Capsicum and Chilli

Strategic Agrichemical Review Process (SARP)

April 2021

Hort Innovation
Project – VG18004

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VG18004 – Vegetable Strategic Agrichemical Review Process (SARP) Report Updates

SARP Service Provider:
Vasanthe Vithanage T/A Hortigrow Consulting

Purpose of the report:
This report was funded by Hort Innovation to investigate the pest problem, agrichemical usage and pest management alternatives for the Capsicum and Chilli industry across Australia. The information in this report will assist the industry with its agrichemical selection and usage into the future.

Date of report:
April 2021

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Communications Manager
Hort Innovation
Level 7, 141 Walker Street
North Sydney NSW 2060
Australia
Email: communications@horticulture.com.au
Phone: 02 8295 2300

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

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1. Summary

The strategic levy investment project Vegetable Industry SARP Report Updates (VG18004) is part of the Hort Innovation Vegetable Fund. A Strategic Agrichemical Review Process (SARP), through the process of a desktop audit and industry liaison;

(i) Assesses the importance of the diseases, insects and weeds (plant pests) that can affect a horticultural industry;

(ii) Evaluates the availability and effectiveness of fungicides, insecticides and herbicides (pesticides) to control the plant pests;

(iii) Determines any gaps in the pest control strategy and

(iv) Identifies suitable new or alternatives pesticides to address the gaps.

Alternative pesticides should ideally be selected for benefits of:

- Integrated Pest Management (IPM) compatibility
- Improved scope for resistance management
- Sound biological profile
- Residue and trade acceptance domestically and for export

The results of this process will provide the Capsicum and Chilli industry with sound pesticide usage for the future that the industry can pursue for registration with the manufacturer, or minor-use permits with the Australian Pesticide and Veterinary Medicines Authority (APVMA).

1.1 Diseases

The high priority diseases are:

Common name	Scientific name
Bacterial Spot	*Xanthomonas campestris pv. vesicatoria*
Powdery Mildew	*Leveillula taurica*
Internal Rot	*Alternaria alternata*, *Fusarium solani, F. oxysporum, F. subglutinans*, *Botrytis cinerea, Colletotrichum spp., Pectobacterium atrosepticum*

1.2 Insects, Mites and Other Pests

The high priority insect and mite pests are:

Common name	Scientific name
Green Peach Aphid	*Myzus persicae*
Queensland Fruit Fly	*Bactrocera tryoni*
Mediterranean Fruit Fly	*Ceratitis capitata*
Eggfruit Caterpillar	*Sceliodes cordalis*
Cotton Bollworm / Corn Earworm	*Helicoverpa armigera*
Native Budworm	*Helicoverpa punctigera*
Two-Spotted Mite	*Tetranychus urticae*
Broad Mite	*Polyphagotarsonemus latus*
Root-Knot Nematode	*Meloidogyne* spp.
Western Flower Thrips	*Frankliniella occidentalis*
Thrips	*Thysanoptera*

1.3 Weeds

The high priority weeds are:

Common Name	Scientific Name
Blackberry Nightshade	*Solanum nigrum*
Marshmallow	*Malva parviflora*
Pigweed	*Portulaca* spp.

2. The Australian Capsicum and Chilli Industry

The APVMA classifies capsicums as a major crop, and chillies as a minor crop.

The varieties referred to in this SARP are:

Crop Subgroup	Common Name	Scientific Name
Peppers VO 0051	Capsicums / Sweet Peppers	*Capsicum annuum, var. grossum* (L.)
	Chillies / Hot Peppers	*Capsicum annuum* (L.) & *Capsicum frutescens* (L.)

Capsicums and chillies are grown across most states of Australia, with the majority being grown in Queensland. The major outdoor growing regions for capsicum and chilli include Bowen and Bundaberg in Queensland, Carnarvon and Geraldton in Western Australia and Adelaide Plains in South Australia. Increasingly, volumes of capsicum and chilli are being grown year-round in high-tech greenhouses.

[1]For the year ending in 2020, Australia produced 71,718 tonnes of capsicums with a value of $213m. Australia is a net importer of capsicums and chillies, typically importing between 600 – 1500 tonnes every year, predominantly from New Zealand. For the year ending June 2020, Australia imported 695 tonnes whilst the exported amount was 506 tonnes.

For the year ending June 2020, 59% of exported fresh capsicums/chillies were sent to New Zealand. The rest of the exported countries include, Fiji (26%), New Caledonia (5%), Brunei (3%) and PNG (2%).

Fresh Capsicum Seasonality by State

State	19/20 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales (3%)	2,293												
Victoria (11%)	8,187												
Queensland (66%)	47,567												
Western Australia (8%)	5,581												
South Australia (9%)	6,300												
Tasmania (3%)	1,790												
Availability legend			High			Medium			Low			None	

[1]Hort Innovation (2020). Australian Horticulture Statistics Handbook 2019/20. [online] Available at: https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/ha18002-australian-horticulture-statistics-handbook-2019-20-vegetables.pdf

[2]For the year ending in 2020, Australia produced 2,092 tonnes of chillies with a value of $8.5m. Australia is a net importer of dried chillies. For the year ending June 2020, Australia imported 4871 tonnes ($ 23.2 m) whilst the exported amount was 224 tonnes ($1.8 m).
Due to Australia's varying weather conditions and the introduction of different varieties of capsicum and chilli, the Australian industry is now able to supply domestic markets with fresh capsicum and chilli throughout the year.

Fresh Chillies Seasonality by State

State	19/20 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales (1%)	31												
Victoria (5%)	104												
Queensland (72%)	1,506												
Western Australia (21%)	439												
Northern Territory (1%)	11												

[2] Hort Innovation (2020). Australian Horticulture Statistics Handbook 2019/20. [online] Available at: https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/ha18002-australian-horticulture-statistics-handbook-2019-20-vegetables.pdf

3. Introduction

3.1 Background

Growers of some horticultural crops suffer from a lack of legal access to crop protection products (pesticides). The problem may be that whilst a relatively small crop area is valuable in an agricultural sense, it may not be of sufficient size for Agrichemical companies to justify the expense of registering a product use on that crop. Alternately, the disease, pest, or weed problem may be regional or spasmodic, making Agrichemical companies unwilling to bear the initial high cost of registering suitable pesticides.

Growers may face severe losses from diseases, pests and weeds due to a lack of registered or approved (via a permit) chemical control tools.

Environmental concerns, consumer demands, and public opinion are also significant influences in the marketplace related to pest management practices. Industry IPM practitioners must strive to implement best management practices and tools to incorporate a pest management regime where strategies work in harmony with each other to achieve the desired effects while posing the least risks.

In combination with cultural practices, pesticides are important tools in capsicum and chilli production and respective IPM programs. They control the various diseases, insects and weeds that affect the crop and can cause severe economic loss in modern high intensity growing operations. Pesticides are utilised during establishment and development, and to maximise quality and customer appeal.

As a consequence of the issues facing the capsicum and chilli industry regarding pesticide access, Hort Innovation undertook a review of the pesticide requirements via a Strategic Agrichemical Review Process (SARP) in 2014. The current project is to update the SARP with the latest information and progress.

The SARP process identifies diseases, insect pests and weeds of major concern to the capsicum and chilli industry. Against these threats, available registered or permitted pesticides are evaluated for overall suitability in terms of IPM, resistance, efficacy, trade, human safety and environmental issues. Where tools are unavailable or unsuitable the process aims to identify potential future solutions. Potential new risks to the industry are also identified.

The results will provide the capsicum and chilli industry with a clear outlook of gaps in existing pest control options. This report is not a comprehensive assessment of ALL pests and control methods used in capsicum and chilli but attempts to prioritise the major problems.

Exotic plant pests, not present in Australia, are not addressed in this document. A biosecurity plan has been developed for the Vegetable Industry in consultation with industry, government and scientists. The Biosecurity Plan for the Vegetable Industry which covers capsicum and chilli outlines key threats to the industry, risk mitigation plans, identification and categorisation of exotic pests and contingency plans. High priority exotic pests have been assessed based on their potential to enter, establish, and spread in Australia (e.g. environmental factors, host range, vectors) and the cost to industry of control measures.
https://ausveg.com.au/app/uploads/2018/06/Industry-Biosecurity-Plan-for-the-Vegetable-Industry.pdf

3.2 Minor use permits and registration

From a pesticide access perspective, the APVMA classifies capsicum as a major crop and chilli a minor crop. The crop fits within the APVMA crop group Crop Group 012: Fruiting vegetables, other than Cucurbits.

Access to minor use permits can be difficult and permit requests need to be in accordance to the APVMA's minor use guidance (https://apvma.gov.au/node/10931).

Possible justification for future permit applications could be based on:

- New disease, insect or weed identified as a cropping issue
- No pesticide approved for the problem
- Insufficient options for resistance management
- Current pesticides ineffective due to resistance
- Trade risk - current pesticides unsuitable where crop commodities will be exported
- IPM, environment or OH&S issues
- Loss of pesticides due to removal from market or chemical review restrictions
- Opportunity to extrapolate a use pattern when a new, effective pesticide is registered in another crop
- Alternate pesticide has overseas registration or minor use permit
- Market failure – insufficient return on investment for registrant.

With each of these options, sound, scientific argument is required to justify any new permit applications. Another option for the capsicum and chilli industry is for manufacturers to register new pesticides uses in the crop.

3.3 Methods

The current update of the Capsicum and Chilli Strategic Agrichemical Review Process (SARP), which was last updated in 2014, was conducted by desktop audit using industry information gathered during 2011-2014 under MT10029 – Managing pesticide access in horticulture and finalised under VG12081 - Review of vegetable SARP reports. The process included gathering, collating and confirming information:

Hort Innovation Project Reference	Process of Review - Activity
VG16060 - Vegetable Agrichemical Pest Management Needs and Priorities (AUSVEG) - Commenced: 2 May 2017	Engagement and consultation with growers and other relevant stakeholders. Including; Online crop specific surveys, workshops and one on one consultation Nationally. Collation of information collected by commodity on applicable pests, diseases and weeds in order of priority.
MT17019 – Regulatory Support & Co-ordination (AKC)	**Capsicum and Chilli Agrichemical Regulatory Risk Assessment Document** To assist strategic planning, with respect to future pest management options, this document was developed as part of the Hort Innovation funded project MT17019 to highlight the regulatory threats to agrichemicals currently approved for the management of the pests and diseases in capsicum and chilli as well as current initiatives aimed at addressing identified pest management deficiencies.
VG18004 – Vegetable Strategic Agrichemical Review Process (SARP) Report Updates	**SARP updated via a desktop audit:** Review list of priorities ranked as high, moderate and low for each plant pest groups (disease, insects and weeds) – provided by VG16060 Identify industries pest priority gaps in order of importance Update current pesticides available via label registrations or minor use permits Update available pesticide use patterns, IPM ranking/compatibility, mode of action and chemical group. Identify pesticides at risk (under review and/or limited uses) via MT17019 Regulatory Support & Co-ordination – AKC consulting. Identify any appropriate solutions through the outcomes of the AgChem Forum's or similar market intelligence and their overall suitability (IPM compatibility, Chemical group to manage resistance, risk profile, existing domestic MRL's or global MRL's including any potential trade barriers, efficacy, OH&S, environmental safety and sustainability). Include known pesticide solutions that are currently under development with registrants for new uses in the nominated crops or in current Hort Innovation projects. Update MRL tables to include Australian MRL's, Codex and any applicable export market MRL's

3.4 Results and discussions

3.4.1 Detail

Results and discussions are presented in the body of this document.

3.4.2 Appendices

Refer to additional information in the appendices:

Appendix 1. Products available for disease control in capsicum and chilli
Appendix 2. Products available for control of insects and mites in capsicum and chilli
Appendix 3. Products available for weed control in capsicum and chilli
Appendix 4. Current permits for use in capsicum and chilli
Appendix 5. Capsicum and Chilli Maximum Residue Limits (MRLs)
Appendix 6. Capsicum and Chilli Agrichemical Regulatory Risk Assessment

4. Diseases, Pests and Weeds of Capsicum and Chilli

Resistance management: To manage the risk of resistance development, integrated disease/pest/weed management (IDM/IPM/IWM) strategies should be adopted. The general principle is to integrate diverse chemical and non-chemical strategies; maximise efficacy; not rely on singular tools and rotate between different modes of action. It is always essential to follow all the label instructions. Specific resistance management strategies may apply. These can be found, along with other useful information, on the CropLife Australia website. https://www.croplife.org.au/resources/programs/resistance-management/

Information on regulatory risk derived from project MT17019 (Chapter 4) - Regulatory support and coordination (Appendix 6) has been incorporated.

Some of the suggested options have no overseas MRLs (see Appendix 5). If treated fruit is to be exported nil residues at harvest would be needed for these options.

While care has been taken to ensure the accuracy of the information provided in this document the APVMA registered label and where relevant the APVMA approved permit must always be followed.

4.1 Diseases of capsicum and chilli

4.1.1 Disease priorities

Common name	Scientific name
High	
Bacterial Spot	*Xanthomonas campestris pv. vesicatoria*
Powdery Mildew	*Leveillula taurica*
Internal Rot	*Alternaria alternata*, *Fusarium solani, F. oxysporum, F. subglutinans*, *Botrytis cinerea, Colletotrichum spp., Pectobacterium atrosepticum*
Moderate	
Base Rot	*Sclerotium* spp.
Anthracnose	*Microdochium panattonianum*
Grey Mould (Botrytis Rot)	*Botrytis cinerea*
Capsicum Chlorosis Virus	CaCV
Cucumber Mosaic Virus	CMV
Tomato Mosaic Virus	TMV
Tomato Spotted Wilt Virus	TSWV
Low	
Damping Off	*Pythium* spp.*, Phytophthora* spp. *Fusarium* spp.*, Rhizoctonia* spp.
Bacterial Leaf Spot and Canker	*Pseudomonas syringae pv. syringae, Clavibacter michiganensis* ssp. *michiganensis*
Downy Mildew	*Peronospora* spp.
Fusarium *(Fusarium Spp.)*	*Fusarium* spp.
Irish (Late) Blight	*Phytophthora infestans*
Sclerotinia	*Sclerotinia* spp.
Septoria	*Septoria spp.*
Soft Rot	*Erwinia carotovora*
Target Spot (Early Blight)	*Alternaria solani*

The most important disease issues based on the feedback received were Bacterial Spot, Powdery Mildew and Internal Rot.

Some of the fungal and bacterial diseases that have received moderate to low priority have few options to suppress or control but should be supplemented by management practices that would increase airflow and minimise moisture in the plant canopy. Soil fumigation also helps in preventing some diseases such as Damping Off. The causal organisms may be carried on cutting knives or on residue in produce bins. Therefore, good farm hygiene is also important in preventing such occurrences.

Management methods that promote clean seeds and transplant material, early detection and disposal of infected seedlings would keep most of these diseases in check whilst eliminating alternative hosts, crop rotation, cover crops and farm hygiene are also important to prevent spread of these between sites. Taking precautions to prevent spread of disease from nursery to field would also help in this effort.

Resistance Management

Powdery Mildew[3] is considered to have a high risk of resistance development. In Australia there are confirmed cases of Powdery Mildew resistance to Group 8 Bupirimate, Group 11 Strobilurins and Group 3 Triadimenol.

While there are no specific disease resistance strategies that apply to capsicums and peppers, there are several strategies[4] that apply to similar crops (such as tomato) for Grey Mould, Powdery Mildew and Early Blight.

[3] www.croplife.org.au/resources/programs/resistance-management/tomato-powdery-mildew-2/
[4] www.croplife.org.au/resources/programs/resistance-management/

4.1.2 Available and potential products for priority diseases

TABLE KEY: Note that blank fields in the table indicate no information has been provided.

