SAMURAI®

SYSTEMIC INSECTICIDE

Technical Manual - Pome and Stone

Follow the path of the SAMURAI®

For the control of: Woolly apple aphid, mealybug, codling moth, oriental fruit moth and green peach aphid.

SUMITOMO CHEMICAL
AgroSolutions Division

Sumitomo Chemical Australia developed Samurai Systemic Insecticide® – to protect your pome and stone fruit from major pests. The superior penetration and wider efficacy gives you the edge - by foliar or soil application.

Foliar application

Apples, pears, peaches, nectarines

- Woolly apple aphid, codling moth, mealybug,
- Oriental fruit moth: Rate 40 g/100 L
- Green peach aphid: Rate 10 g/100 L
- Light brown apple moth – suppression only

Soil application

Apples

- Woolly apple aphid: Rate 2.5 -5 g/tree

The Directions for use are shown on the last page of the booklet.

Features

- Registered on both pome and stone fruit
- Has activity on all the major pests
- Superior penetration of the plant
- Active has very low mammalian toxicity

Benefits

- You only need to carry one product – where previously two may have been needed
- Activity on the major pests means for example:
  - A spray for WAA or mealybug can be timed to control codling moth as well
  - A spray for green peach aphid can be timed to control oriental fruit moth as well
- Quicker uptake and better efficacy as a soil drench
- Safer to field workers

Activity

Both contact and stomach action with the chemical having systemic and residual activity.

Mode of Action

Acetylcholine receptor agonist – interferes with the transmission of nerve impulses.

Active Ingredient

Finally we get the benefits of Clothianidin - arguably the compound from the neonicotinoid group with the widest most useful activity.

Formulation

Samurai is sold as a wettable granule with an active ingredient concentration of 50%.

Independent Trial Results

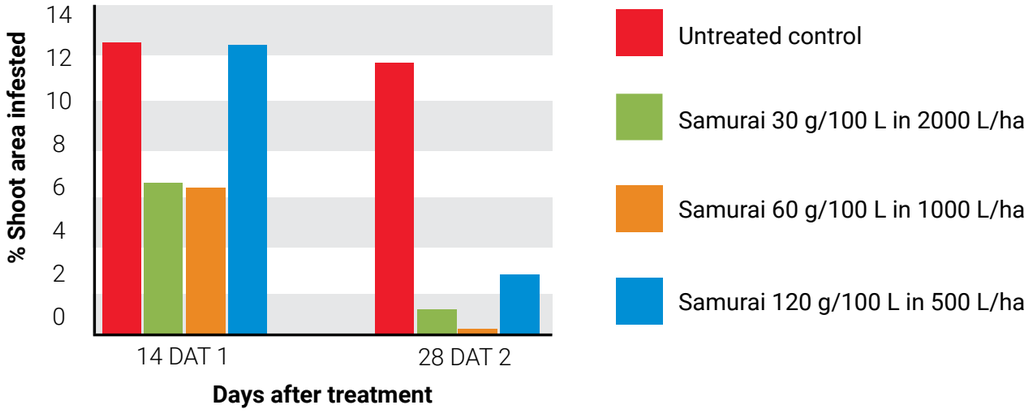
Woolly apple aphid (WAA) *(Eriosoma lanigerum)*

Aphid crawlers overwinter mainly on lower stems and roots then migrate up the tree in summer. In autumn adults migrate back to the roots.

Samurai as a foliar spray for woolly apple aphid

- Do not use concentrate sprays
- A second spray may be required
- Can time to coincide with a codling moth spray

Aphids parasitised by wasps at the top of the colony.



