the non-predatory species usually feed on nectar, pollen, or honeydew.

The larvae of antlions and lacewings have specialized mouthparts with large, sickle-shaped mandibles and maxillae that interlock to form pincers. Once impaled on these pincers, a prey's body contents are sucked out through hollow food channels running between the adjacent surfaces of the mandibles and maxillae.

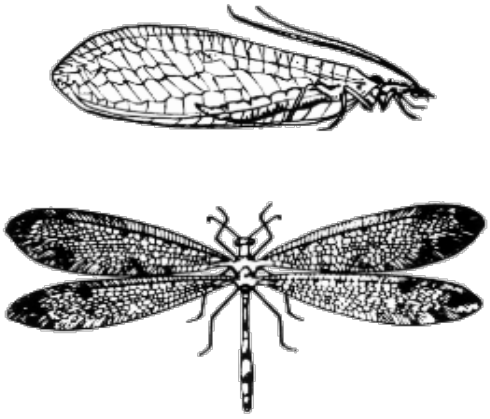
As adults, all neuropterans have two pairs of membranous wings with an extensive pattern of veins and crossveins. At rest, the wings are folded flat over the abdomen or held tent-like over the body. Most species are rather weak fliers.

- ## Physical Features



Immatures

- Head well-developed with ocelli, antennae, and chewing or pinching mouthparts
- Three pairs of thoracic legs; tarsi 1-segmented; claws paired
- Aquatic forms have thread-like gills on most abdominal segments



Adults

- Antennae filiform, multisegmented
- Chewing mouthparts
- Front and hind wing membranous, similar in size
- Extensive branching of venation in all wings; crossveins abundant especially along leading edge (costal margin)

Economic Importance

Larvae of Megaloptera are important predators in aquatic ecosystems. They also serve as food for fish and other aquatic vertebrates. Lacewing larvae are beneficial as predators of agricultural pests (aphids, whiteflies and scale insects). Some species are reared and sold commercially as biocontrol agents.

Major Families

Suborder Megaloptera -- aquatic predatory larvae

- **Corydalidae** (Dobsonflies) -- adults generally longer than 5 cm
- **Sialidae** (Alderflies) -- adults are smaller than dobsonflies

Suborder Raphidoidea -- terrestrial predatory larvae

- **Raphidiidae** (Snakeflies) -- long-necked predators of small arthropods

Suborder Planipennia -- mostly terrestrial predatory larvae

- **Chrysopidae** (Green lacewings) -- aphid predators
- **Hemerobiidae** (Brown lacewings) -- aphid and mite predators
- **Myrmeleontidae** (Antlions) -- doodlebugs, ant predators

Bug bytes

- A lacewing's egg sits atop a slender stalk secreted by the female's reproductive system. For many years, biologists thought these eggs were the fruiting bodies of a fungus they called *Ascophora ovalis*. The true nature of these eggs was first discovered in 1737 by Rene Reaumur, a French physicist, biologist and inventor.
- Some lacewing larvae camouflage themselves by attaching the dead bodies of their prey to spines on their back. Other species use bits of bark, moss, etc.
- Adult lacewings in the subfamily Chrysopinae can detect the sound of bats with auditory organs in the large veins of their front wings.
- Larvae of spongillaflies, family Sisyridae, are predators of freshwater sponges.
- As larvae, lacewings and antlions do not have a complete digestive system: the midgut ends in a dead end. Waste materials accumulate in the midgut throughout larval development and are finally expelled only after a connection is made with the anus near the end of the pupal stage. The accumulated fecal material is called a **meconium**.
- Antlion larvae are sometimes known as doodlebugs. The name is apparently derived from the squiggly trails these insects make when they move around in the sand.
- When they pupate, larvae of lacewings and antlions dig a small cavity in the soil and spin a loose silken cocoon around themselves. Many holometabolous insects exhibit similar behavior, but neuropterans are unusual because their silk is produced by Malpighian

tubules (excretory organs) and spun from the anus. In contrast, most other endopterygote insects produce silk in modified salivary or labial glands and spin it with their mouthparts. Only one other order, the Coleoptera, makes silk in the same manner as Neuroptera.

Belorussian translation

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