Availability		Regulatory risk (refer to Appendix 6)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Bacterial Spot (*Xanthomonas campestris* pv. *Vesicatoria*) **Priority: High**							
Capsicum: Bacterial spot was ranked as a high priority in QLD & WA and as a low priority in SA & VIC. Chilli: Bacterial spot was ranked as a high priority in QLD, WA & VIC. Bacterial Spot may be introduced in seed or in surviving undecomposed crop residue or other host plants. It can spread in water splash during wet, windy weather or by overhead irrigation. It can also disperse on insects, or on people or equipment moving through the crop.							
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	A	ALL	Registered in tomato, capsicum, chilli and several fruits for suppression of **Bacterial Spot.** [Max. no. of applications not specified; re-treatment interval 3-7 d]	-
Benzalkonum Chloride + Poly Hydrochloride (Microtech 7000)	-	Disinfectant	NR	A	ALL	Registered for disinfection of hard surfaces and equipment.	-
Bromo Chloro Methyl Hydantoin (BCDMH) Sanitiser	-	Sanitiser / Post-harvest treatment	NR	A	ALL	Registered in vegetables as a post-harvest treatment for external rot causing organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Chlorine	-	Sanitiser / Post-harvest treatment	NR	A	ALL	Registered in vegetables as a post-harvest treatment for bacteria and fungi. Post-harvest spray. Must make contact with the fruit for at least 30 seconds. Can also be used as a general disinfectant for equipment.	-
Copper	M1	Protective	1	A	ALL	Registered in capsicums (field) for control of **Bacterial Spot** and Bacterial Canker. Apply at first sign of disease. [Max. no. of applications not specified; re-treatment interval 7-14 d]	-
Copper PER14038	M1	Protective	1	A	ALL (excl. VIC)	Permitted for use in paprika and chilli (field) for control of **Bacterial Spot**. [Max. no. of applications not specified; re-treatment interval 7-14 d]	-
Iodine	M	Sanitiser / Post-harvest dip	NR	A	ALL	Registered in vegetables as a post-harvest treatment for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Peroxyacetic Acid	M	Sanitiser / Post-Harvest Treatment	NR	A	ALL	Registered in vegetables as a post-harvest treatment for control of bacterial growth. Spray fruit or submerge them in solution. Ensure a minimum contact time of 45 seconds.	-
Potassium Peroxomonosulfate Triple Salt (Virkon S)	-	Disinfectant	NR	A	ALL	Registered for disinfection of agricultural equipment and facilities.	-
Quarternary Ammonium Compound	-	Disinfectant	NR	A	ALL	Registered for sanitising farm equipment.	-
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protective		P		Registered in tomatoes for suppression of **Bacterial Spot** ***(Xanthamonas campestris)***, Bacterial Speck and Bacterial Canker.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Powdery Mildew (*Leveillula Taurica*) **Priority: High**							
Capsicum: Powdery mildew was ranked as a high priority in QLD, WA & SA and as a moderate priority in VIC. Chilli: Powdery mildew was ranked as a low priority in QLD, WA & VIC. The characteristic white, powdery growth occurs on plants infected by this fungus. Photosynthetic efficiency is reduced in affected leaves and fruit can be scarred and damaged, causing produce to be downgraded. Severe outbreaks can cause defoliation, exposing fruit to sunburn and predisposing them to secondary rots.							
Bupirimate (Nimrod)	8	Protective & Curative	1	A	ALL	Registered in capsicum and chilli for control of **Powdery Mildew**. [Max. 3 applications per crop; re-treatment interval 7-14 d]	-
Hydrogen Peroxide + Peroxy Acetic Acid (Peratec Plus)	M	Contact	1	A	ALL	Registered in peppers for control of **Powdery Mildew**. [Max. 4 applications per crop; re-treatment interval 5-7 d]	-
Penthiopyrad (Fontelis) Corteva	7	Protective & Curative	NR	A	ALL	Registered in capsicum and chilli for control of Early Blight, Grey Mould, and **Powdery Mildew**. [Max. 2 sequential applications per crop; re-treatment interval 7-10 d]	-
Potassium Bicarbonate (EcoCarb)	M2	Contact	NR	A	ALL	Registered in capsicums for control of **Powdery Mildew**. Begin spray at first sign of disease. [Max. no. of applications not specified; re-treatment interval 7-10 d]	-
Potassium Bicarbonate (EcoCarb) PER13695	M2	Contact	NR	A	ALL (excl. VIC)	Permitted in peppers for control of **Powdery Mildew**. Begin application at first sign of disease. [Max. no. of applications not specified; re-treatment interval 10-14 d]	-
Proquinazid (Talendo) Corteva	13	Protective	NR	A	ALL	Registered in capsicums (field grown only) for control of **Powdery Mildew**. [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7-14 d]	-
Sulphur	M2	Protective	NR	A	Variable refer to label	Registered in vegetables for control of **Powdery Mildew**, Rust, Tomato Russet Mite, Bean Spider Mite, and Two-Spotted Mite.	-
Tea Tree Oil	46	Protective	NR	A	ALL	Registered in capsicums for control of **Powdery Mildew**. Apply at first signs of infection. [Max. no. of applications not specified; re-treatment interval 7-10 d]	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Triadimenol (Bayfidan) Bayer	3	Protective & Curative	1	A	ALL	Registered in peppers (capsicums and chillies) for control of **Powdery Mildew**. [Max. 4 applications per crop; re-treatment interval 5-10 d]	-
Trifloxystrobin (Flint) BASF PER14050	11	Protective & Curative	3	A	ALL (excl. VIC)	Permitted for use in capsicums (peppers) (Protected cropping) for control of **Powdery Mildew**. [Max. 2 applications per crop; re-treatment interval 28 d]	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in tomato, capsicum, chilli and several fruits for suppression of Bacterial Spot**.** Permitted for use in eggplant for control of Alternaria, Botrytis, **Powdery Mildew** and suppression of Bacterial Spot.	-
ADM1700F Adama	TBC			P		Fungicide in development from Adama with **Powdery Mildew** activity	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of *Botrytis* in grapes and strawberries in Australia. US registration in peppers for control of **Powdery Mildew** (*Leveillula* spp., *Odiopsis* spp., *Erysiphe* spp., *Sphaerotheca* spp.)	-
BLAD (Problad Plus)	BM 01	Biological		P		Registered in stone fruit for control of Brown Rot and Blossom Blight. US registration for control of Grey Mould and **Powdery Mildew** in fruiting vegetables.	-
Cyflufenamid (Flute) AgNova	U6	Protective & Curative		P		Registered in cucurbits, grapevines and strawberries for control of **Powdery Mildew**.	-
Florylpicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New Mode of Action fungicide being developed in AU. Corteva claim activity on **Powdery Mildew**. Scheduled for JMPR evaluation in 2023.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Isofetamid (Kenja) ISK / AgNova	7	Protective & Curative		P		Registered in berries for control of Botrytis Grey Mould. US registration for control of Grey Mould, **Powdery Mildew** and Anthracnose in low-growing berries.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective & Curative		P		Registered in bananas for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot. US registration for use in almond, brassica leafy vegetables, legume vegetables, melons and various fruit crops for control of a variety of diseases including **Powdery Mildew**, Alternaria Leaf Spot, Gummy Stem Blight, *Septoria, Botrytis, Cladosporium, Cercospora, Sclerotinia*, Rust and Anthracnose and suppression of *Rhizoctonia*.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protective & Curative		P		Registered in apples for control of **Powdery Mildew**, Black Spot and *Alternaria*.	-
NUL3195 Nufarm	TBC			P		Fungicide in development from Nufarm with activity on **Powdery Mildew** and *Botrytis*.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protective & Curative		P		Registration pending in Australia for control of *Botrytis, Alternaria*, **Powdery Mildew** & Anthracnose in berries.	R3
Pyriofenone (Kusabi) ISK / AgNova	50			P		Registered for control of **Powdery Mildew** in cucurbits and grapes.	-
Azoxystrobin + Difenoconazole (Amistar top) Syngenta	3+11	Protective & curative		P		Registered in carrots for control of *Alternaria*, *Cercospora* and Powdery mildew; *Alternaria* and *Phytophthora* in potatoes; *Alternaria*, *Phytophthora*, *Sclerotinia* and **Powdery Mildew** in tomatoes.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Internal Rot (*Alternaria alternata, Fusarium solani, F. oxysporum, F. subglutinans, Botrytis cinerea, Colletotrichum spp., Pectobacterium atrosepticum*) **Priority: High**							
Capsicum: Internal Rot was ranked as a high priority in QLD and as a low priority in WA, SA & VIC. Chilli: Internal Rot was ranked as a low priority in QLD, WA & VIC. Causes of Internal Rot in capsicums are: Alternaria (*Alternaria alternata*), Fusarium (e.g. *Fusarium solani, F. oxysporum, F. subglutinans*), Botrytis (*Botrytis cinerea*), Anthracnose (*Colletotrichum* spp.), Bacterial Soft Rot (*Pectobacterium atrosepticum*). The disease is favoured by warm, humid conditions at flowering. Keeping the flowers dry by protected cropping and/or avoiding the use of overhead irrigation will reduce infections. Current research also indicates that the flowers and developing fruit can be protected by applying fungicides with a current Australian registration or permit for the pathogens listed above, especially when conditions favouring infection are expected. https://ahr.com.au/blog/pests-and-diseases/a-new-fact-sheet-on-internal-rot-in-capsicum-causes-and-control							
Boscalid (Filan) BASF	7	Protective & Curative	14	A	ALL	Registered in capsicums for control of Early Blight (***Alternaria solani***). [Max. 2 applications per crop; re-treatment interval 10-14 d]	-
Metiram (Polyram) BASF	M3	Protective	14	A	ALL	Registered in capsicums for control of Alternaria Leaf Spot and Cercospora Leaf Spot. Apply when disease symptoms first appear. [Max. no. applications not specified; re-treatment interval 7-10 d]	R2
Metiram + Pyraclostrobin (Aero) BASF	M3+11	Protective & Curative	28	A	All	Registered in capsicums for control of Early Blight (***Alternaria solani***). Use subject to CropLife resistance management strategy. [Max. 2 consecutive applications; re-treatment interval 10-14 d]	R2
Penthiopyrad (Fontelis) Corteva	7	Protective & Curative	1	A	ALL	Registered in capsicum and chilli for control of Early Blight (***Alternaria solani***), Grey Mould (***Botrytis***) and Powdery Mildew. Begin application prior to disease development. [Max. 3 applications per crop and max. of 2 consecutive applications; re-treatment interval 7-10 d]	-
Zineb	M3	Protective	7	A	ALL	Registered in capsicums for control of Early Blight (***Alternaria solani***) and Late Blight (Irish Blight). [Max. no. applications not specified; re-treatment interval 7 d]	R2
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in capsicum and chilli for suppression of Bacterial Spot. Registered for control of ***Botrytis*** in grapes and strawberries (field and protected) and ***Colletotrichum*** in tropical fruits.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Aureobasidium pullulans (Botector) Nufarm	-	Biological	NR	P		Registered for control of ***Botrytis*** in grapes and berries.	-
Azoxystrobin + Difenoconazole (Amistar Top) Syngenta	11+3	Protective & Curative		P		Registered in carrots for control of ***Alternaria***, *Cercospora* and Powdery Mildew; ***Alternaria*** and *Phytophthora* in potatoes; ***Alternaria***, *Phytophthora, Sclerotinia* and Powdery Mildew in tomatoes.	R3
Azoxystrobin + Oxathiapiprolin (Orondis) Syngenta	11+49	Protective & Curative		P		Registered in Brassica vegetables for the suppression of Sclerotinia Rot, ***Alternaria***, White Blister and control of Downy Mildew. [Max 3 applications per crop; re-treatment interval 7-14 d; subject to CropLife resistant management strategy]	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of ***Botrytis*** in grapes and strawberries. Registered in the USA in peppers for ***Alternaria, Botrytis*** & ***Colletotrichum***.	-
BLAD (Problad Plus)	BM 01	Biological		P		Registered for control of Brown Rot and Blossom Blight in stone fruit. US registration for control of Grey Mould and Powdery Mildew in fruiting vegetables.	-
DC-126 Bayer	TBC			P		New product from Bayer with ***Botrytis*** activity.	-
Fluazinam (Shirlan) Syngenta	29	Protective		P		Registered for control of Club Root in Brassica vegetables. US registration for control of *Sclerotinia* and ***Alternaria*** in carrots.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective & Curative		P		Registered in Australia for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for use in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops to control a variety of diseases including Powdery Mildew, **Alternaria Leaf Spot**, Gummy Stem Blight, Septoria, ***Botrytis***, *Cladosporium, Cercospora, Sclerotinia* and **Anthracnose** and suppression of *Rhizoctonia*.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protective & Curative		P		Registered for control of Powdery Mildew, Black Spot and ***Alternaria*** in apples.	-
Florylpicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New active in development from Corteva with activity on ***Alternaria*** spp. Scheduled for JMPR evaluation in 2023.	-
NUL3446 Nufarm	TBC			P		New active in development from Nufarm with activity on ***Alternaria*** spp.	-
SYNCUF29 Syngenta	TBC			P		New product from Syngenta with ***Botrytis*** activity.	-
Base Rot (*Sclerotium* spp.) **Priority: Moderate**							
Capsicum: Base rot was ranked as a moderate priority in QLD, WA & SA and as a low priority in VIC. Chilli: Base rot was ranked as a high priority in QLD, WA & VIC. Base Rot is a soil-borne fungus most active during cool, wet weather. It causes rots of the lower stem, roots & crown and can cause rot of fruit in contact with the soil. Practise crop rotation and plough in diseased crops immediately after harvest.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Fumigant	NR	A	ALL	Registered in vegetables for pre-planting control of Soil Borne Diseases including *Fusarium*, *Verticillium* Wilts, *Rhizoctonia* and *Pythium*. ***For use by professional and registered fumigators only.***	**-**
Dazomet (Basamid, Cerlong)	8F	Fumigant	NR	A	ALL	Registered as a pre-plant fumigant in seed beds for control of soil fungi including *Pythium*, *Phytophthora*, *Sclerotinia*, ***Sclerotium***, *Rhizoctonia*, *Verticillium*, *Plasmodiophora*, *Armillaria* and *Fusarium* spp. Apply granules to the soil surface and incorporate and seal the soil surface immediately. Do not plant into soil until a positive germination test has been conducted.	-
Metham Sodium	-	Fumigant	NR	A	ALL	Registered in food crops as a pre-plant fumigant for control of fungus diseases including *Rhizoctonia*, *Pythium*, *Fusarium*, *Phytophthora*, *Verticillium*, *Sclerotinia* and Club Root of crucifers. Applied as a soil injection, soil surface spray in front of a rotary tiller or through approved trickle irrigation systems.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Procymidone (Sumisclex) Sumitomo PER11440	2	Protective & Curative	9	P-A	ALL (excl. VIC)	Permitted for use in peppers for control of Sclerotinia Rot. Registered in onions for control of ***Sclerotium***.	R2
Azoxystrobin + Oxathiapiprolin (Orondis) Syngenta	11+49	Protective		P		Registered in bulb vegetables for suppression of ***Sclerotium***.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of *Botrytis* in grapes and strawberries in Australia. US registration in peppers for ***Sclerotium rolfsii***.	-
Quintozene (Terraclor) Amgrow	14	Protective		P		Registered in apple seedlings, peanuts and tomatoes for control of ***Sclerotium* spp**.	-
Anthracnose (*Microdochium panattonianum*) **Priority: Moderate**							
Capsicum: Anthracnose was ranked as a moderate priority in QLD & WA and as a low priority in SA & VIC. Chilli: Anthracnose was ranked as a moderate priority in QLD, WA & VIC. Anthracnose can be seed-borne and carry over on crop residue in the soil. It is spread in water droplets and is favoured by warm, humid weather. It is thought that protectants that target Downy Mildew and Botrytis will have some effect and post-harvest treatments would afford protection as well. Regular spraying and orchard hygiene are important to prevent crop damage.							
Chlorothalonil (Bravo)	M5	Protective	1	A	ALL	Registered in capsicums and peppers for control of Grey Mould and **Anthracnose**. [Max. no. of applications not specified; re-treatment interval 7-10 d]	R2
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P-A	ALL	Registered for suppression of Bacterial Spot in tomato, chilli and capsicum. Registered for control of **Anthracnose** in tropical fruits.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Copper	M1	Protective	1	P-A	ALL (excl. VIC)	Permitted in paprika and chilli for control of Bacterial Spot. Registered in cucurbits for control of Angular Leaf Spot, Bacterial Leaf Spot, Downy Mildew, **Anthracnose**, Gummy Stem Blight.	-
Aureobasidium pullulans (Botector) Nufarm	BM 02	Biological	NR	P		Registered in grapes and berries for control of *Botrytis* and suppression of several other fungal pathogens (**Anthracnose**, *Phomopsis* and *Rhizopus*) in berries.	-
BLAD (Problad Plus)	BM 01	Biological	NR	P		Registered for suppression of Brown Rot in stone fruit. US registration for control of Grey Mould and Powdery Mildew in fruiting vegetables and control of **Anthracnose** in grapes and strawberries.	-
Florylpicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New Mode of Action fungicide being developed in AU. Corteva claim activity on **Anthracnose**. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration use in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops for control of a variety of diseases including Powdery mildew, Alternaria leaf spot, Gummy stem blight, Septoria, *Botrytis, Cladosporium, Cercospora, Sclerotinia,* **Anthracnose** and suppression of Rhizoctonia.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered in Tropical and Sub-tropical Fruit for control of **Anthracnose** and Stem End Rot.	-
Isofetamid (Kenja) ISK / AgNova	7	Protectant & Curative		P	ALL	Registered in berries for control of Botrytis Grey Mould. US registration for control of Grey Mould, Powdery Mildew and **Anthracnose** in low-growing berries.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Grey Mould (*Botrytis cinerea*) **Priority: Moderate**							
Capsicum: Grey mould was ranked as a moderate priority in QLD, WA, SA & VIC Chilli: Grey mould was ranked as a low priority in QLD, WA & VIC. Grey Mould can impact on all crop stages. Affected parts are rapidly covered with a thick grey mould. *Botrytis* also causes secondary rots on fruit and vegetables in storage or transit.							
Aureobasidium pullulans (Botector) Nufarm	-	Biological	NR	A	ALL	Registered in fruiting vegetables for control of **Botrytis Grey Mould** and suppression of Sclerotinia. [Max. 5 applications per crop; re-treatment interval 7-10 d]	-
Captan PER14326	M4	Protective & Curative	7	A	All (excl. VIC)	Permitted for use in capsicum and chilli peppers (protected) for control of **Grey Mould**. [Max. 3 applications per crop; re-treatment interval 7-14 d]	-
Chlorothalonil (Bravo)	M5	Protective	1	A	ALL	Registered in capsicums and peppers for control of **Grey Mould** and Anthracnose. [Max. no. of applications not specified; re-treatment interval 7-10 d]	R2
Cyprodinil + Fludioxonil (Switch) Syngenta PER84878	9+12	Protective & Curative	7	A	All (excl. VIC)	Permitted for use in capsicum for control of **Botrytis Rot** and Sclerotinia Rot. [Max. 2 applications per crop; re-treatment interval not specified]	R3
Fenhexamid (Fenhexamid 500SC) Imtrade	17	Protective	1	A	All (excl. VIC)	Registered for use in peppers for control of **Botrytis Rot**. [Max. 2 sequential applications per crop; re-treatment interval 7-10 d]	-
Penthiopyrad (Fontelis) Corteva	7	Protective & Curative	NR	A	ALL	Registered in capsicum and chilli for control of Early Blight, **Grey Mould**, and Powdery Mildew. [Max. 2 sequential applications per crop; re-treatment interval 7-10 d]	-
Pyrimethanil (Scala) Bayer PER12565	9	Protective & Curative	3	A	All (excl. VIC)	Permitted for use in capsicum (protected) for control of **Grey Mould**. [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7-10 d]	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in tomato, capsicum, chilli and several fruits for suppression of Bacterial Spot**.** Registered in grapevines and strawberries for control of ***Botrytis***.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of ***Botrytis*** in grapes and strawberries in Australia. Registered in the USA in peppers for *Botrytis cinerea*.	-
BLAD (Problad Plus)	BM 01	Biological		P		Registered for control of Brown Rot and Blossom Blight in stone fruit. US registration for control of **Grey Mould** and Powdery Mildew in fruiting vegetables.	-
DC-126 Bayer	TBC			P		New product from Bayer with ***Botrytis*** activity.	-
Fenpyrazamine (Prolectus) Sumitomo	17	Protectant & Curative		P		Registered for ***Botrytis*** control in grapes. US registration for control of ***Botrytis*** for various crops.	-
Florylpicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New Mode of Action fungicide being developed in Australia. Corteva claims activity on ***Botrytis***. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective & Curative		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for use in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops for control of a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, ***Botrytis****, Cladosporium, Cercospora, Sclerotinia* and Anthracnose and suppression of Rhizoctonia.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered in pome fruit, stone fruit, almonds and tropical and sub-tropical fruit for the control of various diseases, including Powdery Mildew, Anthracnose and Alternaria. US registration for control of ***Botrytis*** in cherries, potatoes, pistachio, watermelon and wine grapes.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Isofetamid (Kenja) ISK / AgNova	7	Protectant & Curative		P		Registered in berries for control of ***Botrytis.***	-
NUL3195 Nufarm	TBC			P		Fungicide in development from Nufarm with activity on Powdery Mildew and ***Botrytis***.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registration pending in Australia for control of ***Botrytis****, Alternaria*, Powdery Mildew & Anthracnose in berries. US registration in fruiting vegetables for suppression of **Grey Mould**.	R3
SYNCUF29 Syngenta	TBC			P		New product from Syngenta with ***Botrytis*** activity.	-
Capsicum Chlorosis Virus (CaCV) **Priority: Moderate**							
Capsicum: Capsicum chlorosis virus (CaCV) was ranked as a moderate priority in QLD & SA, and as a low priority in WA & VIC. Chilli: Capsicum chlorosis virus was ranked as a moderate priority in QLD, WA & VIC. Viruses are transmitted by several aphid species in a non-persistent manner. A key aspect of virus disease management is to accurately identify the virus causing the disease and then implement appropriate management strategies which include crop rotation & use of resistant varieties. The weed species that harbour the virus and vectors that transmit the virus need to be controlled.							
Cucumber Mosaic Virus (CMV) **Priority: Moderate**							
Capsicum: Cucumber mosaic virus (CMV) as ranked as a moderate priority in QLD & SA, and as a low priority in WA & VIC. Chilli: Cucumber mosaic virus (CMV) was ranked as a moderate priority in QLD, WA & VIC. Viruses are transmitted by several aphid species in a non-persistent manner. A key aspect of virus disease management is to accurately identify the virus causing the disease and then implement appropriate management strategies which include crop rotation & use of resistant varieties. The weed species that harbour the virus and vectors that transmit the virus need to be controlled.							