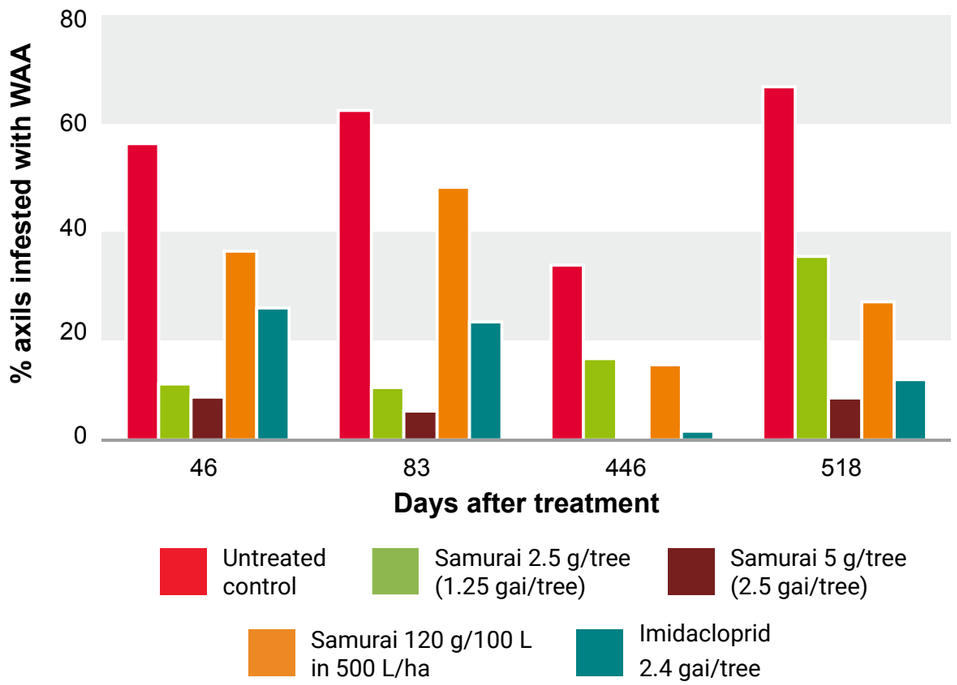
This trial shows the effect of water rate on efficacy in a post harvest situation on 3 - 4 m tall Fuji apple trees. The recommended label rate is 40 g/100 L – but 30 g/100 L is used here for comparison. It shows that in a post harvest situation where foliage is not very dense the water rate can be halved from 2000 L/ha to 1000 L/ha provided the rate of Samurai is doubled (concentrate spraying). However when the water rate is halved again and the Samurai rate doubled again there is a poor result.

Because WAA has a waxy filament covering it and exist in dense colonies in sheltered spots – good coverage is critical. In a full foliage situation coverage is even more important so concentrate spraying multiply again, so a second spray may be required a few weeks later.

The addition of Maxx organosilicone surgacant assists with penetration of the waxy filament and may improve the result - however in slow drying condition such as high humidity Maxx may cause russeting on apples and pears. Maxx should not be added if there is any concer about russeting and should not be used at more than 50 mL/100 L.

Samurai as a foliar spray for woolly apple aphid

- Can give control on large old trees in the season of application
- Ensure thorough coverage around the trunk
- Good soaking rain or irrigation (25 mm) is important to get the best results
- Use 5 g/tree applied in 1 L of water for two years control



This trial shows the effect of a soil drench application of Samurai in 1 L of water on 17 year old Red Delicious apple trees to control WAA. Application was at petal fall. Because Samurai is readily taken up by the roots – control was obtained by 46 days after treatment and the higher rate continued to give efficacy in the second year. Contrast this with imidacloprid that gave poor efficacy in the first year, with only the higher rate showing efficacy in the second year. Good soaking of the soil profile is required for good results. Trickle irrigation is generally not adequate.

Mealybug

Longtailed mealybug - adults and crawlers

- *(Pseudococcus longispinus)* – found in all states

Tuber mealybug

- *(Pseudococcus viburni)* – found mainly in Queensland

Longtailed mealybug life cycle

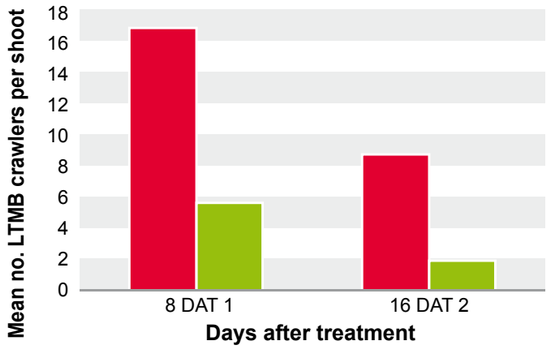
- Depending on the climate there can be 3 - 4 generations per year – each generation lasting 1 - 4 months
- Eggs hatch as they are laid
- 1st instars stay under mothers for 1 - 2 weeks then move through trees to the back of leaves
- 2nd instars remain on leaves, but late third instars move to sheltered areas. Females continue developing but males pupate.
- They over-winter in sheltered spots under the bark on the main limbs
- They prefer humid conditions
- Hot dry conditions can kill them

Adult mealybug emerging from an overwintering site.

