



20 NEW ZEALAND RESIDUE **23** COMPLIANCE INFORMATION FOR FRESH GREENHOUSE TOMATOES



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Biopesticides

General principles for Good Management Practices



WHAT ARE BIOPESTICIDES?

Biopesticides are alternatives to conventional synthetic pesticides. They include live microbes (such as bacteria, fungi and viruses) and/or their extracts, crude or purified plant extracts, pheromones and other natural biochemicals. Biopesticides work best when incorporated into an integrated pest management programme utilising a range of control measures. They are different to biostimulants and biofertilisers since they claim pest control activity rather than just promotion of plant growth.

WHAT REGULATORY APPROVAL IS NEEDED FOR THEIR USE?

In New Zealand, the regulatory process for biopesticides is the same as for conventional chemical pesticides. The product must be registered under the ACVM (Agricultural and Veterinary Medicines) Act. They can be categorised as biofungicides, bioinsecticides and bioherbicides.

HOW DO THEY WORK?

Biopesticides can work in a number of different ways. Some products only have one mode of action whilst others have multiple modes of action.

- **Attraction/repellency** Produce compounds that disrupt the normal behaviour of insect pests.
- **Competition** Microbes can out-compete plant pathogens for space and other resources and prevent the pathogen from infecting the plant.
- **Physical action** Produce compounds that cause cell leakage, desiccation and death in the target pest.
- **Parasitism** Microbes can infect/colonise a target pest/pathogen and kill it.
- **Toxicity** Microbes/plants can produce a compound that has a direct toxic effect on the target pest.
- **Induced resistance** Microbes/plants can produce compounds that stimulate the crop plant's general resistance to pest/pathogen attack.

BIOPESTICIDE BENEFITS

Biopesticides may seem more challenging to use than conventional chemicals, but they provide a number of benefits.

Low resistance risk

Biopesticides have a low risk of resistance developing because of their multiple modes of action. They can be integrated into IPM systems to extend the life of agrichemicals.

Residue management

Biopesticides are exempt from MRL residue targets and therefore can be used close to harvest time when other chemicals are not suitable.

Low environmental impact

Biopesticides often have good compatibility with beneficial insects and are generally regarded as safer for the environment. Many biopesticides have a zero or low re-entry and handling interval.

HOW TO USE BIOPESTICIDES

Storage

It is very important to follow the label guidelines, particularly around storage. Products based on living microbes can be affected by extreme heat and cold, so storing at ambient temperature is usually recommended, although some products need to be refrigerated. Some products must be used immediately and cannot be resealed and stored. Biopesticides are subject to the same regulations as chemical pesticides and need to be held in an approved store.

Environment

Biopesticides can be sensitive to environmental conditions so check labels carefully. Many biopesticides should be applied in the evening to avoid the heat of the day and some benefit from being applied with UV protectants. Most biopesticides are not systemic or rain fast so re-application will be needed if there is a significant rainfall event.

Application

Most foliar biopesticides are protectants, so it is important to apply them before pest/disease symptoms appear and to make sure that good plant coverage is achieved. Use the specified nozzle to prevent blockages. When using products based on live microbes clean your spray system very well before adding and don't use chlorinated water. Biopesticides may need to be reapplied at 7-10 day intervals.

Compatibility

Check label recommendations around adjuvant use and tank mixing as live microbes may be affected by other crop protection products.

QUESTIONS TO ASK WHEN BUYING BIOPESTICIDES

What is the active ingredient?

If it is a crude preparation (plant extract or mix of microbes) ask about the consistency of the product with respect to quality assurance. If it's a single microbe/pure compound ask for specific identifications eg specific strain of a microbe. If you get vague answers – buyer beware.

How does it work?

Don't accept vague or overly complicated answers. Understanding how the product works is the key to understanding how to use it properly. Cross reference what the company rep tells you with what is on the label.

What field trial data can you show me?

Reputable companies selling good products will have good trial data to back up their claims. Don't accept pot trial data (poor translation to field efficacy) and be cautious with field data on other crops/pests.

How should I use the product?

Ask for detailed information on how the product should be used and what other products it is compatible with. Beware of vague answers or claims that it can be used exactly like a chemical.

If something sounds too good to be true – it will be.

Biopesticides are not stand-alone solutions. They work best when incorporated into an integrated pest management programme utilising a range of control measures.

A selection of biopesticides and other products registered in New Zealand for use on indoor tomato crops

Bio-insecticides

Biologicals

Active Ingredient	Trade name examples	Agrichemical group	More info
AZADIRACTIN	Naturally Neem	Biological	Page 8
BACILLUS THURINGIENSIS	Bactercide WG, Biobit DF, Dipel DF, Dipel ES, Bactur	Biological	Page 9
BEAUVERIA BASSIANA	Contego BB, Beaugenic, Beublast	Biological	Page 9
VERTICILLIUM LECANII	eNtokill, eNtoblast	Biological	Page 16

Bio-fungicides

Microbials:

Active Ingredient	Trade name examples	Agrichemical group	More info
BACILLUS AMYLOLIQUEFACIENS BS1B	Triplex	Microbial	Page 20
BACILLUS SUBTILIS	Donaghys Foliactive, Bacstar, Serenade Max	Microbial	Page 20

Mineral Oil:

MINERAL OIL	Excel Oil - Organic	Mineral oil	Page 27
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Other:

BENZALKONIUM CHLORIDE	Spotless, Surrender, Graphic Biocide, Winter Clean-up, Yield	n/a	Page 21
CHLORINE DIOXIDE	Biospray	n/a	Page 22
POTASSIUM BICARBONATE	Ecocarb, K-pow	n/a	Page 27

Safe use of agrichemicals

Important, PLEASE READ:

This document provides fresh tomato growers with MRL (Maximum Residue Limit) and WHP (Withholding Period) compliance information for the New Zealand market. These guidelines also indicate where WHP information is not known. Where this is the case, growers are encouraged to exercise caution around the use of these products (in terms of application timing etc.). This information is specific to fresh tomatoes grown under cover and excludes field grown tomatoes. It is grower's duty to read and follow labels and controls and to meet the required domestic and export MRLs. When using a product that contains multiple active ingredients, it is the grower's responsibility to ensure that residues do not exceed the MRL for every active ingredient that product contains. It is also the grower's responsibility to ensure they comply with any other use controls such as maximum application rates / frequency restrictions. Some NZ MRLs for older pesticides have been set to cover "vegetables or fruiting vegetables" in general and may no longer reflect current Good Agricultural Practice. For some compounds, greenhouse tomato label claims do not exist and efficacy, phytotoxicity / plant safety etc. needs to be considered when using these products. Off label uses are not illegal unless registration conditions state otherwise and provided residues comply with the NZ MRL (set or default).