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Tomato Mosaic Virus (TMV) **Priority: Moderate**							
Capsicum: Tomato mosaic virus (TMV) was ranked as a moderate priority in QLD & SA, and as a low priority in WA & VIC. Chilli: Tomato mosaic virus (TMV) was ranked as a moderate priority in QLD, and as a low priority in WA & VIC. Viruses are transmitted by several aphid species in a non-persistent manner. A key aspect of virus disease management is to accurately identify the virus causing the disease and then implement appropriate management strategies which include crop rotation & use of resistant varieties. The weed species that harbour the virus and vectors that transmit the virus need to be controlled.							
Tomato Spotted Wilt Virus (TSWV) **Priority: Moderate**							
Capsicum: Tomato spotted wilt virus (TSWV) was ranked as a moderate priority in QLD & SA, and as a low priority in WA & VIC. Chilli: Tomato spotted wilt virus (TSWV) was ranked as a moderate priority in QLD, and as a low priority in WA & VIC. Viruses are transmitted by several aphid species in a non-persistent manner. A key aspect of virus disease management is to accurately identify the virus causing the disease and then implement appropriate management strategies which include crop rotation & use of resistant varieties. The weed species that harbour the virus and vectors that transmit the virus need to be controlled.							
Damping Off (*Pythium* spp., *Phytophthora* spp., *Fusarium* spp*., Rhizoctonia* spp.) **Priority: Low**							
Capsicum: Damping off was ranked as a moderate priority in WA & SA and as a low priority in QLD, SA & VIC. Chilli: Damping off was ranked as a low priority in QLD, WA & VIC. Damping Off will attack seedlings at the 1-2 leaf stage, causing water-soaked lesions on the stem and roots. Severe infections can cause stunting and yellowing in older crops. Management strategies centre around general farm hygiene and cultural measures such as irrigation, drainage and nutrition.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Fumigant	NR	A	ALL	Registered in vegetables for pre-planting control of Soil Borne Diseases including ***Fusarium***, *Verticillium* Wilts, ***Rhizoctonia*** and ***Pythium***. ***For use by professional and registered fumigators only.***	**-**
Chloropicrin (Agrocelhone NE Soil Fumigant)	8	Fumigant	NR	A	ALL	Registered as a general fumigant to control nematodes, insects, ***Pythium***, ***Phytophthora***, ***Fusarium***, *and Verticillium.* Do not plant for 10 d after soil treatment.	-
Dazomet (Basamid, Cerlong)	8F	Fumigant	NR	A	ALL	Registered as a general fumigant to control nematodes, insects, weeds and soil fungi ***Pythium***, ***Phytophthora***, ***Fusarium,*** *and Verticillium.* Do not plant for 14- 42 d after soil treatment.	**-**

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Metalaxyl-M (Ridomil Gold 25G) Syngenta	4	Protective & Curative	7	A	QLD, NSW & WA	Registered in capsicums for control of ***Pythium* spp.** and ***Phytophthora* spp. (Damping Off**), Bacterial Spot and Bacterial Canker. Apply in a 30 cm wide band along the rows and incorporate into soil.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in vegetables for application to soil to improve bioavailability of soil resources to horticultural crops. US registration in peppers for the management of *Pythium* spp., ***Phytophthora* spp., *Fusarium* spp., *Rhizoctonia* spp.**	-
Amisulbrom (Amishield) Nufarm	21	Protective & Curative		P		Nufarm Amishield 500WG Fungicide (amisulbrom) is now registered for use in brassica vegetables against Club root and **Damping off** (Pythium spp. & **Phytophthora spp.**) (suppression) and potatoes (pink rot and powdery scab).	-
Azoxystrobin + Difenoconazole (Amistar Top) Syngenta	11+3	Protective & Curative		P		Registered in carrots for control of Alternaria, Cercospora and Powdery Mildew; Alternaria and **Phytophthora** in potatoes; Alternaria, **Phytophthora**, Sclerotinia and Powdery Mildew in tomatoes.	R3
Cyazofamid (Ranman) UPL/ISK	21	Protective & Curative		P		Registered in Brassica leafy vegetable seedlings for the control of Downy Mildew. US registration for control of **Damping Off (*Pythium* spp.)** in nursery stock, spinach and silverbeet.	-
Fludioxonil + Sedaxane (Vibrance Premium) Syngenta	12+7	Protective & Curative		P		Registered as a seed treatment for control of Black Scurf (**Rhizoctonia**), Silver Surf, Black Dot, Gangrene, Fusarium Dry Rot and suppression of Common Scab in potatoes.	R3
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective & Curative		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for use in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops to control a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, *Botrytis, Cladosporium, Cercospora, Sclerotinia* and Anthracnose and suppression of ***Rhizoctonia.***	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
NUL3163 Nufarm	TBC			P		New active in development from Nufarm with activity on ***Fusarium, Pythium & Rhizoctonia*.**	-
Streptomyces lydicus (Actinovate) Novozymes Bioag	BM 02	Biological		P		Registered in strawberries and tomato for control of ***Phytophthora*** and as a seed treatment in vegetables for control of ***Pythium*,** *Fusarium* and ***Rhizoctonia***.	-
Thiophanate-Methyl + Etridiazole (Banrot)	1+14	Systemic		P		Registered in container grown ornamentals and in ground bedding plants as a post plant soil drench for control of ***Pythium, Phytophthora, Rhizoctonia*** and *Thielaviopsis*.	-
Thiram + Thiabendazole (Evershield) UPL	1+M3	Protective & Curative		P		Registered in field & garden peas for control of Black Spot (*Mycosphaerella pinodes*) & Seedling Root Rots (***Fusarium, Pythium*** & *Macrophomina* spp.)	R2
Bacterial Leaf Spot & Canker (*Pseudomonas syringae* pv. *syringae, Clavibacter michiganensis* ssp. *michiganensis*) **Priority: Low**							
Capsicum: Bacterial leaf spot & Canker were ranked as a low priority in QLD, WA, SA & VIC. Chilli: Bacterial leaf spot & Canker were ranked as a low priority in QLD, WA & VIC. *P. syringae* can be moved by wind, rain, nursery material, mechanical equipment and pruning tools. Cultural management, host resistance, biological control with microbial antagonists are helpful in controlling this disease.							
Copper	M1	Protective	1	A	ALL	Registered in capsicums for control of **Bacterial Spot** and **Bacterial Canker**. [Max. no. of applications not specified; re-treatment interval 7-14 d]	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P-A	ALL	Registered for control Botrytis in strawberries and grapes, suppression of Bacterial Spot in tomato, chili and capsicum and control of Anthracnose and suppression of Stem End Rot in tropical fruits.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of *Botrytis* in grapes and strawberries in Australia. US registration in peppers for control of ***Pseudomonas* spp.**	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Downy Mildew (*Peronospora* spp.) **Priority: Low**							
Capsicum: Downy Mildew was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Downy Mildew was ranked as a low priority in QLD, WA & VIC. Management strategies include general farm hygiene, crop rotation, planting space (to allow air movement) and the use of protectant and curative fungicide spray applications when conditions favour disease outbreaks.							
Mancozeb + Metalaxyl-M (Ridomil Gold MZ WG) PER82456	M3 + 4	Protective & Curative	7	A	ALL (excl. VIC)	Permitted for use in peppers (field) for control of **Downy Mildew**. [Max. 2 consecutive applications per crop; re-treatment interval 7 d]	R2
Acibenzolar-S-methyl (Actigard Plant Activator) Syngenta	P01	Protective		P		Registered in tomatoes for the suppression of Powdery Mildew. US registration for the control of **Downy Mildew** in Brassica vegetables.	-
Cyazofamid (Ranman) UPL/ISK	21	Protective & Curative		P		Registered in Brassica leafy vegetable seedlings for the control of **Downy Mildew**.	-
Dimethomorph (Acrobat) BASF	40	Protective & Curative		P		Registered in cucurbits for control of **Downy Mildew**, Anthracnose, Gummy Stem Blight, Alternaria Leaf Spot, and Septoria Spot.	-
Dimethomorph + Ametoctradin (Zampro) AgNova/BASF	40+45	Protective	1	P	ALL	Registered in Australia for control of **Downy Mildew** in grape vines. The control of Downy mildew in bulb onion, spring onion, leafy vegetables including brassica leafy vegetables, cucurbits, beetroots are being added to the Zampro label following data generation via Hort Innovation strategic projects ST16006 and ST17000. BASF submitted June 2020	
Oxathiapiprolin (Zorvec Enicade) Corteva	49	Protective & Curative		P		Registered in cucurbits including melons and rockmelons for control of **Downy Mildew.**	-
Phosphorous Acid	33	Systemic		P		Registered in grapes for control of **Downy Mildew**.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fusarium (*Fusarium* spp.) **Priority: Low**							
Capsicum: Fusarium was ranked as a moderate priority in SA and as a low priority in QLD, WA & VIC. Chilli: Fusarium was ranked as a low priority in QLD, WA & VIC. Fusarium is a widespread soil-borne disease. Infected leaves show yellowing, curling and eventually wither and decay because of the compromised root system. Cultural controls include soil fumigation, crop rotation, farm hygiene and the use of resistant varieties.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Fumigant	NR	A	ALL	Registered in vegetables for pre-planting control of Soil Borne Diseases including ***Fusarium***, *Verticillium* Wilts, *Rhizoctonia* and *Pythium*. ***For use by professional and registered fumigators only.***	**-**
Chloropicrin (Agrocelhone NE Soil Fumigant)	-	Fumigant	NR	A	ALL	Registered in vegetables for pre-planting control of Soil-Borne Diseases, including ***Fusarium***, *Verticillium* Wilts, *Rhizoctonia* and *Pythium*. ***For use by professional and registered fumigators only.***	**-**
Dazomet (Basamid, Cerlong)	8F	Fumigant	NR	A	ALL	Registered as a general fumigant to control Nematodes, insects, weeds and soil fungi *Pythium, Phytophthora, **Fusarium**, and Verticillium.* Do not plant for 14- 42 d after soil treatment.	**-**
Metham Sodium	-	Fumigant	NR	A	ALL	Registered in food crops as a pre-plant fumigant for control of fungus diseases including *Rhizoctonia*, *Pythium*, ***Fusarium***, *Phytophthora*, *Verticillium*, *Sclerotinia* and Club Root of crucifers. Applied as a soil injection, soil surface spray in front of a rotary tiller or through approved trickle irrigation systems.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in vegetables for application to soil to improve bioavailability of soil resources to horticultural crops. US registration in peppers for the management of *Pythium* spp., ***Phytophthora* spp., *Fusarium* spp., *Rhizoctonia* spp.**	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P	ALL	Registered for control of *Botrytis* in grapes and strawberries. US registration in peppers for the control of *Pythium* spp., *Phytophthora* spp., ***Fusarium*** spp. and *Rhizoctonia* spp..	-
Fludioxonil + Sedaxane (Vibrance Premium) Syngenta	12+7	Protective & Curative		P		Registered as a seed treatment for control of Black Scurf (*Rhizoctonia*), Silver Scurf, Black Dot, Gangrene, **Fusarium** Dry Rot and suppression of Common Scab in potatoes.	R3
NUL3163 Nufarm	TBC			P		New active in development from Nufarm with activity on ***Fusarium,*** *Pythium & Rhizoctonia*.	-
Streptomyces lydicus (Actinovate) Novozymes Bioag	BM 02	Biological		P		Registered in strawberries and tomato for control of *Phytophthora* and as a seed treatment in vegetables for control of *Pythium*, ***Fusarium*** and *Rhizoctonia*. Apply prior to onset of disease season.	-
Thiram + Thiabendazole (Evershield) UPL	1+M3	Protective & Curative		P		Registered in field & garden peas for control of Black spot (*Mycosphaerella pinodes*) & Seedling root rots (***Fusarium****, Pythium* & *Macrophomina* spp.). Use as a liquid seed dressing.	R2
Irish (Late) Blight (*Phytophthora infestans*) **Priority: Low**							
Capsicum: Irish (Late) blight was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Irish (Late) blight was ranked as a low priority in QLD, WA & VIC. Irish Blight is a widespread soil-borne disease. It enters through the roots and the leaves of affected plants show yellowing, curling and eventually wither and decay because of the compromised root system. Cultural controls include crop rotation, farm hygiene and the use of resistant varieties.							
Chloropicrin (Agrocelhone NE Soil Fumigant)	8	Fumigant	NR	A	ALL	Registered as a general fumigant to control nematodes, insects, *Pythium,* ***Phytophthora****, Fusarium, and Verticillium.* Do not plant for 10 d after soil treatment.	-
Dazomet (Basamid, Cerlong)	8F	Fumigant	NR	A	ALL	Registered as a general fumigant to control Nematodes, insects, weeds and soil fungi *Pythium,* ***Phytophthora****, Fusarium, and Verticillium.* Do not plant for 14- 42 d after soil treatment.	**-**

