milbeKNOCK®

More effective mite control

- Controls adults, larvae, nymphs and eggs
- Unique mode of action for resistance management
- Suitable for Integrated Pest Management

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milbeKNOCK®

Adult female Two Spotted Spider Mite

Damage to apple foliage from feeding Two-Spotted Spider Mites
(Source: Bower and Thwaite 1995

Two Spotted Spider Mite
(Tetranychus urticae)

The Two-Spotted Spider Mite is considered to be one of the most economically important spider mites. It has been reported infesting over 200 species of plants. The adult females are about 0.6mm long, oval shaped with pale yellowish green abdomen with a dark green spot on each side of the body. Females that over winter can change to an orange colour in cold climates. Males are less abundant, have a triangular pointed abdomen with the two spots being less obvious (Bower C. C. and Thwaite W. G., 1995).

European Red Spider Mite

Damage to an apple leaf caused by European Red Spider Mite
(Source: Bower and Thwaite 1995

European Red Spider Mite
(Panonychus ulmi)

The European Red Spider Mite is an introduced pest in Australia and is a primary pest of nut, pome and stone fruits, as well as some berries, damaging leaves and causing fruit russetting. Adult mites are red with white spots at the base of six to eight hairs on their back

European Red Spider Mites can have six to eight generations per year. All active stages of the European Red Spider Mite injure the foliage by feeding with piercing mouthparts and removing the cell contents.

Mode of Action

milbe*KNOCK* has contact and stomach action. Because it is translaminar, **milbe*KNOCK*** persists within the leaf for many weeks which gives residual activity on sucking insects such as mites. For insecticide resistance management, **milbe*KNOCK*** is a Group 6B insecticide.

Suppression of Reproduction in Female Mites

Sub lethal doses of **milbe*KNOCK*** remaining within crop leaves have an inhibitory effect on mite reproduction. The effect of a sub lethal dose of **milbe*KNOCK*** is that mites lay fewer eggs than those that have not been treated. In this way the product can provide control of the mite population for many weeks after application.

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Resistance Management

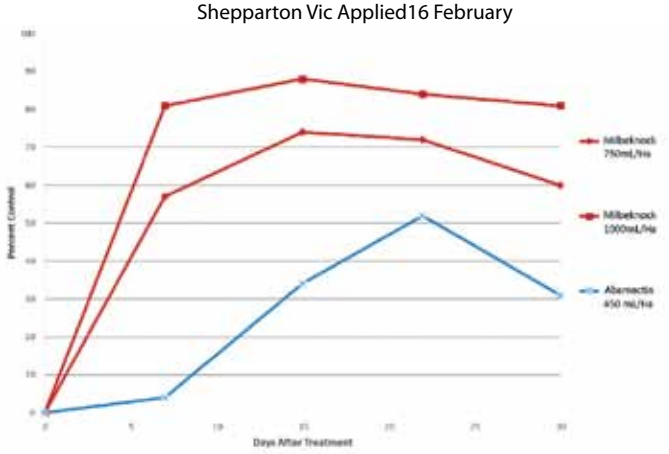
milbe*KNOCK* is the only Group 6B mode of action miticide available for use in Australia, providing an effective alternative to older miticides eg abamectin (Group 6A), bifenazate (Group 2D) and etoxazole (Group 10B). While similar in mode of action to abamectin, **milbe*KNOCK*** has been shown in field trials to control abamectin resistant mites in tomatoes.

To avoid the development of resistance, all APVMA approved labels have specific restrictions on how often a product can be used on any one crop. In addition, CROPLIFE has developed Resistance Management Plans for key pests and major crops. Refer to the website http://www.croplifeaustralia.org.au for the most recent version of the Insect Resistance Management Plans.

milbe*KNOCK* should not be applied more than once per season in pome fruit or twice in stone fruit, capsicums, eggplants, chili peppers, tomatoes, or strawberries.

In addition, **milbe*KNOCK*** should not be applied in 2 consecutive sprays within or between seasons or crops without an unrelated chemical being used in between. Alternate **milbe*KNOCK*** with approved miticides from other chemical groups.

Two Spotted Mites Control Tomatoes
Shepparton Vic Applied16 February



Integrated Pest Management (IPM)

To help delay the onset of resistance, **milbe*KNOCK*** can be used with integrated pest management (IPM) programs using predatory mites Galendromus (Typholodromus) spp. and the predatory beetles Stethorus spp.

milbe*KNOCK* should be applied as the first treatment in a program to allow predator numbers to steadily increase after application. Predatory mite numbers may not increase for a number of weeks due to the lack of suitable mite prey and a possible direct effect of the miticide on the predators. If introducing Phytoseilus spp., delay their introduction for 2 weeks after spraying.

DO NOT use in IPM programs unless the pest mite threshold has been reached and predators are unlikely to achieve effective control.

