

Users' guide for citrus



MOVENTO®

2XSYS

Innovative softer chemistry for the control of sucking pests

Movento® 240 SC insecticide is a powerful new IPM-friendly insecticide for controlling key sucking insect pests in citrus.

The first Group 23 insecticide registered in Australia, **Movento** has unique '2-way systemicity': it is distributed through the canopy both upwards and downwards.

Importantly, **Movento** can now be alternated between seasons with **Confidor® Guard** (Group 4A) so two different chemical modes of action (both highly effective against sucking pests) are being used within the citrus industry, which will help manage insecticide resistance for both products.

Mode of action

Movento is mainly effective in controlling citrus pests through ingestion.

Movento acts as a lipid biosynthesis inhibitor and is particularly active on the immature stages of many sucking pests, especially armoured scale. As a result, insects at an early life-cycle stage are much more sensitive to **Movento** compared to adults and are the main target of spray applications.

IPM compatibility

Movento is 'soft' on most beneficial species. Australian studies show application at proposed label rates had little effect on the parasitic wasps of red scale including *Aphytis lingnanensis*, *A. melinus* and *Comperiella bifasciata*; the parasitic wasp of pink wax scale (*Anicetus beneficus*); or the predatory ladybirds *Chilocorus circumdatus* and *Cryptolaemus montrouzieri*.

Movento is harmless to hoverflies, and lacewings, slightly harmful to earwigs, spiders and predatory bugs, and only moderately harmful to predatory mites, with no long-term population effects.

In summary, **Movento** is highly compatible with IPM production systems.

MOVENTO IN CITRUS CROPS AT A GLANCE

Pests	Red scale Pink wax scale Soft brown scale Mussel scale White louse scale (Citrus snow scale) Kelly's citrus thrips Citrus mealybug (suppression only)
Rate	20–40 mL/100 L + adjuvant*
Spray interval	3–5 weeks for scale No less than 14 days for thrips
Maximum sprays	No more than 3 applications in a twelve-month period and no more than 2 applications within 90 days of harvest.
Adjuvant(s)	Hasten™ or Synertrol® Excel at 0.05% v/v (50 mL/100 L of water) are preferred
Coverage	Thorough coverage is necessary.
Compatibility	Movento + Hasten is physically compatible with Antracol®, Dithane™ Rainshield, Oxydul® DF, Kocide® Blue Xtra, Bugmaster®, dimethoate, Dipterex®, Lebaycid®, Lorsban® 500 EC, Sacoa BioPest® Oil, Thiodan® EC, Vertimec® and Ethrel®. Check the label and the tank-mixing guidelines over the page before applying spray mixtures



* Consult label for specific rate information by target pest.

TWO-WAY SYSTEMICITY



Movento is highly systemic in citrus canopies when applied as a foliar spray.

The innovative advantage of spirotetramat, the active ingredient of **Movento**, is that it moves both upwards and downwards through the canopy, which is why it can reach older leaves as well as the younger flush.

The 'systemicity' of insecticides refers to the uptake, transport and distribution of the active ingredient within the plant. There are two systems of transport within plants, however traditionally only one has been utilised by the available chemistry.

Existing systemic insecticides are transported by the xylem, which carries water and nutrients upwards from the roots of a plant to its growing leaves. Transport through the xylem has given traditional insecticides one-way systemicity only and is most effective when applied to actively growing plant parts.

The additional transport system in the plant is the phloem, which transports the sucrose produced by photosynthesis from the leaves to the young shoots, leaves, buds, fruits and developing roots. Unlike the xylem, the phloem works in both directions – upwards from leaf to leaf and back down from the leaf to the roots.

Unlike Confidor Guard and other conventional systemic insecticides, which only move within the xylem, **Movento** is transported within the phloem as well.

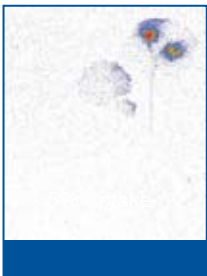
GETTING THE BEST OUT OF MOVENTO

Coverage and plant health

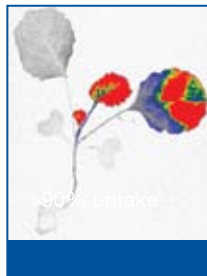
Spray coverage and overall tree health are important. Poor spray coverage and/or any form of climatic or environmental stress will impact on the uptake of **Movento** into the foliage and its subsequent translocation throughout the tree canopy.

