

## Order Coleoptera



**Common names:** beetles, weevils, chafers, longhorns, scarabs, whirligigs, ladybirds, curl grubs, wireworms

**Simple diagnosis.** Beetles have thickened forewings called elytra, which meet along the midline of the body, do not overlap, and are without venation, although they often have rows of punctures. If present, the hind wings are membranous, folded 2 or 3 times from the end inwards, and held beneath the elytra at rest. Beetles have chewing mouthparts, they usually have more than 3 segmented feet (tarsi) and their antennae do not have more than 12 segments.

### **Technical diagnosis.**

**Adults.** Adult beetles are diverse in shape and size (0.5-100mm long) but generally have a 3 body part appearance, with distinct head, prothorax, and forewings over the remainder of the body. The distinctive sclerotised forewings (elytra) are without venation, usually pitted (punctured, often in rows) and are not flapped in flight. The elytra do not overlap along the midline, and vary in length, but are only completely absent in rare larviform adults (adults which have larva-like bodies but fully developed genitalia). Hindwings if present are entirely covered by the elytra. The head is prognathous to hypognathous head, with compound eyes rarely absent or subdivided (4 eyes present), and usually without ocelli. The antennae vary greatly, but have 12 (very rarely) or less



Rove beetle (Coleoptera: Staphylinidae)

segments. The mouthparts are mandibulate, although in some beetles they are reduced for lapping up nectar or other secretions. The pronotum of beetles is well developed, and the meso- and metathorax are fused, forming a pterothorax. Fully winged species have a small triangular scutellum at the base of the elytra. Legs of beetles are generally robust, have short trochanters and tarsi with 3- five segments. The abdomen has 7 or fewer visible segments and lacks multisegmented appendages or cerci.

Larvae. Beetle larvae vary considerably in morphology, reflecting great diversity in life styles, but lack any evidence of wing development or genitalia. For example, predatory larvae are generally long-legged with distinguishable head, thorax and abdomen, prominent mouthparts and long abdominal urogomphi, whereas herbivorous larvae boring into plants, or parasitic larvae, may be simply cylindrical with minute mouthparts, and no legs or processes. The head is always present, prognathous or hypognathous, and sclerotised, without an adfrontal area. Mouthparts are mandibulate, usually chewing, usually with maxillary and labial palps, with the maxillary palps usually two- or three-segmented (not more than 4). The labium is without a spinneret, and the labial palps are 1-2- segmented or absent. Eyes are usually present and composed of six to zero stemmata, often organised in a row or loose cluster. Antennae are short and usually composed of 4 or fewer



Mandibulate mouthparts

Leaf beetle (Coleoptera: Chrysomelidae)



Tortoise beetle (Coleoptera: Chrysomelidae)



Straight-snouted weevil (Coleoptera: Brentidae)

segments, usually 1-3 (multisegmented in aquatic larvae of Scirtidae). Legs if present have 6 or less segments, and may be absent. The abdomen usually has 10 segments, but with the 10<sup>th</sup> not visible dorsally. Ventral swellings like prolegs may occur but these lack crotchets (hooks) except in a few aquatic Hydrophilidae. There may be paired processes on abdominal segment IX (urogomphi), and sometimes a short apical spine is present.

**What can they be confused with?** Adult beetles may be confused with several other orders, especially Heteroptera, Dermaptera and Blattodea.

Heteroptera (bugs), especially shield bugs or stinkbugs: these have sucking mouthparts, 3-segmented tarsi and usually part of the upper wing is membranous. Dermaptera (earwigs): only those beetles with very short elytra might be confused with earwigs, which differ by always having a pair of large forceps at the apex of the abdomen; they also have only 3-segmented tarsi. Blattodea (cockroaches): cockroaches are superficially similar to beetles but have distinct venation on the forewings and usually paired multisegmented cerci at the apex of the abdomen.



Scarab beetle (Coleoptera: Scarabaeidae)



Leaf beetle (Coleoptera: Chrysomelidae)



Scarab (Coleoptera: Scarabaeidae)

Photograph: © John Pickering 2004-2014

Coleopteran larvae vary and different forms can be confused with larvae from a number of other holometabolous orders. The active long-legged campodeiform larvae are similar to those of Neuroptera, and Trichoptera, also the non-insect adult Diplura.

**Biology.** Coleoptera are cosmopolitan and include more than 350,000 described species. Coleoptera is the most diverse insect order and is known worldwide, from almost any habitat, including fresh water, marine (rarely) and vegetation microhabitats. Both adults and larvae can be carnivorous, omnivorous or herbivorous.

**Diversity in Papua New Guinea.** Some groups (generally with large species) are well-known for New Guinea but others (generally with small species) are very poorly known.



Weevil (Coleoptera: Curculionidae)

Photograph: © Celia Symonds 2016

**Key references for Papua New Guinea.**

Gressitt, JL & Hornabrook, RW. 1977. *Handbook of common New Guinea beetles*. Handbook 2, Wau Ecology Institute, Wau.

Setliff, GP. 2007. Annotated checklist of weevils from the Papuan region (Coleoptera, Curculionoidea) *Zootaxa* 1536: 1-296

Lawrence, JL & Slipinski, SA. 2013. *Australian Beetles volume 1*. CSIRO Publishing, Melbourne.