Mealybug are very hard to control once they get into an apple or pear calyx.

Samurai as a foliar spray for longtailed mealybug

- Apply the full rates as a dilute spray with thorough coverage
- 2 sprays about 14 days apart will give good knockdown
- Follow up sprays from other chemical groups may be required



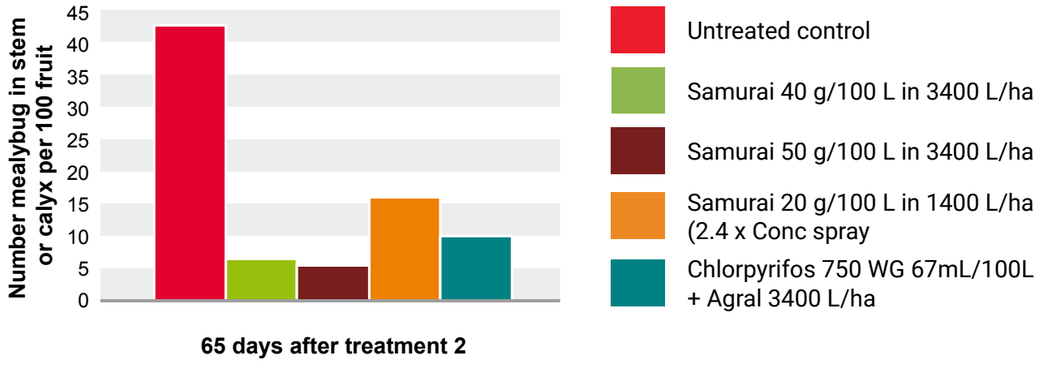
The chart shows the effect of two mid season Samurai sprays on William bon Chretien pears to control mealybug crawlers. The sprays were 2 weeks apart and achieved good knockdown. However some mealybug survive in sheltered spots and can multiply again – so sprays from other groups are required throughout the season.

The addition of Maxx organosilicone surfactant assists with penetration of the waxy filaments and may improve the result. However in slow drying conditions such as high humidity Maxx may cause russetting on apples and pears. Maxx should not be added if there is any concern about russeting and should not be used at more than 50 mL/100 L.

Best results on apples and pears will be achieved when Samurai is used in programs starting at petal fall.

Samurai as a foliar spray for tuber mealybug

- Concentrate spraying is not recommended.



These results show the effect of two dilute mid-season sprays in reducing tuber mealybug in the calyx of Granny Smith apples on large trees. Samurai at 40 g/100 L is the recommended rate. To show the effect of concentrating the spray Samurai at 50 g/100 L was used at 3400 L/ha and then concentrated 2.4 times so that 120 g was applied in 1400 L. The result was poor control. Samurai has better efficacy than the standard chlorpyrifos.

Codling moth (CM) *(Cydia pomonella)*

Codling moth life cycle

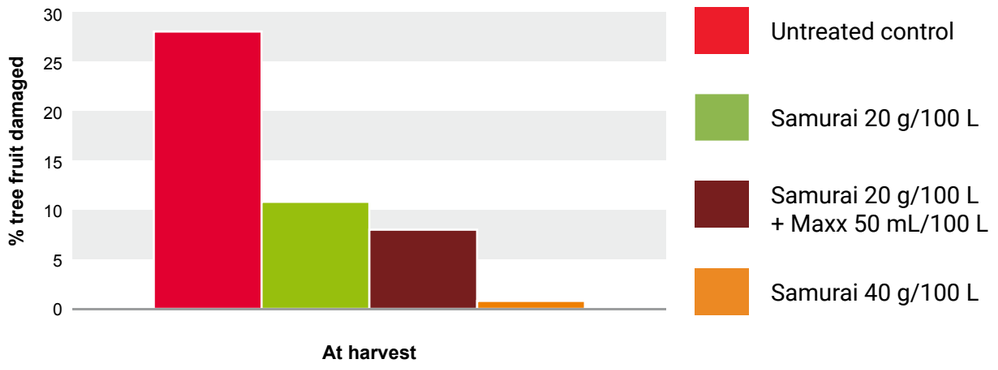
- Around 3 generations per year that may overlap starting in September
- Females lay eggs and neonate larvae immediately enter the fruit
- Larvae develop to 4th instar while feeding on the fruit then leave to pupate – normally under the bark