Some EPA controls have not been included in this spreadsheet as they are not expected to apply to closed glasshouse use of compounds. These include restrictions on applying substances to water, restrictions on aerial application, and requirements to take steps to prevent spray drift off of the property on which the product is applied. If growers are using crop protection compounds outside of the glasshouse, please check the EPA controls database and refer to the product label, prior to use.

Disclaimer: This document is not a legal instrument or advice. This information is solely based on domestic and internationally sourced data. While this information is based on the best data available, and has been collated with care, it is not possible to guarantee the accuracy of this information and is intended for reference only. For this reason, and because of variations in GAP, climatic conditions etc, Market Access Solutionz does not accept any responsibility or liability in respect of loss or damage arising from the use or misuse of information contained in this document. Growers must ensure that their use of agrichemicals is in accordance with NZ regulations including MRLs. It is the responsibility of exporters to comply with importing country legal requirements. Market Access Solutionz strongly recommends growers verify this information through residue tests before harvest. In addition, MRLs can be changed or updated without notice. No guarantees can be given that export MRLs will not be exceeded in all instances. It is therefore strongly recommended that this information be used in conjunction with residue monitoring to try and avoid residue breaches.

WorkSafe Requirements

The Health and Safety at Work (Hazardous Substances) Regulations 2017 also impose some requirements around the use of crop protection compounds, such as the need for workers to be provided with PPE, and the requirement for signage at entrances to a site, where large quantities of certain hazardous substances are used. Guidance on WorkSafe's requirements are here: <https://worksafe.govt.nz/topic-and-industry/hazardous-substances/>

One new requirement that came into force in Mid-2017 is that businesses must now keep an inventory of all their hazardous substances, which includes not only crop protection products, but cleaning products and fuel as well. WorkSafe has an online hazardous substance calculator tool that can assist in determining what key requirements growers must comply with. This tool can be found here: <https://worksafe.govt.nz/topic-and-industry/hazardous-substances/managing/inventory/>

Resistance Management

When using agricultural chemicals growers should be aware of managing resistance. Resistance in a pest, disease or weed population can develop from repeat use of an agricultural chemical. Resistance can become an issue because of high selection pressure exerted on a pest, disease or weed population over several seasons. This is generally the result of repeated use of the same or several agricultural chemicals with the same or similar mode of action.

In order to reduce the risk of resistance the majority of agricultural chemicals have a designated IRAC/FRAC/HRAC code. This coding system is based on the mode of action of the biochemical process through which the pesticide disrupts a pest, disease or weed's biology, generally resulting in the death of the pest, disease or weed.

These codes are used as part of a resistance management strategy. By using different modes of action growers can make decisions about rotating products to avoid or delay resistance developing. The mode of action of most agricultural chemicals is generally on the label.

For further information refer to:

<http://resistance.nzpps.org/>
www.irac-online.org
www.frac.info
www.hracglobal.com

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References

The information contained in this document was correct at the time of collation (July - August 2020 except for Japan MRLs which were updated in August 2021)

ACVM Label database:

<https://eatsafe.nzfsa.govt.nz/web/public/acvm-register>

MRLs are outlined in the MRL Standard which is regularly updated:

<https://www.mpi.govt.nz/processing/agricultural-compounds-and-vet-medicines/maximum-residue-levels-for-agricultural-compounds/>

Export MRLs

<https://www.mpi.govt.nz/news-and-resources/resources/registers-and-lists/maximum-residue-levels-database/>

EPA controls database:

<https://www.epa.govt.nz/database-search/approved-hazardous-substances-with-controls/>

Managing spray drift

Guidance information is available from TomatoesNZ:
<https://www.tomatoesnz.co.nz/industry/research/members-research/spray-drift/>

This document should be read in conjunction with the NZGAP document 'Guideline for off label use of agricultural chemicals in Horticulture' found here: https://www.newzealandgap.co.nz/NZGAP_Public/NZGAP_Public/Growers/Guidelines.aspx



Insecticides

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ABAMECTIN**Trade Name Examples:** Apostle, Avid, Verdex, Tripsol**Agrichemical Group:** Avermectin**IRAC (Insecticide Resistance Action Committee mode of action number):** 6**Registered on indoor tomato?:** Yes**Withholding Period (days):** 3**Maximum Residue Limit (mg/kg):** 0.10 {108} Sum of parent B1a and B1b components**Additional NZ EPA controls by trade name:** Tripsol: The maximum application rate for Tripsol shall be 0.85 L/ha (19.13 g acrinathrin/ha and 10.71 g abamectin/ha) with a maximum application frequency of 4 applications per year and a minimum application interval of 7 days.**ACRINATHRIN****Trade Name Examples:** Tripsol**Agrichemical Group:** Synthetic Pyrethroid**IRAC (Insecticide Resistance Action Committee mode of action number):** 3A**Registered on indoor tomato?:** Yes**Withholding Period (days):** 3**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** Tripsol: The maximum application rate for Tripsol shall be 0.85 L/ha (19.13 g acrinathrin/ha and 10.71 g abamectin/ha) with a maximum application frequency of 4 applications per year and a minimum application interval of 7 days.**ALPHA-CYPERMETHRIN****Trade Name Examples:** Bestseller 100EC, Cypher, Dominex 100, Ken-Tac 100**Agrichemical Group:** Synthetic Pyrethroid**IRAC (Insecticide Resistance Action Committee mode of action number):** 3A**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** No additional controls**AZADIRACHTIN****Trade Name Examples:** Naturally Neem**Agrichemical Group:** Biological**IRAC (Insecticide Resistance Action Committee mode of action number):** UN: Compounds of unknown or uncertain mode of action**Registered on indoor tomato?:** Yes**Withholding Period (days):** Not required: WHP is not required as the active is exempt from MRLs**Maximum Residue Limit (mg/kg):** Exempt (insecticide)**Additional NZ EPA controls by trade name:** No additional controls**BACILLUS THURINGIENSIS****Trade Name Examples:** Bactercide WG, Biobit DF, Dipel DF, Dipel ES, Bactur**Agrichemical Group:** Biological**IRAC (Insecticide Resistance Action Committee mode of action number):** 11A**Registered on indoor tomato?:** Yes**Withholding Period (days):** Not required: WHP is not required as the active is exempt from MRLs**Maximum Residue Limit (mg/kg):** Exempt: active is exempt from the requirements to set an MRL**Additional NZ EPA controls by trade name:** No additional controls**BEAUVERIA BASSIANA****Trade Name Examples:** Contego BB, Beaugenic, Beaublast**Agrichemical Group:** Biological**IRAC (Insecticide Resistance Action Committee mode of action number):** UNF: Fungal agents of unknown or uncertain mode of action**Registered on indoor tomato?:** Yes**Withholding Period (days):** Not required: WHP is not required as the active is exempt from MRLs**Maximum Residue Limit (mg/kg):** Exempt: active is exempt from the requirements to set an MRL**Additional NZ EPA controls by trade name:** Beaublast and Beaugenic: Application is restricted to ground-based application.
Beaugenic: Workers must use respiratory protection when mixing, loading and applying the substance, or undertaking tasks during the restricted entry interval. A restricted entry interval of 4 hours applies.**BIFENTHRIN****Trade Name Examples:** Talstar 80SC, Venom, Assail**Agrichemical Group:** Synthetic Pyrethroid**IRAC (Insecticide Resistance Action Committee mode of action number):** 3A**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.05**Additional NZ EPA controls by trade name:** No additional controls**BUPROFEZIN****Trade Name Examples:** Applaud 40SC, Mortar, Ovation 50 WDG, Pilan 500Sc**Agrichemical Group:** Buprofezin**IRAC (Insecticide Resistance Action Committee mode of action number):** 16**Registered on indoor tomato?:** Yes**Withholding Period (days):** 3**Maximum Residue Limit (mg/kg):** 0.50**Additional NZ EPA controls by trade name:** No additional controls