Non Target Mites and Insects

- **Aphid parasitoid** *(Aphidius rhopalosiphi)*
  milbe*KNOCK* is not harmful to the aphid parasitoid.
- **Bees** *(Apis spp)*
  milbe*KNOCK* is harmful to bees. Do not spray any plants in flower while bees are foraging.
- **Lacewing** *(Chrysoperla carnea)*
  milbe*KNOCK* is not harmful to the lacewing when applied at rates of up to 3L product /ha.
- **Predatory bug** *(Orius laevigatus)* - **milbe*KNOCK*** is not harmful to this ground dwelling predatory bug.
- **Predatory mite *Galendromus*** *(Typholodromus) spp.*
  milbe*KNOCK* has limited topical effect. Predatory mite numbers may not increase for a number of weeks after application due to a lack of suitable mite prey. Predatory mite numbers will increase with any increase in pest mite numbers allowing the continuation of biological mite control.
- **Predatory mite *Phytoseilus spp*.**
  milbe*KNOCK* is harmful to *Phytoseilus spp*.
  If introducing Phytoseilus spp., delay their introduction for 2 weeks after spraying.

Application

milbe*KNOCK* quickly moves into young leaves from where it is taken up by feeding mites and remains active for many weeks. However, good spray coverage is essential as **milbe*KNOCK*** is not systemic. The exact volume is dependent on plant size and density of foliage, but plants should be sprayed uniformly and thoroughly to wet the leaf to near the point of run off.

Apply by high volume (Dilute or Concentrate Spraying) or boom spraying equipment as given in the directions for use table. Thorough coverage and penetration into plant canopy is essential. The chosen water volume should match the crop and foliage density being sprayed so that there is even coverage throughout the canopy.

Boom Spraying

Apply at sufficient volume and pressure to obtain thorough coverage and penetration of the plant. Air assisted booms or droppers may be used to improve coverage through the canopy by directing the spray into the plants and away from the inter-row.

Dilute Spraying

Use a sprayer designed to apply high volumes of water up to the point of run-off and matched to the stage of growth of crop being sprayed. Calibrate and operate the sprayer to achieve even coverage throughout the crop canopy. Apply sufficient water to cover the crop to the point of run-off. Avoid excessive run-off. The required water volume may be determined by applying different test volumes, using different settings on the sprayer, from industry guidelines or specialist advice. Add the amount of product specified in the Directions for Use table for each 100 L of water. Spray to the point of run-off. The required dilute spray volume, sprayer calibration and operation may all need to be changed as the crop grows.

Concentrate Spraying

Use a sprayer designed and calibrated for concentrate spraying (that is a sprayer which applies water volumes less than those required to reach the point of run-off) and matched to the stage of crop being sprayed. Calibrate and operate the sprayer to achieve even coverage throughout the crop canopy using your chosen water volume. Determine an appropriate dilute spray volume (See Dilute Spraying above) for the crop canopy. This is needed to calculate the concentrate mixing rate. The mixing rate for concentrate spraying can then be calculated in the following way:

Example only **-**
Dilute spray volume, as determined above to achieve coverage near the point of run-off, for example is 2000L/ha. Your chosen concentrate spray volume is 1000L/ha. The concentration factor in this example is: 2 x (2000L ÷ 1000L = 2). If the dilute label rate is 75 mL/100 L, then the concentrate rate becomes 2 x 75, which is 150 mL/100L of water. The chosen spray volume, amount of product per 100L of water, and the sprayer set up and operation may need to be changed as the crop grows. For further information on concentrate spraying, users are advised to consult relevant industry guidelines, undertake appropriate competency training and follow industry Best Practices.

Compatibility

milbe*KNOCK* is compatible with most commonly used insecticides and fungicides. DO NOT use with chlorothalonil or Bordeaux tank mixes. As formulations of other manufacturer's products are beyond the control of Sipcam, all mixtures should be tested prior to mixing commercial quantities.

Use of Surfactants

The addition of a non ionic surfactant is required when applying **milbe*KNOCK*** to improve the coverage and wetting of the leaves.

No oil is required, reducing the potential for phytoxicity if mixing **milbe*KNOCK*** with other products.

For best results ensure:

* Good spray coverage on the crop.
* Time your application early – early rather than late.
* Alternate different miticide groups to reduce resistance potential.

milbeKNOCK®

milbe*KNOCK* is an IPM friendly miticide for the control of Two-spotted mite on capsicums, chili peppers, eggplant, pome fruit, stone fruit, strawberries and tomatoes plus European red mite on pome fruit.

