

# Aphids - A Rapidly Reproducing Problem

## Background

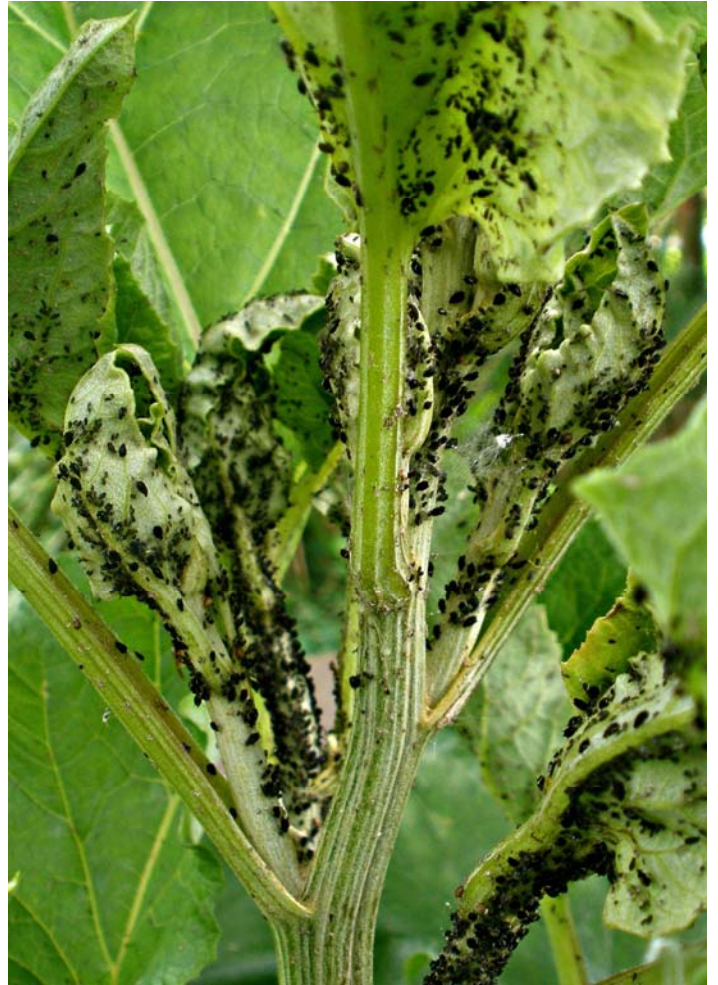
Aphids are relatively small, bulbous, soft-bodied insects that are common pests in production nurseries across Australia. There are about 5000 described species of aphids worldwide but only a few hundred are known to be present in Australia. Of these, only a small number are believed to be native to Australia (only a few dozen); the rest were introduced accidentally on cultivated plants by early British settlers. There are still many exotic aphids currently not present in Australia.

Aphids represent a single family of insects (Aphididae) that are sucking insects in the order Hemiptera. Aphids are closely related to whiteflies, scale insects, psyllids, stink bugs, shield bugs, pirate bugs and numerous other groups of common nursery pests and predators. There are two families of insects that are closely related to aphids (being in the same superfamily). These each have only a few species present in Australia and will only be encountered if specific host plants are grown. However, these species can be serious pests if you grow those host plants, e.g. grapevine phylloxera (*Daktulosphaira vitifoliae*) which is a notifiable, regulated pest in Australia. These peripheral aphid-like groups are not covered in this factsheet.

## General biology

The biology of aphids is quite complex and lends itself to rapid multiplication and dispersal. Most species are all female, do not need to mate and rarely lay eggs. Instead first instar nymphs are born and begin feeding almost immediately. Each individual moults through a number of immature stages and eventually becomes an adult (female) that can then begin reproducing.

