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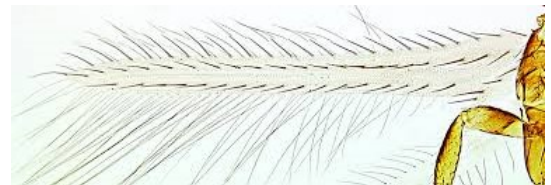
Thrips

Thrips

Thrips are small insects from the order Thysanoptera which literally means “fringed wings”. Adult thrips have fringe like sets of hairs along both sides of their wings. Thrips are found all over the world. Most are harmless, and some are predators of other insects or mites, but there are a few species that are particularly harmful to plants. There are more than 800 recognized thrips species in Australia, with less than 3% causing damage to commercial plants. Thrips have piercing sucking mouthparts that suck the contents out of the surface cells of plants. This causes the surrounding tissue to die and often results in silver/grey patches on plants. The plants can become sickly due to the loss of chlorophyll. Damage can also occur from direct feeding on developing fruitlets and flowers, or via distortion of fruit due to uneven development of fruitlets around feeding scars. Weeds, and mixed pastures can harbor large breeding populations of many thrips species. The most commonly encountered pest thrips in Australian protected horticulture are western flower thrips—*Frankliniella occidentalis* (WFT), onion thrips—*Thrips tabaci*, tomato thrips—*Frankliniella schultzei*, Melon thrips—*Thrips palmi*, and plague thrips—*Thrips imaginis*. The first 4 thrips mentioned here are all capable of transmitting tospoviruses in Australia.



Adult thrips



The wing of a western flower thrips showing the typical fringed edge

Thrips and virus transmission

Some thrips species are also responsible for the transmission of several plant damaging viruses such as tomato spotted wilt virus (TSWV), capsicum chlorosis virus (CaCV) and impatiens necrotic spot virus (INSV). These viruses are tospoviruses. All tospoviruses are transmitted by thrips and are not able to be transmitted by any other sap sucking insect such as aphids, leafhoppers or whitefly. Virus transmission can only occur if the virus is acquired from an infected plant by newly hatched thrips (first or early second instar nymphs). Older thrips (including adults) may acquire the virus but the tospovirus cannot complete its lifecycle within the thrips to allow for transmission. Once a juvenile thrips has acquired a virus, the virus quickly circulates and multiplies within the insect and is then transmitted to a plant when the adult thrips pierces the surface of a leaf to start feeding. Adult thrips remain infective all of their lives but cannot pass the virus onto their offspring via their eggs. About 5 days are needed after a thrips has acquired a virus before it can actively spread it to further plants. The thrips can then transmit the virus in less than 10 minutes when feeding. Tospoviruses are not carried in seed or on cuttings, prunings or equipment and are not able to survive in soil or rotting crop residues.

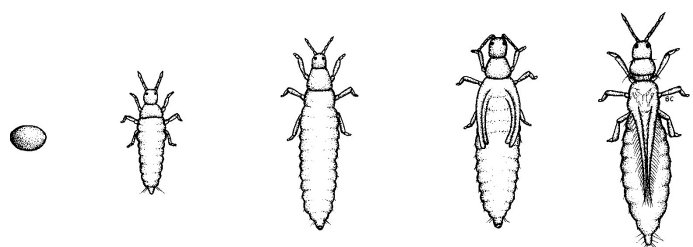


TSWV on yellow capsicum fruit

Lifecycle and appearance

Thrips hatch from an egg and develop through two actively feeding larval stages and two non-feeding stages, the prepupa and pupa, before becoming an adult.

Females of most plant-feeding species lay their eggs on or into leaves, buds, or other locations where larvae feed. The pale



The 5 life stages of a plant damaging thrips

prepupae and pupae of most species drop to the ground or lodge within plant crevices, to pupate. Greenhouse thrips pupate openly on lower leaf surfaces.

Thrips have several generations (up to about twelve) a year. When the weather is hot, the life cycle from egg to adult may be completed in as short a time as 2 weeks.

Western flower thrips (*Frankliniella occidentalis*)

WFT is found on vegetables, ornamentals and fruit throughout Australia. When found in low densities, populations are mainly males, but females develop when the population becomes more dense. Western flower thrips are more numerous in mid to late summer although in both protected and outdoor crops they can be found throughout the year. WFT females range in size from 1.4mm to 1.8mm, and males from 0.9mm to 1.1mm. A darker, slightly larger form of WFT may be seen in winter. There is a distinctive black tip on the females abdomen. WFT are usually found in flowers, where they feed on nectar and pollen. In flowers, feeding causes silvery, streaking, bronzing or distortion of petals or sepals. Feeding scars on immature fruit can result in distortion of the fruit as the fruit is unable to elongate evenly around the scar tissue. WFT is a primary vector of tomato spotted wilt virus, which can cause major problems in a wide range of crops such as tomato, capsicum, eggplant, potato, ornamentals, lettuce, cymbidium orchids, melon, and cucumber to name but a few.

Western flower thrips can be controlled with Orius, Cucumeris, Hypo-A and Dalotia.

Onion thrips (*Thrips tabaci*)

Onion thrips are found primarily on vegetables, and are most numerous in early summer. Onion thrips are a small thrips (1-1.2mm), and there are only females found in Australia. A darker, larger form of onion thrips may be found in winter months. The colouring of the abdominal segments on onion thrips is more uniform than that of either WFT or tomato thrips. The ocelli or eyespots are pale on onion thrips, whereas they are red on WFT. The tip of the abdomen is a uniform grey/brown colour on onion thrips, while it is black on WFT. Onion thrips are found on all parts of the plant but they prefer the undersides of young leaves. They are often found sitting close to leaf veins. Onion thrips will also feed on pollen. Onion thrips can also feed on the eggs of two spotted mite and may hide from predators underneath mite webs on a leaf.

Development stops when the temperature drops below 12° C and increases between 16-28° C. Pupation occurs in the soil or hidden in cracks and crevasses on the plant.

Onion thrips can be controlled by Orius, Cucumeris and Hypo-A and Dalotia.

Plague thrips (*Thrips imaginis*)

Plague thrips are pests of lettuce, beans, tomatoes, cucurbits and stone and pome fruit. Plague thrips are relatively small thrips with females ranging in size from 1.1mm to 1.3mm.

On stone and pome fruit, plague thrips are the most commonly found thrips during the flowering period. Late in the season, plague thrips tend to feed in protected places on fruit and often between fruits or under leaves. Feeding damage shows as small silver patches on leaves, where the cell contents have been removed. On coloured petals, white/silver patches can appear where the pigment has been removed. Feeding damage to young developing buds can result in stunted or deformed flowers, while feeding damage towards the end of flowering will result in stunted or deformed fruit. Plague thrips can be controlled by Orius, Cucumeris and Hypo-M.



Adult western flower thrips



Adult onion thrips



Adult plague thrips

silver