

AUSTRALIAN BUG

Icerya purchasi Maskell

1 PEST PROFILE

1.1 Distribution and status

The Australian bug, (also known as cottony cushion scale), occurs on citrus in all areas and has a wide range of other host plants. It is usually considered a minor pest as a result of normally effective biological control by *Novius* (*Vedalia*) predatory beetles, but infestations have become more common on mandarin hybrids.

However, outbreaks can occur as secondary repercussions in association with the use of certain chemical insect growth regulators (IGRs), in particular pyriproxyfen. Outbreaks of Australian bug more usually occur in orchards adjacent to those sprayed with pyriproxyfen. They seldom occur in sprayed orchards because direct spraying of pyriproxyfen suppresses Australian bug if application coincides with the presence of susceptible young life stages. However, a non-lethal (reduced) dosage, associated with spray drift, will induce a high degree of egg mortality in *Novius* beetle populations. This allows Australian bugs to escape predation and reach serious levels in such orchards.

1.2 Description

Australian bugs are easily identified by the white, +/- 8 mm long fluted egg sac, secreted by the adult female as it matures. Adult males are dark red with grey wings but are rarely observed except where populations are high. The adult females often settle on older wood and can reproduce without mating. Eggs within the fluted egg sac are bright red and give rise to similarly coloured nymphs with black legs and antennae. These so-called crawlers settle along leaf veins and on young wood. Second and third instar nymphs secrete a yellow-white wax covering. Immature and adult stages produce copious amounts of honeydew resulting in sooty mould formation (see **SOFT SCALES** for more information on honeydew and related problems).

1.3 Infestation sites on tree

The Australian bug is primarily a pest of the tree framework. Heaviest infestations are likely to occur on the twigs and branches in the foliage canopy. It occurs less frequently on leaves and seldom on fruit.

1.4 Damage

1.4.1 Symptoms

The white egg sacs attached to the adult females, together with sooty mould deposits on foliage and twigs in their immediate vicinity, are usually the primary indicators of an infestation.

Malformed leaves with the midrib bent to one side can also be indicators of Australian bug presence, although this type of damage is also caused by mealybugs on citrus. Ant presence in the tree is usually associated with infestations of Australian bug and/or other honeydew-producing insects.

Heavy infestations of Australian bug can cause leaf and fruit drop and general loss of tree vitality.

1.4.2 Seasonal occurrence

The tree framework provides a permanent refuge for the Australian bug. The pest has 3-4 generations per year and is likely to reach peak density from mid-summer to autumn. In the absence of biocontrol, population levels may increase in subtropical production areas during winter and require treatment before budburst. In cooler areas, the population will usually remain stable during winter and may decrease in colder regions, before again increasing in spring. The degree of infestation is usually related to the extent that ants and/or insecticide treatments have reduced the presence of its major natural enemy, the *Novius cardinalis* (Muls.) and other *Novius* spp. Damage to young leaves is most likely to occur on growth flushes produced during spring and autumn.

2 MANAGEMENT ASPECTS

2.1 Infestation/Damage assessment

2.1.1 Inspection

Trees should be inspected at monthly intervals.

Move the branches apart and look into the tree framework and on young leaves of new growth flushes. It is advisable to mark infested trees in the orchard for monitoring of biological control activity, which would help in deciding whether spot treatments are necessary or not.

2.1.2 Treatment threshold

If regular inspection indicates an increase in Australian bug, ensure that ant control is adequate. In addition, surveys should be conducted to ascertain whether the *Novius* beetle is making sufficient impact on the population. The combination of ant control and *Novius* beetles is likely to ensure commercial control of the pest. If beetles are absent and a noticeable increase in pest presence is recorded with an increase in honeydew and sooty mould, then chemical treatment can be considered.

2.2 Control options

2.2.1 Biological

In the latter part of the 19th century the Australian bug became a major international citrus pest. The discovery of its most important predator in Australia, the predatory beetle, *N. cardinalis*, and its introduction into infested plantings, led to remarkable control of the pest. The dramatic reduction in the global status of Australian bug was of primary importance in focusing attention on the beneficial role of natural enemies in the control of agricultural pests.

The adult *Novius* beetle is 4-5 mm in length and has irregular orange-red and black markings on its wings. Both adults and larvae feed on all stages of the Australian bug. Monitor *Novius* beetles by searching for reddish-black larvae and/or red eggs on all life stages or attached to the egg sac.

If *Novius* beetles do not appear in citrus orchards by December/January one should take note but **do not** be hasty to treat with a chemical spray. The late-season arrival of *Novius* beetles can control a serious Australian bug infestation in 4–6 weeks.

2.2.2 Cultural

There are no direct cultural options for the

control of this pest but efficient ant control is very important. This promotes favourable conditions that enable *Novius* beetles to flourish in citrus and bring the pest under biological control. Where ant control is achieved by means of trunk treatments, trees will need to be skirted, and weed growth suppressed, in order to ensure that ants are unable to enter the tree canopy.

2.2.3 Plant Protection Products

The use of these products should only be necessary in extreme cases where biological control is lacking with a risk of crop loss due to severe sooty mould negatively affecting packout percentage. If possible, apply spot sprays to infested areas. The following organophosphates are still registered for the control of Australian bug but should be considered only as a last resort. Since their registration, residue standards for export fruit have changed significantly. Any use of chemical treatments should only be considered with reference to the latest “Recommended Usage Restrictions for Plant Protection Products on Southern African Export Citrus” issued, and regularly updated, by Citrus Research International.

Products	Dosage/100 ℓ water
omethoate + narrow range oil*	50 ml + 1.0 - 1.5 ℓ
mercaptotion EC	300 ml
mercaptotion WP	500 g

* See RED SCALE for precautions when using oil.

Although narrow range oil sprays are registered for the control of this pest, experimental evidence has shown that alone they are not effective. Also the dosage of the original registration (2 L per 100 L of water) is likely to cause phytotoxicity to citrus and thus cannot be recommended here. Two additional organophosphates, registered for the control of other citrus pests, have been found to be effective in controlling Australian bug. These

are profenophos at 75 ml per 100L and methidathion at 100 ml per 100 L of water, both with the addition of a wetting agent. These should only be considered as part of a winter / spring complex programme prior to petal-fall due to chemical residue regulations. A carbamate, methomyl 90%WP at 50 g per 100 L of water has been found to be effective, also when applied with a wetting agent. Buprofezin, an IGR, as registered for mealybugs, has also successfully been used experimentally to control Australian bug.

Any chemical treatment should be applied as a full-cover spray ensuring that the tree framework is completely wetted. This is because Australian bug can survive on old wood, and may be hidden within cracks, on the tree trunk and beneath loose bark.