Some species will produce males just prior to winter in cooler climates. In this case, adults mate and females lay eggs that do not hatch until



**Black bean aphid (*Aphis fabae*) is a major pest that is absent from Australia** (Ansel Oommen, Bugwood.org)

temperatures increase in spring. Green peach aphid (GPA - *Myzus persicae*), is one such species that has this type of biology (refer to the fact sheet on this species for more detail). In warmer climates, and in glasshouses that are artificially heated, this does not occur; the populations may reproduce asexually for the entire year.

Immature insects never have wings, only adults have wings, however, adult aphids sometimes have wings and sometimes do not. Wingless adults produce more offspring than winged aphids, but have a more limited dispersal ability. Winged adults are weak fliers, produce about half the number of offspring, but can be dispersed widely on wind currents. Most individuals become wingless adults; winged adults are more likely to occur when the density of aphids becomes high or when the health of their host plant begins to decline.

Most species of aphids are highly host specific, having hosts from one or a small number of closely related genera. Only a small number of aphid species are highly polyphagous (feeding on a large number of host plant species from many plant families). Of course, these species are the ones most commonly encountered in production nurseries, giving the illusion that aphids feed on a large number of host plant species.

Most aphids are small, their bodies being no more than 1-2mm long, but some species can be a massive 6-7mm long (e.g. *Cinara* spp.). Most species are oval or almond shaped. Immature and wingless individuals are often light to dark green, yellow or orange, but some species are relatively dark, e.g. cow pea aphid is black. Winged individuals of a species often have much darker colouration than immature or wingless individuals.

Aphids often become pests during mild conditions typical of spring and autumn in Australia. High summer temperatures tend to reduce populations drastically and low temperatures cause populations to reproduce slowly or go into diapause. However, exceptions will occur particularly in protected cropping situations with good environmental control systems.

During good conditions, aphids can complete their lifecycle in 5-10 days and females may lay 1-2 offspring per day. As such, populations can build up rapidly from even one aphid flying into a crop.

### Aphid damage

Aphids produce damage by feeding (removing sap), by injecting salivary secretions into the plant and via the production of honeydew, on which black sooty mould often grows. The exact damage depends upon where they are located on the plant. Many aphids are found on the underside of leaves, particularly new growth that has not fully expanded. Young leaves fed upon by aphids may appear deformed or stunted when they expand. Small numbers of aphids infesting the growing tip can potentially cause abnormal, deformed and or stunted growth that may cause the plant to be unsaleable. Aphids feeding on fully-expanded leaves may cause the leaf to become chlorotic, wilt and fall from the plant. Large populations may cause greatly reduced growth rates.



**Aphid nymphs and adults** (above); **winged green peach aphid**, (middle - Scott Bauer, USDA Agricultural Research Service, Bugwood.org); **Aphids on corn being eaten by a lady beetle larva, mummies also present** (below).

The saliva injected into the plant by aphids may cause retarded or stunted new growth and stem dieback if large numbers of aphids are present. Aphids also produce honeydew (their excretion), which is sugary and often attracts ants. Some species of aphids may be attended by ants that may protect them from predators and parasitoids and may move individuals around. Black sooty mould often grows on honeydew and can cause plants to become unsaleable. Large populations may cause plants to become covered or dusted in white casts (skins from moulting individuals) and can cause allergic reactions in some people, particularly those prone to asthma.

A small number of aphid species feed on roots. Such species appear similar to root feeding mealybugs and cause similar damage, i.e. reduced growth rates and plant vigour. Very heavy infestations may cause certain plants to wilt, collapse and die. In addition, there are a small number of aphids that produce galls. For example, the aphid *Eriosoma lanigerum* can cause outgrowths on twigs and roots of apple. Other species may cause distinctive leaf curl, e.g. green peach aphid.