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Metham Sodium	-	Fumigant	NR	A	ALL	Registered in food crops as a pre-plant fumigant for control of fungus diseases including *Rhizoctonia*, *Pythium*, *Fusarium*, ***Phytophthora***, *Verticillium*, *Sclerotinia* and Club Root of crucifers. Applied as a soil injection, soil surface spray in front of a rotary tiller or through approved trickle irrigation systems.	-
Phosphorous Acid PER81408	33	Protective	1	A	ALL (excl. VIC)	Permitted for use in capsicum (protected) for control of ***Phytophthora* spp.** [Max. 4 applications per crop; re-treatment interval 7 d]	**-**
Zineb	M3	Protective	7	A	ALL	Registered in capsicum for control of *Alternaria* (Early Blight) and **Late Blight** (Irish Blight). [Max. no. of applications not specified; re-treatment interval 7-10 d]	R2
Metalaxyl-M (Ridomil Gold 25G) Syngenta	4	Systemic	7	P-A	QLD, NSW & WA	Registered in capsicums for control of *Pythium* spp. and *Phytophthora* spp. (Damping Off), Bacterial spot and Bacterial canker.	-
Azoxystrobin + Difenoconazole (Amistar Top) Syngenta	11+3	Protective & curative		P		Registered in carrots for control of Alternaria, Cercospora and Powdery Mildew; Alternaria and ***Phytophthora*** in potatoes; Alternaria, ***Phytophthora***, Sclerotinia and Powdery Mildew in tomatoes.	R3
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of *Botrytis* in grapes and strawberries in Australia. Registered in the USA in peppers for the management of *Pythium* spp., ***Phytophthora* spp.,** *Fusarium* spp*., Rhizoctonia* spp.	-
Streptomyces lydicus (Actinovate) Novozymes Bioag	BM 02	Biological		P		Registered in strawberries and tomato for control of ***Phytophthora*** and as a seed treatment in vegetables for control of *Pythium*, *Fusarium* and *Rhizoctonia*. Apply prior to onset of disease season.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Sclerotinia (*Sclerotinia* spp.) **Priority: Low**							
Capsicum: Sclerotinia was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Sclerotinia was ranked as a low priority in QLD, WA & VIC. Sclerotinia tends to be a problem at canopy closure, particularly if plants have sustained mechanical injuries. Correct timing and good penetration of foliage with fungicides is essential for effective control. Crop rotation is critical to minimise the disease.							
Aureobasidium pullulans (Botector) Nufarm	-	Biological	NR	A	ALL	Registered in fruiting vegetables for control of Botrytis Grey Mould and suppression of **Sclerotinia**. [Max. 5 applications per crop; re-treatment interval 7-10 d]	-
Boscalid (Filan) BASF PER11127	7	Protective & Curative	14	A	ALL (excl. VIC)	Permitted for use in peppers for control of **Sclerotinia**. [Max. 2 applications per crop; re-treatment interval 7-14 d]	-
Cyprodinil + Fludioxonil (Switch) Syngenta PER84878	9+12	Protective & Curative	7	A	All (excl. VIC)	Permitted for use in capsicum for control of Botrytis rot & **Sclerotinia rot**. [Max. 2 applications per crop; re-treatment interval not specified]	R3
Iprodione (Rovral) PER14353	2	Protective & Curative	7	A	ALL (excl. VIC)	Permitted for use in peppers for control of **Sclerotinia**. [Max. 2 applications per crop; re-treatment interval 14 d]	R2
Procymidone (Sumisclex) Sumitomo PER11440	2	Protective & Curative	9	A	ALL (excl. VIC)	Permitted for use in peppers for control of **Sclerotinia Rot**. [Max. no. of applications not specified; re-treatment interval 10-14 d]	R2
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P-A	ALL	Registered for control Botrytis in strawberries and grapes, suppression of bacterial spot in tomato, chili and capsicum and control of Anthracnose and suppression of Stem end rot in tropical fruits. Registered in US for control of Botrytis, **Sclerotinia**, Xanthomonas and Erwina in grapes, strawberries, pome fruits, tree nuts, leafy vegetables & potatoes.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Azoxystrobin + Oxathiapiprolin (Orondis) Syngenta	11+49	Protective		P		Registered in bulb vegetables, Brassica vegetables, cucurbits, lettuce & leafy vegetables for control of **Sclerotinia**.	-
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protective & Curative		P		Registered in several vegetable crops including leafy vegetables (including spinach, silverbeet, kale, endive, mustard, cress chard, rocket, Asian leafy greens and Chinese cabbage), peas, beans, leafy vegetables and lettuce for control of ***Sclerotinia,*** *Botrytis* and other diseases.	R3
Fluazinam (Shirlan) Syngenta	29	Protective		P		Registered for control of Club Root in Brassica vegetables. US registration for control of **Sclerotinia** and Alternaria in carrots.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for use in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops for control of a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, *Botrytis, Cladosporium, Cercospora,* ***Sclerotinia*** and Anthracnose and suppression of *Rhizoctonia*.	R3
NUL3446	TBC			P		Fungicide in development from Nufarm with activity on ***Sclerotinia*** spp.	**-**
Septoria Spot (*Septoria* spp.) **Priority: Low**							
Capsicum: Septoria was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Septoria was ranked as a low priority in QLD, WA & VIC. Septoria Spot is favoured by cool and wet conditions, occurring mostly in autumn and winter. The fungus survives in several ways: it can survive on the old leaves removed at harvest, on weeds, and as spores on seed. The use of drip irrigation is recommended to reduce leaf wetness.							
Penthiopyrad (Fontelis) Corteva	7	Protective & Curative	NR	P-A	ALL	Registered in capsicum and chilli for control of Early Blight, Grey Mould, and Powdery Mildew. US registration for control of Septoria in fruiting vegetables, blueberries, leafy greens and tree nuts.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Metiram (Polyram) BASF	M3	Protective		P-A		Registered in capsicum, peppers & eggplant for control of Alternaria & Cercospora leaf spots. Registered in tomatoes for control of ***Septoria*** spp.	-
Dimethomorph (Acrobat) BASF	40	Protective & Curative		P		Registered in cucurbits for control of Downy Mildew, Anthracnose, Gummy Stem Blight, Alternaria Leaf Spot, and **Septoria Spot**.	-
Florylpicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New Mode of Action fungicide being developed in AU. Corteva claim activity on **Septoria**. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for use in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops for control of a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, **Septoria**, Botrytis, Cladosporium, Cercospora, Sclerotinia and Anthracnose and suppression of Rhizoctonia.	R3
Pydiflumetofen (Miravis) Syngenta	7	Protective		P		Registered in the USA for the control of **Septoria** in fruiting vegetables. No use in protected cropping.	-
Soft Rot (*Erwinia Carotovora*) **Priority: Low**							
Capsicum: Soft Rot was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Soft Rot was ranked as a low priority in QLD, WA & VIC. Soft Rot can occur in the field but is more common during storage and transport. Bacteria survive in crop debris and infect by water splash through damaged tissues. Maintaining good farm hygiene is an important control measure.							
Copper	M1	Protective & curative	1	A	ALL	Registered in capsicum for the control of **Bacterial Spots,** Canker & other fungal and bacterial diseases. Apply at first signs of infection. [Max no. of applications not specified; re-treatment interval 10-14 d]	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P-A	ALL	Registered for suppression of Bacterial Spot in tomato, chilli and capsicum and control of Anthracnose. US registration for control of *Botrytis, Sclerotinia, Xanthomonas* and ***Erwinia*** in grapes, strawberries, pome fruits, tree nuts, leafy vegetables & potatoes.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Target Spot / Early Blight (*Alternaria solani*) **Priority: Low**							
Capsicum: Target spot was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Target spot was ranked as a low priority in QLD, WA & VIC. Target Spot is an uncommon disease that can infect the leaves and fruit. Resistant varieties & disease-free or treated seed are recommended. Adequate nitrogen fertiliser generally reduces the rate of infection. Crop rotation, removal and burning of plant debris, if infected, and eradication of weed hosts help reduce the inoculum for subsequent plantings of susceptible crops.							
Boscalid (Filan) BASF	7	Protective & Curative	14	A	ALL	Registered in capsicums for control of **Alternaria** (Early Blight). [Max. 2 applications per crop; re-treatment interval 10-14 d]	-
Mancozeb	M3	Protective	14	A	ALL	Registered in capsicum for control of **Target Spot**. [Max. no. of applications not specified; re-treatment interval 7-10 d]	R2
Metiram + Pyraclostrobin (Aero) BASF	M3+11	Protective & Curative	28	A	ALL	Registered in capsicums and peppers for control of **Early Blight**. [Max. 2 applications per crop; re-treatment interval 10-14 days]	R2
Penthiopyrad (Fontelis) Corteva	7	Protective & Curative	NR	A	ALL	Registered in capsicum and chilli for control of **Early Blight**, Grey Mould, and Powdery Mildew. [Max. 2 sequential applications per crop; re-treatment interval 7-10 d]	-
Zineb	M3	Protective	7	A	ALL	Registered in peppers (field) for control of **Early Blight** and Late Blight. [Max. no. of applications not specified; re-treatment interval 7-10 d]	R2
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in tomato, capsicum, chilli and several fruits for suppression of Bacterial Spot**.** Permitted for use in eggplant for control of **Alternaria**, Botrytis, Powdery Mildew and suppression of Bacterial Spot.	-
Azoxystrobin + Difenoconazole (Amistar Top) Syngenta	11+3	Protective & curative		P		Registered in carrots for control of **Alternaria**, Cercospora and Powdery Mildew; **Alternaria** and Phytophthora in potatoes; **Alternaria**, Phytophthora, Sclerotinia and Powdery mildew in tomatoes.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Azoxystrobin + Oxathiapiprolin (Orondis) Syngenta	11+49	Protective & curative		P		Registered in Brassica vegetables for the suppression of Sclerotinia Rot, **Alternaria**, White Blister and control of Downy Mildew.	-
Fluazinam (Shirlan) Syngenta	29	Protective		P		Registered for control of Club Root in Brassica vegetables. US registration for control of Sclerotinia and **Alternaria** in carrots.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for use in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops for control of a variety of diseases including Powdery Mildew, **Alternaria Leaf Spot**, Gummy Stem Blight, Septoria, Botrytis, Cladosporium, Cercospora, Sclerotinia and Anthracnose and suppression of Rhizoctonia.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protective		P		Registered for control of Powdery Mildew, Black Spot and **Alternaria** in apples.	-
Florylpicoxamid (Adavelt) Corteva	21	Protective & curative		P		New active in development from Corteva with activity on ***Alternaria* spp**. Scheduled for JMPR evaluation in 2023.	-
NUL3446 Nufarm	TBC			P		New active in development from Nufarm with activity on ***Alternaria*** spp.	-

4.2 Insects, mites and other pests of capsicum and chilli

4.2.1 Insects, mites and other pest priorities

Common name	Scientific name
High	
Green Peach Aphid	*Myzus persicae*
Queensland Fruit Fly	*Bactrocera tryoni*
Mediterranean Fruit Fly	*Ceratitis capitata*
Eggfruit Caterpillar	*Sceliodes cordalis*
Cotton Bollworm / Corn Earworm	*Helicoverpa armigera*
Native Budworm	*Helicoverpa punctigera*
Two-Spotted Mite	*Tetranychus urticae*
Broad Mite	*Polyphagotarsonemus latus*
Root-Knot Nematode	*Meloidogyne* spp.
Western Flower Thrips	*Frankliniella occidentalis*
Thrips	Thysanoptera
Moderate	
Tomato Russet Mite	*Aculops lycopersici*
European Red Mite	*Panonychus ulmi*
Rust Mite	*Eriophyidae*
Silverleaf Whitefly	*Bemisia tabaci*
Greenhouse Whitefly	*Trialeurodes vaporariorum*
Green Mirids	*Creontiades dilutus*
Green Vegetable Bug	*Nezara viridula*
Rutherglen Bug	*Nysius vinitor*
Cutworms	*Agrotis* spp.
Cluster Caterpillar	*Spodoptera litura*
Leafhoppers / Jassids	*Cicadellidae*

Common name	Scientific name
Low	
Black Field Cricket	*Teleogryllus commodus*
Mole Cricket	*Gryllotalpa* spp.
Cucumber Fly	*Bactrocera cucumis*
Grasshoppers	Orthoptera
Lace Bugs	*Corythucha* spp.
Tomato Leafminer / Potato Moth	*Phthorimaea operculella*
Looper Caterpillars	*Chrysodeixis* spp.
Mealybugs	*Pseudococcidae*
Vegetable Weevil	*Listroderes difficilis*

Non-ranked pests and new incursions of an exotic pest which poses a potential threat.

Common name	Scientific name
Fall Armyworm	*Spodoptera frugiperda*
Fungus Gnats	*Bradysia* spp., *Sciaridae*
Tomato Potato Psyllid	*Bactericera cockerelli*
Vegetable Leaf Miner	*Liriomyza sativae*
Serpentine Leaf Miner	*Liriomyza huidobrensis*
American Serpentine Leaf Miner	*Liriomyza trifolii*

The feedback received from the different states ranked several insects as high priority pests. Available and potential products for these high priority insects and mites are in Section 4.2.2.

Resistance to some insect groups has reduced control options despite a range of actives registered. Growers should not exceed the maximum number of applications permitted on the insecticide label.

Aphids are pests across many vegetables and specific resistance management strategies exist for aphids[5].

[5] https://www.croplife.org.au/resources/programs/resistance-management/various-cottonmelon-aphid-and-green-peach-aphid/

4.2.2 Available and potential products for priority insects and mites

TABLE KEY: Note that blank fields in the table indicate no information has been provided.

Availability		Regulatory risk (refer to Appendix 6)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG
IPM – indicative overall impact on beneficials (based on the Cotton Pest Management Guide 2018-19 and cotton use patterns)			
VL – Very low; L – Low; M – Moderate; H – High; VH – Very High; - not specified			

