# Aeolothripidae

## Australian fauna

Link to genera and species of Australian Aeolothripidae

Ten genera and 31 species of Aeolothripidae are known from Australia, and all but five of the species are endemic to this continent (Mound & Marullo, 1998).

## Biology

Adults and larvae of many species of Aeolothripidae appear to be facultative predators of other small arthropods, in that they feed on both floral tissues as well as on thrips and mites that live in flowers. However, some species are solely phytophagous, a few being univoltine in flowers of particular plant species (Tyagi *et al*., 2008), whereas in the warmer parts of the world, a considerable number of species are obligate predators (Hoddle, 2003). In Australia, the main aeolothripid genus, *Desmothrips*, includes many species that are common in a wide range of flowers, and most of these seem to be facultative predators. This also appears to be true of the many species in the northern hemisphere genus *Aeolothrips*. However, in both of these genera some species appear to be predatory, and a few of them are distinctive ant-mimics. These include *Aeolothrips albicinctus* in Europe, *Aeolothrips bicintus* and related species in North America, as well as *Desmothrips reedi* in southern Australia. Ant-mimicry has also arisen amongst other members of this family, including *Gelothrips cinctus* in South East Asia and tropical Australia (Mound & Marullo, 1998), *Stomatothrips* species in Central and South America (Mound & Marullo, 1996), and *Franklinothrips* species throughout the tropics (Mound & Reynaud, 2005). *Franklinothrips orizabensis* has been employed as a biocontrol agent against thrips pests in European greenhouses. Species of the tropical genus *Mymarothrips* are also obligate predators, but have a body form and wings that ressemble those of small chalcid wasps. In contrast, *Cycadothrips* species are phytophagous, breeding only in the male cones of *Macrozamia* cycads in Australia (Mound & Terry, 2001), and *Dactuliothrips* species also seem to be phytophagous breeding in California particularly in the flowers of *Yucca* species (Mound *et al*., 2019). It is probable that in all species of Aeolothripidae the second instar larva produces a silken cocoon within which to pupate (Hoddle *et al*., 2001), and such cocoons usually occur at ground level.

*Aeolothrips fasciatus*, female

*Desmothrips propinquus*, female

*Desmothrips reedi*, female microptera

*Franklinothrips orizabensis*, female

*Mymarothrips bicolor*, female

*Rhipidothrips brunneus*, female

*Stomatothrips angustipennis*, female

*Mymarothrips bicolor*, female antenna


*Andrewarthaia kellyana*, antenna

*Andrewarthaia kellyana*, antennal segments III & IV

*Aeolothrips intermedius*, antennal segments I to IV

*Aeolothrips fasciatus*, sternites VI-VII

## Geographic distribution

The family Aeolothripidae is found worldwide. However, the 112 species recognised in *Aeolothrips* are almost entirely Holarctic, and the six species of *Rhipidothrips* are Palearctic. However, a few species in both genera are widely introduced around the world, including Australia and North America. Five of the 24 recognised genera are endemic to the Americas, four to the Afrotropical region, three to India and five to Australia. *Desmothrips* is known only from Australia, with 18 described species, and a closely related Australian species is placed in a genus *Andrewarthaia*. Also known only from Australia, *Cycadothrips* includes

three described species, and the Australian genera *Erythridothrips* and *Lamprothrips* each include a single species. Three genera in the Americas have diversified, *Erythrothrips* with 14 species, and *Dactuliothrips* and *Stomatothrips* each with six or seven species, and in the Afrotropical region *Allelothrips* includes seven species. Similarly, *Franklinothrips* includes 16 tropical species, with one from Central America now widespread around the tropics but the others locally endemic including two in Australia. Several genera remain known from only one or two species, indeed, *Euceratothrips* is known only from a single male taken in Peru. Although a few genera are of doubtful significance, *Orothrips* is a particularly interesting genus with two species in California and one in southern Europe.

## Recognition

Species of Aeolothripidae all have nine antennal segments, with the exception of a single species known only from Iran. Moreover, at least segments VII-IX are broadly connate and form a single unit. The sensoria on segments III and IV are generally linear and longitudinal in the apical portion of these segments but often curling around the segmental apex. Exceptions to this occur in *Rhipidothrips*, in which the sensoria are interpreted as being reduced to the apical curve, although essentially linear in *R. gratiosus*. Antennal segments III and IV each bear two sensoria in *Orothrips*, *Dactuliothrips* and *Cycadothrips* species. Aeolothripidae are distinguished from Melanthripidae by the complete loss of sternite VIII. The pair of lobes that represent this sternite in Melanthripidae each bear two setae, and these two pairs of setae are represented on sternite VII of Aeolothripidae by two pairs of submarginal accessory setae. In the head, the tentorial bridge is well-developed, but the anterior tentorial arms are weaker than in Melanthripidae. The fore wings often have transverse or longitudinal dark bands, and are broadly rounded at the apex, with several cross-veins. Most Aeolothripidae have only short setae on the head and pronotum, but *Dactuliothrips* species have many prominent setae similar to those found in many Melanthripidae.

## Genus and species diversity

Worldwide, the Aeolothripidae comprises about 215 species and 24 genera, with a further 7 genera and 15 species known only from fossils. The genus *Aeolothrips* includes more than 50% of the species in this family, with three genera that each have between 10 and 15 species, eight genera that each include less than five species, and eight genera each with a single species. The genus *Aeolothrips* is sometimes restricted (Bhatti, 2006) to a single ground-living species, *A. albicinctus*, in which the first abdominal tergite is narrowed and bears numerous transverse striae; the other species being treated in *Coleothrips*. However, a similar transversely striate first abdominal tergite occurs in *Desmothrips reedi*, a ground-living species in this Australian genus. This body form seems to be part of the ant-mimicry syndrome that recurs amongst Aeolothripidae, and is insufficient to consider *A. albicinctus* as sister species to all the other members of *Aeolothrips*. Species of *Stomatothrips* and *Franklinothrips* also have a "wasp-waist", and the behaviour of some species is remarkably like that of small Hymenoptera.

## Family relationships

Members of the Aeolothripidae are distinguished from those of the Melanthripidae and Merothripidae by the complete loss in females of the eighth abdominal sternite and its two pairs of setae. However, in female Aeolothripidae there are two pairs of accessory setae submarginally on the seventh sternite that are considered to represent the paired setae of the lost eighth sternite. The sensoria on antennal segments III and IV are linear in most Aeolothripidae with a slight curve around the apex of the segments. The antennal sensoria of *Rhipidothrips* are interpreted as having almost lost the linear portion and retained only the distal curved portion, but *R. gratiosus* retains the linear portion of both sensoria as a series of isolated areas (Mound *et al.*, 2019). Species in three genera do not have linear sensoria, these being *Cycadothrips* in Australia, and *Dactuliothrips* and *Orothrips* in western USA.

## Thysanoptera systematics

The classification adopted here is a compromise between practicality and the ideal of a classification based on phylogenetic relationships. The two sub-orders, Terebrantia and Tubulifera, are probably sister-groups (Buckman *et al.*, 2013), but relationships among the eight families of Terebrantia remain far from clear (and there are also five families based on fossils - see ThripsWiki 2020). A radically different classification was proposed by Bhatti (1994, 1998, 2006) that recognised two Orders, 10 superfamilies and 40 families. This classification is based on autapomorphies rather than synapomorphies, and thus is essentially phenetic rather than phylogenetic.

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