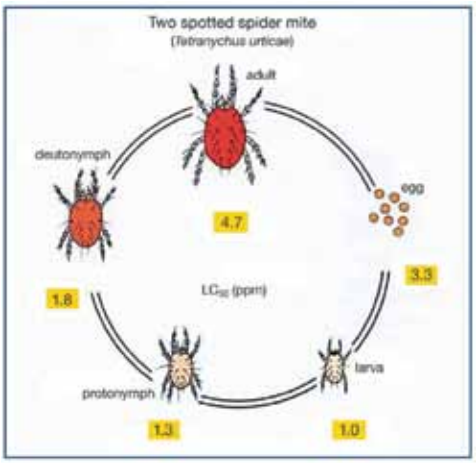
milbe*KNOCK*

- Controls adults, larvae, nymphs and eggs
- Unique mode of action for resistance management
- Suitable for Integrated Pest Management

Effective on all Growth Stages

milbe*KNOCK* is effective against all mite growth stages: eggs, larvae, nymphs and adults. Figure 1 shows the LD50 in ppm for Two-spotted Mite.

Treated mites die without showing any movement or observable excitatory action. It may take 7-14 days after application to reach maximum mite control. Some treated mites may remain on the leaves, however they are paralyzed and do not feed.



Long-Lasting Control

Although **milbe*KNOCK*** is not persistent and is quickly degraded by sunlight on the leaf surface, it still provides long lasting control of the mite population. There are three reasons for this:

1. **milbe*KNOCK*** is effective on all mite growth stages, including eggs
2. **milbe*KNOCK*** which moves into the leaves remains active for many weeks helping to control sap feeding mites
3. Any sub lethal doses remaining in the leaf have a suppressive effect on reproduction in female mites.

Untreated spider mite eggs

Non-viable eggs 8 days after treatment

Untreated adult mite

12 hours after treatment

3 days after treatment

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DIRECTIONS FOR USE

Restraints: DO NOT apply if rainfall or irrigation is expected before the MILBEKNOCK spray has time to dry on the leaves. DO NOT use by aerial application.

CROP	PEST	RATE	COMMENTS
Pome fruit	European Red Mite *(Panonychus ulmi)* Two-spotted Mite *(Tetranychus urticae)*	Dilute Spraying 100-125mL/100L plus 25mL/100L of a 60% non-ionic surfactant	DO NOT apply more than one application per season. Spray to wet foliage to near the point of run-off. Thorough coverage and penetration into plants is essential. Dilute Spraying: Total spray volume 2000 L/ha. Concentrate spraying: Refer to the Mixing/ Application section. Apple or Pear trees with mite eggs - apply MilbeKNOCK from 2weeks after petal fall if monitoring shows high numbers of over-wintering European Red Mite eggs are present Apple or Pear trees with motile mites - MilbeKNOCK application against motile mite stages of both species should be made soon after mite numbers have reached the threshold for your area. MilbeKNOCK takes 7-14 days to reach maximum mite control. MilbeKNOCK will control moderate to high mite populations, but in the absence of predatory mites, re-treatment with another miticide may be necessary. If re-treatment is required, use an approved miticide from a different chemical group.
Stone fruit	Two-spotted Mite *(Tetranychus urticae)*	Dilute Spraying 100-125mL /100 L plus 25 mL/100L of a 60% non-ionic surfactant	DO NOT apply a second application of MilbeKNOCK within 7 days of the first. Spray to wet foliage to near the point of run-off. Thorough coverage and penetration into plant canopy is essential. Dilute Spraying: Total spray volume 1500 L/ha. Concentrate spraying: Refer to the Mixing/ Application section. When applied early, one application may be sufficient to give effective control. However, if mite numbers exceed local threshold levels a second spray of MilbeKNOCK may be applied. MilbeKNOCK should not be applied in 2 consecutive sprays within or between seasons or crops without an unrelated chemical being used in between.
Capsicums (sweet peppers), eggplants, chili peppers, tomatoes		Dilute Spraying 100 mL /100 L Boom application 1.0L/ha	Thorough coverage and penetration into plant canopy is essential. Preferably apply on first appearance of mites. When applied early, one application may be sufficient to give effective control. However, if mite numbers exceed local threshold levels a second application may be required. MilbeKNOCK should not be applied in 2 consecutive sprays within or between seasons or crops without an unrelated chemical being used in between. Refer to notes on Resistance under the General Instructions section of the label. Capsicums (sweet peppers), eggplants, chili peppers, tomatoes: DO NOT apply a second application within 14 days of the first.
Strawberries		Dilute Spraying 125 mL /100L	

WITH-HOLDING PERIODS

Stone fruit	DO NOT HARVEST FOR 14 DAYS AFTER APPLICATION DO NOT ALLOW LIVESTOCK TO GRAZE IN TREATED AREAS
Pome fruit	DO NOT HARVEST FOR 7 DAYS AFTER APPLICATION DO NOT ALLOW LIVESTOCK TO GRAZE IN TREATED AREAS
Strawberries	DO NOT HARVEST FOR 1 DAY AFTER APPLICATION
Capsicums, tomatoes, eggplant, chili peppers	DO NOT HARVEST FOR 1 DAY AFTER APPLICATION

ALWAYS READ THE LABEL PRIOR TO USE.

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