CARBARYL

Trade Name Examples: Grochem Carbaryl, Sevin Flo

Agrichemical Group: Carbamate

IRAC (Insecticide Resistance Action Committee mode of action number): 1A

Registered on indoor tomato?: Yes

Withholding Period (days): 1

Maximum Residue Limit (mg/kg): 3.00

Additional NZ EPA controls by trade name: Grochem Carbaryl & Sevin Flo: Maximum application rate of 2700g carbaryl/ha, can be used up to 3 times/crop cycle. Restricted Entry Interval: An REI of 12 hours applies. A person may only re-enter the area if PPE and RPE is worn as though that person were applying the substance and if entering an indoor tented area, for the purposes of carrying out tasks associated with ventilation of the building

CHROMOBACTERIUM SUBSUGAE

Trade Name Examples: Grandevo

Agrichemical Group: Biological

IRAC (Insecticide Resistance Action Committee mode of action number): NC: Not classified. Target site and code unknown.

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL

Additional NZ EPA controls by trade name: Grandevo is likely to leave heavy deposits on fruit from high volume spray application. Maximum application rate of 1020g a.i./ha. Maximum of 4 applications per year, with a minimum of 7 days between applications. Must be applied using ground-based methods only. Do not apply into or onto water. Must not be applied when wind speeds are less than 3km/hr or greater than 20 km/hr.

CYANTRANILIPROLE

Trade Name Examples: DuPont Benevia insecticide, DuPont Exirel insecticide, Minecto Star

Agrichemical Group: Diamide

IRAC (Insecticide Resistance Action Committee mode of action number): 28

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Benevia: Ground-based application methods only. A maximum application rate of 50g/ai/ha, up to 3 applications per year, with a minimum application interval of 7 days. Only spray after daily honey bee flight unless the application rate is less than or equal to 20 g ai/ha and spraying after daily honeybee flights is not possible.
Exirel: as above except maximum application rate is 15g/ai/ha.
Minecto Star: Do not apply within 10 days of a plant being likely to flower. Maximum application rate of 150g/product/ha, up to 3 times per year with a minimum application interval of 14 days. Ground-based application only (includes airblast), and nozzles must provide a medium or coarse droplet size.

CYPERMETHRIN

Trade Name Examples: Ripcord

Agrichemical Group: Synthetic Pyrethroid

IRAC (Insecticide Resistance Action Committee mode of action number): 3A

Registered on indoor tomato?: Yes

Withholding Period (days): 3

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: No additional controls

DELTAMETHRIN

Trade Name Examples: Ballistic Insecticide, Decis Forte, Deltaphar 25EC, Proteus

Agrichemical Group: Synthetic Pyrethroid

IRAC (Insecticide Resistance Action Committee mode of action number): 3A

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.05 {7} Sum of isomers or enantiomers or diastereomers

Additional NZ EPA controls by trade name: Proteus: Ground-based application only

DICHLORVOS

Trade Name Examples: Divap, Nuvos

Agrichemical Group: Organophosphate

IRAC (Insecticide Resistance Action Committee mode of action number): 1B

Registered on indoor tomato?: Yes

Withholding Period (days): 3

Maximum Residue Limit (mg/kg): 2.00

Additional NZ EPA controls by trade name: Please see pages 15-16 for detailed controls information

FATTY ACIDS (K SALTS)

Trade Name Examples: Natures Way Natrasoap Veggie Insect Gun, Protector hml

Agrichemical Group: Fatty acids

IRAC (Insecticide Resistance Action Committee mode of action number): n/a

Registered on indoor tomato?: No

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): exempt (C8+)

Additional NZ EPA controls by trade name: No additional controls

FLONICAMID

Trade Name Examples: Mainman

Agrichemical Group: Flonicamid

IRAC (Insecticide Resistance Action Committee mode of action number): 29

Registered on indoor tomato?: Yes

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Maximum application rate of 160 g product/ha (equivalent to 80 g flonicamid/ha). Do not apply into or onto water. Do not allow entry into treated areas until the spray has dried, unless wearing cotton overalls buttoned to the neck and wrist (or equivalent clothing) and chemical resistant gloves. Clothing should be laundered after each day's use. Do not apply [product name] to any plant likely to be visited by bees or in areas where bees are foraging at the time of (or immediately after) application, until spray has dried.

IMIDACLOPRID

Trade Name Examples: Acclaim, Confidor, Kohinor 350 Insecticide, Nuprid 350SC

Agrichemical Group: Neonicotinoid

IRAC (Insecticide Resistance Action Committee mode of action number): 4A

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: No additional controls

LAMBDA-CYHALOTHRIN

Trade Name Examples: Cyhella, Dovetail, Halex, Karate Zeon, Lavron, Lavron 50WG

Agrichemical Group: Synthetic Pyrethroid

IRAC (Insecticide Resistance Action Committee mode of action number): 3A

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Cyhella, Halex, Karate Zeon: No additional controls
Dovetail: Maximum application rate of 1.5L product/ha, up to 4 times per season with a minimum application interval of 10 days. Restricted Entry Interval: - An REI of 24 hours applies. A person may only re-enter the area during this time if PPE and RPE is worn as though that person were applying the substance and if entering an indoor tented area, for the purposes of carrying out tasks associated with ventilation of the building
Lavron 50WG: Ground based application only.