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Green Peach Aphid (*Myzus persicae*) **Priority: High**								
Capsicum: Green Peach Aphid were ranked as a high priority in QLD, WA, SA & VIC. Chilli: Green Peach Aphid were ranked as a high priority in QLD, WA & VIC. Green Peach Aphids suck on sap, causing loss of vigour, and in some cases yellowing, stunting or distortion of plant parts. Honeydew secreted by the insects can cause sooty mould to develop on leaves. Aphids can also be vectors for viruses.								
Afidopyropen (Versys) BASF	9D	Ingestion	1	A	ALL	Label extension in April 2021 now includes protected cropping situations for Fruiting vegetables and Cucurbits and PER87852 will be surrendered. Registered in fruiting vegetables for control of **Green Peach Aphid**, Cabbage Aphid, Currant Lettuce Aphid, Cotton/Melon Aphid, Corn aphid & suppression of Silverleaf Whitefly.	L L-Bees	-
Afidopyropen (Versys) PER87852 *Use now registered in protected cropping and permit to be surrendered	9D	Ingestion	3	A	ALL	Permitted for use in cucumber, capsicum & eggplant (protected cropping situations) for control of **Green Peach Aphid**, Melon Aphids and suppression of Silverleaf Whitefly. Versys label extension in April 2021 now covers protected cropping and permit will be surrendered.	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, **Green Peach Aphid** & Two-Spotted Spider Mites. [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Ingestion	NR	A	ALL	Registered in capsicums for control of Cotton Bollworm, Native Budworm, Potato Moth, Cluster Caterpillar, **Green Peach Aphid**, Silverleaf Whitefly, Greenhouse Whitefly, Western Flower Thrips, and Tomato Thrips. [Max. no. of applications and re-treatment interval not specified]	M VH-Bees	R2
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER87051	28+4A	Ingestion	35 NG	A	QLD (within Wide Bay Burnett region)	Permitted for use as a single post plant chemigation in cucurbits & fruiting vegetables including capsicum and chilli (field & protected) for control of Diamondback Moth, Cabbage White Butterfly, Corn Earworm, Native Budworm, Cabbage Centre Grub, Cabbage Cluster Caterpillar, Cluster Caterpillar, Cabbage Aphid, **Green Peach Aphid**, Silverleaf Whitefly – all biotypes, Greenhouse Whitefly, Western Flower Thrips, Green Vegetable Bug, Potato Moth, Tomato Thrips, Brown Sowthistle Aphid, Vegetable Leafhopper, Lucerne Leafroller, Leafhoppers (Jassids), Onion Thrips and Psyllids. [Max. 1 application per crop]. PER87051 is held by Bundaberg Fruit & Vegetable Growers Cooperative and applicable only to QLD growers in Wide Bay Burnett region.	M VH-Bees	R2
Cyantraniliprole (Benevia) FMC	28	Ingestion	1	A	ALL	Registered in fruiting vegetables including capsicum for control of Silverleaf Whitefly, Cotton Bollworm, Native Budworm, Tomato Leaf Miner and suppression of **Green Peach Aphid**, Tomato Thrips and Western Flower Thrips. [Max. 2 applications per crop; re-treatment interval 7-10 d]	M VH-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dimethoate	1B	Contact	3	A	ALL	Registered in capsicum for control of **Aphids**, Jassids, Mites, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1
Emulsifiable Botanical Oil (Eco-Oil)	-	Contact	NR	A	ALL	Registered in capsicums for control of Two-Spotted Mite and **Aphids**. [Max 2 applications per crop; re-treatment interval 3-5 d]	L L-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, **Aphids**, Caterpillars, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Imidacloprid (Confidor)	4A	Contact	7	A	ALL	Registered in capsicums for control of **Green Peach Aphid**. [Max no. of applications and re-treatment interval not specified]	M M-Bees	R2
Imidacloprid (Confidor) PER12489	4A	Contact	7	A	ALL (excl. VIC)	Permitted for use in peppers for control of **Green Peach Aphid**, Green House Whitefly and suppression of Plague Thrips & Onion Thrips. [Max 2 applications per crop; re-treatment interval not specified]	M M-Bees	R2
Petroleum Oil	UN	Contact	1	A	ALL (excl. QLD)	Registered in peppers for control of **Aphids**, Mites, Thrips & Leafhopper. [Max. 4 applications per season; re-treatment intervals not specified]	VL L-Bees	
Pirimicarb (Aphidex) Adama	1A	Contact	2	A	ALL	Registered in capsicum for control of **Aphids**. [Max. no. of applications not specified; re-treatment 5-10 d]	VL VL-Bees	R3
Phorate (Thimet) PER8930	1B	Contact	70	A	ALL	Permitted for use in peppers for control of **Aphids**, Jassids, Mites, Thrips & Onion Maggot. [Max. 1 applications per year].	H H-Bees	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of **Aphids**, Thrips, Mealybug, Two Spotted Mite, Spider-Mite and Whitefly. Apply mornings or evenings when temperatures are cooler. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Pymetrozine (Chess) Syngenta	9B	Contact & Ingestion	14	A	ALL	Registered in capsicum for control of Potato Aphid, **Green Peach Aphid** and suppression of Silver Leaf & Greenhouse White Flies. Apply before aphid population reaches high levels. [Max 2 applications per season; re-treatment interval 7 d].	L VL-Bees	R3
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of **Aphids**, Thrips, Caterpillars, Ants, Earwigs, White Flies & Leafhoppers. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, **Aphids**, Thrips, Caterpillars, Leaf Hoppers & Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-
Spirotetramat (Movento) Bayer	23	Ingestion	1	A	ALL	Registered in capsicum and chilli for control of Silverleaf Whitefly, Green Peach **Aphids** & Western Flower Thrips. Uses subject to CropLife resistance management strategies. [Max 3 applications per crop; re-treatment interval 7 d]	M VL-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in capsicum for control of **Green Peach Aphid**, Greenhouse Whitefly, Rutherglen Bug and Tomato Potato Psyllid. Do not use if honeybees are foraging. [Max. no. of applications not specified; re-treatment interval 7-10 d].	M VH-bees	-
Clothianidin + Imidacloprid (Poncho Plus) BASF	4A	Contact		P		Registered in sweet corn, sunflower, canola and forage brassica for control of Wireworms, Cutworms and **Aphids**.	M VH-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dimpropyridaz (Axalion) BASF	TBC			P		BASF has applied for registration to control Whitefly, **Aphids** and Thrips in leafy vegetables, brassica vegetables and fruiting vegetables, including cucurbits. Pending regulatory approvals, first market introduction in Australia is expected by late 2022 or early 2023.	-	-
Flonicamid (Mainman) UPL/ISK	29	Systemic		P		Registered in cucurbits for control of **Aphids** and Silverleaf White Fly; **Aphids** in potatoes; **Aphids** and Mealybugs in apples and pears; Aphids and Mirids in cotton. Hort Innovation is undertaking trials in bulb vegetables in support of a permit for Thrips control.	M L-Bees	-
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of Leafhoppers, **Aphids** and Whiteflies in brassica vegetables. Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and **Aphids** in cucurbits and potatoes.	L VL-Bees	-
Novaluron + Acetamiprid (Cormoran) Adama	4A+15	IGR / Ingestion		P		Registered for control of **Green Peach Aphid** and Black Peach Aphid in stone fruits.	M M-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Queensland Fruit Fly (*Bactrocera tryoni*) **Mediterranean Fruit Fly** (*Ceratitis capitata*) **Priority: High**								
Capsicum: Fruit flies were ranked as a high priority in QLD & WA, as a moderate priority in VIC and as a low priority in SA. Chilli: Fruit flies were ranked as a high priority in QLD, WA & VIC. There are both native & exotic fruit flies in Australia. Fruit flies usually attacks fruits and cause rots and discolouration. Eggs are laid close to the surface inside the fruit with small, discoloured patches developing because of the stings. Interstate quarantine restrictions are in place to prevent further spread of Mediterranean and Queensland fruit flies.								
Alpha-Cypermethrin PER80099	3A	Contact & ingestion	1	A	ALL (excl. VIC)	Permitted for use in fruiting vegetables except cucumber for control of **Fruit Flies**. [Max 3 applications per crop; 2 consecutive; re-treatment interval 7 d].	VH H-Bees	-
Bifenthrin (Talstar) PER13567	3A	Contact	1	A	QLD (Bowen & Gumlu)	Permitted for use in capsicums for control of **Fruit Flies**. [Max 4 applications per crop; re-treatment interval 10 d].]	VH H-Bees	R3
Clothianidin (Samurai) Sumitomo PER80100	4A	Contact	7 NG	A	ALL	Permitted for use in fruiting vegetables except cucumber for control of **Fruit Flies**. [Max 2 applications per crop; re-treatment interval 7 d]	M VH-Bees	R2
Dimethoate	1B	Contact	3	A	NSW, QLD & WA	Registered in capsicum for control of Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and **Fruit Fly** (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1
Maldison	1B	Contact	3	A	ALL	Registered in capsicum for control of **Fruit Fly**. [Max. 4 applications per crop; re-treatment interval 5 d]	H H-Bees	-
Methomyl (Lannate) PER13566	1A	Contact	1	A	QLD (Bowen & Gumlu)	Permitted for use in capsicums for control of **Fruit Flies**. [Max 6 applications per crop; re-treatment interval 10 d].	H H-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spinosad (Naturalure)	5	Ingestion	NR	A	ALL	Registered as a bait solution in fruit trees and vegetables for control of **Fruit Flies**. [Max no. of applications not specified; re-treatment interval 7 d]	L L-Bees	-
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL (excl. TAS)	Registered in capsicum (field only) for control of **Fruit Flies**; in vegetables for control of Green Vegetable Bug, and Rutherglen Bug (All States). Apply at first sight of infestation. [Max no. of applications not specified; re-treatment interval 7-10 d].	H H-Bees	R2
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in capsicum for the control of *Helicoverpa*, Potato Moth and Western Flower Thrip. Permitted in berries and pome and stone fruit for suppression of **Queensland Fruit Fly**, Lesser Queensland Fruit Fly and **Mediterranean Fruit Fly**.	M H-Bees	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Ingestion/ IGR		P		Registered for suppression of **Queensland Fruit Fly** in avocado, citrus and mango.	M H-Bees	-
Novaluron + Acetamiprid (Cormoran) Adama	15+4A	Contact & stomach		P		Registered for control of **Mediterranean Fruit Fly** and suppression of **Queensland Fruit Fly** in stone fruit.	M M-Bees	R2
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, **Fruit Fly** and Thrips.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Eggfruit Caterpillar (*Sceliodes cordalis*) **Priority: High**								
Capsicum: Eggfruit Caterpillar was ranked as a high priority in QLD & WA, and as a low priority in SA & VIC. Chilli: Eggfruit Caterpillar was ranked as a high priority in QLD, WA & VIC. Eggfruit Caterpillar is active all year in warm areas but has a winter diapause in cold climates. Larvae damage the fruit, making extensive tunnels. Cultural controls involve the removal of susceptible weeds such as Thornapple and other solanaceous species and ploughing in of crop residues soon after harvest.								
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	A	ALL	Registered in capsicum for control of Cotton Bollworm (*Helicoverpa*), Tomato Leaf Miner and **Eggfruit Caterpillar**. [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7 d]	L VL-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, **Caterpillars**, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of Aphids, Thrips, **Caterpillars**, Ants, Earwigs, White Flies & Leafhoppers. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, **Caterpillars**, Leaf Hoppers & Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3	P-A	ALL	Registered in capsicums for control of *Helicoverpa* and Cluster Caterpillar.	M H-Bees	-
Indoxacarb (Avatar) FMC	22A	Ingestion	3	P-A	ALL	Registered in capsicums for control of *Helicoverpa* and Potato Moth.	L H-Bees	R3
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Ingestion	3 NG	P-A	ALL	Registered in capsicum and chilli for control of *Helicoverpa* spp. and Tomato Leaf Miner.	M M-Bees	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Methoxyfenozide (Prodigy) Corteva	18	Insect growth regulator	NR	P-A	ALL	Registered in capsicum and chilli for control of Native Budworm, Tomato Grub and Cluster Caterpillar.	VL VL-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in capsicum for the control of *Helicoverpa*, Potato Moth and Western Flower Thrip.	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	P-A	ALL	Registered in fruiting vegetables including peppers, eggplant & sweet corn for control of Potato Moth, *Helicoverpa* & Western Flower Thrips. Registered in Brassica vegetables for control of various **Lepidoptera** including Cabbage Centre Grub, Cabbage Cluster Caterpillar, Cabbage White Butterfly, Loopers & Diamondback Moth.	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on **Lepidoptera**, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**.		-
Cotton Bollworm (*Helicoverpa armigera*) **Native budworm** (*Helicoverpa punctigera*) **Priority: High**								
Capsicum: *Helicoverpa* was ranked as a high priority in QLD & WA, as a moderate priority in SA and as a low priority in VIC. Chilli: *Helicoverpa* was ranked as a high priority in QLD, WA & VIC. *Helicoverpa armigera* is generally regarded as the more serious pest because of its greater capacity to develop resistance to insecticides, broader host range, and persistence in cropping areas from year to year. Larvae feed on leaves but are most damaging when feeding on growing terminals, buds, flowers & fruit. Damage also occurs through bud/fruit shedding and reduced quality.								
Amorphous Silica (Abrade)	-	Contact	NR	A	ALL	Registered in vegetables for control of ***Helicoverpa*** and Cluster Caterpillars. [Max. 2 applications per crop; re-treatment interval 6-7 d]	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Bacillus thuringiensis subsp. kurstaki (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of **Caterpillars** including Armyworm, Cotton Bollworm, Native Budworm, Cabbage Moth, Cabbage White Butterfly, Green Looper, Lightbrown Apple Moth, Pear Looper, Soybean Looper, Vine Moth, and Tobacco Looper**.** [Apply a minimum of 2 sprays, 3 d apart; re-treatment interval 3-5 d]	VL L-Bees	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	A	ALL	Registered in capsicum for control of **Cotton Bollworm (*Helicoverpa*),** Tomato Leaf Miner and Eggfruit Caterpillar. [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7 d]	L VL-Bees	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Ingestion	NR	A	ALL	Registered in capsicums for control of **Cotton Bollworm**, **Native Budworm**, Potato Moth, Cluster Caterpillar, Green Peach Aphid, Silverleaf Whitefly, Greenhouse Whitefly, Western Flower Thrips, and Tomato Thrips. [Max. no. of applications and re-treatment interval not specified]	M VH-Bees	R2
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER87051	28+4A	Ingestion	35 NG	A	QLD (within Wide Bay Burnett region)	Permitted for use as a single post plant chemigation in cucurbits & fruiting vegetables including capsicum and chilli (field & protected) for control of Diamondback Moth, Cabbage White Butterfly, **Corn Earworm**, **Native Budworm**, Cabbage Centre Grub, Cabbage Cluster Caterpillar, Cluster Caterpillar, Cabbage Aphid, Green Peach Aphid, Silverleaf Whitefly – all biotypes, Greenhouse Whitefly, Western Flower Thrips, Green Vegetable Bug, Potato Moth, Tomato Thrips, Brown Sowthistle Aphid, Vegetable Leafhopper, Lucerne Leafroller, Leafhoppers (Jassids), Onion Thrips and Psyllids. [Max. 1 application per crop]. PER87051 is held by Bundaberg Fruit & Vegetable Growers Cooperative and applicable only to QLD growers in Wide Bay Burnett region.	M VH-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cyantraniliprole (Benevia) FMC	28	Ingestion	1	A	ALL	Registered in fruiting vegetables including capsicum for control of Silverleaf Whitefly, **Cotton Bollworm**, **Native Budworm,** Tomato Leaf Miner and suppression of Green Peach Aphid, Tomato Thrips and Western Flower Thrips. [Max. 2 applications per crop; re-treatment interval 7-10 d]	M VH-Bees	-
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3	A	ALL	Registered in capsicums for control of ***Helicoverpa*** and Cluster Caterpillar. Apply when pests first appear. Use subject to CropLife resistance management strategy. [Max. 4 applications per crop; re-treatment interval not specified]	M H-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	A	ALL	Registered in fruiting vegetables including capsicum for the control of ***Helicoverpa*** and Tomato Leaf Miner [Max. 3 applications per crop; re-treatment interval 7-14 d]	L-M L-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, **Caterpillars**, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Indoxacarb (Avatar) FMC	22A	Ingestion	3	A	ALL	Registered in capsicums for control of ***Helicoverpa*** and Potato Moth. [Max. no. of applications not specified; re-treatment interval 7 d]	L H-Bees	R3
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Ingestion	3 NG	A	ALL	Registered in capsicum and chilli for control of ***Helicoverpa* spp.** and Potato Moth / Tomato Leaf Miner. [Max. 3 applications per crop; no more than 2 consecutive applications; min retreatment interval 7 days]	M M-Bees	R3
Methomyl (Lannate)	1A	Contact	1		QLD, WA & NT	Registered in capsicums for control of ***Helicoverpa***. Apply when pests first appear. [Max. no. of applications not specified; re-treatment interval 7 d]	H H-Bees	R2
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in peppers for control of ***Helicoverpa*** spp. Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug and Thrips including Western Flower Thrips. [Max. 6 applications per crop; re-treatment interval 7 d]	H H-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Methoxyfenozide (Prodigy) Corteva	18	Insect Growth Regulator	NR	A	ALL	Registered in capsicum and chilli for control of **Native Budworm**, Tomato Grub and Cluster Caterpillar. Apply to brown eggs or at egg hatch. [Max. no. of applications not specified; re-treatment interval 7 d]	VL VL-Bees	-
Nuclear Polyhedrosis Virus (Vivus) AgBiTech	31	Biological	NR	A	ALL	Registered in fruiting vegetables including peppers for control of ***Helicoverpa* spp.** Effective on larvae of <7 mm. [Max no. of applications not specified; re-treatment interval 2-3 d]	VL L-Bees	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of Aphids, Thrips, **Caterpillars**, Ants, Earwigs, White Flies & Leafhoppers. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, **Caterpillars**, Leaf Hoppers & Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	A	ALL	Registered in capsicum for the control of ***Helicoverpa***, Potato Moth and Western Flower Thrip. [Max no. of applications not specified; re-treatment interval: 7-14 d]	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in fruiting vegetables including peppers, eggplant & sweet corn for control of Potato Moth, ***Helicoverpa*** & Western Flower Thrips. [Max. 4 applications per season; re-treatment interval 7-14 d]	L L-Bees	-
Clitoria ternatea Extract (Sero-X) Growth Agriculture	UN	Biological	NR	P		Registered for control of ***Helicoverpa* spp.**, Green Mirids and Silverleaf Whitefly in cotton and Diamondback moth in Brassicas. Innovate Ag applied in January 2021 to the APVMA seeking to add new uses against Silverleaf whitefly and thrips in brassicas and cucurbits to its Sero-X Insecticide label.	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on **Lepidoptera**, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Two-Spotted Mite (*Tetranychus urticae*) **Broad Mite** (*Polyphagotarsonemus latus*) **Priority: High**								
Capsicum: Mites were ranked as a high priority in QLD, WA & SA, and as a moderate priority in VIC. Chilli: Mites were ranked as a high priority in QLD, WA & VIC. Mites feed on aerial parts of the plant with the damage caused providing entry points for soil-borne disease. Two-Spotted Mite causes minor and infrequent damage to the aerial parts of the plant. Predatory mites (*Phytoseiulus persimilis*) which attack Two-Spotted Mites are available commercially.								