Adult moth

Entry hole

Internal fruit damage

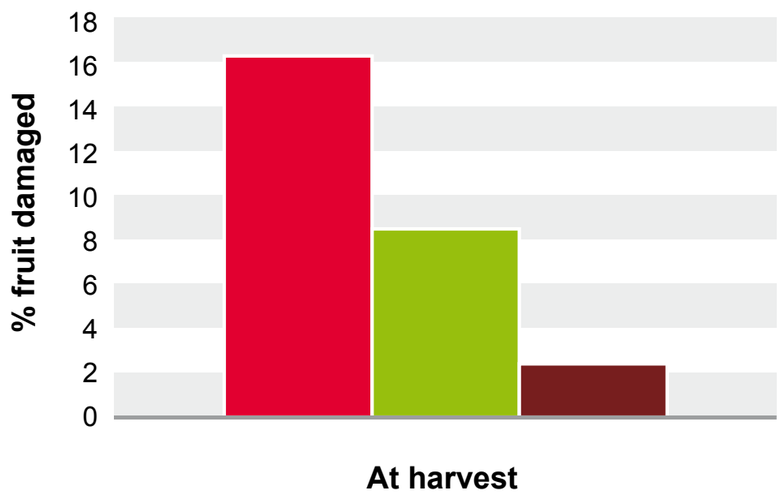
Samurai as a foliar spray for codling moth



This data shows the efficacy of a program of sprays on Golden Delicious apples to cover each generation. Because the larvae enter the fruit soon after hatching – spraying has to be timed to coincide with egg hatch. The addition of Maxx can also improve efficacy on codling moth. 20g Samurai/100 L is used for this comparison but the recommended rate is 40 g/100L

Light brown apple moth (LGAM) *(Epiphyas postvittana)*

Samurai as a foliar spray for light brown apple moth

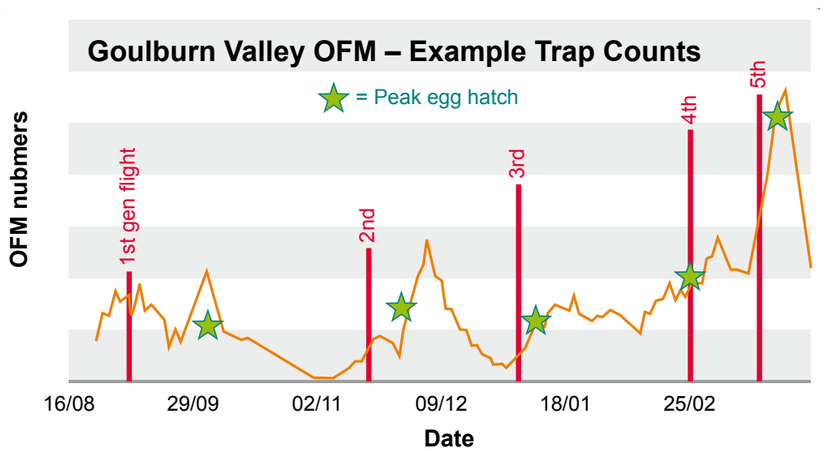


At the standard rate of 40 g/100 L Samurai will give around 50% control of light brown moth (LBAM). This can be useful under low pressure situations if an application for another pest is timed to fit in with one for LBAM.

Oriental fruit moth (OFM) *(Grapholita molesta)*

Oriental fruit moth generations

Because the larvae enter the fruit soon after egg hatch, spraying has to be timed to coincide with egg hatch for each generation.