METHOMYL

Trade Name Examples: Orion Methomyl, Lannate L

Agrichemical Group: Carbamate

IRAC (Insecticide Resistance Action Committee mode of action number): 1A

Registered on indoor tomato?: Yes

Withholding Period (days): 2

Maximum Residue Limit (mg/kg): 0.50 {35} Sum of methomyl and thiodicarb, expressed as methomyl

Additional NZ EPA controls by trade name: Lannate L & Orion Methomyl: Maximum application rate of 480g active ingredient/ha. Application using hand-gun spray is not permitted. Restricted Entry Interval - An REI of 24 hours applies for application by boom and knapsack if applied at rates up to 300g/active ingredient/ha. For all other applications, the REI is 48 hours. A person may only re-enter the area during this time if PPE and RPE is worn as though that person were applying the substance and if entering an indoor tented area, for the purposes of carrying out tasks associated with ventilation of the building

MINERAL and NON MINERAL OILS

Trade Name Examples: Caltex D-C Tron Plus Spray Oil, D-C-Tron Plus (Organic) Spray Oil, Excel Oil, Excel Spring Oil, Organic Super Spraying Oil, Organic Super Spraying Oil Ready-To-Use

Agrichemical Group: n/a

IRAC (Insecticide Resistance Action Committee mode of action number): n/a

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): exempt (paraffin oils)

Additional NZ EPA controls by trade name: No additional controls

Caution: Can cause serious crop damage in greenhouse crops

PERMETHRIN

Trade Name Examples: Ambush, Attack

Agrichemical Group: Synthetic Pyrethroid

IRAC (Insecticide Resistance Action Committee mode of action number): 3A

Registered on indoor tomato?: Yes

Withholding Period (days): 3

Maximum Residue Limit (mg/kg): 0.50 {7} Sum of isomers or enantiomers or diastereomers

Additional NZ EPA controls by trade name: Ambush & Attack: Contains pirimiphos-methyl. Maximum application rate of 1425 g pirimiphos-methyl/ha up to 4 times per crop cycle. Application with a hand-gun spray is not permitted. Restricted Entry Interval - REI of 12 hours applies. A person may only re-enter the area during this time if PPE and RPE is worn as though that person were applying the substance and if entering an indoor tented area, for the purposes of carrying out tasks associated with ventilation of the building.

PIRIMICARB

Trade Name Examples: Aphidex WG, Aphidex 800WG, Pirimisect, Pirimor 50, Piritek, Prohive, Dovetail

Agrichemical Group: Carbamate

IRAC (Insecticide Resistance Action Committee mode of action number): 1A

Registered on indoor tomato?: Yes

Withholding Period (days): 3

Maximum Residue Limit (mg/kg): 1.00 {31} Sum of parent plus -desmethyl and -desmethylformamido metabolites

Additional NZ EPA controls by trade name: Dovetail: See 'Dovetail' under Lambda-cyhalothrin. All other listed trade name products: Restricted Entry Interval - An REI of 24 hours applies. A person may only re-enter the area during this time if PPE and RPE is worn as though that person were applying the substance and if entering an indoor tented area, for the purposes of carrying out tasks associated with ventilation of the building

PIRIMIPHOS-METHYL

Trade Name Examples: Actellic 50EC, Actellic Dust, Attack, Silo 500EC, Ambush

Agrichemical Group: Organophosphates

IRAC (Insecticide Resistance Action Committee mode of action number): 1B

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 1.00

Additional NZ EPA controls by trade name: Attack and Ambush: Maximum application rate of 1425 g pirimiphos-methyl/ha up to 4 times per crop cycle. Application with a hand-gun spray is not permitted. Controls apply to all products containing pirimiphos-methyl: Restricted Entry Interval - REI of 12 hours applies. A person may only re-enter the area during this time if PPE and RPE is worn as though that person were applying the substance and if entering an indoor tented area, for the purposes of carrying out tasks associated with ventilation of the building.

PYMETROZINE

Trade Name Examples: Chess WG, Minecto Star, Worthide Xtra

Agrichemical Group: Pyridine azomethine

IRAC (Insecticide Resistance Action Committee mode of action number): 9

Registered on indoor tomato?: Yes

Withholding Period (days): 3

Maximum Residue Limit (mg/kg): 0.50

Additional NZ EPA controls by trade name: Chess WG - No additional controls
Minecto Star - See 'Minecto Star' listed under cyantraniliprole
Worthide Xtra: Maximum application rate of 200g pymetrozine/ha with maximum application frequency of 3 applications per season and a minimum interval of 7 days between applications. Ground use only

PYRETHRINS

Trade Name Examples: Beat-a-Bug, Greenseals Pyrethrum, Pyganic, ZETaPY

Agrichemical Group: Pyrethroid

IRAC (Insecticide Resistance Action Committee mode of action number): 3A

Registered on indoor tomato?: Yes

Withholding Period (days): 1

Maximum Residue Limit (mg/kg): 1.00

Additional NZ EPA controls by trade name: Pyganic: Workers must not be exposed to concentrations of pyrethrins, greater than 5mg/m³
Zetapy: Maximum application rate of 56g active ingredient / ha, up to 5 times per season

PYRIPROXYFEN

Trade Name Examples: Relent, Admiral

Agrichemical Group: Pyriproxyfen

IRAC (Insecticide Resistance Action Committee mode of action number): 7

Registered on indoor tomato?: Yes

Withholding Period (days): 1

Maximum Residue Limit (mg/kg): 1.00

Additional NZ EPA controls by trade name: No additional controls

SPINETORAM

Trade Name Examples: Sparta, Uphold

Agrichemical Group: Spinosyns

IRAC (Insecticide Resistance Action Committee mode of action number): 5

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.02 {62} Sum of spinosyn J and spinosyn L

Additional NZ EPA controls by trade name: Sparta & Uphold: Ground based application - Maximum application rate of 500ml/product/ha, up to 4 applications per season, with a minimum of 7 days between applications.
For airblast sprayers - Maximum application rate of 800ml/product/ha, up to 4 applications per season, with a minimum of 14 days between applications.

SPINOSAD

Trade Name Examples: Entrust Naturalyte Insect Control, Success *Naturalyte* Insect Control

Agrichemical Group: Spinosyns

IRAC (Insecticide Resistance Action Committee mode of action number): 5

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.05 {60} Sum of spinosyn A and spinosyn D

Additional NZ EPA controls by trade name: No additional controls

SPIROMESIFEN

Trade Name Examples: Oberon, Optimite

Agrichemical Group: Tetric and Tetric acid derivatives

IRAC (Insecticide Resistance Action Committee mode of action number): 23

Registered on indoor tomato?: Yes

Withholding Period (days): 1

Maximum Residue Limit (mg/kg): 0.50

Additional NZ EPA controls by trade name: Oberon: Maximum application rate of 144g/a.i./ha, up to two applications per season. Ground-based application methods only.
Optimite: Maximum application rate of 144g/a.i./ha, up to two applications per crop cycle. Ground-based application methods only.

