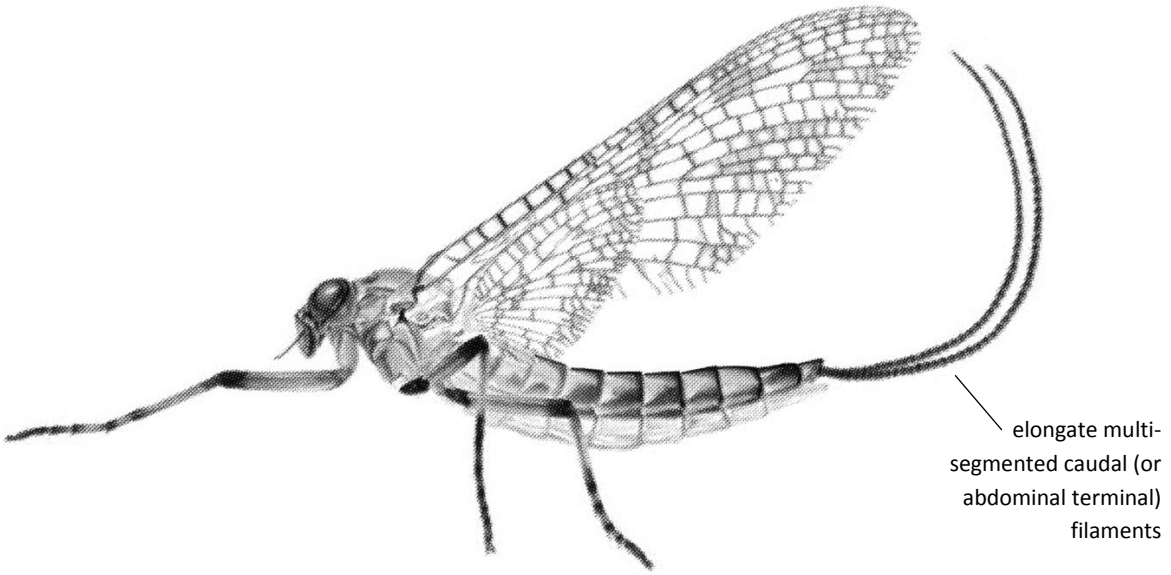
Order Ephemeroptera



Common name: mayflies

Simple diagnosis. Adults have one to two pairs of unfolded wings with extensive venation; the wings are held upright at rest. The hindwings are much smaller than the forewings, or are absent. Adults also have three, rarely two, long tail-like segmented filaments on their abdomen. Mouthparts are reduced or absent, eyes are large and often touching in males, and three ocelli are present. The antennae are usually shorter than the head.

Technical diagnosis. The adult (= imago) and subadult (= subimago) stages are characterised by having two pairs of unfolded wings with extensive venation, the forewings are subtriangular and the hindwings are distinctly shorter than the forewings, the wings can also be reduced or absent. They usually possess three, sometimes two, long caudal (= at tip of abdomen) segmented filaments, short and bristlelike antennae, presence of costal brace on the forewings (= thickened leading edge of the forewing), and the forelegs of males are often elongate. Adult mayflies do not feed as they lack mouthparts and there are swellings on the head where the mouthparts are normally placed.

Mayfly nymphs are aquatic and differ considerably from adults. They have an elongate body, with distinct compound eyes and three ocelli, distinct mandibulate (= biting and chewing) mouthparts, long legs, and often, wing buds. They also have two or three caudal segmented filaments, a large mesonotum (= second dorsal thoracic segment) covering a shorter metanotum (= third dorsal abdominal segment), a series or one pair of abdominal gills (= respiratory organs within water), and no spiracles (= external opening of the tracheal system).

What can they be confused with? Adults are distinct and cannot be confused with other orders. Mayfly nymphs can be confused with the aquatic nymphs of the orders Odonata (= dragonflies and damselflies) and Plecoptera (= stoneflies). Odonate nymphs can be readily recognised by the mouthparts having a mask shape, the presence of three caudal lamellae (not filaments) on the

abdomen, and the absence of lateral abdominal gills. Plecopteran nymphs can be distinguished by the metanotum being visible from above, and subequal or only slightly shorter than the mesonotum, and the presence of not more than two abdominal filaments, which are sometimes very short.

Biology. Adult mayflies are ephemeral, living for no more than a few days. They do not eat and their only purpose is to reproduce. Conspecific adults (= individuals of the same species) usually appear synchronously (= together) and swarm near or above aquatic habitats. These congregations can include millions of individuals. The Ephemeroptera is the only order to have a winged immature stage, the “subimago”, which precedes the reproductive adult stage.

Mayfly nymphs have a distinct way of swimming, where the abdomen moves vertically, up and down. This is opposed to the nymphs of the Odonata and Plecoptera which move the abdomen from side to side when swimming. Unlike adults, ephemeropteran nymphs (= naiads) are aquatic, have functional mandibulate (= biting and chewing) mouthparts and mostly feed on small plants, fungi and/or detritus. There are a few predaceous species.

Diversity in Papua New Guinea. The order is comprised of about 3000 species and has a worldwide distribution, with the highest diversity in the temperate regions. The New Guinea fauna is poorly known (Miller 2007).

Small mayfly (Atalophlebia: Baetidae)

Mayfly (Ephemeroptera)

Key references for Papua New Guinea.

Edmunds, GF & Polhemus, DA. 1990. Zoogeographical patterns among mayflies (Ephemeroptera) in the Malay Archipelago, with special reference to Celebes. In: Knight & Hollloway*, Insects and the rain forests of southeast Asia*. Royal Entomological Society, London.