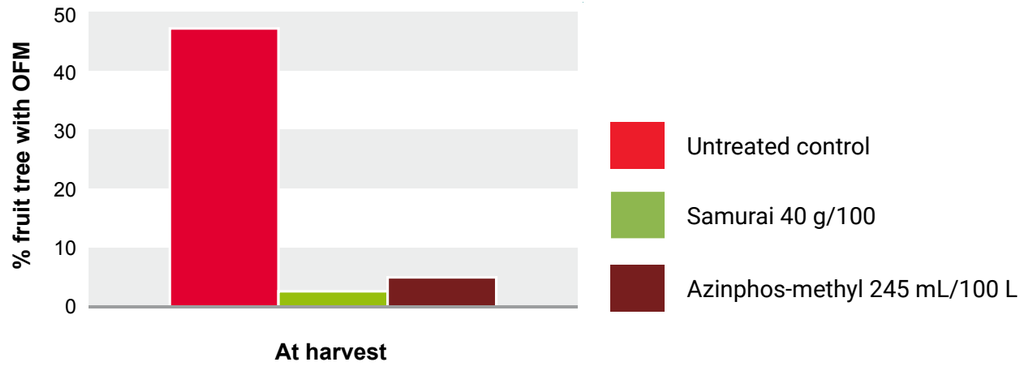


Tip damage

Entry hole

Larvae growing in fruit

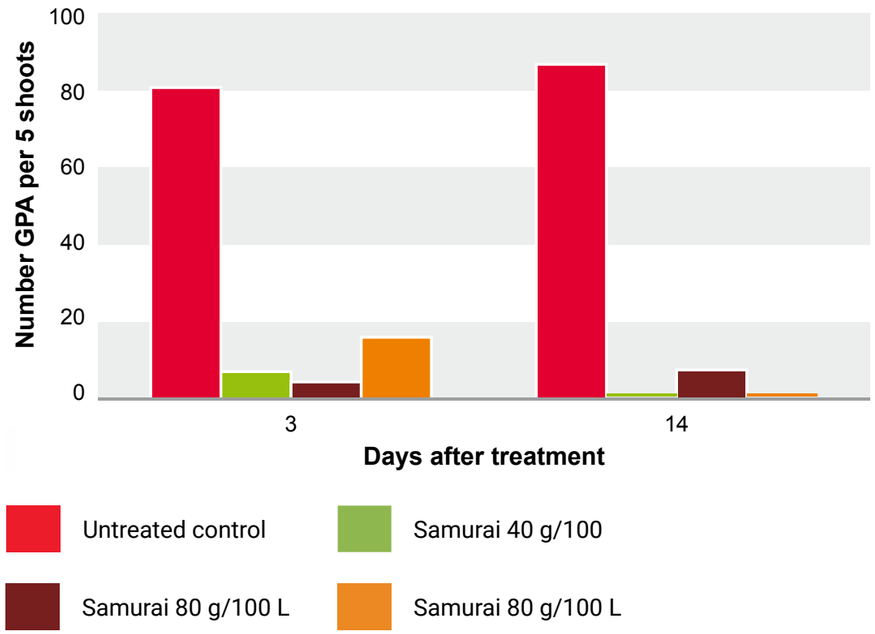
Samurai as a foliar spray for Oriental fruit moth



A trial showing how well Samurai performed when applied in a program over 3 generations. More than matching an existing product.

Green peach aphid (GPA) *(Myzus persicae)*

Samurai as a foliar spray for green peach aphid



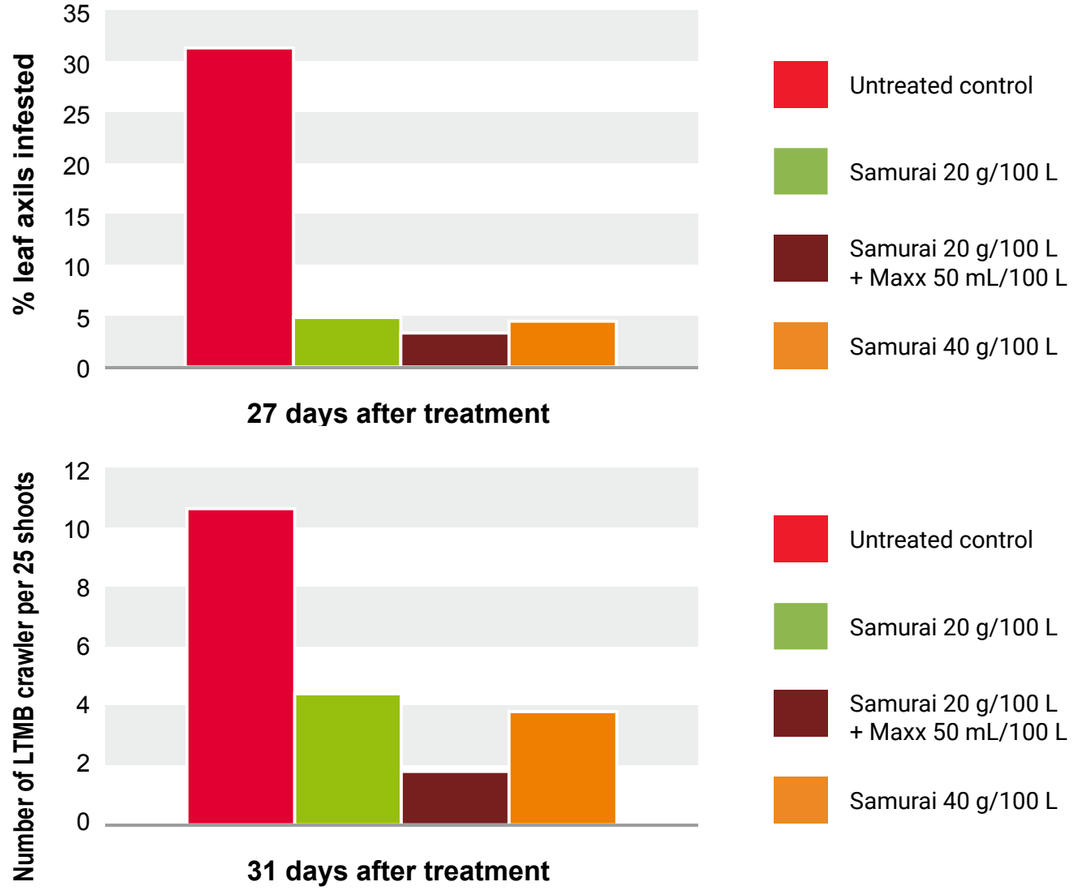
This trial shows that at 10 g/100L Samurai gives quick knockdown of green peach aphid and also extended control.

