Note: 235
June 2007

Department of Agriculture and Food
Gardennote

Common pests of citrus in home gardens

By Harald Hoffmann, Biosecurity Communications, Kevin Lacey, Horticulture, and Sonya Broughton, Entomology, South Perth

This Gardennote describes the most common insect pests of citrus trees occurring in home gardens in Western Australia and their control using natural or low toxic chemical controls.

Chewing Insects

Citrus leafminer *(Phyllocnistis citrella)*

Citrus leafminer is the larva of a small moth originating from southeast Asia and is commonly seen in backyard citrus trees. The larva infests young flushing foliage in early autumn, peaking in April or May and feeds within the leaves creating distinctive silvery tunnels or "mines".

They can cause severe damage to the leaves of young trees (less than three years old). Established trees are less affected. Damage is usually worst when there is new flushing growth (early autumn peaking in April or May), depending on temperature.

Citrus leafminers are naturally controlled by small parasitic wasps. Damaged leaves can be pruned out but if chemical control is required, treat young trees with a suitable horticultural oil from summer to autumn.

Lightbrown apple moth *(Epiphyas postvittana)*

Lightbrown apple moth caterpillars are a native species occurring from spring to autumn and are up to 20 mm long. They can be found in protected areas where fruit, or fruit and leaves touch, or in the navel of some navel orange varieties. The caterpillars produce a protective web under which they feed. Lightbrown apple moth are naturally controlled by wasps such as *Trichogramma* which parasitise the eggs, while caterpillars are parasited by braconid wasps. Bugs (*Oechalia schellembergii)* will also predate on the adult moth.

For chemical control, a mixture of garlic, chilli and pyrethrins is commercially available as a low toxic pesticide.

Native budworm *(Heliothis punctigera)*

Native budworm is an occasional spring pest on fruit trees in Western Australia. The caterpillars feed on shoots, flowers and newly set fruit, causing fruit drop. The caterpillars may grow to 40 mm long and can be green or brown in colour. Often the level of damage is not sufficient to warrant chemical control. If chemical control is required, the biological insecticide *Bacillus thuringiensis* is effective on young caterpillars.

Lemon bud moth *(Prays parilis)*

The larva of the lemon bud moth feeds on the flowers of lemon trees and can cause fruit to become misshapen and deformed. The larvae are yellowish to reddish-brown in colour and grow up to 10 mm in length. They are most commonly found within the buds of unopened lemon flowers. Affected flowers can often be identified by the small exit hole left by larvae. Chemical control is only required at high infestation levels.

If chemical control of caterpillars is necessary, check with your local nursery or hardware store for available chemical control measures. Try garlic extract as a repellent.

Clockwise from top left: Citrus leaf miner, lightbrown apple moth, native budworm, Mediterranean fruit fly.

Mediterranean fruit fly *(Ceratitis capitata)*

Mediterranean fruit fly (Medfly) is the most common pest on citrus in home gardens in the metropolitan area, and is particularly active between November and July. First detected in Western Australia in the 1890's, Medfly will attack most citrus varieties, especially mandarins and oranges. The presence of small piercing holes in the fruit indicates that eggs were laid under the fruit skin and that maggots (up to 8 mm long) may be present. The maggots tunnel into the fruits and cause rotting, often resulting in premature ripening and fruit drop.

Adults can be controlled with weekly baiting of leaves with a combination of an insecticide (e.g. maldison) and a suitable lure (e.g. protein hydrolysate). Readily mixed products (currently Naturalure® and Eco-Naturalure®) containing spinosad and protein are now available for organic growers, but may not be available in home pack quantities. Spinosad is derived from a bacteria and is a contact and stomach poison. Baiting may not prevent egg laying and maggot infestation of fruit however, particularly if the Medfly population is high.

If the infestation is heavy, a cover spray (every one to two weeks) with a registered insecticide when the fruit is half to three quarter size will kill eggs and larvae present in the fruit. Note that insecticide residues will be present in the fruit, so follow the recommended withholding period on the label, (period after which fruit has been sprayed before it is safe to pick) before consuming the fruit.

To get rid of infested fruit, seal them in plastic bags and place bags in a bin, or place fruit in water with a small amount of kerosene on the surface of the water. The layer of kerosene will suffocate the larvae. Medfly larvae can survive burial, so this method is not recommended for fruit disposal.

Weevils

A number of weevil species have been observed causing damage to citrus trees in Western Australia. The main problem species are apple weevil (*Otiorhynchus cribricollis*), garden weevil (*Phlyctinus callosus*) and Fullers rose weevil (*Asynonychus cervinus*), but occasionally other species may also cause damage.

Clockwise from top: Apple weevil, Fullers rose weevil, garden weevil.

