

Thripidae



Australian fauna

[Link to identification of subfamilies of Thripidae](#)

[Link to genera and species of Australian Dendrothripinae](#)

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There are 85 genera and 290 species of Thripidae recorded from Australia. Many species, particularly in southern Australia, are introduced from the northern hemisphere. However, the majority of recorded species are endemic to Australia, although northern Australia has some taxa that are shared with southeastern Asia.

Biology

Species in the Thripidae exhibit a wide range of biologies. Some, such as those of *Dendrothrips* and *Scirtothrips*, breed only on leaves, with *Scirtothrips* species apparently particularly dependent on actively dividing young tissues for successful breeding. In contrast, many species of Panchaetothripinae breed most readily on old leaves, and often build up large populations on mature leaves of plants that are water stressed. Some Thripidae species breed only in flowers, such as *Odontothrips* species in Europe and *Odontothripella* species in Australia, both of which are associated with Fabaceae, and species in these genera are often host specific. Some flower-living Thripidae are pollinators on particular species of plants (Mound, 2004; Zerega *et al.*, 2004).

Many Thripidae feed both in flowers and on leaves, and some of these are the common pest species and tospovirus vectors on crops. Curiously, a few of these pest species, including *Thrips tabaci* and *Frankliniella occidentalis*, may at times act as beneficials, in that they will also feed on leaf-feeding spider mites. A few Thripidae, such as those of the genus *Scolothrips*, are obligate predators of mites.

The Poaceae, including grasses and bamboos, support a very wide range of Thripidae in a variety of genera. Species of *Chirothrips* and related taxa breed in the flowers of grasses (and some sedges), and a single individual will pupate within the glumes that would normally surround a mature seed. Other Thripidae, such as *Anaphothrips* and *Stenchaetothrips* species, feed on leaves, but *Limothrips* species seem to feed on both leaves and flowers of grasses.

All Thripidae have two larval and two pupal instars before emerging as adults, and pupation usually occurs at ground level (Heming, 1991). In their unusual life cycle, Thysanoptera are thus effectively exopterygote holometabola. Depending on the species, adults may have fully developed wings, or the wings may be no longer than the thorax width (micropterous), or the wings may not be developed at all (apterous) (see, Tyagi *et al.*, 2008). Males are more commonly micropterous or apterous than



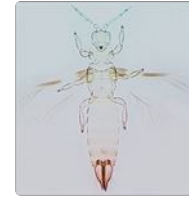
Aptinothrips rufus, female



Arorathrips mexicanus, female



Astrothrips tumiceps, female



Chaetanaphothrips orchidii, female



Dendrothrips ornatus, female



Hydatothrips species, female



Leucothrips nigripennis, female



Limothrips cerealium, male & female



Parthenothrips dracaena, female



Phibalothrips longiceps, female



Scolothrips sexmaculatus, female



Selenothrips rubrocinctus, female



Thrips australis, female



Hercinothrips bicinctus, forewing

females, but species such as *Frankliniella fusca* regularly produce micropterous females. Winged adults are unknown in species of the Thripidae genera *Aptinothrips* and *Apterothrips*.

Most species of Thripidae are bisexual, although males usually constitute 30% or less of any population. For a few common species, such as the North American Basswood thrips, *Thrips calcaratus*, males have never been found, but individual populations of some other thrips, such as *Thrips tabaci*, commonly lack males.

Geographic distribution

The majority of Thripidae species occur in the tropics and warm temperate areas, but there is a considerable radiation in cool temperate areas, and a few species are known from the subarctic (Greenland) and the subantarctic (Kerguelen and Macquarie Islands). In general, there is a considerable difference between both the size and the composition of the thrips faunas of tropical and temperate areas, such as North/South across the land masses of North America, China and Australia.

Some Thripidae species are particularly liable to be transported through human trading, such as some grass-living species (*Aptinothrips rufus*) that are found worldwide (Mound, 1983). Similarly, Thripidae associated with particular crops are also widespread, such as the gladiolus thrips (*Thrips simplex*) and the onion thrips (*Thrips tabaci*). Some of these expanded distribution patterns probably occurred during the period of sailing ships, but the more recent increase in air transport of horticultural produce is reflected in the increased distribution of other species, such as *Scirtothrips dorsalis* and *Thrips palmi*.

Europe is the only part of the world for which the Thripidae fauna can be considered reasonably well-known (zur Strassen, 2003), although even on that continent there is a lack of precise host-plant information for many common species. The Thripidae fauna of North America is probably less known than the available literature might imply (Stannard, 1968; Mound *et al.*, 2019), and the fauna of Australia is certainly considerably larger than published figures indicate. Similarly, much of the Thripidae fauna of S.E. Asia remains undescribed, and the Thripidae fauna of tropical Africa is effectively unknown.