As Samurai is a systemic product, good control of green peach aphid requires sufficient foliage to good uptake.

Adult and nymph of green peach aphid

Samurai and Maxx Organiosilicone Surfactant

Effect of the addition of Maxx to WAA control

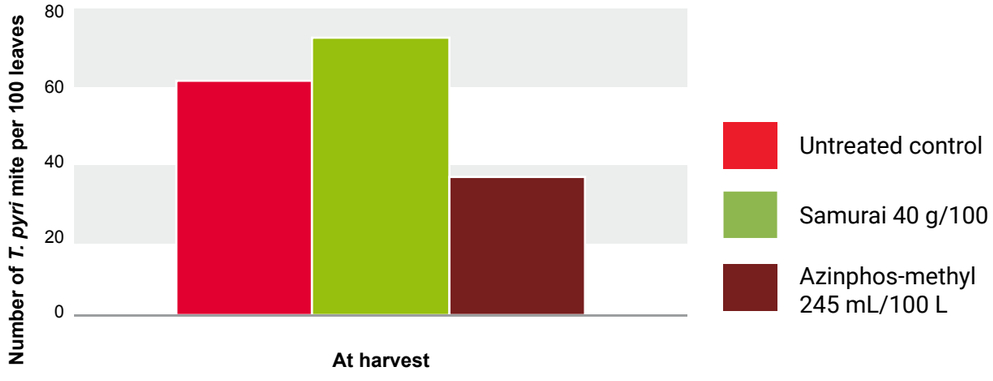


- The addition of Maxx assists with penetration of waxy filaments and hard to reach areas.
- Maxx will, on average, increase efficacy by about 8%.
- Extensive trials at 50 mL/100 L have shown no adverse effects from Maxx.
- However, in slow drying conditions such as high humidity, Maxx may still cause russeting on apples and pears.
- Maxx should not be added if there is any danger of russeting and should not be used at more than 50 mL/100 L.
- Control is still good without Maxx.

In both these trials Samurai at 20 g/100 L was used to show the effect of Maxx when added at 50 mL/100 L. The effect of Maxx when Samurai is used at the recommended rate of 40 g/100 L will be less – but still useful.

Samurai and Beneficials

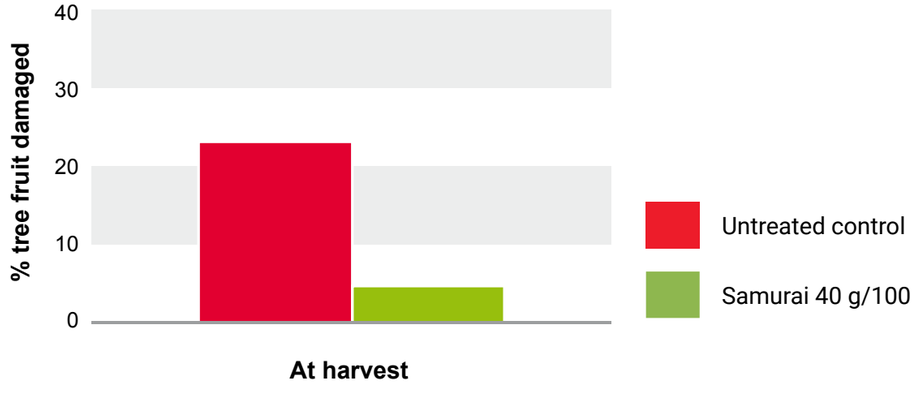
Comparison of the effect of Samurai and asinphosmethyl on the beneficial mite *Typhlodromus pyri*



