

External Morphology of Dragonflies and Damselflies

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Perspective

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DESCRIPTION

The order of flying insects known as Odonata comprises dragonflies and damselflies. Odonatoptera, the group in which they all belong, first formed in the Late Carboniferous, but members of the group first appeared during the Triassic. Dragonflies, which belong to the suborder Epiprocta, are distinguished from damselflies, which belong to the suborder Zygoptera, by having larger, more often than not larger eyes and wings that are up or out while at rest.

Meganeura monyi, the enormous Upper Carboniferous dragonfly progenitor, had wings that measured about 680 mm (27 in) in length. All Odonata have aquatic larvae known as naiads (nymphs), and both the larvae and the adults of all Odonata are carnivorous. Adults can fly, but they hardly ever walk. Their legs are designed specifically to catch prey. They are almost entirely insectivorous. The word "odonata," derived from the Ancient Greek "odn" (the ionic form of "o" odos), "tooth," was first used by Fabricius in 1793. One theory is that it was due of the noticeable toothiness of their maxillae. The majority of insects also have mandibular teeth. When referring to just the Anisoptera, Odonata aficionados avoid confusion by using the term real dragonfly, or simply anisopteran. The word "dragonfly" is typically used to refer exclusively to the Anisoptera, but it is also occasionally used to refer to all Odonata. Another term that has been suggested is warriorfly. In this order, some 7,000 species have been identified.

External morphology

The gigantic Central American helicopter damselfly *Megaloprepus coerulatus*, which has a wing span of 191 mm (7.5 in), is the largest odonate species still alive. *Tetracanthagyna plagjata* and *Petalura ingentissima* are the heaviest living odonates, with wing spans of 165 mm (6.5 in) and 160 mm (6.3 in) respectively. The Neotropical helicopter damselfly *Mecistogaster linearis*, with a body length of 135 mm (5.3 in), is the longest odonate species still living. It is occasionally asserted that the enormous Hawaiian darner *Anax strenuus*, with its purported wing

span of 190 mm (7.5 in), is the largest living odonate, however only 152 mm (6.0 in) wing spans are scientifically documented.

These insects have two pairs of long, translucent wings that move independently, lengthened abdomens, legs that make it easier to catch prey (other insects) in flight, huge, rounded heads covered primarily by well-developed, compound eyes that provide good eyesight. They have short antennae and three ocelli. The mouth features basic chewing mandibles and is located on the underside of the skull in adults. The Odonata have direct flight, with the flight muscles attaching directly to the wings, as opposed to the Neoptera, which have indirect flight, with the flight muscles attaching to the thorax. This enables independent active control of the amplitude, frequency, angle of attack, camber, and twist of all four wings.

The pterostigma, which is a structure on the leading edge close to the tip of the wing, is present in the majority of families. This is a vein-bound region that is swollen, filled with hemolymph, and frequently colourful. Though its exact purposes are unknown, the pterostigma most likely has an aerodynamic effect and possibly also has an aesthetic purpose. The energy required to raise and lower the wings may be lessened by adding mass at the end of the wing. Flying could use less energy if its wings' stiffness and bulk are combined properly. Bees and other insects, including them, have pterostigmas.

The nymphs are smaller and stockier than adults. Their eyes are smaller, their antennae are longer, and their heads are less movable than those of an adult in addition to missing wings. The labium, which is changed into a special prehensile organ called a labial mask for gripping prey, is one of their modified mouthparts. While dragonfly nymphs breathe through an organ in their rectum, damselfly nymphs use external gills on their abdomen.

Although they are often quite similar, dragonflies and damselflies differ in a number of distinctive ways. When at rest, dragonflies hold their wings either out to the side, out and downward or even considerably forward. They are strong flyers with rather substantial bodies. Damselflies often have weaker, even weaker-appearing wings when flying, and the majority of species maintain their wings folded back over the abdomen when at rest (see image below, left). The majority of the animal's head is taken up with dragonfly eyes that are in close proximity to one another across the face. Usually, damselflies have a space between their eyes.