Recognition

The Thripidae is a diverse family, in colour, body sculpture and thoracic structure, but can usually be recognised from the structure of the antennae and slender fore wings. The number of antennal segments is usually seven or eight, but varies from six to nine, and the sense cones on segments III and IV are characteristically Y-shaped but sometimes simple. The 9-segmented antennal condition is comparatively rare in this family, and is presumably derived secondarily rather than an inherited ancestral condition (Zhang *et al.*, 2019).

Most Thripidae have three pairs of setae associated with the ocelli, and the pronotum commonly bears two pairs of prominent posteroangular setae, but reduction in setal lengths on the pronotum and fore wings has occurred in several unrelated genera. The metanotal median pair of setae usually arise at the anterior margin, but are sometimes near the middle of this sclerite; they are close to the posterior margin only in the members of *Synaptothrips* from South Africa. The posteromarginal cilia on the fore wing are wavy (undulating) in most species of this family, and two longitudinal veins are usually visible.

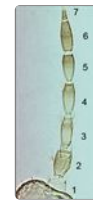
Genus and species diversity

The family Thripidae is currently interpreted as comprising rather more than 2100 described species, these being arranged into four subfamilies. The number of genera and species recognised in each of these subfamilies is as follows: Dendrothripinae 12/105; Panchaetothripinae 42/145; Sericothripinae 3/170; Thripinae 230/1730. More than 40% of the genera of Thripidae are monobasic (ie. each one includes a single species), and scarcely 30 of the genera include more than 10 species. However, a few genera include more than 50 species, with *Thrips* including about 295, and *Frankliniella* about 235 species (ThripsWiki, 2020).

Family relationships



Heliethrips haemorrhoidalis, wing



Thrips tabaci, antenna



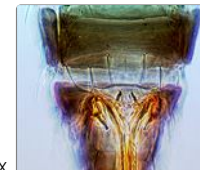
Heliethrips haemorrhoidalis, antenna



Thrips vulgatissimus, antenna



Thrips setipennis, tergites VIII-X



Thrips setipennis, sternite VII

Species of the family Thripidae are currently arranged into four subfamilies, although these probably have limited phylogenetic significance (Zhang *et al.*, 2019). The Dendrothripinae comprises small leaf-feeding thrips with an enlarged metathoracic furca that is associated with muscles involved in jumping. The Panchaethripinae are largely tropical leaf-feeding thrips, in which the body and legs have strong reticulate sculpture, but a metathoracic furca similar to that of the Dendrothripinae occurs in a few of these species. The Sericothripinae is a group of species found both in flowers and on leaves, and these (often bicoloured) thrips have the body surface bearing numerous rows of microtrichia, and the fore wing second vein without any setae; however, both of these conditions also occur in some Thripinae. Thripinae is the largest subfamily, and although most species feed either on leaves or in flowers of higher plants, many being pests, a few species are predatory and a very few are associated with mosses or ferns.

Within the Thripinae, few supra-generic groups can be defined clearly, although *Thrips* genus-group and *Frankliniella* genus-group are both well-defined, and comprise a large number of species in a series of genera (Mound, 2002).

Similarly, genus-groups have been defined around *Mycterothrips*, *Scirtothrips* and *Trichromothrips* (Masumoto & Okajima, 2005, 2006, 2007). In contrast, some groupings such as the "Aptinothripina" are based on character states such as "absence of long setae" that are evidently convergent. It is clear that reduction in setal lengths has occurred independently within genera in several unrelated lineages among the Thripidae.

Bhatti (2006) has presented a very different classification of these taxa in recognising three superfamilies, Dendrothripoidae (for Dendrothripinae plus *Retithrips* from the Panchaethripinae); Rhipiphoroethripoidae (for *Rhipiphoroethrips* from the Panchaethripinae), and Thripoidae (for the remaining taxa). This decision was based on character states of adults, but did not include larval characters. Larval Panchaethripinae, including *Retithrips* and *Rhipiphoroethrips*, have a characteristic body form with the tenth abdominal segment tubular, and their chaetotaxy is different from that of species in the other three recognised subfamilies (Heming, 1991). The three superfamilies proposed by Bhatti do not seem to represent evolutionary relationships.

Similarly, Bhatti (2006) recognised nine families within his "Thripoidae", that is, eight families in addition to the Thripidae. Five of these eight families were further subdivisions of the Panchaethripinae, one represents the Sericothripinae, one included a single genus specific to *Pandanus* in the Old World tropics, and one included the *Chirothrips* lineage of thrips that breed and pupate within individual grass flowers and thus have a distinctive body form. This classification is essentially phenetic, emphasising structural differences rather than relationships, and is thus of limited value to other biological disciplines.

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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