Weevils damage leaves and occasionally the fruit. Garden weevil and apple weevil can be trapped and then destroyed by attaching corrugated cardboard strips about 15 cm wide around the trunks of trees. The weevils, which feed at night, will shelter under the cardboard during the day which can then be removed and destroyed. Fullers Rose Weevil shelters in trees and cannot be controlled using this method. Use fluffy dacron bands around tree trunks to slow the movement of weevils into the canopy of the tree.

Sap-sucking insects

Honeydew producing insects

Scale, mealybug, aphids and whiteflies are closely related species, sucking plant juices from various plant parts with specialised mouthparts. Honeydew, a sweet, sticky liquid is excreted as a by-product of their feeding. Wherever honeydew lands (e.g. leaves, twigs, fruit, furniture), sooty mould can establish. Sooty moulds are fungi that give whatever they coat the appearance of being covered with a layer of soot.

Although sooty moulds do not infect plants, they can cause indirect damage by interfering with photosynthesis. This in turn can stunt plant growth. Coated leaves may also drop prematurely. Fruit covered with sooty moulds are edible. Sooty moulds can be removed from the fruit with a solution of mild soap and warm water. A suitable horticultural oil is an effective chemical control for these insects.

Scales

Scales are unusual insects appearing to lack legs and eyes. Most species are usually only mobile when young and remain stationary on the plant as adult insects.

Red scale (*Aonidiella aurantii*) is a major pest in Western Australian home gardens, infesting leaves, fruit, twigs and limbs. They are attacked by small parasitic wasps such as *Aphytis melinus* and by minute ladybirds. Chemical control with a suitable horticultural oil (not in hot weather) should be used on bad infestations.

Aphytis wasp laying eggs in red scale (Photo by Australasian Biological Control Association).

Other scale pests sometimes seen on citrus trees in Western Australia include soft brown scale (*Coccus hesperidum*), black scale (*Saissetia oleae*), citricola scale (*Coccus pseudomagnoliarum*), white wax scale (*Ceroplastes destructor*), cottony cushion scale (*Icerya purchasi*), and hard or Chinese wax scale (*Ceroplastes sinensis*). A number of different predator and parasite species have been released in commercial orchards over the years to help control different scale insects, including parasitic wasps. Some ladybird species are also predators of scale insects.

Aphids

Aphids are small (1-3 mm), pear shaped, soft bodied insects. They can be winged or wingless and are usually slow moving. The black citrus aphid (*Toxoptera citricida*) is an exotic species commonly found on West Australian

citrus. Aphids are most abundant when there is new, flushing growth, usually in September/October and February to April. The aphids cluster on blossoms and young shoot growth, causing twisting and distortion. Aphids also excrete honeydew on which sooty mould, a black fungus, often grows. Sooty mould can grow on any part of the tree, including the fruit.

Aphids are attacked by a wide range of naturally occurring beneficial insects including small parasitic wasps, ladybirds, lacewings and hoverfly larvae. For chemical control, a spray containing garlic, chilli and pyrethrins is commercially available as a low toxicity pesticide. For other pesticide recommendations, check with your local nursery or hardware store for registered chemicals.

Mealybugs

Mealybugs are coated with a fluffy layer of wax. Two exotic species, citrus mealybug (*Planococcus citri)* and the long-tailed mealybug (*Pseudococcus longispinus*), attack Western Australian citrus trees. Mealybugs are up to 3 mm long and are found on naval ends and under calyxes of fruit, as well as between touching fruit and leaves. Long-tailed meaybugs have long white 'hairs' extending from the tail region, whereas citrus mealybugs do not.

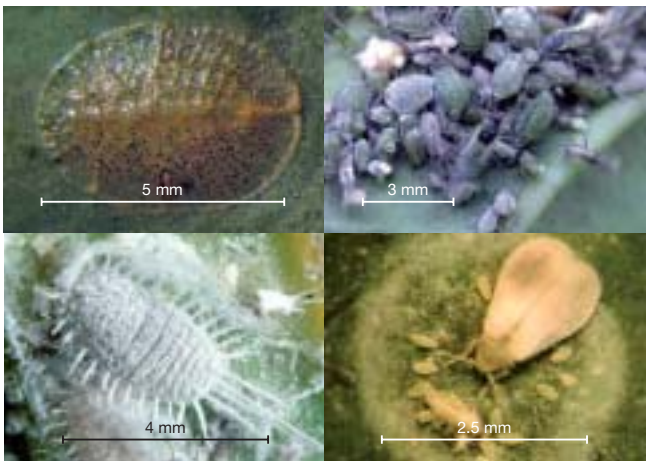
Cryptolaemus adult (right) and larva (left) feeding on mealybugs (below). The younger larvae can be easily confused with the mealybugs on which they feed. Older larvae, however (as shown) are larger than mealybugs (Photo by Australasian Biological Control Association).

Apart from parasitic wasps, the 'mealybug destroyer', a native ladybird species (*Cryptolaemus montrouzieri*), and lacewings are natural control agents.