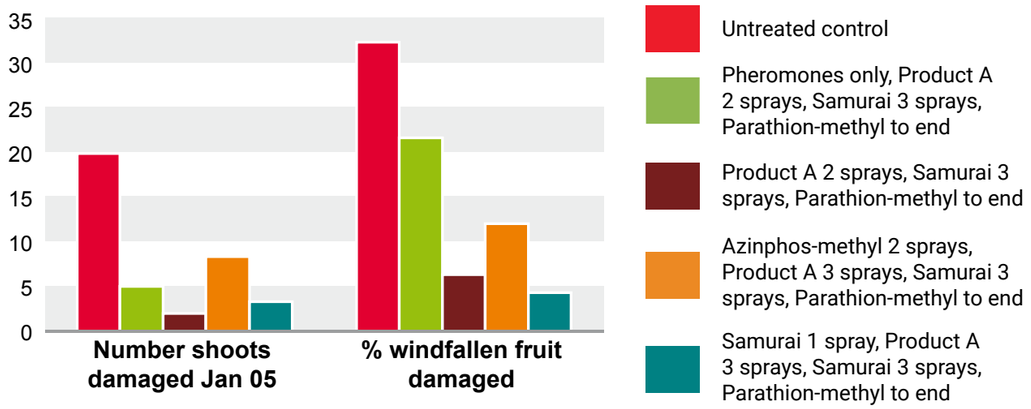
- The main WAA predators are ladybirds, lacewings and wasps such as *Aphelinus mali* and *Anagurus fusciventris*.
- Trials have shown that Samurai may affect these but numbers should soon recover.
- There is still wasp predation of WAA in trees treated with Samurai.
- There is no obvious effect on *Typhlodromus pyri* and no two spotted mite flare has been seen in trials.
- Samurai as a foliar spray is classified as having moderate effect on beneficials.
- Soil application will have much less effect on beneficials.

Where does Samurai fit in your program

Samurai in a program for codling moth control on apples



- Earlier use generally gives better results
- Preferable use two sprays after petal fall for 1st generation codling moth control and before the withholding period to control
- Can however use at any time after petal fall WAA or mealybug and before the withholding period to control WAA or mealybug
- WAA can also be controlled post harvest
- If woolly apple aphid or mealybug are a problem - try and time these sprays to fit in with the codling moth program



- Earlier use generally gives better results
- Use two sprays after petal fall on the 1st generation of OFM
- Can however be used at any time after petal fall to control aphids or OFM
- If aphids are a problem try and time an aphid spray to coincide with an OFM spray

Samurai Label - Directions for Use.

Restraints

- MAXX surfactant may cause russeting on pears and apples.
- Do not use MAXX surfactant on pears and apples in conditions such as high humidity where russeting may be caused.
- Do not use MAXX surfactant at more than 50 mL/100 L water.
- Do not use MAXX surfactant within 7 days of applying copper based or nutritional products to fruit.
- Do not apply more than 2 foliar sprays per season.
- Do not apply more than 1 foliar spray per season if water volumes are greater than 2000 L/ha