SPIROTETRAMAT

Trade Name Examples: Movento

Agrichemical Group: Tetric and Tetric acid derivatives

IRAC (Insecticide Resistance Action Committee mode of action number): 23

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.30 {90} Sum of parent and its -enol metabolite

Additional NZ EPA controls by trade name: No additional controls. May cause harm to off-target plants

SULFOXAFLOR

Trade Name Examples: Transform

Agrichemical Group: Sulfoximine

IRAC (Insecticide Resistance Action Committee mode of action number): 4C

Registered on indoor tomato?: Yes - Fruiting vegetable

Withholding Period (days): 1

Maximum Residue Limit (mg/kg): 1.00

Additional NZ EPA controls by trade name: Maximum ground based application rate of 96 g ai / ha, up to 4 applications per year with a minimum interval of 14 days between applications. Do not apply this product in areas where bees are foraging or to any plant likely to be visited by bees (a) at the time of application; or (b) before the spray has dried following application

TEBURENOZIDE

Trade Name Examples: Approve 70 WP, Comic

Agrichemical Group: Diacylhydrazines

IRAC (Insecticide Resistance Action Committee mode of action number): 18

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Approve WP & Comic: Maximum application rate of 180g/a.i/ha, up to four applications per season, with a minimum of 14 days between applications. Ground-based application only.

THIACLOPRID

Trade Name Examples: Alpasso, Calypso, Proteus

Agrichemical Group: Neonicotinoid

IRAC (Insecticide Resistance Action Committee mode of action number): 4A

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Alpasso, Calypso no additional controls. Proteus contains deltamethrin: see 'Proteus' listed under deltamethrin

VERTICILLIUM LECANII

Trade Name Examples: eNtokill, eNtoblast

Agrichemical Group: Biological

IRAC (Insecticide Resistance Action Committee mode of action number): n/a

Registered on indoor tomato?: Yes

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL

Additional NZ EPA controls by trade name: Ground based application only

Dichlorvos: additional EPA controls

Please see page 11 for additional information on Dichlorvos

Re-entry Interval and handling

For indoor greenhouse applications, a 48 hour restricted entry interval applies. No REI applies if dichlorvos is applied by dipping, or as a spot treatment using a knapsack, handgun or handheld fogger. No person may re-enter the application area during this time, unless they are wearing full Personal Protective Equipment (PPE) and Respiratory Protective Equipment (RPE), in which case they may be in the area for up to a total of 30 mins, per 24 hour period.

Full PPE and RPE should include:

- Chemical resistant coveralls
- Chemical resistant gloves
- Chemical resistant footwear plus socks
- Protective eyewear
- Chemical resistant headgear for overhead exposures
- Respiratory protective equipment (with an appropriate protection factor) to protect against respiratory exposure to the substance in dust, mist, gas or vapour forms of the substance.

Dichlorvos must not be applied at a rate in excess of 0.05g dichlorvos/m³.

The following table lists the maximum quantity of dichlorvos that can be handled per person in a 24 hour period, based on application method.

Application method	Maximum handling quantity /g (dichlorvos) per person per 24 hour period
Handgun	15
Handheld fogger	15
Knapsack	15
Trolley boom	1300
Semi-automated sprayer	1300
Fully Automated sprayer	1300
Fully automated fogger	1300
Dipping	600
Boom or airblast	7200

Fully automated, in relation to application equipment for a hazardous substance, means the equipment can be operated in a way that allows its operator not to be in the same enclosed space as the equipment during its application of the substance.



Dichlorvos: additional EPA controls continued

Exclusion zone and sensitive areas

The person in charge of the Application Area must establish an Exclusion Zone that extends to a distance of 20m outward from the perimeter of the Enclosed Space; and is maintained from the Start of Application until at least 2 hours from the End of Application. No person is permitted to be present in an Exclusion Zone for more than 15 minutes in any 24 hour period, unless they are wearing full PPE and RPE.

The person in charge of the application area (enclosed space) must take all reasonably practicable steps to ensure that no person is present in the exclusion zone for more than 15 minutes, unless they are wearing full PPE and RPE.

With the exception of dipping and spot treatment using a knapsack, handgun, or handheld fogger, dichlorvos must not be applied if a "sensitive area" is within the exclusion zone unless a permission to do so has been obtained prior to application, from the EPA. "Sensitive area" means residential dwellings and sites such as schools, playgrounds, early childhood centres, prisons, hospitals or long-term care facilities, and any place where non-occupational bystanders are present or could normally be expected to be present.

Notification

Prior to application, notice must be provided to any person occupying a sensitive area within 100m of the enclosed space where the substance is being applied. This notice must be provided at least 12 hours, but no more than 48 hours before applying the substance. The notice must specify 1) the approximate time and duration of the application of the substance, including ventilation, 2) the steps that should be taken to avoid exposure to the substance, 3) the contact details of the person in charge of the application of the substance, including phone number, email address, and postal address. No notification is necessary if being applied by dipping or using dichlorvos as a spot treatment using a knapsack, handgun, or handheld fogger.

Record-keeping

Records must be kept of:

- What measures are implemented to ensure that the REI is complied with
- The size of the application plot and any associated enclosed space
- The location and extent of the exclusion zone or buffer zone
- The method used to apply the substance
- The quantity of dichlorvos handled by each person involved in the application
- The measures implemented to monitor worker exposure to dichlorvos
- How it was determined, who needed to be notified (see above)
- Who was notified of the application (see above)
- What information was provided to those persons who were notified

Fully automated, in relation to application equipment for a hazardous substance, means the equipment can be operated in a way that allows its operator not to be in the same enclosed space as the equipment during its application of the substance.

Fungicides

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AMETOCTRADIN**Trade Name Examples:** Zampro**Agrichemical Group:** Triazolo-pyrimidylamine***FRAC (Fungicide Resistance Action Committee mode of action number):** 45**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** Maximum application rate 0.8 L/ha, up to 4 applications/year with a minimum application interval of 7 days**AZOXYSTROBIN****Trade Name Examples:** Atlantis Flo, Inspire, Orbit, Roxy, Salute, Amistar, Mirador 250SC, Tazer Xpert, Avior 250 SC, Amistar Opti**Agrichemical Group:** Methoxy-acrylates***FRAC (Fungicide Resistance Action Committee mode of action number):** 11**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.01 {97} Sum of parent plus its Z-isomer**Additional NZ EPA controls by trade name:** Atlantis Flo: max rates:
• 126 g a.i./ha, 2 / year, min interval 7 days;
• 201.6 g a.i./ha, 2 / year, min interval 10 days; and
• 252 g a.i./ha, 2 / year, min interval 14 days.
Tazer: 2.4L/ha, max 2 / year, min interval 14 days.
Avior: max rate 619 g ai/ha, max 2 / year, min interval 14 days.
Amistra Opti: max rate 1.25L/ha, 4 / season. min interval 7 days.
All others: No additional controls.**Caution:** Can cause crop damage when used via irrigation**BACILLUS AMYLOLIQUEFACIENS BS1B****Trade Name Examples:** Triplex**Agrichemical Group:** Microbial***FRAC (Fungicide Resistance Action Committee mode of action number):** 44**Registered on indoor tomato?:** Yes**Withholding Period (days):** Not required: WHP is not required as the active is exempt from MRLs**Maximum Residue Limit (mg/kg):** Exempt: active is exempt from the requirements to set an MRL**Additional NZ EPA controls by trade name:** No additional controls**BACILLUS SUBTILIS****Trade Name Examples:** Donaghys Foliactive, Bacstar, Serenade Max**Agrichemical Group:** Microbial***FRAC (Fungicide Resistance Action Committee mode of action number):** 44**Registered on indoor tomato?:** No**Withholding Period (days):** Not required: WHP is not required as the active is exempt from MRLs**Maximum Residue Limit (mg/kg):** Exempt: active is exempt from the requirements to set an MRL**Additional NZ EPA controls by trade name:** No additional controls