As with aphids, honeydew production encourages the 'sooty mould' fungus to grow on leaves and fruit.

Whiteflies

Whiteflies resemble tiny, snowy white moths. The native whitefly, *Orchamoplatus citri*, attacks backyard citrus in Western Australia. The adults, eggs, larvae and pupae are often found on the underside of leaves. Native citrus whitefly is attacked by a range of naturally occurring predators including ladybirds, lacewing, hoverfly larvae and some beetles.



Clockwise from top left: Scale, aphids, citrus whitefly, mealybugs.

Ants and honeydew producing insects

Honeydew producing insects are often actively transported, 'farmed' and defended by ants. Ants use the honeydew as a food source whilst the insects are protected from parasites and predators. Controlling the ant population will therefore also reduce these pests. To control ants, send a small sample on a small piece of sticky tape to the address below, for identification and advice on control methods.

Non-honeydew producing insects

Crusader bugs *(Mictis profana)*

Crusader bugs are up to 25 mm long, with a pale yellow/orange cross on their backs, often spraying a stinking fluid when disturbed. Crusader bugs are a native species and can occur year round. On citrus trees, they feed by sucking on young shoots causing the shoot tip to wilt and die.

They are controlled naturally by assassin bugs (*Pristhesancus plagipennis)* and by small wasps which parasitise the eggs.

Assassin bugs can attack a caterpillar many times their size.

Mites

Mites are small (less than 1 mm), often tick or spider-like in appearance with eight legs (adults). Some species such as two-spotted mite are just visible to the naked eye, while other mites such as the brown citrus rust mite and citrus bud mite can only be seen with the aid of a microscope. In Western Australia, two-spotted mites and citrus bud mites are the most common citrus pests.

Two-spotted mite *(Tetranychus urticae)*

These mites feed mainly on lower surface of leaves causing a typical yellow stippling or spotting effect. Occasionally, damage can also occur to fruit. Two-spotted mites are particularly active in warm hot conditions. Mite eating ladybirds and predatory mites are natural control agents. Chemical control is usually not required. However if leaves or fruit are badly infested, mites can be controlled with sulfur or a suitable horticultural oil spray.

Citrus bud mite *(Aceria sheldoni)*

Citrus bud mites can attack all citrus varieties, but damage is mainly seen on lemons. Active year round, symptoms of bud mite damage are distorted flowers, fruit and shoots. The mites usually hide inside leaf and flower buds making control difficult. If required, control as for two-spotted mites.

Clockwise from top left: Crusader bug, two-spotted mite (highly magnified, photo by USDA), lemon affected by citrus bud mites, thrips.

Thrips

Thrips are small slender soft-bodied insects just visible to the naked eye. Adults are only about 2 mm long. Two exotic species of thrips damage citrus in Western Australia: Kelly's citrus thrips (*Pezothrips kellyanus*) and greenhouse thrips (*Heliothrips haemorrhoidalis*). Kelly's thrips feed under the calyx of young fruit causing scarring which develops into a distinctive halo as the fruit matures. Greenhouse thrips feed on the leaves, between touching fruit, or where leaves or stems touch the fruit resulting in the production of grey scars or "bleaching". Natural predators and parasites of thrips do occur and chemical control is not normally required.

Other Garden pests

Birds

Birds are generally less of a problem for citrus than for many other fruit types; however cockatoos, parrots and other birds may occasionally damage new shoots, twigs flowers and the fruit of citrus trees. Cover trees with bird-netting or use a bird repellent containing aluminium ammonium sulphate to repel birds.

Rainbow Lorikeets are increasingly becoming a pest on fruit trees.

Snails and slugs

Common garden snails and slugs feed on leaves and fruit at night, making holes and marks on fruit. Snails are also known to be responsible for ringbarking young shoots, twigs and trees resulting in twig and tree death in severe cases. Snail and slug numbers are reduced naturally by some birds, lizards and sciomyzid flies. To reduce the snail and slug population in your garden, use snail traps or baits (look for those that are non-toxic to pets). Both are available in garden centres and hardware stores?.

Caution

Some chemicals can also destroy beneficial insect populations that may be providing natural control of pest insects in your garden. Horticultural or white oils can burn foliage if used incorrectly and should not be used in very hot weather. Check with your local chemical retailer, hardware store or nursery for oils, suitable for your crop and conditions. Always follow label instructions

Seen something unusual?

Exotic pests are a concern for the citrus industry as many citrus pest insects established in the Eastern States are not present in Western Australia. Please report anything unusual to the Pest and Disease Information Service.

When sending or delivering samples the following information is required:

- Collectors name, location (where the specimen was found), full address, telephone number and e-mail address, description of the damage and date collected.

Department of Agriculture and Food
Pest and Disease Information Service
3 Baron Hay Court, South Perth WA 6151
Freecall: 1800 084 881
E-mail: info@agric.gov.au

1941-06/07-ID7889

ISSN 0726-934X