

Order Odonata



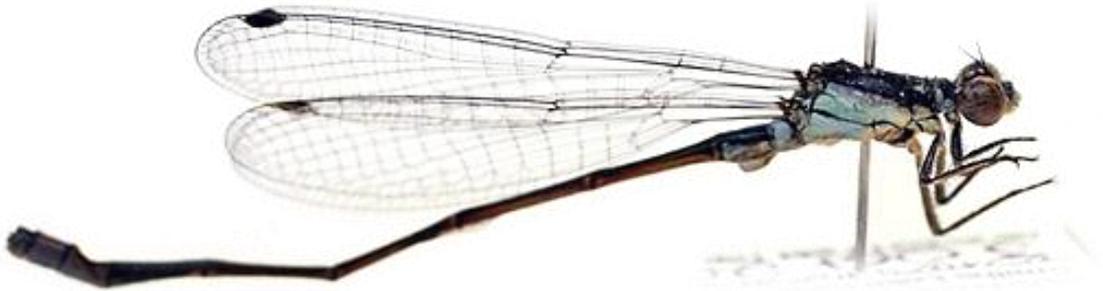
Common name: dragonflies and damselflies

Simple diagnosis. Adults are medium to large insects (2 to 15 cm long), with a maximum wingspan of 17 cm. Their main features include two pairs of unfolded long wings that are about equal in length and held vertically or horizontally over the body. They have very large eyes, three ocelli, minute antennae, dense venation and a pterostigma (= a pigmented spot on the leading edge of the forewings).

Technical diagnosis. The Odonata are recognised by two pairs of unfolded wings, which are subequal in length without any coupling apparatus, dense quadrangular venation, minute antennae which are shorter than the head, large eyes, thoracic pleura directed posteriorly and, in males, an abdominal apex with grasping apparatus, and the genitalia are on the ventral surface of abdominal segments II and III. The nymphs are aquatic and can be recognised by mouthparts in the shape of a mask and the presence of three caudal lamellae.

The nymphs are aquatic, with a stout or elongate body, well-developed eyes and legs, and often, possess ocelli. Their characteristic mouthparts are in the shape of an elongate mask that are held below the head at rest. On the apex of the abdomen, they have three caudal lamellae composed of five short outgrowths. The nymphs do not have abdominal gills and their abdomens move from side to side during swimming.

What can they be confused with? Adults are distinct with their elongate, unfolded wings, with extensive venation, including cross-veins. They can be superficially confused with the holometabolous order Neuroptera (= lacewings), which also have an elongate body, mandibulate (= biting and chewing) mouthparts, large wings that are often subequal in length, and dense venation.



Damselfly (Odonata: Zygoptera)

Lacewings differ in that the thoracic pleura are not directed posteriorly, the antennae are usually long, and wings are held tent-like above the body when at rest.

Odonate nymphs are superficially similar to nymphs of the orders Ephemeroptera (= mayflies) and Plecoptera, (= stoneflies) but both these orders differ in that the mouthparts are simple and mandibulate, sometimes modified, but not in the shape of a mask. In addition, the abdominal filaments are present instead of lamellae and the genitalia are at the tip of the abdomen. Nymphs of Ephemeroptera can also be recognised by the presence of lateral abdominal gills.

Biology. Adults are active and diurnal, excellent flyers, and exhibit territorial behaviour, antagonistic sexual mating. They are predators and feed on aerial insects. The nymphs are voracious predators, feeding vertebrates and small aquatic vertebrates.

Diversity in Papua New Guinea. The Odonata are cosmopolitan in distribution. They comprise two suborders, the damselflies (suborder Zygoptera) and dragonflies (suborder Anisoptera), 17 families, about 600 genera and 6500 species. The New Guinea fauna is fairly well-known, with over 600 species. However, new species continue to be described, especially from more remote outer islands and inland mountainous regions (see example refs below). Some guides have recently been released. Michalski (2012) compiled the first comprehensive guide to 620 species from New Guinea and neighbouring islands with nearly half the species being endemic. Later guides have been produced separately to the dragonflies (Orr & Kalkman 2015a) and damselflies (Kalkman & Orr 2013) of New Guinea.



Photograph: © John Pickering 2004-2014

Key references for Papua New Guinea.

Michalski, J. 2012. *A Manual for the Identification of The Dragonflies and Damselflies of New Guinea, Maluku and the Solomon Islands*. Kanduanum Books, Morrostown, NJ, 561 pp, 8 colour pages, 1275 bw line drawings.

Orr, AG & Kalkman, VJ. 2015a. Field guide to the Dragonflies of New Guinea. *Brachytron* 17, Supplement, 3-155.

Kalkman, VJ & Orr, AG. 2013. Field Guide to the Damselflies of New Guinea. *Brachytron* 15, 3-128.

Kalkman, VJ., Theischinger, G. & Richards, SJ. 2011. Dragonflies and damselflies of the Muller Range, Papua New Guinea. In: Richards. S.J. & B.G. Gamui (ed.) 2011. Rapid Biological Assessments of the Nakanai Mountains and the Upper Strickland Basin: surveying the biodiversity of Papua New Guinea's sublime karst environments. *RAP Bulletin of Biological Assessment* 60. Conservation International. Arlington, VA