*REFER TO RESISTANCE MANAGEMENT (PAGE 5)

BENZALKONIUM CHLORIDE**Trade Name Examples:** Spotless, Surrender, Graphic Biocide, Winter Clean-up, Yield**Agrichemical Group:** n/a***FRAC (Fungicide Resistance Action Committee mode of action number):** n/a**Registered on indoor tomato?:** Yes (certain uses)**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** Spotless: Maximum application rate of 22.5 L/ha, up to 8 applications per season. Graphic Biocide, Surrender, Winter Clean-up, Yield : No additional controls**BOSCALID****Trade Name Examples:** Colliss, Pristine**Agrichemical Group:** Pyridine-carboxamides***FRAC (Fungicide Resistance Action Committee mode of action number):** 7**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** Colliss: Maximum application rate of 0.5L/ha, up to 3 applications / season at 14-21 day intervals, application only by boom or hand held spray. Pristine & Pavo Boss: max rate 1.6 kg/ha, 4 applications / year.**BUPIRIMATE****Trade Name Examples:** Nimrod EW Fungicide, Neptune Encaps, Neptune, Evito**Agrichemical Group:** Pyrimidine***FRAC (Fungicide Resistance Action Committee mode of action number):** 8**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** Nimrod EW Fungicide, Neptune Encaps, Neptune: No additional controls. Evito: Maximum application rate 1 L/ha, maximum of 3 applications per season.**CARBENDAZIM****Trade Name Examples:** Chief, Carbenz, Goldazim 500 SC, MBC 500Flo, MBC 800WDG, Prolific, Protek**Agrichemical Group:** Benzimidazole***FRAC (Fungicide Resistance Action Committee mode of action number):** 1**Registered on indoor tomato?:** Yes some TNPs**Withholding Period (days):** 3**Maximum Residue Limit (mg/kg):** 2.00 {186} Sum of carbendazim and thiophanate-methyl, expressed as carbendazim**Additional NZ EPA controls by trade name:** No additional controls**Caution:** Does kill natural enemies of Pythium when used via irrigation

*REFER TO RESISTANCE MANAGEMENT (PAGE 5)

CHLORETHEPHON (see notes for chlorethephon)

Trade Name Examples: Ethrel, Ethepon 480 Growth Regulator

Agrichemical Group: Plant growth regulator

***FRAC (Fungicide Resistance Action Committee mode of action number):** n/a

Registered on indoor tomato?: Yes

Withholding Period (days): 7

Maximum Residue Limit (mg/kg): 1.00

Additional NZ EPA controls by trade name: No additional controls

CHLORINE DIOXIDE

Trade Name Examples: Biospray

Agrichemical Group: n/a

***FRAC (Fungicide Resistance Action Committee mode of action number):** n/a

Registered on indoor tomato?: Yes

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): exempt - Max use 10ppm

Additional NZ EPA controls by trade name: Biospray: Maximum application rate: 0.02 kg ai/ha

CHLOROTHALONIL

Trade Name Examples: Amistar Opti, Barrack Betterstick, Barrachlor 720, Blizzard 720SC, Bravo Weather Stik, Cavalry, Cannon, Cobra, Folio Gold, Max Cl, Taratek 5F,Thalonil, Cleaner, Phatip plus

Agrichemical Group: Chloronitrile

***FRAC (Fungicide Resistance Action Committee mode of action number):** M5

Registered on indoor tomato?: Yes

Withholding Period (days): 7 to 14 days (depending upon product used)

Maximum Residue Limit (mg/kg): 5.00

Additional NZ EPA controls by trade name: Amistar Opti: Maximum application rate 1.25L product /ha, up to 4 applications / season with a minimum interval of 7 days between applications. Barrachlor 720: For wide dispersive (ie boom and airblast) - maximum application rates 2.5L/ha, 4 applications / year, minimum 7 day interval. For non wide dispersive: maximum rate rate 210 mL/ 100 m², 4 applications / year, minimum interval of 10 days between applications. Cannon: maximum rate 2 L/ha, 3 applications / season, minimum 14 day interval. Cobra: application rate 2 l substance per hectare, applied every 10-14 days, with no more than 4 applications per season. Max Cl: maximum application rate 4.0 litres per hectare, or 400 mL per 100 litres spray.

COPPER HYDROXIDE

Trade Name Examples: Blue Shield DF, Champ DP, Champ Flo, Kocide Opti, ManKocide DF

Agrichemical Group: Inorganic copper

***FRAC (Fungicide Resistance Action Committee mode of action number):** M1

Registered on indoor tomato?: Yes

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL

Additional NZ EPA controls by trade name: No additional controls

Caution: Can cause crop damage when multiple sprays are done

COPPER OXIDE

Trade Name Examples: Nordox 75 WG

Agrichemical Group: Inorganic copper

***FRAC (Fungicide Resistance Action Committee mode of action number):** M1

Registered on indoor tomato?: Yes

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL

Additional NZ EPA controls by trade name: No additional controls

Caution: Can cause crop damage when multiple sprays are done

COPPER OXYCHLORIDE

Trade Name Examples: Agpro Copper Oxychloride 800 WP, Fruitfed Copper Oxychloride, Oxi-Cup 50WG

Agrichemical Group: Inorganic copper

***FRAC (Fungicide Resistance Action Committee mode of action number):** M1

Registered on indoor tomato?: Yes

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL

Additional NZ EPA controls by trade name: No additional controls

Caution: Can cause crop damage when multiple sprays are done

COPPER SULPHATE

Trade Name Examples: Graphic biocide, Winter Clean-up

Agrichemical Group: Inorganic copper

***FRAC (Fungicide Resistance Action Committee mode of action number):** M1

Registered on indoor tomato?: No

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL

Additional NZ EPA controls by trade name: No additional controls

Caution: Can cause crop damage when multiple sprays are done

CYPRODINIL

Trade Name Examples: Switch, Evoke, Renovo, Savvy 500 SC, Scylla

Agrichemical Group: Anilinopyrimidine

***FRAC (Fungicide Resistance Action Committee mode of action number):** 9

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Savvy 500SC: Maximum application rate of 0.3 kg cyprodinil/ha, and 0.2 kg fludioxonil/ha per application, with a maximum application frequency of three applications per calendar year. Ground application only. Scylla: ground application only.