### Aphids as virus vectors

Aphids are the most common group of insect vectors of plant viruses. The largest group of plant viruses (Potyviruses) are all vectored by aphids. Some species of aphids may only vector a small number of viruses, whereas green peach aphid can vector over 100 plant viruses and is considered by many to be the most efficient vector of plant viruses across all insect species. *Cucumber* and *Celery mosaic virus*, *Potato leaf roll virus*, *Potato virus Y*, *Beet western yellows virus* (and other beet yellow viruses), *Papaya ringspot virus*, *Watermelon mosaic virus*, *Lettuce mosaic virus* and many other viruses affecting vegetable and ornamental crops are all vectored by aphids. The host range of each virus varies but often includes ornamental species and weeds. If you are experiencing virus infection, submit have the aphids and virus identified to better understand virus-vector biology and host range. This will aid in management of both pest and disease. For more information on [viruses in production nurseries refer to the factsheet](#) devoted to this topic.

### Monitoring for aphids

Plant health should be inspected on a weekly basis and include monitoring for pests and diseases. Increase the frequency of monitoring during warmer weather, particularly in spring and autumn and on host plants which are known to be more susceptible to aphids. Frequent monitoring will enable infestations to be spotted while numbers are low, making the problem easier and cheaper to manage. Aphids can be monitored by visual inspection, beating plants and winged aphids can be detected on sticky traps. Note that aphids may be difficult to detect on pale yellow or green leaves, particularly at



**Lacewing larva feeding on aphids** (David Cappaert - Bugwood.org) **syrrhid larva feeding on aphids** (middle - Clemson University - USDA Coop Extension, Bugwood.org); **aphid mummies (brown) and black aphids killed from pesticide application** (below).

low densities. The presence of ants often provides an indication that aphids or another sap-sucking insect (such as scales or mealybugs) are present on a plant. Always investigate why ants are present on plants as they may lead you to a pest infestation.

Parasitised aphids turn into 'mummies', as in a preserved corpse. An aphid that has been parasitised swells into a hard, brown or black ball which is distinctly different from normal living aphids. Mummified aphids will not reproduce and will give rise to wasps that parasitise or feed on other aphids.

### Managing aphids

Wherever possible, use multiple management strategies. Do not rely on pesticides as the sole method of management of aphids or any pest. A range of cultural practices will reduce aphid infestations including management of weeds, use of wind breaks, removal of heavily infested stock, quarantining and monitoring incoming stock, use of insect proof structures and practicing good crop hygiene. Avoid use of broad spectrum, highly residual chemicals that will cause high mortality of naturalised parasitoids and predators.

There are four commercially available biological control agents that consume or parasitise aphids; green lacewing, a pirate bug (*Orius*) and two parasitoid wasps. These are available from Bugs for Bugs and Biological Services. In addition, a wide array of natural enemies will also consume aphids, e.g. lady beetles, if applications of broad spectrum pesticides are limited. Seek the advice of the biocontrol agent provider before releasing predators for the first time.

There are numerous pesticides registered for the control of aphids in nursery crops. These include broad-spectrum, long residual products (e.g. organophosphate, neonicotinoid and synthetic pyrethroid products) and products that are specific to aphids (e.g. pirimicarb). Oil products can also be very effective, particularly for smaller species. However, some species, e.g. rose aphid, are not managed effectively with oils. Products available include contact, translaminar and systemic modes of action. Choose an appropriate product depending on where aphids are located within the canopy, i.e. systemic or translaminar products when aphids are relatively protected. Refer to the [APVMA](#) or [infopest](#) websites for current pesticides available against aphids.

This document was prepared by Andrew Manners (Agriscience Queensland, Department of Agriculture and Fisheries, Ecosciences Precinct, GPO Box 267, Brisbane QLD 4001) as part of the Hort. Innovation, levy funded project 'Building the resilience and on-farm biosecurity capacity of the Australian production nursery industry' in 2016. Thanks go to David Carey, Lindy Coates and John Duff (DAF) for helpful comments on previous versions of this factsheet. Photos without acknowledgements were taken by DAF.



**Black cherry aphid** (above - Whitney Cranshaw, Colorado State University); **Pemphigus root aphids** (below - Alton N. Sparks, Jr, University of Georgia). Both Bugwood.org