

CITRUS BUD MITE

Aceria sheldoni (Ewing)

1 PEST PROFILE

1.1 Distribution and status

Bud mite occurs in all citrus production areas. All cultivars can be attacked. However, major cultivars exhibit the following declining sequence of susceptibility to bud mite attack: Lemons, navels, mandarins, midseasons, grapefruit and Valencias.

1.2 Description

The adult bud mite is banana-shaped and ranges in colour from white to orange-brown. The eggs are spherical and translucent white. There are two nymphal stages. These are similar in appearance to the adult but smaller. All stages of the bud mite including adults are microscopic in size and require magnification in the range 20 to 30X to become readily identifiable.

1.3 Infestation sites on tree

Bud mite is secretive by nature and can primarily be found within leaf axil buds. Mites migrate from old to new buds when the latter become available as a result of a growth flush. When present in high numbers, bud mite can also be found beneath the calyx on young fruit.

1.4 Damage

1.4.1 Symptoms

Bud mite readily becomes a problem in orchards of susceptible cultivars which receive few or no pest control treatments for long periods. Heavily infested axil buds dry out and die as a result of the mechanical damage caused by the mites' feeding activities. Where buds are not destroyed the feeding activity affects the hormonal balance in the embryonic tissues. This promotes multiple bud formation and also leads to malformation of the plant organs which develop from the affected buds. Twigs, leaves, blossoms and fruit are all detrimentally affected.

1.4.1.1 Twigs and blossoms

Affected twig growth is weak, shortened and can also be twisted. Leaves produced on these twigs are small and malformed with irregularly indented margins. Blossom petals can be twisted and condensed, while the calyx, pistils and stamens can be thickened and malformed.

1.4.1.2 Fruit

The malformation of fruit takes various forms. Fruit with less severe symptoms usually have longitudinal grooves that commence at the calyx and run partially down the cheeks.

In more serious cases fruit are flattened and assume a pumpkin-like shape while the navel end (in the case of navel oranges) is enlarged with marked protrusion of the navel. Lemon fruit are particularly prone to malformation. Such fruit can have finger-like protuberances with marked indentation towards the styler end.

Bud mite may also cause more subtle feeding damage underneath the calyx. This may take the form of an irregular, brown ring, somewhat similar to damage caused by leafroller larvae but not as deep.

1.4.1.3 Crop

Crop damage can vary from losses due to malformation to major crop reduction; the latter being caused by the dropping of malformed blossoms and fruitlets.

1.4.1.4 Young trees

Infestations in non-bearing trees can reduce tree vitality and eventually lead to subnormal yields.

1.4.2 Seasonal occurrence

Bud mite is continuously present on citrus trees.

2 MANAGEMENT ASPECTS

2.1 Infestation/damage assessment

It is not possible for the average grower to conduct microscopic assessments of leaf axil

buds to determine the bud mite infestation status of trees. Therefore, on trees of all ages the presence of damage symptoms must be used as a criterion for determining whether special treatment is required for bud mite control. In the case of bearing trees it is important to remember that if infestations are allowed to cause severe blossom malformation, application of a registered treatment will have no effect on the ensuing crop and, apart from improved growth flushes, will only be reflected in the blossom of the following spring.

2.1.1 Non-bearing trees

2.1.1.1 Inspection

Where a routine preventive treatment is not applied, trees must be inspected at each growth flush for signs of twig malformation.

2.1.1.2 Treatment threshold

The promotion of vegetative growth on the non-bearing tree is important. It is therefore desirable to take a preventive approach to the protection of tree growth during the first four years after planting of the more susceptible cultivars. In general the control contribution from measures applied against other pests such as thrips, orange dog and red scale must be recognised so that unnecessary treatments for bud mite can be avoided.

2.1.2 Bearing trees

2.1.2.1 Inspection

Growers should annually assess the degree of blossom malformation in orchards in order to establish the status of bud mite infestations. This type of observation is the most practical indicator that can be offered. The blossom surveys should be conducted on **all cultivars**. The results of the surveys should be recorded for future reference (refer to ORCHARD INSPECTION in Chapter 2 for further comments).

2.1.2.2 Treatment threshold

Treatment is recommended when orchard inspection reveals the general presence of malformed blossoms. The need for treatment will be confirmed if comparison with previous

survey data also indicates there has been a noticeable increase in blossom malformation.

2.2 Control options

2.2.1 Biological

No predators or parasitoids have been recorded in southern Africa that can make a contribution to the suppression of bud mite.

2.2.2 Cultural

There are no cultural options that can be used to control bud mite.

2.2.3 Plant protection products

2.2.3.1 Treatment type

Soil treatment

If Temik is being used for nematode control it will control bud mite as well. However, this product is being phased out and usage for pests other than nematodes is discouraged due to the likelihood of increasing Accelerated Microbial Degradation in the soil

Trunk treatment

Citrimet applied to tree trunks can give good suppression of bud mite on trees with a trunk diameter up to 150 mm. The application procedure is discussed in detail in Chapter 2 (TRUNK APPLICATION PROCEDURE). The application time is similar to that for spray options and is described below.

Spray treatments

Although several treatments are registered for the control of bud mite, due to changes in residue limits, lack of availability or poor efficacy there are only two products that can reliably be used on export fruit. These must both be sprayed from the ground as medium cover film sprays. Apart from poor direct control, inadequate spraying will permit rapid resurgence of mites on treated trees. The following treatments are recommended:

Product	Dosage/100 ℓ water
Mitigate ¹	150 ml ²
Lime sulphur ³	1.25 ℓ

¹ First verify residue acceptability of citrus type for markets.

² This rate will also control citrus red mite if present when sprayed.

³ May not be used on young fruitlets or within six weeks of an oil-containing spray. Do not apply to heat- or water-stressed trees or when high temperatures are expected.

2.2.3.2 Timing of treatments

Non-bearing trees

During the first four years after planting, bud mite should be controlled twice a year. The first application should be made during November to December and the second during April to May. If one or more Citrimet trunk treatments are applied during February to May to protect new growth against thrips attack, then the second treatment for bud mite can be omitted. Mitigate should also not be applied more than once a year to reduce selection for resistance.

Bearing trees

Once trees start to bear, the emphasis can be placed on crop rather than growth protection. As a result, only a single treatment will be required per annum and it can be made during the period February to May. From an organisational viewpoint any time during the period can be regarded as adequate to achieve satisfactory bud mite control.

2.2.3.3 Influence of registered treatments on natural enemies

Citrimet is a systemic material. It therefore has little influence on adult parasitoids due to the absence of surface residues. It is not known to what extent its residue in plant tissue will have a detrimental effect on immature parasitoids that may be present in scale insects that are variably affected by the treatment. Predatory insects can be detrimentally affected by consuming numerous prey items that are variably affected by such treatments. However, large-scale commercial applications of Citrimet trunk treatments have not appeared to be

responsible for any pest repercussions. Temik applications have sometimes been associated with an increase in citrus red mite which may have occurred due to an effect on their predators but this has not been confirmed in experiments.

Mitigate residues have been shown to be harmless to *Chilocorus nigritus*, *Aphytis coheni* and *Coccidoxenoides perminutus* and slightly harmful to *Trichogrammatoidea cryptophlebiae* and *Euseius citri*. Lime sulphur is known to be harmful to all parasitoids when sprayed but the effect is short-lived. It has not been tested in CRI bioassays.