DIFENOCONAZOLE

Trade Name Examples: Cannon, Difference 250EC, Divino, Dyfen, Glacier, Score 250 EC, Emerald 10WG, Score 10 WG, Tallos

Agrichemical Group: Triazole

***FRAC (Fungicide Resistance Action Committee mode of action number):** 3

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Cannon: Maximum application rate 2 L/ha, up to 3 times / season, with a minimum of 14 days between applications. Difference 250EC, Divino, Dyfen, Glacier, Score 250EC, Score 10WG, Emerald 10WG and Tallos: No additional controls.

DIMETHOMORPH

Trade Name Examples: Acrobat MZ 690, Cobra, Sovrin Flo, Sphinx Fungicide, Zampro

Agrichemical Group: Cinnamic acid amide

***FRAC (Fungicide Resistance Action Committee mode of action number):** 40

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Cobra: Maximum application rate 2L of product /ha, no more than 4 applications per season, applied every 10-14 days. Zampro: maximum application rate 0.8 L/ha, up to 4 applications / year, with a minimum 7 days interval between applications. Acrobat MZ 690, Sovrin Flo, Sphinx Fungicide: no additional controls.

FLUOXAPIPROLIN

Trade Name Examples: Xivana Prime

Agrichemical Group: OSBPI

***FRAC (Fungicide Resistance Action Committee mode of action number):** 49

Registered on indoor tomato?: No (outdoor only)

Withholding Period (days): Off-label / 7 days TBC, see MRL below

Maximum Residue Limit (mg/kg): 0.1 (default), 0.09 tomatoes proposed

Additional NZ EPA controls by trade name: The maximum application rate for XIVANA is 1 L/ha (equivalent to 20 g fluoxapiprolin/ha), with a maximum frequency of three applications per year, and a minimum interval of seven days between applications.

FLUAZINAM

Trade Name Examples: Curalan, Gem Fungicide, Nando, Pinnacle, Shirlan, Nexus, Nexigro

Agrichemical Group: 2,6-dinitro-aniline

***FRAC (Fungicide Resistance Action Committee mode of action number):** 29

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.02

Additional NZ EPA controls by trade name: No other controls

FLUDIOXONIL

Trade Name Examples: Maxim, Switch, Wakil XL, Renovo, Nexus, Savvy 500 SC, Nexigro, Scylla, Fludio

Agrichemical Group: Phenylpyrrole

***FRAC (Fungicide Resistance Action Committee mode of action number):** 12

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Savvy 500SC: maximum application rate 0.3 kg cyprodinil/ha, and 0.2 kg fludioxonil/ha per application, maximum application frequency of 3 applications per calendar year. Ground application only. Scylla: ground application only.

FLUOPYRAM

Trade Name Examples: Luna Privilege

Agrichemical Group: Pyridinyl-ethylbenzamides

***FRAC (Fungicide Resistance Action Committee mode of action number):** 7

Registered on indoor tomato?: Yes

Withholding Period (days): 1

Maximum Residue Limit (mg/kg): 1.00

Additional NZ EPA controls by trade name: Maximum application rate 300 mL product /ha (equivalent to 150 g/ha of fluopyram), with a maximum of one application in any 365 day period, except when used in greenhouses on crops separated from the soil. Maximum application rate when used in greenhouses on crops separated from the soil is 600 mL product /ha (equivalent to 300 g/ha of fluopyram), maximum of two applications in any 365 day period, and a minimum interval between applications of seven days. REI 13 days for greenhouse use on fruiting vegetables.

IPRODIONE

Trade Name Examples: Ippon 500SC, Rapid 500, Rovral Aquaflo, Rovral WP

Agrichemical Group: Dicarboximide

***FRAC (Fungicide Resistance Action Committee mode of action number):** 2

Registered on indoor tomato?: Yes

Withholding Period (days): 3

Maximum Residue Limit (mg/kg): 5.00

Additional NZ EPA controls by trade name: No additional controls

KRESOXIM-METHYL

Trade Name Examples: Colliss

Agrichemical Group: Oximino-acetates

***FRAC (Fungicide Resistance Action Committee mode of action number):** 11

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: Colliss: Maximum application rate of 0.5L/ha, up to 3 applications/season at 14-21 day intervals. Application only by boom or hand held spray.

MANCOZEB

Trade Name Examples: Dithane Rainshield, Kotek, Max MZ, Ridomil Gold MZ WG, Supermanz, Mankocide DF, Acrobat MZ 690, Promanz, Penncozeb DF, Shotgun, Manzeb

Agrichemical Group: Dithiocarbamate

***FRAC (Fungicide Resistance Action Committee mode of action number):** M3

Registered on indoor tomato?: Yes

Withholding Period (days): 1, 2 or 3 days (depending upon product used)

Maximum Residue Limit (mg/kg): 7.00 {17} As carbon disulphide, for ethylenebis- or dimethyl- dithiocarbamates

Additional NZ EPA controls by trade name: Shotgun: Maximum application rate 3.6Kg/ha, maximum 5 applications / year, with a minimum 7 day interval between applications. Kotek: maximum application rate 40 L product/ha, maximum of 3 applications / year. Max MZ: Maximum application rate 100 L/ha, maximum 3 applications / year. Others No additional controls.

METALAXYL

Trade Name Examples: Max CI, Max MZ, Phytospear, Speartek, Ventura, Shotgun

Agrichemical Group: Acylalanines

***FRAC (Fungicide Resistance Action Committee mode of action number):** 4

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.05 {75} Metalaxyl, sum of isomers, including metalaxyl-M (mefenoxam)

Additional NZ EPA controls by trade name: Max CI: maximum application rate is 4.0 litres per hectare, or 400 mL per 100 litres spray. Max MZ: maximum application rate 100 L product/ha, maximum of 3 applications per year. Ventura: maximum application rate of 1200 g ai/ha, 1 application / season, OR 200 g ai/ha, a maximum of 3 applications / season, with a minimum of 10 days between applications. All others: No additional controls.

METALAXYL-M (Mefenoxam)

Trade Name Examples: Apron XL, Folio Gold, Ridomil Gold MZ WG, Ridomil Gold SL, Wakil XL

Agrichemical Group: Acylalanines

***FRAC (Fungicide Resistance Action Committee mode of action number):** 4

Registered on indoor tomato?: Yes

Withholding Period (days): 3

Maximum Residue Limit (mg/kg): 0.05 {75} Metalaxyl, sum of isomers, including metalaxyl-M (mefenoxam)

Additional NZ EPA controls by trade name: No additional controls

*REFER TO RESISTANCE MANAGEMENT (PAGE 5)

MINERAL OIL

Trade Name Examples: Excel Oil - Organic

Agrichemical Group: mineral oil

***FRAC (Fungicide Resistance Action Committee mode of action number):** NC: Not classified. Target site and code unknown.