Adjuvants

Without spray adjuvant



With spray adjuvant



As these images show, the uptake and translocation of spirotetramat in plant tissue is dramatically improved by the addition of a vegetable oil-based spray adjuvant.

After extensive testing in the field, the two recommended spray adjuvants are Hasten™ Spray Adjuvant or Synertrol® Excel Spray Adjuvant at 0.05% v/v (50 mL/100 L of water).

The use of straight non-ionic surfactants and organo-silicon based products has produced inconsistent results, so they are not recommended in tank-mixes with **Movento** in citrus.

HOW TO USE MOVENTO

Spray timing

Hand-sprayed small plot trials and grower-applied trials have consistently shown that applying **Movento** early during crawler release and/or the early life stages of the target citrus pest gives the best results. Furthermore, once within the plant **Movento** takes some time (14–21 days or more) before peak activity is evident, so it is important to apply **Movento** early enough to reach full effectiveness before the citrus pest establishes. Once **Movento** reaches peak activity, it has demonstrated a very long residual effect.

Field trials confirm that excellent results are achieved against scale and suppression of citrus mealybug when **Movento** is applied as two foliar sprays about 3–5 weeks apart. For Kelly's citrus thrips the second spray should occur from 14 days after the first spray and prior to calyx closure.



Untreated, 80% infested fruit (left) and pest-free Freemont mandarins (right) 137 days after two applications of Movento at 20 mL/100 L 26 days apart.

This back-to-back spray program enhances the residual control achieved with **Movento**, by increasing the level of spirotetramat throughout the tree canopy, thus controlling early life-cycle stages of scale, mealybugs & thrips before they can establish on leaves and fruit.

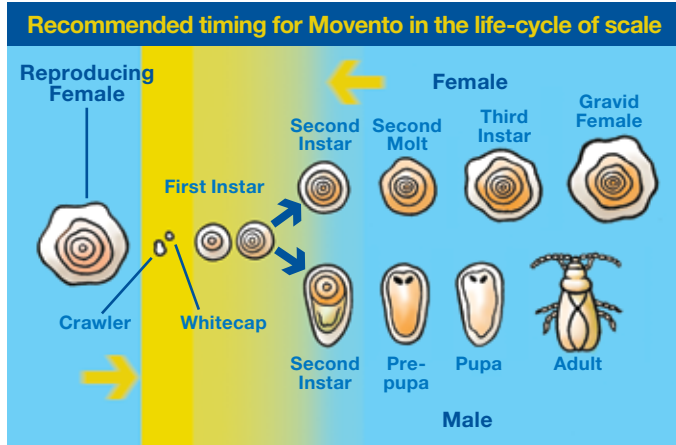
The second spray is especially important for citrus pests where an extended crawler release, or egg hatch (thrips) may occur as the residual control from the first application begins to run out. Under low pest pressure, a single application coupled with beneficial insect release may be adequate to maintain citrus pests below economic thresholds up until final harvest.

Controlling, or at least reducing, numbers from the first generation during the spring/summer months is the key to sustained insect control. Applying **Movento** to established pest populations dominated by mature adults is not recommended.

CONTROLLING RED SCALE (*Aonidiella aurantii*)

Timing

Applications of **Movento** for red scale control must start at the onset of crawler emergence or when pest numbers reach the local economic threshold, as shown in this diagram.



The timing of the first **Movento** application will vary between seasons and cropping regions. Female scale will start reproducing in spring and release the season's first generation of crawlers soon after. Once the red scale crawler settles and starts feeding, it is susceptible to **Movento**. As a general guide:

- In northern, central eastern and Western Australia the first **Movento** application is likely to occur between late September and late November.
- In southern Australia the first application is likely to be between mid-October and December.

Rates

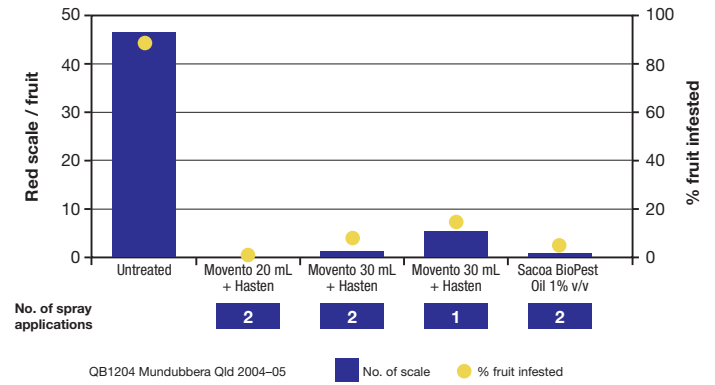
20-30 mL/100 L plus adjuvant is recommended for control of red scale. Use the higher rate for high-pressure blocks or for longer residual control. The higher rate will provide control where crawlers have settled and whitecaps are visible.