Abamectin	6	Contact	3 G:3	A	ALL	Registered in fruiting vegetables, including peppers, for control of **Two-Spotted Mite**, Tomato Red Spider Mite, Tomato Russet Mit**e**, Tomato Potato Psyllid and Tobacco Leafminer. [Max 2 applications per crop; re-treatment interval 28 d.]	M H-Bees	-
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & **Two-Spotted Spider Mites**. [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-
Bifenazate (Acramite) UPL	20D	Contact	1	A	ALL	Registered in fruiting vegetables including capsicum and peppers for control of **Two-Spotted Mite** and Bryobia Mite. [Max 1 application per season]	M M-Bees	-
Dimethoate	1B	Contact	3	A	ALL	Registered in capsicum for control of Aphids, Jassids, **Mites**, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1
Emulsifiable Botanical Oil (Eco-Oil)	-	Contact	NR	A	ALL	Registered in capsicums for control of **Two-Spotted Mite** and Aphids. [Max 2 applications per crop; re-treatment interval 3-5 d]	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Etoxazole (Paramite) Sumitomo	10B	Contact	7	A	ALL	Registered in capsicum and tomato for control of **Two-Spotted Mite**. [Max no. of applications and re-treatment interval not specified]	L VL-Bees	-
Hexythiazox (Calibre) Nufarm PER14765	10A	Contact & Ingestion	3	A	ALL (excl. VIC)	Permitted for use in in fruiting vegetables including peppers for control of **Two-Spotted Mite, Broad Mite** & Tomato Russet Mite. [Max 1 application per crop]	L L-Bees	-
Milbemectin (Milbeknock)	6	Contact	1	A	ALL	Registered in capsicums for control of **Two-Spotted Mite**. [Max. 2 applications per crop; re-treatment interval 14 d]	M H-Bees	-
Petroleum Oil	UN	Contact	1	A	ALL (excl. QLD)	Registered in cucurbits for control of Aphids, **Mites**, Thrips and Leafhopper. [Max. 4 applications per season; re-treatment intervals not specified]	VL L-Bees	-
Phorate (Thimet) PER8930	1B	Contact	70	A	ALL	Permitted in peppers for control of Aphids, Jassids, **Mites**, Thrips, and Onion Maggot. [Max. 1 applications per year]	H H-Bees	R3
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of Aphids, Thrips, Mealybug, **Two Spotted Mite**, Spider-Mite and Whitefly. Apply mornings or evenings when temperatures are cooler. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Propargite (Omite)	12C	Contact	7	A	ALL	Registered in vegetables for control of **Two-Spotted Mite** and **Spider Mite** (QLD & WA). [Max no. of applications and re-treatment interval not specified]	M L-Bees	R3
Sulphur	M2	Contact	NR	A	Variable	Registered in vegetables for control of **Tomato Russet Mite** (QLD & NSW) and **Two-Spotted Mite** (VIC, TAS, SA & WA). [Max. no. of applications not specified; re-treatment interval 14-21 d]	L L-Bees	-
Acequinocyl (Kanemite) UPL	20B	Contact & Ingestion		P		Not registered in Australia. US registration in strawberry for control of various spider mites, including **Two Spotted Mites**.	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cyflumetofen (Danisaraba) BASF	25A	Contact		P		BASF is seeking registration in Australia for the control of **Spider Mites** in various crops.	L L-Bees	-
Diafenthiuron + Cyantraniliprole (Minecto Forte) Syngenta	12A+28	Contact stomach & translaminar		P		Registered in fruiting vegetables and cucurbits for control of Helicoverpa, Potato Moth, Cucumber Moth, Cluster Caterpillar, Aphids and **Two-Spotted Spider Mites** and for suppression of Western Flower Thrips, Tomato Thrips and Plague Thrips. Field use only with ground-based spraying. [Max. 2 application per crop; re-treatment interval 28 d]	M VH-Bees	-
Spiromesifen (Oberon) Bayer	23	Systemic		P		Hort Innovation project ST19020 is generating data for a label registration to control Mites in multiple commodities, including fruiting vegetables.	M VL-Bees	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, **Mites** and Caterpillars.		-
Root-Knot Nematode (*Melodoigyne* spp.) **Priority: High**								
Capsicum: Root-Knot Nematodes were ranked as a high priority in QLD & SA, moderate priority in WA, and as a low priority VIC. Chilli: Root-Knot Nematodes was ranked as a moderate priority in QLD, WA & VIC. Root-knot nematodes are minute, worm-like animals that are common in soil. The juveniles hatch from eggs, move through the soil and invade roots near the root tip. Affected plants have an unthrifty appearance and often show symptoms of stunting, wilting or chlorosis (yellowing). Control measures include pre-plant soil fumigation, nematicides, crop rotation and use of nematode free transplants.								
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Fumigant	NR	A	ALL	Registered in vegetables for control of soil borne pests including **nematodes**. Leave soil undisturbed for 14 d after treatment.	-	-
Abamectin (Tervigo) Syngenta	6	Contact	NR	A	ALL	Registered in capsicum and chilli for control of **Root-Knot** N**ematode.** Apply as a plant hole drench or through trickle irrigation immediately following transplant, followed by up to 4 applications through trickle irrigation. [Max. 5 applications; re-treatment interval 14 d]	M H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dazomet (Basamid, Cerlong)	8F	Fumigant	NR	A	ALL	Registered in various situations for control of soil fungi, **nematodes**, soil insects and weeds. Soil moisture is essential for release of gas and plastic cover brings optimum results. See label for details.	-	-
Fluensulfone (Nimitz) Adama	-	Contact	NR	A	ALL	Registered in capsicum and chilli for control of **Root-Knot** N**ematode**. Apply a minimum of 7 d before transplanting, either by broadcast spray, band spray or via drip irrigation. Requires soil incorporation to 15-20 cm and must be followed by irrigation within 3-4 days of application. [Max. 1 application per crop]	L L-Bees	-
Metham Sodium	-	Fumigant	NR	A	Variable. Refer to label.	Registered as a soil fumigant for plant parasitic **nematodes**, weed seeds, and various fungal diseases as a pre-plant treatment only.	-	-
Oxamyl (Vydate) Corteva	1A	Contact	NR	A	ALL (excl. TAS)	Registered in capsicum for control of **Root-Knot** N**ematode**. Apply through trickle irrigation, initial application at transplanting followed by 4 applications in crop. [Max. 5 applications per crop; re-treatment interval 14 d]	- H-Bees	-
Fluazaindolizine (Reklemel, Salibro) Corteva	New			P		Development underway in AU, to be launched globally in 2021. New MOA nematicide from Corteva.	-	-
Fluopyram (Velum) Bayer	7			P		Registration pending for control of **nematodes** in various crops. US registration for control of **nematodes** in a range of vegetables.	L L-Bees	-
NUL3145 Nufarm	TBC			P		New product in development from Nufarm with activity on Scale, **nematodes**, Mealybug and Whitefly.		-
SYNSTN1 Syngenta	TBC			P		Nematicide in development from Syngenta.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Western Flower Thrips (*Frankliniella occidentalis*) **Priority: High**								
Capsicum: Western Flower Thrips were ranked as a high priority in QLD, WA & SA, and as a moderate priority in VIC. Chilli: Western Flower Thrips was ranked as a high priority in QLD, WA & VIC. Western Flower Thrips develop resistance more easily than other thrips species. It is a vector for many viruses including Tomato Spotted Wilt Virus. Identification of the correct species is important prior to treatment. Resistance is an ongoing issue and virus transmission with thrip infestations are a concern for industry. IPM recommendations include: The use of predatory thrips, mites & bug releases, control flowering weeds, mulch and use of certified seed.								
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: **Western Flower Thrips**, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites. [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Ingestion	NR	A	ALL	Registered in capsicums for control of Cotton Bollworm, Native Budworm, Potato Moth, Cluster Caterpillar, Green Peach Aphid, Silverleaf Whitefly, Greenhouse Whitefly, **Western Flower Thrips**, and Tomato Thrips. [Max. no. of applications and re-treatment interval not specified]	M VH-Bees	R2
Cyantraniliprole (Benevia) FMC	28	Ingestion	1	A	ALL	Registered in fruiting vegetables including capsicum for control of Silverleaf Whitefly, Cotton Bollworm, Native Budworm, Tomato Leaf Miner and suppression of Green Peach Aphid, Tomato Thrips and **Western Flower Thrips**. [Max. 2 applications per crop; re-treatment interval 7-10 d]	M VH-Bees	-
Dimethoate	1B	Contact	3	A	ALL	Registered in capsicum for control of Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, **Thrips** and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER87051	28+4A	Ingestion	35 NG	A	QLD (within Wide Bay Burnett region)	Permitted for use as a single post plant chemigation in cucurbits & fruiting vegetables including capsicum and chilli (field & protected) for control of Diamondback Moth, Cabbage White Butterfly, Corn Earworm, Native Budworm, Cabbage Centre Grub, Cabbage Cluster Caterpillar, Cluster Caterpillar, Cabbage Aphid, Green Peach Aphid, Silverleaf Whitefly – all biotypes, Greenhouse Whitefly, **Western Flower Thrips**, Green Vegetable Bug, Potato Moth, Tomato Thrips, Brown Sowthistle Aphid, Vegetable Leafhopper, Lucerne Leafroller, Leafhoppers (Jassids), Onion Thrips and Psyllids. [Max. 1 application per crop]. PER87051 is held by Bundaberg Fruit & Vegetable Growers Cooperative and applicable only to QLD growers in Wide Bay Burnett region.	M VH-Bees	R2
Ethyl Formate	-	Fumigant	-	A	ALL	Registered in capsicum for control of **Western Flower Thrips.** Check label for methods and equipment for use.	-	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, **Thrips** and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in peppers for control of *Helicoverpa* spp. Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug and **Thrips including Western Flower Thrips**. [Max. 6 applications per crop; re-treatment interval 7 d]	H H-Bees	R2
Petroleum Oil	UN	Contact	1	A	ALL (excl QLD)	Registered in capsicum for control of Aphids, Mites, **Thrips** and Leafhopper. [Max. 4 applications per season; re-treatment intervals not specified].	VL L-Bees	-
Phorate (Thimet) PER8930	1B	Contact	70	A	ALL	Permitted for use in peppers for control of Aphids, Jassids, Mites, **Thrips**, and Onion Maggot. [Max. 1 applications per year]	H H-Bees	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of Aphids, **Thrips**, Mealybug, Two Spotted Mite, Spider-Mite and Whitefly. Apply mornings or evenings when temperatures are cooler. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of Aphids, **Thrips**, Caterpillars, Ants, Earwigs, White Flies & Leafhoppers. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, **Thrips**, Caterpillars, Leaf Hoppers, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	A	ALL	Registered in capsicum for the control of *Helicoverpa*, Potato Moth and **Western Flower Thrips.** [Max no. of applications not specified; re-treatment interval: 7-14 d]	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in fruiting vegetables including peppers, eggplant & sweet corn for control of Potato Moth, *Helicoverpa* & **Western Flower Thrips**. [Max. 4 applications per season; re-treatment interval 7-14 d]	L L-Bees	-
Spirotetramat (Movento) Bayer	23	Ingestion	1	A	ALL	Registered in capsicum and chilli for the control of Silverleaf Whitefly, Green Peach Aphids and **Western Flower Thrips**. Uses subject to CropLife resistance management strategies. [Max 3 applications per crop; re-treatment interval 7 d]	M VL-Bees	-
Dimpropyridaz (Axalion) BASF	TBC			P		BASF has applied for registration to control Whitefly, Aphids and **Thrips** in leafy vegetables, brassica vegetables and fruiting vegetables, including cucurbits. Pending regulatory approvals, first market introduction in Australia is expected by late 2022 or early 2023.	-	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and **Thrips**.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for **Thrips**, Bugs, Mites and Caterpillars.		-
Thrips (Thysanoptera) **Priority: High**								
Capsicum: Thrips were ranked as a high priority in QLD & WA, and as a low priority in SA & VIC. Chilli: Thrips were ranked as a high priority in QLD, WA & VIC. It can be difficult to distinguish between thrips species in the field. It is important to use different insecticide modes of action to prevent the development of resistance. MT16009 IPM Project Recommends: The use of predatory thrips, mites & bug releases, control flowering weeds, mulch and use of certified seed.								
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, **Onion Thrips**, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites. [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Ingestion	NR	A	ALL	Registered in capsicums for control of Cotton Bollworm, Native Budworm, Potato Moth, Cluster Caterpillar, Green Peach Aphid, Silverleaf Whitefly, Greenhouse Whitefly, Western Flower Thrips, and **Tomato Thrips**. [Max. no. of applications and re-treatment interval not specified]	M VH-Bees	R2
Cyantraniliprole (Benevia) FMC	28	Ingestion	1	A	ALL	Registered in fruiting vegetables including capsicum for control of Silverleaf Whitefly, Cotton Bollworm, Native Budworm, Tomato Leaf Miner and suppression of Green Peach Aphid, **Tomato Thrips** and Western Flower Thrips. [Max. 2 applications per crop; re-treatment interval 7-10 d]	M VH-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER87051	28+4A	Ingestion	35 NG	A	QLD (within Wide Bay Burnett region)	Permitted for use as a single post plant chemigation in cucurbits & fruiting vegetables including capsicum and chilli (field & protected) for control of Diamondback Moth, Cabbage White Butterfly, Corn Earworm, Native Budworm, Cabbage Centre Grub, Cabbage Cluster Caterpillar, Cluster Caterpillar, Cabbage Aphid, Green Peach Aphid, Silverleaf Whitefly – all biotypes, Greenhouse Whitefly, Western Flower Thrips, Green Vegetable Bug, Potato Moth, **Tomato Thrips**, Brown Sowthistle Aphid, Vegetable Leafhopper, Lucerne Leafroller, Leafhoppers (Jassids), Onion Thrips and Psyllids. [Max. 1 application per crop]. PER87051 is held by Bundaberg Fruit & Vegetable Growers Cooperative and applicable only to QLD growers in Wide Bay Burnett region.	M VH-Bees	R2
Dimethoate	1B	Contact	3	A	ALL	Registered in capsicum for control of Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, **Thrips** and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, **Thrips** and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Imidacloprid (Confidor) PER12489	4A	Contact	7	A	ALL (excl. VIC)	Permitted for use in peppers for control of Green Peach Aphid, Greenhouse Whitefly and suppression of **Plague Thrips** & **Onion Thrips**. [Max 2 applications per crop; re-treatment interval not specified]	M M-Bees	R2
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted in capsicums for control of *Helicoverpa* spp. Cucumber moth Cluster caterpillar, Loopers, Webworm, Rutherglen bug and **Thrips** including Western Flower Thrips. [Max. 6 applications per crop; re-treatment interval 7 d]	H H-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Petroleum Oil	UN	Contact	1	A	ALL	Registered in peppers for control of Aphids, Mites, **Thrips** and Leafhopper. [Max. 4 applications per season; re-treatment intervals not specified]	VL L-Bees	-
Phorate (Thimet) PER8930	1B	Contact	70	A	ALL	Permitted for use in peppers for control of Aphids, Jassids, Mites, **Thrips** & Onion Maggot. [Max. 1 applications per year]	H H-Bees	R3
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of Aphids, **Thrips**, Mealybug, Two Spotted Mite, Spider-Mite and Whitefly. Apply mornings or evenings when temperatures are cooler. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of Aphids, **Thrips**, Caterpillars, Ants, Earwigs, White Flies & Leafhoppers. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, **Thrips**, Caterpillars, Leaf Hoppers, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in capsicum for the control of *Helicoverpa*, Potato Moth and Western Flower Thrips**.**	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	P-A	ALL	Registered in fruiting vegetables including peppers, eggplant & sweet corn for control of Potato Moth, Helicoverpa & Western Flower Thrips. Registered in US and Canada for control of a range of insect pests such as Ants, Caterpillars, Colorado Potato Beetle, Corn Earworms, Flea Beetle, Leaf Miners, Loopers, Mites & **Thrips** in various vegetables.	L L-Bees	-
Spirotetramat (Movento) Bayer	23	Ingestion	1	P-A	ALL	Registered in capsicum and chilli for the control of Silverleaf Whitefly, Green Peach Aphids and Western Flower Thrips.	M VL-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dimpropyridaz (Axalion) BASF	TBC			P		BASF has applied for registration to control Whitefly, Aphids and **Thrips** in leafy vegetables, brassica vegetables and fruiting vegetables, including cucurbits. Pending regulatory approvals, first market introduction in Australia is expected by late 2022 or early 2023.	-	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and **Thrips**.		-
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for **Thrips**, Bugs, Mites and Caterpillars.		-
Tomato Russet Mite (*Aculops lycopersici*) **European Red Mite** (*Panonychus ulmi*) **Rust Mite** (*Eriophyidae*) **Priority: Moderate**								
Capsicum: Mites were ranked as a high priority in QLD, WA & SA, and as a moderate priority in VIC. Chilli: Mites were ranked as a high priority in QLD, WA & VIC. Mites feed on aerial parts of the plant with the damage caused providing entry points for soil-borne disease. Two-Spotted Mite causes minor and infrequent damage to the aerial parts of the plant. Predatory mites (*Phytoseiulus persimilis*) which attack two-spotted mites are available commercially.								
Abamectin	6	Contact	3 G:3	A	ALL	Registered in fruiting vegetables, including peppers, for control of Two-Spotted Mite, Tomato Red Spider Mite, **Tomato Russet Mite**, Tomato Potato Psyllid and Tobacco Leafminer. [Max 2 applications per crop; re-treatment interval 28 d.]	M H-Bees	-
Bifenazate (Acramite) UPL PER82341	20D	Contact	1	A	ALL (excl. VIC)	Permitted for use in peppers for control of **Red Tomato Spider Mite**. [Max 1 applications per crop]	M M-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dimethoate	1B	Contact	3	A	ALL	Registered in capsicum for control of Aphids, Jassids, **Mites**, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1
Etoxazole (Paramite) Sumitomo PER82460	10B	Contact	7	A	ALL	Registered in capsicum for control of **Tomato Red Spider Mite**. [Max 1 application per crop]	L VL-Bees	-
Hexythiazox (Calibre) Nufarm PER14765	10A	Contact & Ingestion	3	A	ALL (excl. VIC)	Permitted for use in in fruiting vegetables including peppers for control of **Tomato Russet Mite**, Two-Spotted Mite, Broad Mite & Tomato Red Mite. [Max 1 application per crop]	L L-Bees	-
Petroleum Oil	UN	Contact	1	A	ALL (excl. QLD)	Registered in peppers for control of Aphids, **Mites**, Thrips and Leafhopper. [Max. 4 applications per season; re-treatment intervals not specified]	VL L-Bees	-
Phorate (Thimet) PER8930	1B	Contact	70	A	ALL	Permitted in peppers for control of Aphids, Jassids, **Mites**, Thrips, and Onion Maggot. [Max. 1 applications per year]	H H-Bees	R3
Sulphur	M2	Contact	NR	A	Variable	Registered in vegetables for control of **Tomato Russet Mite** (QLD & NSW) and Two-Spotted Mite (VIC, TAS, SA & WA). [Max. no. of applications not specified; re-treatment interval 14-21 d]	L L-Bees	-
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	P-A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites. US registration for control of **Aphids** in enclosed greenhouses.	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Diafenthiuron + Cyantraniliprole (Minecto Forte) Syngenta	12A+28	Contact stomach & translaminar		P		Registered in fruiting vegetables and cucurbits for control of Helicoverpa, Potato Moth, Cucumber Moth, Cluster Caterpillar, Aphids and Two-Spotted Spider Mites and for suppression of Western Flower Thrips, Tomato Thrips and Plague Thrips.	M VH-Bees	-