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: No additional controls

Caution: Can cause serious crop damage when used in greenhouses

MYCLOBUTANIL

Trade Name Examples: Systhane 200EW, Validus 200EW

Agrichemical Group: Triazole

***FRAC (Fungicide Resistance Action Committee mode of action number):** 3

Registered on indoor tomato?: No

Withholding Period (days): Off-label: no WHP has been assessed

Maximum Residue Limit (mg/kg): 0.10

Additional NZ EPA controls by trade name: No additional controls

PHOSPHOROUS ACID/ INORGANIC PHOSPHOROUS

Trade Name Examples: Agri-Fos 600, Foschek, Phosgard, Phostemic

Agrichemical Group: Inorganic phosphorus/ Inorganic

***FRAC (Fungicide Resistance Action Committee mode of action number):** P 07

Registered on indoor tomato?: No

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL

Additional NZ EPA controls by trade name: No additional controls

POTASSIUM BICARBONATE

Trade Name Examples: Ecocarb, K-pow

Agrichemical Group: n/a

***FRAC (Fungicide Resistance Action Committee mode of action number):** n/a

Registered on indoor tomato?: Yes

Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs

Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL

Additional NZ EPA controls by trade name: No additional controls

*REFER TO RESISTANCE MANAGEMENT (PAGE 5)

PROCHLORAZ**Trade Name Examples:** Curator, Mirage 450 Fungicide, Octave, Sportak EW**Agrichemical Group:** Imidazole***FRAC (Fungicide Resistance Action Committee mode of action number):** 3**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** All others: No additional controls.**Caution:** Only prochloraz-Mn formulations can be used**PROCYMIDONE****Trade Name Examples:** Sumisclex 500SC**Agrichemical Group:** Dicarboximide***FRAC (Fungicide Resistance Action Committee mode of action number):** 2**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 1.00**Additional NZ EPA controls by trade name:** No additional controls**PROPAMOCARB****Trade Name Examples:** Proplant, Infinito**Agrichemical Group:** Carbamate***FRAC (Fungicide Resistance Action Committee mode of action number):** 28**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** Infinito: maximum application rate 1.6L/ha, 3 applications / season.
Proplant: No additional controls.**PYRACLOSTROBIN****Trade Name Examples:** Comet, Pristine**Agrichemical Group:** Methoxy-carbamates***FRAC (Fungicide Resistance Action Committee mode of action number):** 11**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** Pristine: maximum application rate 1.6 kg product/ha, up to 4 applications / year. Comet: No additional controls.**PYRIMETHANIL****Trade Name Examples:** Diva, Pyrus 400SC, Scala, Predict**Agrichemical Group:** Anilinopyrimidine***FRAC (Fungicide Resistance Action Committee mode of action number):** 9**Registered on indoor tomato?:** No**Withholding Period (days):** Off-label: no WHP has been assessed**Maximum Residue Limit (mg/kg):** 0.10**Additional NZ EPA controls by trade name:** No additional controls**Caution:** Can cause leaf damage under humid conditions**SULPHUR****Trade Name Examples:** Bio Blast Lime Sulphur, Fungisul 80 WP Zolfindustria, Kumulus DF, Microthiol Disperss, Nimbus, Organic Super Sulphur, Sulclean DF, Thiovit Jet, Unishield**Agrichemical Group:** Sulphur compound***FRAC (Fungicide Resistance Action Committee mode of action number):** M2**Registered on indoor tomato?:** Yes - Vegetable claim for some products**Withholding Period (days):** Not required: WHP is not required as the active is exempt from MRLs**Maximum Residue Limit (mg/kg):** Exempt: active is exempt from the requirements to set an MRL**Additional NZ EPA controls by trade name:** No additional controls**THIOPHANATE-METHYL****Trade Name Examples:** Taratek 5F, Topsin M-4A, Phartip plus**Agrichemical Group:** Thiophanate***FRAC (Fungicide Resistance Action Committee mode of action number):** 1**Registered on indoor tomato?:** Yes**Withholding Period (days):** 3 - 7 days (depending upon product used)**Maximum Residue Limit (mg/kg):** 2.00 {101} Sum of benomyl and/or thiophanate methyl and carbendazim, expressed as carbendazim**Additional NZ EPA controls by trade name:** No additional controls**Caution:** Does kill natural enemies of Pythium when used via irrigation**THIRAM****Trade Name Examples:** Thiram 40F, Thiram 80WDG**Agrichemical Group:** Dithiocarbamate***FRAC (Fungicide Resistance Action Committee mode of action number):** M3**Registered on indoor tomato?:** Yes**Withholding Period (days):** 3**Maximum Residue Limit (mg/kg):** 7.00 {17} As carbon disulphide, for ethylenebis- or dimethyl- dithiocarbamates**Additional NZ EPA controls by trade name:** Thiram 80 WDG: maximum application rate is 0.6 kg ai/ha, with a maximum of five applications per year and minimum interval of 7 days. Other - no additional controls.

TRIADIMENOL

Trade Name Examples: Luna Devotion
Agrichemical Group: Triazole
***FRAC (Fungicide Resistance Action Committee mode of action number):** 3
Registered on indoor tomato?: No
Withholding Period (days): Off-label: no WHP has been assessed
Maximum Residue Limit (mg/kg): 0.10
Additional NZ EPA controls by trade name: Maximum application rate 1L/ha, with a maximum of 2 applications / year, and a minimum interval of 30 days between applications.

TRICHODERMA ATROVIRIDE

Trade Name Examples: Sentinel, Tenet, Unite
Agrichemical Group: Fungus
***FRAC (Fungicide Resistance Action Committee mode of action number):** BM 02
Registered on indoor tomato?: Yes
Withholding Period (days): Not required: WHP is not required as the active is exempt from MRLs
Maximum Residue Limit (mg/kg): Exempt: active is exempt from the requirements to set an MRL
Additional NZ EPA controls by trade name: No additional controls

TRIFLOXYSTROBIN

Trade Name Examples: Luna Sensation
Agrichemical Group: Oximino-acetates
***FRAC (Fungicide Resistance Action Committee mode of action number):** 11
Registered on indoor tomato?: No
Withholding Period (days): Off-label: no WHP has been assessed
Maximum Residue Limit (mg/kg): 0.10
Additional NZ EPA controls by trade name: Maximum application rate 0.15L /ha, 2 applications / year, with a minimum 10 day interval between applications.

TRIFORINE

Trade Name Examples: Sapol
Agrichemical Group: Piperazines
***FRAC (Fungicide Resistance Action Committee mode of action number):** 3
Registered on indoor tomato?: Yes
Withholding Period (days): 3
Maximum Residue Limit (mg/kg): 2.00
Additional NZ EPA controls by trade name: No additional controls

NOTES



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