Results

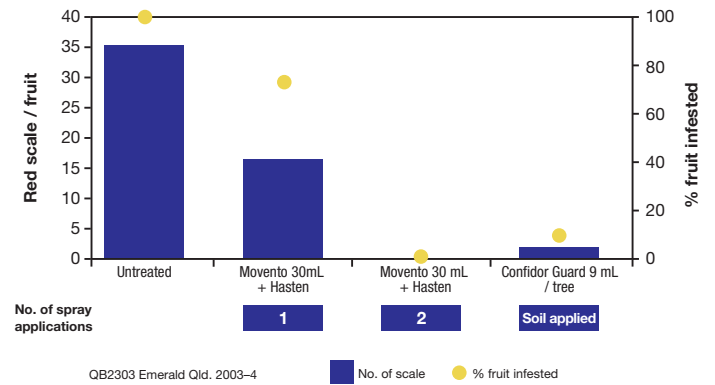
In several trials a single application timed correctly during the first red scale generation maintained red scale numbers at low levels for most of the season. If there is an extended crawler release and/or high pressure, then a single application may not be sufficient to control the red scale population and a second **Movento** application 3-5 weeks after the first spray may be required to provide higher levels of scale control.

Applying **Movento** to established red scale populations is not recommended, and under these conditions, alternative products (e.g. registered oils) should be used in conjunction with beneficial insect releases.

Mean red scale number and % fruit infested in Imperial mandarins after one or two applications of Movento + Hasten at various rates per 100 L



Mean red scale number and % fruit infested in Murcott mandarins after one or two applications of Movento at 30 mL/100 L + Hasten



Established red scale population on citrus leaves.

KEY FACTS – Movento on red scale

Rates	20-30 mL/100 L water plus adjuvant. Use the higher rate under high pest pressure or to provide longer residual control
Activity	Young feeding instars, especially whitecaps
Timing	Commence application after flowering, during onset of crawler release or once local pest thresholds are reached
Interval	21-35 days after the first spray application if required

CONTROLLING KELLY'S CITRUS THRIPS

(*Pezothrips kellyanus*)

Identification

Monitoring for the presence of adult Kelly's citrus thrips must begin from early flowering onwards. It is important not to confuse Kelly's citrus thrips with plague thrips, which can also be present in high numbers at flowering.

During flowering the Kelly's citrus thrips adults lay eggs on the flowers. Soon after, the larvae hatch from the eggs and start to develop through two larval stages. These larvae tend to feed around the calyx, or between touching fruit where they are sheltered, causing scurfing (the halo effect shown in the photo below) or rind bleaching damage.



Adult Kelly's citrus thrips in an open lemon flower.

Timing

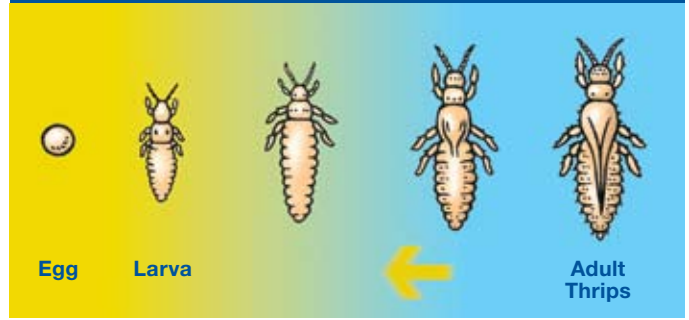
Apply the first spray application of **Movento** immediately after flowering (i.e. shortly after petal fall) once local pest thresholds are reached. **Movento** controls Kelly's citrus thrips larvae only, not adults, so applications must be timed prior to calyx closure as susceptible larvae emerge and commence feeding.



High level of halo damage caused by Kelly's citrus thrips on untreated fruit.

During summer, the Kelly's citrus thrips life-cycle can be as short as 14 days, so a second spray application of **Movento** may be required no less than 14 days after the first to ensure the next generation of larvae are controlled as they emerge onto the young fruit.