Spiromesifen (Oberon) Bayer	23	Systemic		P		Hort Innovation project ST19020 is generating data for a label registration to control Mites in multiple commodities, including fruiting vegetables.	M VL-Bees	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, **Mites** and Caterpillars.		-
Silverleaf Whitefly *(Bemisia tabaci)* **Greenhouse Whitefly** (*Trialeurodes vaporariorum*) **Priority: Moderate**								
Capsicum: Whiteflies were ranked as a moderate priority in QLD & WA, and as a low priority in VIC & SA. Chilli: Whiteflies were ranked as a high priority in QLD, WA & VIC. Whiteflies can damage crops through direct feeding damage, honeydew secretion leading to development of sooty mould and as a vector for plant viruses. Silverleaf Whitefly can rapidly develop resistance to insecticides so control strategies need to be planned to utilise product rotation and preserve beneficial predators that can play an important role in managing Whitefly populations.								
Afidopyropen (Versys) BASF	9D	Ingestion	1	A	ALL	Label extension in April 2021 now includes protected cropping situations for Fruiting vegetables and Cucurbits and PER87852 will be surrendered. Registered in fruiting vegetables for control of Green Peach Aphid, Cabbage Aphid, Currant Lettuce Aphid, Cotton/Melon Aphid, Corn aphid & suppression of **Silverleaf Whitefly**.	L L-Bees	-
Afidopyropen (Versys) PER87852 *Use now registered in protected cropping and permit to be surrendered	9D	Ingestion	3	A	ALL	Permitted for use in cucumber, capsicum & eggplant (protected cropping situations) for control of Green Peach Aphid, Melon Aphids and suppression of **Silverleaf Whitefly**. Versys label extension in April 2021 now covers protected cropping and permit will be surrendered.	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, **Greenhouse Whitefly**, **Silverleaf Whitefly**, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites. [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-
Buprofezin (Applaud) Corteva PER82467	16	Insect Growth Regulator	3	A	ALL (excl. VIC)	Permitted for use in several vegetables including capsicum for control of **Greenhouse Whitefly,** Sweet Potato Whitefly & **Silverleaf Whitefly**. [Max. 2 applications per crop; re-treatment interval 14 d]	L L-Bees	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Ingestion	NR	A	ALL	Registered in capsicums for control of Cotton Bollworm, Native Budworm, Potato Moth, Cluster Caterpillar, Green Peach Aphid, **Silverleaf Whitefly, Greenhouse Whitefly**, Western Flower Thrips, and Tomato Thrips. [Max. no. of applications and re-treatment interval not specified]	M VH-Bees	R2
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER87051	28+4A	Ingestion	35 NG	A	QLD (within Wide Bay Burnett region)	Permitted for use as a single post plant chemigation in cucurbits & fruiting vegetables including capsicum and chilli (field & protected) for control of Diamondback Moth, Cabbage White Butterfly, Corn Earworm, Native Budworm, Cabbage Centre Grub, Cabbage Cluster Caterpillar, Cluster Caterpillar, Cabbage Aphid, Green Peach Aphid, **Silverleaf Whitefly** – all biotypes, **Greenhouse Whitefly**, Western Flower Thrips, Green Vegetable Bug, Potato Moth, Tomato Thrips, Brown Sowthistle Aphid, Vegetable Leafhopper, Lucerne Leafroller, Leafhoppers (Jassids), Onion Thrips and Psyllids. [Max. 1 application per crop]. PER87051 is held by Bundaberg Fruit & Vegetable Growers Cooperative and applicable only to QLD growers in Wide Bay Burnett region.	M VH-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cyantraniliprole (Benevia) FMC	28	Ingestion	1	A	ALL	Registered in fruiting vegetables including capsicum for control of **Silverleaf Whitefly**, Cotton Bollworm, Native Budworm, Tomato Leaf Miner and suppression of Green Peach Aphid, Tomato Thrips and Western Flower Thrips. [Max. 2 applications per crop; re-treatment interval 7-10 d]	M VH-Bees	-
Emulsifiable Botanical Oil (Eco-Oil)	-	Contact	NR	A	ALL	Registered in vegetables for control of **Greenhouse Whiteflies**. [Max. 3 applications per crop; re-treatment interval 28-56 d]	L L-Bees	-
Emulsifiable Botanical Oil (Eco-Oil) PER14077	-	Contact	NR	A	ALL (excl. VIC)	Permitted for use in capsicums (protected) for control of **Silverleaf Whitefly**. [Max. 2 applications per season; re-treatment intervals 3-5 d]	L L-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars, Earwigs, **Whitefly**, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Imidacloprid (Confidor Guard)	4A	Contact	NR	A	ALL	Registered in capsicum for control of **Silverleaf Whitefly**. Apply either through sub-surface trickle irrigation (5-7 days after planting out, or 5-7 days after emergence if planted from seed), a furrow spray pre-plant (not earlier than 5 days prior to planting), or as a plant hole drench.	M M-Bees	R2
Imidacloprid (Confidor) PER88558	4A	Contact	NR	A	ALL (excl. VIC)	Permitted for use in chilli peppers (field) for control of **Silverleaf Whitefly**. Apply as sub-surface trickle, furrow spray or plant hole drench. [Max. 1 application per crop]	M M-Bees	R2
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in capsicum for control of **Greenhouse Whitefly** & ***Bemisia tabaci***. [Max. no. of applications and re-treatment intervals not specified]	VL L-Bees	-
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of Aphids, Thrips, Mealybug, Two Spotted Mite, Spider-Mite and **Whitefly**. Apply mornings or evenings when temperatures are cooler. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Potassium Salts of Fatty Acids PER13920	-	Contact	NR	A	ALL (excl. VIC)	Permitted for use in peppers (protected) for control of **Silverleaf Whitefly** and **Greenhouse Whitefly**. [Max. no. of applications not specified; re-treatment intervals 5-7 d]	L L-Bees	-
Pymetrozine (Chess) Syngenta	9B	Contact & Ingestion	14	A	ALL	Registered in capsicum for control of Potato aphid, Green peach aphid and suppression of **Silverleaf Whitefly** and **Greenhouse Whitefly**. [Max 2 applications per season; re-treatment interval 7 d]	L VL-Bees	R3
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of Aphids, Thrips, Caterpillars, Ants, Earwigs, **Whiteflies** & Leafhoppers. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, Caterpillars, Leafhoppers, and **Whitefly**. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-
Pyriproxyfen (Admiral) Sumitomo	7C	Ingestion/ IGR	1 NG	A	ALL	Registered in capsicum for control of **Silverleaf Whitefly** and **Greenhouse Whitefly**. [Max. 2 applications per season; re-treatment interval 14 d]	VL L-Bees	-
Spirotetramat (Movento) Bayer	23	Ingestion	1	A	ALL	Registered in capsicum and chilli for the control of **Silverleaf Whitefly**, Green Peach Aphid and Western Flower Thrips. Uses subject to CropLife resistance management strategies. [Max 3 applications per crop; re-treatment interval 7 d]	M VL-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in capsicum for control of Green Peach Aphid, **Greenhouse Whitefly**, Rutherglen Bug and Tomato Potato Psyllid. Do not use if honeybees are foraging. [Max. no. of applications not specified; re-treatment interval 7-10 d]	M VH-bees	-
Clitoria ternatea Extract (Sero-X) Growth Agriculture	UN	Biological	NR	P		Registered for control of *Helicoverpa* spp., Green Mirids and Silverleaf Whitefly in cotton and Diamondback moth in Brassicas. Innovate Ag applied in January 2021 to the APVMA seeking to add new uses against **Silverleaf whitefly** and thrips in brassicas and cucurbits to its Sero-X Insecticide label.	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dimpropyridaz (Axalion) BASF	TBC			P		BASF has applied for registration to control **Whitefly**, Aphids and Thrips in leafy vegetables, brassica vegetables and fruiting vegetables, including cucurbits. Pending regulatory approvals, first market introduction in Australia is expected by late 2022 or early 2023.	-	-
Flonicamid (Mainman) UPL/ISK	29	Systemic		P		Registered in cucurbits for control of Aphids and **Silverleaf Whitefly**; Aphids in potatoes; Aphids and Mealybugs in apples and pears; Aphids and Mirids in cotton.	M L-Bees	-
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of Leafhoppers, Aphids and **Whiteflies** in brassica vegetables. Label extension submitted October 2020 for control of **Whitefly** in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-
NUL3145 Nufarm	TBC			P		New product in development from Nufarm with activity on Scale, Nematodes, Mealybug and **Whitefly**.		-
Green Mirids (*Creontiades dilutes*) **Priority: Moderate**								
Capsicum: Green mirids were ranked as a high priority in SA, as a moderate priority in QLD & WA and as a low priority in SA. Chilli: Green mirids were ranked as a moderate priority in QLD, WA & VIC. Green Mirids are plant bugs whose adults and nymphs pierce plant tissue and release a chemical that destroys cells in the feeding zone. Mirids can overwinter in low numbers on weeds or wild hosts. Local movement into summer crops occurs as alternative host plants dry off. Large numbers can cause significant feeding damage to foliage by sucking the sap and depleting the crop of nutrients.								
Dimethoate	1B	Contact	3	P-A	ALL	Registered in capsicum for control of Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Registered for control of **Green Mirid** in pulse crops and cotton.	H H-Bees	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Indoxacarb (Avatar) FMC	22A	Ingestion	3	P-A	ALL	Registered in capsicums for control of *Helicoverpa* and Potato Moth. Registered for control of **Green Mirid** in pulse crops and cotton.	L H-Bees	R3
Petroleum Oil	UN	Contact	1	P-A	ALL (excl. QLD)	Registered in peppers for control of Aphids, Mites, Thrips and Leafhopper. Registered for control of **Green Mirid** in cotton.	VL L-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in capsicum for control of Green Peach Aphid, Greenhouse Whitefly, Rutherglen Bug and Tomato Potato Psyllid. Registered for control of **Green Mirid** in cotton and strawberries.	M VH-bees	-
Flonicamid (Mainman) UPL/ISK	29	Systemic		P		Registered in cotton for control of **Green Mirid**, Aphids in cucurbits and Mealybug in apples and pears. US registration for control of Aphids, Plant Bugs and Tomato Psyllids in fruiting vegetables. Hort Innovation is undertaking trials in bulb vegetables in support of a permit for Thrip control.	M L-Bees	-
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of Leafhoppers, Aphids, Colorado Potato Beetle, Psyllid, Whiteflies and suppression of Chilli Thrips in fruiting vegetables. Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, **Bugs**, Mites and Caterpillars.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Green Vegetable Bug (*Nezara viridula*) **Priority: Moderate**								
Capsicum: Green Vegetable Bug was ranked as a high priority in SA, a moderate priority in QLD & WA and as a low priority in VIC. Chilli: Green Vegetable Bug was ranked as a moderate priority in QLD, WA, & VIC. These bugs use their long, thin mouthpart to suck nutrients from the aerial parts of the plant. It emits a foul smell when disturbed to deter predators. Nymphs are attacked by ants, spiders & predatory bugs. It is important to monitor crops for eggs and nymphs of pest species by regular field scouting. Target sprays against mature eggs and nymphs before pests become entrenched.								
Dimethoate	1B	Contact	3	A	ALL	Registered in capsicum for control of Aphids, Jassids, Mites, Leafhoppers, **Green Vegetable Bug**, Thrips and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in capsicum (field only) for control of Fruit flies (QLD, NSW, VIC, WA & NT); in vegetables for control of **Green Vegetable Bug**, and Rutherglen Bug (All States). Apply at first sight of infestation. [Max no. of applications not specified; re-treatment interval 7-10 d].]	H H-Bees	R2
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Ingestion		P-A		Registered in capsicums for control of Cotton Bollworm, Native Budworm, Potato Moth, Cluster Caterpillar, Green Peach Aphid, Silverleaf Whitefly, Greenhouse Whitefly, Western Flower Thrips, and Tomato Thrips. Registered in Brassica vegetables for control of various pests including **Green Vegetable Bug**.	M VH-Bees	R2
Flonicamid (Mainman) UPL/ISK	29	Systemic		P		Registered in cotton for control of Green Mirid, Aphids in cucurbits and Mealybug in apples and pears. US registration for control of Aphids, Plant Bugs and Tomato Psyllids in fruiting vegetables.	M L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of Leafhoppers, Aphids, Colorado Potato Beetle, Psyllid, Whiteflies and suppression of Chilli Thrips in fruiting vegetables. Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, **Bugs**, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, **Bugs**, Mites and Caterpillars.		-
Rutherglen Bug (*Nysius vinitor*) **Priority: Moderate**								
Capsicum: Rutherglen Bug was ranked as a moderate priority in QLD and as a low priority in WA, SA & VIC. Chilli: Rutherglen Bug was ranked as a high priority in QLD and as a moderate priority in WA & VIC. It is important to monitor crops for eggs and nymphs by regular field scouting. Repeated influxes of migrating adults can make multiple insecticide applications necessary. Large numbers can cause significant feeding damage to foliage by sucking the sap and depleting the crop of nutrients.								
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in peppers for control of *Helicoverpa* spp. Cucumber Moth Cluster Caterpillar, Loopers, Webworm, **Rutherglen Bug** and Thrips including Western Flower Thrips. [Max. 6 applications per crop; re-treatment interval 7 d].	H H-Bees	R2
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in capsicum for control of Green Peach Aphid, Greenhouse Whitefly, **Rutherglen Bug** and Tomato Potato Psyllid. Do not use if honeybees are foraging. [Max. no. of applications not specified; re-treatment interval 7-10 d].	M VH-bees	-
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in capsicum (field only) for control of Fruit Flies (QLD, NSW, Vic, WA & NT); in vegetables for control of Green Vegetable Bug, and **Rutherglen Bug** (All States). Apply at first sight of infestation. [Max no. of applications not specified; re-treatment interval 7-10 d].	H H-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flonicamid (Mainman) UPL/ISK	29	Systemic		P		Registered for control of Green Mirids in cotton, Aphids in cucurbits and Mealybug in apples and pears. US registration to control Aphids, Plant Bugs and Tomato Psyllids in fruiting vegetables.	M L-Bees	-
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of Leafhoppers, Aphids, Colorado Potato Beetle, Psyllid, Whiteflies and suppression of Chilli Thrips in fruiting vegetables. Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, **Bugs**, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, **Bugs**, Mites and Caterpillars.		-
Cutworms (*Agrotis* spp.) **Priority: Moderate**								
Capsicum: Cutworms were ranked as a moderate priority in QLD, WA & SA, and as a low priority in VIC. Chilli: Cutworms were ranked as a moderate priority in QLD, WA & VIC. Cutworms are caterpillars that attack seedling crops by chewing through leaves and stems at ground level. This frequently results in loss of whole plants which has a significant impact on production. If insecticide control is required, application should be made late afternoon to evening to coincide with when the larvae are feeding. MT16009 IPM Project Recommends: Predatory wasps, rotation, and early insecticide applications.								
Chlorpyrifos (Lorsban)	1B	Contact	5	A	ALL	Registered in capsicum for control of **Cutworms,** Wingless Grasshopper, Field and Mole Crickets and Vegetable Weevils. Apply on soil to a minimum of 20 cm on both sides of row crop. [Max. 1 application per crop]	H H-Bees	R1
Diazinon	1B	Contact	14 G:14	A	ALL	Registered in capsicum for control of **Cutworms**. [Max no. of applications and re-treatment interval not specified]	H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Clothianidin + Imidacloprid (Poncho Plus) BASF	4A	Contact		P		Registered in sweet corn, sunflower, canola & forage brassica for control of Wireworms, **Cutworms** and Aphids.	M VH-Bees	R2
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on **Lepidoptera**, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**.		-
Cluster Caterpillar (*Spodoptera litura*) **Priority: Moderate**								
Capsicum: Cluster Caterpillar was ranked as a moderate priority in QLD & WA, and as a low priority in VIC & SA. Chilli: Cluster Caterpillar was ranked as a moderate priority in QLD, WA, & VIC. Larvae are voracious leaf feeders and can defoliate crops when in large numbers.								
Amorphous silica (Abrade)	-	Contact	NR	A	ALL	Registered in vegetables for control of *Helicoverpa* and **Cluster Caterpillars**. [Max. 2 applications per crop; re-treatment interval 6-7 d]	-	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Ingestion	NR	A	ALL	Registered in capsicums for control of Cotton Bollworm, Native Budworm, Potato Moth, **Cluster Caterpillar**, Green Peach Aphid, Silverleaf Whitefly, Greenhouse Whitefly, Western Flower Thrips, and Tomato Thrips. [Max. no. of applications and re-treatment interval not specified]	M VH-Bees	R2
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3	A	ALL	Registered in capsicums for control of *Helicoverpa* and **Cluster Caterpillar**. [Max. 4 applications per crop; re-treatment interval minimum 7 d]	M H-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, **Caterpillars**, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER87051	28+4A	Ingestion	35 NG	A	QLD (within Wide Bay Burnett region)	Permitted for use as a single post plant chemigation in cucurbits & fruiting vegetables including capsicum and chilli (field & protected) for control of Diamondback Moth, Cabbage White Butterfly, Corn Earworm, Native Budworm, Cabbage Centre Grub, Cabbage Cluster Caterpillar, **Cluster Caterpillar**, Cabbage Aphid, Green Peach Aphid, Silverleaf Whitefly – all biotypes, Greenhouse Whitefly, Western Flower Thrips, Green Vegetable Bug, Potato Moth, Tomato Thrips, Brown Sowthistle Aphid, Vegetable Leafhopper, Lucerne Leafroller, Leafhoppers (Jassids), Onion Thrips and Psyllids. [Max. 1 application per crop]. PER87051 is held by Bundaberg Fruit & Vegetable Growers Cooperative and applicable only to QLD growers in Wide Bay Burnett region.	M VH-Bees	R2
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in peppers for control of *Helicoverpa* spp. Cucumber Moth **Cluster Caterpillar**, Loopers, Webworm, Rutherglen Bug & Thrips including Western Flower Thrips. [Max. 6 applications per crop; re-treatment interval 7 d]	H H-Bees	R2
Methoxyfenozide (Prodigy) Corteva	18	Insect Growth Regulator	NR	A	ALL	Registered in capsicum and chilli for control of Native Budworm, Tomato Grub and **Cluster Caterpillar**. Apply to brown eggs or at egg hatch. [Max. no. of applications not specified; re-treatment interval 7 d]	VL VL-Bees	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of Aphids, Thrips, **Caterpillars**, Ants, Earwigs, Whiteflies and Leafhoppers. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, **Caterpillars**, Leaf Hoppers & Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in capsicum for control of Cotton Bollworm (*Helicoverpa*), Tomato Leaf Miner and Eggfruit Caterpillar. Registered for control of **Cluster Caterpillar** in brassica vegetables.	L VL-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in fruiting vegetables including capsicum for the control of *Helicoverpa* and Tomato Leaf Miner. Registered for control of **Cluster Caterpillar** in brassicas vegetables, root and tuber vegetables and strawberries.	L-M L-Bees	-
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Ingestion	3 NG	P-A	ALL	Registered in capsicum and chilli for control of *Helicoverpa* spp. and Potato Moth / Tomato Leaf Miner.	M M-Bees	R3
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	P-A	ALL	Registered in fruiting vegetables including peppers, eggplant & sweet corn for control of Potato Moth, *Helicoverpa* & Western Flower Thrips. Registered in Brassica vegetables for control of various Lepidoptera including Cabbage Centre Grub, Cabbage Cluster Caterpillar, Cabbage White Butterfly, Loopers & Diamondback Moth.	L L-Bees	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Leafhoppers / **Jassids** (Cicadellidae) **Priority: Moderate**								
