



Whitefly

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By officers of the Entomology Branch, Department of Agriculture Western Australia

'Whiteflies' or 'snow flies' (Aleyrodidae) are tiny, sap-sucking insects often found on the underside of leaves. They are related to other sucking insects such as aphids, mealybugs and scale insects, and tend to fly when the plant is disturbed. Whitefly adults resemble small moths and the body and wings are covered in a powdery white wax. Nymphs (or larvae) are a flattened oval shape, and look more like a scale insect.

Damage

Whiteflies produce a sticky substance known as honeydew, on which sooty mould can develop. Low numbers of whiteflies are not usually damaging and adults by themselves will not cause significant damage unless they are transmitting plant viruses. Virus symptoms include irregular ripening in tomatoes and blanching in carrots and broccoli. When present in large numbers, whitefly feeding can affect plant growth causing distortion, discoloration, yellowing or silvering of leaves. Whiteflies can be a problem of fruit trees, ornamentals and vegetables. Many species of whitefly, such as the silverleaf whitefly (*Bemisia tabaci*), have a wide host range (over 500 species).

Which whiteflies occur in Western Australia?

Five important species of whitefly occur in Western Australia, as listed in the table below. With the exception of the citrus whitefly and the native strain of *Bemisia tabaci*, which are native to Australia, all have been introduced. Species such as the greenhouse and silverleaf whitefly cause significant damage to commercial crops both here and overseas.

Identification of whiteflies is extremely difficult since most whitefly adults appear similar in colour (most are white to off-white), size (1.5–2.5 mm) and shape (moth-like). The pupal stage has most of the characteristics used to identify whiteflies and is the only stage from which an accurate species identification can be made.



Ash whitefly adult and pupae.
(Courtesy of NSW Department of Agriculture.)

Species	Size, description	Host
Australian citrus whitefly <i>Orchamoplatus citri</i>	Adult: 2.5 mm long, white body. Pupa: marginal fringe.	Citrus, particularly lemons
Silverleaf whitefly <i>Bemisia tabaci</i> - B biotype	Adult: 1.5 mm long, white wings and a yellow body; wings are held at a slightly tilted angle to the surface or substrate. Pupa: no waxy filaments or marginal fringe.	Wide host range including avocado, beans, cabbage, capsicum, cucumber, egg plant (aubergine), melon, tomato, lettuce, papaw, potato, pumpkin, squash, sweet potato, begonia, poinsettia and hibiscus.
Ash whitefly <i>Siphoninus phillyreae</i>	Adult: 1.5 mm long, white with slightly mottled wings. Pupa: thick band of wax down the back and a fringe of tiny tubes, each with a liquid droplet at the end.	Many species of ash (eg claret ash, golden ash etc), olives, hawthorn, apple, plum, pear and pomegranate. A variety of other plants including citrus, magnolia and crepe myrtle, can be occasional hosts.
Cabbage whitefly <i>Aleyrodes proletella</i>	Adult: 1.5 mm long, white with black flecks on the wing.	Brassicas including broccoli, cabbage, brussels sprouts, lettuce, and sow thistle (weed).
Greenhouse or glasshouse whitefly <i>Trialeurodes vaporariorum</i>	Adult: 1.5 – 2.0 mm long with white wings held relatively flat over body. Pupa: long waxy filaments and a marginal fringe.	Wide host range including most vegetables and herbaceous ornamentals. Hosts include begonia, cineraria, chrysanthemum, cucumber, hibiscus, geranium, ferns, tomato and tamarillo.

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Life cycle and habits

All whiteflies have a similar life cycle, developing from the egg through four nymphal instars before becoming adults. Males and females are similar, except that the female is usually larger.

The female adult lays oval eggs in horseshoe or circular patterns on the undersides of leaves. Crawlers (approx. 0.3 mm long) emerge from the eggs and wander over the leaf surface.

Within approximately one week, the crawler settles and remains stationary for the second, third and fourth instars. At this stage the whitefly nymph (or larva) is flat and oval and resembles a small scale insect. Both legs and antennae are lost after the first moult, and subsequent nymphs remain fixed to the leaf surface. Nymphs may be yellowish or black in colour. Yellowish individuals are normally associated with herbaceous plants and black individuals are usually found on woody plants. The second and third instar nymphs are pale green and scalelike in appearance. Fourth instar nymphs feed initially, then feeding ceases before the adult begins to form internally.

The winged adult emerges from the fourth instar nymph (often incorrectly called a pupa). When they first emerge from this stage, adult whiteflies are pale green or yellow, but they quickly secrete a white, waxy coating. All stages feed by sucking plant juices from leaves and excreting excess liquid as drops of honeydew as they feed.

Whitefly populations can develop very rapidly in warm weather and the greatest populations usually occur in spring and autumn. There are several generations of whitefly a year. The entire life cycle may be completed in as little as 18 days at temperatures of 28°C, depending on species. All growth stages can often be found on leaves at any one time.



Greenhouse whitefly on rose leaves.
(Courtesy of NSW Department of Agriculture.)



Citrus whitefly. Syrphid (hover fly) larva is attacking the eggs.

Control

Whiteflies can quickly develop insecticide resistance. In particular, the silverleaf whitefly is resistant to a wide range of insecticides. For this reason, the best strategy is to prevent problems from developing. Avoid or remove plants that repeatedly host high populations of whiteflies. In the early stages of population development, whiteflies can be reduced by removing infested leaves or hosing down with water, or even by vacuuming. If you choose to use insecticides, insecticidal soaps or petroleum spray oils may reduce, but will not eliminate, populations. Most insecticides used are only effective against adults, so that repeated treatments at three to five day intervals are necessary for several weeks before control can be achieved. Make sure that the undersides of the leaves are treated. Check with your local nursery to determine which chemicals are registered for whitefly control.

Biological control

In many situations, natural enemies will provide some control of whiteflies. Effectiveness of natural enemies will be reduced by insecticides, dusty conditions, or interference by ants. Several insect species that will feed on whitefly may be found in the suburban backyard. These including lacewings, ladybirds and syrphids (hover flies). The biological control agent *Encarsia formosa* is a small, parasitic wasp that attacks both greenhouse and silverleaf whiteflies. *Encarsia* is, however, more effective against the greenhouse whitefly. It is sold as parasitised greenhouse whitefly pupae that are glued onto small cards and is available commercially for use by greenhouse growers.