CROP	PEST	RATE	CRITICAL COMMENTS
Apples	Woolly apple aphid	**Dilute foliar spray** 40 g/ 100 L	These sprays may be timed to coincide with the spray timing required for codling moth control. Ensure thorough coverage. Woolly apple aphid should be sprayed at the first signs of infestation but after petal fall. Some woolly apple aphid may survive the first spray in sheltered spots such as cracks in the bark. From here they will multiply again. If this occurs a second spray may be required two or more weeks later. Samurai should be applied as part of a season long program with other chemical group sprays to provide control. The addition of MAXX Organosilicone Surfactant at 50 mL/100 L water may improve efficacy. Refer to Restraints and the Application/ Wetting Agent section. Concentrate spraying is not recommended because thorough coverage is essential for good control of these insects.
Apples (cont'd)	Woolly apple aphid (cont'd)	**Soil drench** 2.5 - 5 g per tree applied in 1 L of water to the soil around the base of the tree	Apply between green tip and late petal fall. The higher rate will give longer control. Control may be achieved in the season of application. It is however recommended that trees with infestations in autumn are marked so that they can be treated at green tip the following season. The speed of control from this application depends on how fast the product enters the root zone and is taken up by the tree actively growing. The diluted product needs to be applied to give thorough coverage around the trunk to a distance of 15 cm from the trunk. Ensure that mixture penetrates the soil around the trunk base and does not run off. If in doubt about penetration, irrigation or rain is required after application to take the chemical into the root zone. Remove trash and weeds from application zone before spraying.
Apples and Pears	Longtailed mealybug Tuber mealybug	**Dilute foliar spray** 40 g/ 100 L	The first spray should be as soon as crawlers are seen but after petal fall. Ensure thorough coverage. Two sprays 14 days apart will give significant knockdown of these pests on foliage and tree limbs, however some mealybug may survive in sheltered spots and multiply again from these. They then migrate to the calyx of the fruit where they are very difficult to control, so these sprays should be applied as part of a season long program with other chemical group sprays to keep them under control. The addition of MAXX Organosilicone Surfactant at 50 mL/100 L water may improve efficacy. Refer to Restraints and the Application/ Wetting Agent section. Concentrate spraying is not recommended because thorough coverage is essential for good control of these insects.
	Codling moth	**Dilute foliar spray** 40 g/ 100 L **Concentrate spraying** Refer to the Mixing/ Application section	Apply once pest monitoring indicates that a generation egg hatch is taking place. Ensure thorough coverage. Apply two consecutive sprays 14 days apart to maintain control of a generation. It is recommended this be part of a season long control program. Further sprays for this generation, or the next should be from a different chemical group. The addition of MAXX Organosilicone Surfactant at 50 mL/100 L water may improve efficacy. Refer to Restraints and the Application/ Wetting Agent section.

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Samurai Label (cont'd)

CROP	PEST	RATE	CRITICAL COMMENTS
Peaches and Nectarines	Oriental fruit moth	**Dilute foliar spray** 40 g/ 100 L **Concentrate spraying** Refer to the Mixing/ Application section	Apply once pest monitoring indicates that a generation egg hatch is taking place. Apply two consecutive sprays 14 days apart to a generation. Further sprays for this generation, or the next should be from a different chemical group. Samurai should be used as part of a season long control program. The addition of MAXX Organosilicone Surfactant at 50 mL/100 L water may improve efficacy. Refer to the Application/ Wetting Agent section.
	Green peach aphid	**Dilute foliar spray** 10 g/ 100 L **Concentrate spraying** Refer to the Mixing/ Application section	Apply once monitoring indicates that chemical control is necessary. Ensure that a reasonable amount of leaf is present at spraying to enhance uptake.

Withholding Period

Do not harvest for 21 days after application.
Do not graze treated area or cut treated area for stock feed.

Treated fruit for export to particular destinations outside Australia may require a longer interval before harvest to comply with residues standards of importing countries. Please contact your industry body, exporter or Sumitomo Chemical Australia before using Sumitomo Samurai Systemic Insecticide.

Wetting Agent

Add MAXX Organosilicone Surfactant at the rate of 50 mL/100 L (0.05%) of spray. Do not exceed this rate (see Restraints). Other surfactants may be acceptable but their effectiveness, safety to trees and fruit, or compatibility with Samurai cannot be guaranteed.

For further information on Sumitomo ReTain & ProGibb SG, please contact:

Andrew Franklin (FNQ)	0408 063 371
Danita Clark (Central QLD)	0447 000 622
Patrick Press (SE Qld & NSW Northern Rivers)	0417 085 160
Ardina Jackson (NW NSW)	0477 967 509
Phil Glover (Central & Coastal NSW)	0418 668 586
Charles McClintock (S NSW)	0429 004 290
Frank Galluccio (NW VIC & Riverina)	0418 502 466
Jack Bartels (Eastern VIC & TAS)	0488 036 313
Matthew Hincks (SA)	0409 807 301
Imre Toth (WA)	0429 105 381
OR our Sydney office:	(02) 8752 9000

Scan here to see more information about Samurai Systemic Insecticide

SUMITOMO CHEMICAL
AgroSolutions Division
www.sumitomo-chem.com.au
ABN 21 081 096 255
Level 5, 51 Rawson Street EPPING NSW 2121
TEL: (02) 8752 9000 FAX: (02) 8752 9099