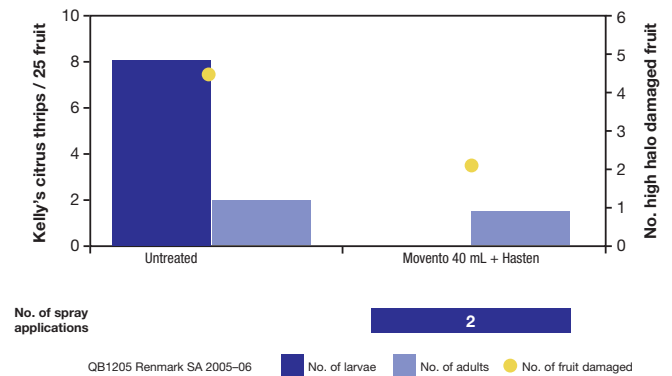
Recommended timing for Movento in the life-cycle of Kelly's citrus thrips



Coverage

Application prior to calyx closure and thorough spray coverage are the keys to achieving good results with **Movento**. Concentrate spraying is not appropriate for this use.

Mean Kelly's citrus thrips number and number of highly halo-damaged fruit after two applications of Movento at 40 mL/100 L + Hasten applied pre-calyx closure in navel oranges.



KEY FACTS – Movento on Kelly's citrus thrips

Rates	30–40 mL/100 L water plus adjuvant. Use the higher rate under high pest pressure or to provide longer residual control
Activity	Kelly's citrus thrips larvae only, not adults
Timing	Commence after flowering, once local pest thresholds are reached
Interval	From 14 days after the first, with both spray applications prior to calyx closure

Resistance management

For management of insecticide resistance, no more than three **Movento** (Group 23) applications should be made in citrus in a twelve-month period. No more than two applications should be made within 90 days of harvest.

Tank-mixing

Tests have established that **Movento** + Hasten is physically compatible with Antracol, Dithane Rainshield, Oxydul DF, Kocide Blue Xtra, Bugmaster, dimethoate, Dipterex, Lebaycid, Lorsban 500 EC, Sacoa BioPest Oil, Thiodan EC, Vertimec and Ethrel.

Maintain constant agitation during mixing and make sure that spray mixtures are applied promptly after mixing. As formulations of other manufacturers' products are beyond the control of Bayer CropScience, all mixtures should be tested prior to mixing commercial quantities. Changes in climatic conditions can alter the sensitivity of plants to mixtures of sprays, so Bayer CropScience cannot be responsible for the behaviour of such mixtures.

For information on the compatibility of **Movento 240 SC** with other products, contact your local Bayer CropScience representative.



MOVENTO PEST ACTIVITY AT A GLANCE

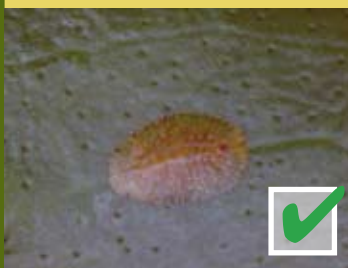
Red scale



Pink wax scale



Soft brown scale



Mussel scale



Kelly's citrus thrips (larvae only)



White louse scale (citrus snow scale)



Citrus mealybug (suppression only)



Long soft scale & Citrus leafminer



Withholding periods

Domestic Market: 21 days

Export Market: Consult www.australiancitrusgrowers.com or Bayer CropScience

CONTROLLING AND SUPPRESSING OTHER CITRUS PESTS

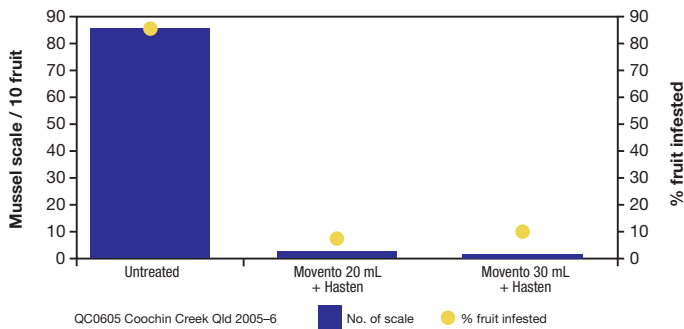
Movento also offers control of a broad range of other pests in citrus, including mussel, white louse, soft brown and pink wax scales. Movento also provides suppression of citrus mealybug.

For these scale pests, apply the same principles as for red scale:

- Make your first application as crawlers begin to emerge or when pest numbers reach local economic threshold.
- Where applicable, use the higher rate under high pest pressure or to provide longer residual control.
- Continue to monitor crops and apply a second spray application 3–5 weeks after the first application if required.
- Good coverage is essential and as such only dilute spraying equipment should be used.

