

## Order Zoraptera

### Common name: zorapterans

**Simple diagnosis.** Zorapterans can be recognised by the small body, 9-segmented antennae, two-segmented and slender tarsi, and unsegmented cerci. In winged forms eyes and ocelli are present, the wings are membranous (= translucent) and have very reduced venation, and the hindwing is shorter than the forewing. Wingless forms usually do not have compound eyes and ocelli.

**Technical diagnosis.** Zorapterans are small (= 3-4 mm long) insects, that have wingless and winged forms. Morphologically they can be recognised by their hypognathous (= vertically directed) head with unmodified mandibulate (= biting and chewing) mouthparts, moniliform (= bead-like) antennae, with 9 segments, all thoracic terga are well defined and separated, tarsi are two-segmented and not enlarged, and abdominal cerci are unsegmented. The winged forms have compound eyes and ocelli, and the wings are held flat over the body when at rest. The venation is minimal, and the hindwing is considerably smaller than the forewing. Wingless forms usually do not have eyes and ocelli. Nymphs are similar to adults.

**What can they be confused with?** Zorapterans are similar to Termitoidea (= termites) as they also have winged and wingless forms, reduced wing venation, thoracic segments separated, mandibulate (= biting and chewing) mouthparts, moniliform antennae, often-reduced eyes and short unsegmented cerci. However, termites have fore- and hindwings subequal in length, and the tarsi usually 4-segmented, and rarely 5-segmented.

Zorapterans can be confused with Embioptera (= foot spinners), as both of them live gregariously, although the former are not eusocial. Both orders have winged and wingless forms, mandibulate (= biting and chewing) mouthparts, eyes usually reduced or absent, thoracic terga well-developed and separated, and wings with reduced venation. However, embiopterans differs in having a



Photograph: © David R. Maddison 2004; used under a Creative Commons Attribution License - Version 3.0

prognathous (= directed forwards) head, three tarsal segments, the foretarsus enlarged, antennae with 12-32 segments, two-segmented cerci, fore- and hindwings subequal in length and with cross veins. Zorapterans live under bark or in decaying wood whereas embiopterans usually live in silk galleries.

Wingless zorapterans can be confused with wingless Psocoptera (= book lice), as both are small in size, have a hypognathous (= directed vertically) head, their eyes can be reduced or absent, and the tarsi are 2- or 3-segmented. Book lice can be separated by the antennae having 13 or more segments, swollen frons, the mouthparts with a needle-like lacinia, the pronotum is small, the pterothorax is enlarged, and the abdominal cerci are absent.

**Biology.** Zorapterans are gregarious and can be found under the bark or in decaying wood, and are sometimes inquilines (= living in the home of another insect and sharing its food) in termite nests. They feed on fungi and small arthropods.

**Diversity in Papua New Guinea.** Zorapterans inhabit warm and temperate regions of the world (absent from Australia), but only about 40 species are known. There is a single species in New Guinea from New Britain (Terry & Whiting 2012; <http://en.wikipedia.org/wiki/Zoraptera>)

**Key references for Papua New Guinea.**

Terry, MD & Whiting, MF. 2012. *Zorotypus novobritannicus* n. sp., the first species of the order Zoraptera (Zorotypidae) from the Australasian Ecozone. *Zootaxa* 3260: 53 - 61