Mussel scale (*Lepidosaphes beckii*)

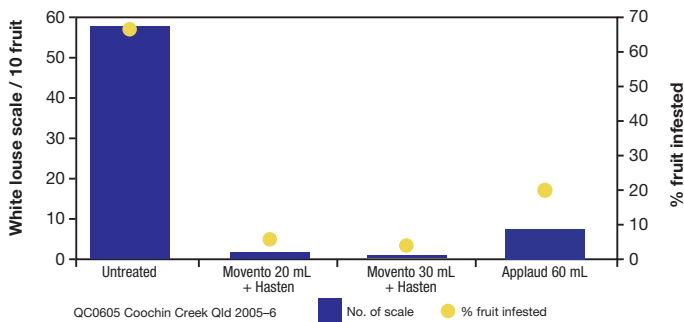
Recommended Rate: 20 – 30 mL/100 L + Hasten



Mean number of mussel scale per 10 fruit and % fruit infested 40 days after the second of two applications of **Movento** + Hasten in Siletta oranges.

White louse scale (*Unaspis citri*)

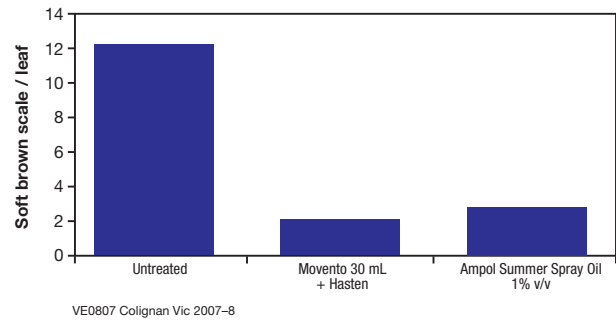
Recommended Rate: 20 – 30 mL/100 L + Hasten



Mean number of white louse scale per 10 fruit and % fruit infested 40 days after the second of two applications of **Movento** + Hasten in Siletta oranges.

Soft brown scale (*Coccus hesperidum*)

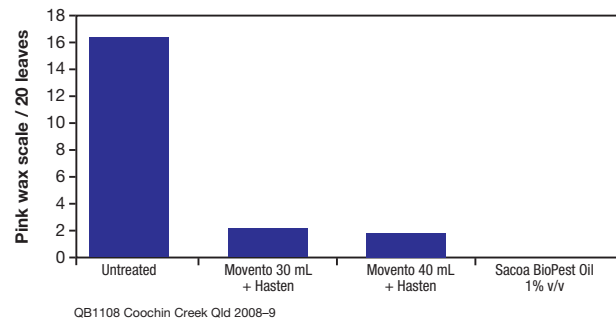
Recommended Rate: 30 mL/100 L + Hasten



Mean number of soft brown scale per leaf 29 days after the second of two applications of **Movento** + Hasten in Valencia oranges.

Pink wax scale (*Ceroplastes rubens*)

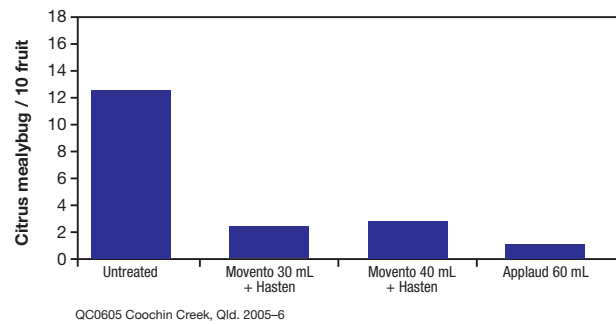
Recommended Rate: 30 – 40 mL/100 L + Hasten



Mean number of pink wax scale per 20 leaves 15 days after the second of two applications of **Movento** + Hasten in Siletta oranges.

Citrus mealybug (*Planococcus citri*)

Recommended Rate: 30 – 40 mL/100 L + Hasten



Mean number of citrus mealybug per 10 fruit 40 days after two applications of **Movento** + Hasten in Siletta oranges.

Movento has demonstrated excellent performance against citrus mealybug in some citrus trials. However results are variable, therefore only suppression of this pest is claimed.

Disclaimer

Always consult the product label for detailed information.

The information and recommendations set out in this brochure are based on tests and data believed to be reliable at the time of publication. Results may vary, as the use and application of the products is beyond our control and may be subject to climatic, geographical or biological variables, and/or developed resistance. Any product referred to in this brochure must be used strictly as directed, and in accordance with all instructions appearing on the label for that product and in other applicable reference material. So far as it is lawfully able to do so, Bayer CropScience Pty Ltd accepts no liability or responsibility for loss or damage arising from failure to follow such directions and instructions.

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