Capsicum: Leafhoppers (including Jassids) were ranked as a moderate priority in QLD & WA and as a low priority in VIC & SA. Chilli: Leafhoppers (including Jassids) were ranked as a moderate priority in QLD & WA and as a low priority in VIC. Adult and nymph leafhoppers suck sap and inject toxins into the plant. Some leafhopper species transmit diseases such as viruses and phytoplasmas. Perimeter sprays may be useful to minimise vector transmission.								
Dimethoate	1B	Contact	3	A	ALL	Registered in capsicum for control of Aphids, **Jassids**, Mites, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshopper (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, Thrips and **Leafhoppers**. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Petroleum Oil	UN	Contact	1	A	ALL (excl. QLD)	Registered in peppers for control of Aphids, Mites, Thrips and **Leafhopper**. [Max. 4 applications per season; re-treatment intervals not specified]	VL L-Bees	-
Phorate (Thimet) PER8930	1B	Contact	70	A	ALL	Permitted for use in peppers for control of Aphids, **Jassids**, Mites, Thrips, and Onion maggot. [Max. 1 applications per year]	H H-Bees	R3
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of Aphids, Thrips, Caterpillars, Ants, Earwigs, Whiteflies and **Leafhoppers**. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, Caterpillars, **Leafhoppers**, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Buprofezin (Applaud) Corteva PER82467	16	Insect Growth Regulator	3	P-A	ALL (excl. VIC)	Permitted for use in several vegetables including capsicum for control of Greenhouse Whitefly, Sweet Potato Whitefly & Silverleaf Whitefly. Registered for control of **Leafhoppers** in citrus.	L L-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in capsicum for control of Green Peach Aphid, Greenhouse Whitefly, Rutherglen Bug and Tomato Potato Psyllid. US registration for control of **Leafhoppers** in berries, cotton, root and tuber vegetables and pome fruit.	M VH-bees	-
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of **Leafhoppers**, Aphids and Whiteflies in brassica vegetables. Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars.		-
Cucumber Fly (*Bactrocera Cucumis*) **Priority: Low**								
Capsicum: Cucumber fly was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Cucumber fly was ranked as a low priority in QLD, WA & VIC. Cucumber Fly can attack fruit and cause rots and discolouration. Eggs are laid close to the surface inside the fruit with small, discoloured patches developing because of the stings.								
Dimethoate	1B	Contact	3	A	NSW & WA	Registered in capsicum for control of Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshopper (All States); **Cucumber Fly** (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Maldison	1B	Contact	3	A	ALL	Registered in capsicum for control of **Fruit Fly**. [Max. 4 applications per crop; re-treatment interval 5 d]	H H-Bees	-
Spinosad (Naturalure) Corteva	5	Ingestion	NR	A	ALL	Registered as a bait solution in fruit trees and vegetables for control of **Fruit Flies**. [Max no. of applications not specified; re-treatment interval 7 d]	L L-Bees	-
Trichlorfon (Lepidex)	1B	Contact	2	A	QLD, NSW, VIC, WA & NT	Registered in capsicum (field only) for control of **Fruit Flies**; in vegetables for control of Green Vegetable Bug, and Rutherglen Bug (All States). Apply at first sight of infestation. [Max no. of applications not specified; re-treatment interval 7-10 d]	H H-Bees	R2
Novaluron + Acetamiprid (Cormoran) Adama	15+4A	Contact & stomach		P		Registered for control of Mediterranean Fruit Fly and suppression of Queensland Fruit Fly in stone fruit.	M M-Bees	R2
Black Field Cricket (*Teleogryllus commodus*) **Mole Cricket** (*Gryllotalpa* spp.) **Grasshoppers** (Orthoptera) **Priority: Low**								
Capsicum: Ranked as a low priority in QLD, WA, SA & VIC. Chilli: Ranked as a low priority in QLD, WA & VIC.								
Chlorpyrifos (Lorsban)	1B	Contact	5	A	ALL (excl. QLD)	Registered in capsicum for control of Cutworms, **Wingless Grasshopper**, **Field Crickets, Mole Crickets** and Vegetable Weevils. Apply on soil to a minimum of 20 cm on both sides of row crop. [Max. 1 application per crop]	H H-Bees	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dimethoate	1B	Contact	3	A	ALL	Registered in capsicum for control of Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, Thrips and **Wingless Grasshopper** (All States); Cucumber Fly (NSW & WA) and Fruit Fly (NSW, QLD & WA). Apply before flowering commences. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R1
Carbaryl	1A	Contact & ingestion		P		Registered in cucurbits (prior to flowering) for the control of *Helicoverpa*, Pumpkin Beetle, 28 Spotted Lady Bird, Wingless **Grasshopper**, Green Vegetable Bug, Leaf Eating Ladybird, Cutworms, Earwig, Potato Moth, Rutherglen Bug and Army Worm. [Max. no. of applications and re-treatment interval not specified]	H H-Bees	R3
Lace Bugs (Tingidae) **Priority: Low**								
Capsicum: Lace Bugs was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Lace Bugs was ranked as a low priority in QLD, WA & VIC. Lace Bugs suck the juices from the leaf and leave white or yellow spots on the upper surface. This will eventually give a silvery mottled appearance to the whole leaf if they continue to feed. Once leaf damage has occurred it cannot be reversed, so proactive control measures are required.								
Flonicamid (Mainman) UPL/ISK	29	Systemic		P		Registered in cucurbits for control of Aphids and Silverleaf White Fly; Aphids in potatoes; Aphids and Mealybugs in apples and pears; Aphids and Mirids in cotton. US registration for control of Aphids, Plant Bugs and Tomato Psyllids in fruiting vegetables.	M L-Bees	-
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of Leafhoppers, Aphids, Colorado Potato Beetle, Psyllid, Whiteflies and suppression of Chilli Thrips in fruiting vegetables. Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, **Bugs**, Mites and Caterpillars.		-
Tomato Leafminer / Potato Moth (*Phthorimaea operculella*) **Priority: Low**								
Capsicum: Tomato Leafminer was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Tomato Leafminer was ranked as a low priority in QLD, WA & VIC. Tomato Leafminer feed inside leaves and fruit, causing severe yield losses and quality downgrades. It is important to monitor crops for eggs and larvae by regular field scouting. Target sprays against mature eggs and newly hatched larvae before pests become entrenched.								
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	A	ALL	Registered in capsicum for control of Cotton Bollworm, **Tomato Leaf Miner** and Eggfruit Caterpillar. [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7 d]	L VL-Bees	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Ingestion	NR	A	ALL	Registered in capsicums for control of Cotton Bollworm, Native Budworm, **Potato Moth**, Cluster Caterpillar, Green Peach Aphid, Silverleaf Whitefly, Greenhouse Whitefly, Western Flower Thrips, and Tomato Thrips. [Max. no. of applications and re-treatment interval not specified]	M VH-Bees	R2
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER87051	28+4A	Ingestion	35 NG	A	QLD (within Wide Bay Burnett region)	Permitted for use as a single post plant chemigation in cucurbits & fruiting vegetables including capsicum and chilli (field & protected) for control of Diamondback Moth, Cabbage White Butterfly, Corn Earworm, Native Budworm, Cabbage Centre Grub, Cabbage Cluster Caterpillar, Cluster Caterpillar, Cabbage Aphid, Green Peach Aphid, Silverleaf Whitefly – all biotypes, Greenhouse Whitefly, Western Flower Thrips, Green Vegetable Bug, **Potato Moth**, Tomato Thrips, Brown Sowthistle Aphid, Vegetable Leafhopper, Lucerne Leafroller, Leafhoppers (Jassids), Onion Thrips and Psyllids. [Max. 1 application per crop]. PER87051 is held by Bundaberg Fruit & Vegetable Growers Cooperative and applicable only to QLD growers in Wide Bay Burnett region.	M VH-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cyantraniliprole (Benevia) FMC	28	Ingestion	1	A	ALL	Registered in fruiting vegetables including capsicum for control of Silverleaf Whitefly, Cotton Bollworm, Native Budworm, **Tomato Leaf Miner** and suppression of Green Peach Aphid, Tomato Thrips and Western Flower Thrips. [Max. 2 applications per crop; re-treatment interval 7-10 d]	M VH-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	A	ALL	Registered in fruiting vegetables including capsicum for the control of *Helicoverpa* and **Tomato Leaf Miner** [Max. 3 applications per crop; re-treatment interval 7-14 d]	L-M L-Bees	-
Indoxacarb (Avatar) FMC	22A	Ingestion	3	A	ALL	Registered in capsicums for control of *Helicoverpa* and **Potato Moth.** [Max. no. of applications not specified; re-treatment interval 7 d]	L H-Bees	-
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Ingestion	3 NG	A	ALL	Registered in capsicum and chilli for control of *Helicoverpa* spp. and **Potato Moth / Tomato Leaf Miner**. [Max. 3 applications per crop; no more than 2 consecutive applications; min retreatment interval 7 days]	M M-Bees	R3
Spinetoram (Success Neo) Corteva	5	Ingestion	1	A	ALL	Registered in capsicum for the control of *Helicoverpa*, **Potato Moth** and Western Flower Thrips. [Max no. of applications not specified; re-treatment interval: 7-14 d]	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in fruiting vegetables including peppers, eggplant & sweet corn for control of **Potato Moth**, *Helicoverpa* & Western Flower Thrips. [Max. 4 applications per season; re-treatment interval 7-14 d]	L L-Bees	-
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3	P-A	ALL	Registered in capsicums for control of *Helicoverpa* and Cluster Caterpillar.	M H-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on **Lepidoptera**, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Looper Caterpillars (*Chrysodeixis* spp.) **Priority: Low**								
Capsicum: Loopers were ranked as a low priority in QLD, WA, SA & VIC. Chilli: Loopers were ranked as a low priority in QLD, WA & VIC. The last two larval instars are the most voracious feeders and will usually eat the entire leaf but may avoid the midrib or other large veins. It is important to monitor crops for eggs and larvae by regular field scouting. Target sprays against mature eggs and larvae before pests become entrenched.								
Bacillus thuringiensis subsp. kurstaki (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of **Caterpillars.** [Apply a minimum of 2 sprays, 3 d apart; re-treatment interval 3-5 d]	VL L-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, **Caterpillars**, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in peppers for control of *Helicoverpa* spp. Cucumber Moth Cluster Caterpillar, **Loopers**, Webworm, Rutherglen Bug and Thrips including Western Flower Thrips. [Max. 6 applications per crop; re-treatment interval 7 d]	H H-Bees	R2
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in vegetables for control of Aphids, Thrips, **Caterpillars**, Ants, Earwigs, White Flies & Leafhoppers. Spray early in the morning or late evening. [Max. no. of applications and re-treatment intervals not specified]	VH H-Bees	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, **Caterpillars**, Leafhoppers, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH H-Bees	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in capsicum for control of Cotton Bollworm (*Helicoverpa*), Tomato Leaf Miner and Eggfruit Caterpillar. Registered for control of **Loopers** in brassica vegetables.	L VL-Bees	-
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3	P-A	ALL	Registered in capsicums for control of *Helicoverpa* and Cluster Caterpillar. Registered for control of **Loopers** in brassica vegetables, legume vegetables, root and tuber vegetables and strawberries.	M H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in fruiting vegetables including capsicum for the control of *Helicoverpa* and Tomato Leaf Miner. Registered for control of **Loopers** in brassica vegetables.	L-M L-Bees	-
Indoxacarb (Avatar) FMC	22A	Ingestion	3	P-A	ALL	Registered in capsicums for control of *Helicoverpa* and Potato Moth.	L H-Bees	R3
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Ingestion	3 NG	P-A	ALL	Registered in capsicum and chilli for control of *Helicoverpa* spp. and Potato Moth / Tomato Leaf Miner.	M M-Bees	R3
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in capsicum for the control of *Helicoverpa*, Potato Moth and Western Flower Thrips**.** Registered for control of **Loopers** in brassica vegetables, pulses, tropical fruits, berries, leafy vegetables, legume vegetables and pome fruit.	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	P-A	ALL	Registered in fruiting vegetables including peppers, eggplant & sweet corn for control of Potato Moth, *Helicoverpa* & Western Flower Thrips. Registered in legume vegetables for control of **Loopers**.	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on **Lepidoptera**, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Mealybugs (*Pseudococcidae*) **Priority: Low**								
Capsicum: Mealybugs were ranked as a low priority in QLD, WA, SA & VIC. Chilli: Mealybugs were ranked as a low priority in QLD, WA & VIC. Mealybugs are small insects covered with a white mealy coating. The bugs feed by sucking on plant sap and excreting honey dew. Honeydew infestations can lead to sooty mould growth, and if left uncontrolled can downgrade the quality of the fruit.								
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	Nil	A	ALL	Registered in vegetables for control of Aphids, Thrips, **Mealybug**, Two Spotted Mites, Spider Mite and Whitefly. Apply when temperatures are cooler. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Buprofezin (Applaud) Corteva PER82467	16	Insect Growth Regulator	3	P-A	ALL (excl. VIC)	Permitted for use in several vegetables including capsicum for control of Greenhouse Whitefly, Sweet Potato Whitefly & Silverleaf Whitefly. Registered for control of **Mealybugs** in custard apple, grapes, citrus, passion fruit, pear & persimmons.	L L-Bees	-
Spirotetramat (Movento) Bayer	23	Ingestion	1	P-A	ALL	Registered in capsicum and chilli for control of Silverleaf Whitefly, Green Peach Aphids & Western Flower Thrips. Registered for control of **Mealybug** in cotton, citrus, grapes, mango, passionfruit, pome fruit and stone fruit.	M VL-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in capsicum for control of Green Peach Aphid, Greenhouse Whitefly, Rutherglen Bug and Tomato Potato Psyllid. Registered for control of **Mealybug** in citrus, grapes and pome fruit.	M VH-bees	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Ingestion/ IGR		P		Registered for control of **Mealybugs** in grapes and macadamia.	M M-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flonicamid (Mainman) UPL/ISK	29	Systemic		P		Registered in cucurbits for control of Aphids and Silverleaf White Fly; Aphids in potatoes; Aphids and **Mealybugs** in apples and pears; Aphids and Mirids in cotton. Hort Innovation is undertaking trials in bulb vegetables in support of a permit for Thrip control.	M L-Bees	-
Flupyradifurone (Sivanto) Bayer	4D	Systemic, ingestion & contact		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of Leafhoppers, Aphids, Colorado Potato Beetle, Psyllid, Whiteflies and suppression of Chilli Thrips in fruiting vegetables and for control of **Mealybug** in citrus and small fruit climbing (except fuzzy kiwifruit). Label extension submitted October 2020 for control of Whitefly in cucurbits, eggplant, peppers, green beans, potatoes and sweet potatoes, and Aphids in cucurbits and potatoes.	L VL-Bees	-
NUL3145 Nufarm	TBC			P		New product in development from Nufarm with activity on Scale, Nematodes, **Mealybug** and Whitefly.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars.		-
Vegetable Weevil (*Listroderes difficilis*) **Priority: Low**								
Capsicum: Vegetable Weevil was ranked as a low priority in QLD, WA, SA & VIC. Chilli: Vegetable Weevil was ranked as a low priority in QLD, WA & VIC. Vegetable Weevil can cause damage by tunnelling into leaves and reducing plant vigour. MT16009 IPM Project Recommends: Control broadleaf weed hosts (e.g. marshmallow) in the season prior to planting.								
Chlorpyrifos (Lorsban)	1B	Contact	5	A	NSW & WA	Registered in capsicum for control of Cutworms, Wingless Grasshopper, Field and Mole Crickets and **Vegetable Weevils**. Apply on soil to a minimum of 20 cm on both sides of row crop. [Max. 1 application per crop]	H H-Bees	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Indoxacarb (Avatar) FMC	22A	Ingestion	3	P-A	ALL	Registered in capsicums for control of Helicoverpa and Potato Moth. Registered for control of **Weevils** in pome and stone fruits.	L H-Bees	R3
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/**Weevils**, Fruit Fly and Thrips.		-
Tetraniliprole (Vayego) Bayer	28	Disrupts feeding		P		Registered in Australia in multiple crops for various insect pests such as Beetles, **Weevils** & Lepidoptera.	M VH-Bees	-
Fall Armyworm (*Spodoptera frugiperda*) **Priority: Unknown**								
Fall Armyworm was not ranked as a pest in capsicum and chilli. It is an exotic pest that could affect most vegetable crops. It is important to monitor crops for eggs and larvae of pest species by regular field scouting. Target sprays against mature eggs and newly hatched larvae before pests become entrenched.								
Chlorantraniliprole (Coragen) FMC PER89259	28	Ingestion	1	A	ALL (excl. VIC)	Permitted in Field peas, Faba beans, Brassica vegetables, Brassica leafy vegetables, Stalk and stem vegetables, Leafy vegetables, Fruiting vegetables (including cucurbits), Legume vegetables, Potatoes, Sweet corn and Lettuce for control of **Fall Armyworm**. [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7 d]	L VL-Bees	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER89280	28+4A	Ingestion	42	A	ALL (excl. VIC)	Permitted in Brassica vegetables, Brassica leafy vegetables, Leafy vegetables (including lettuce, endive, silverbeet and spinach) and Fruiting vegetables (excluding cucurbits) for control of **Fall Armyworm**. Do not transplant seedlings treated by seedling drench into hydroponic production systems. [max 1 application per crop]	M VH-Bees	R2
Emamectin (Proclaim Opti) Syngenta PER89263	6	Ingestion	3 NG	A	ALL (excl. VIC)	Permitted in Brassica vegetables, Root and tuber vegetables, (except potato) Leafy vegetables, Brassica leafy vegetables, Sweet Corn, Lettuce, Cucurbits, Legume vegetables and Fruiting vegetables (field grown and protected cropping) for control of **Fall Armyworm**. [Max 4 applications per crop; re-treatment interval: 7 d]	M H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Indoxacarb (Avatar eVo) FMC PER89278	22A	Contact	7	A	ALL (excl. VIC)	Permitted in Broccoli, Brussels sprouts, Cabbage (closed head varieties only), Cauliflower, Celery, Capsicum, Eggplant, Peppers Tomato (field or trellis), Leafy vegetables and Chinese leafy vegetables for control of **Fall Armyworm**. [Max 4 applications per crop; re-treatment interval: 7 d]	L H-Bees	R3
Spinetoram (Delegate & Success Neo) Corteva PER89241	5	Ingestion	3	A	ALL (excl. VIC)	Permitted in Sweet corn, Brassica vegetables, Brassica leafy vegetables, Stalk and stem vegetables, Leafy vegetables, Fruiting vegetables (including cucurbits), Legume vegetables, Stalk and stem vegetables, Culinary herbs, Root and tuber vegetables and several fruits for control of **Fall Armyworm**. (field & protected) [Max. 4 applications per crop; re-treatment interval 7-14 d]	M H-Bees	-
Spinosad (Entrust Organic) Corteva PER89870	5	Ingestion	3 G:14	A	ALL (excl. VIC)	Permitted in Brassica vegetables, Brassica leafy vegetables, Stalk and stem vegetables, Leafy vegetables, Fruiting vegetables, Legume vegetables (succulent seeds & immature pods only), Stalk and stem vegetables, Culinary herbs, Root and tuber vegetables and several fruits for control of **Fall Armyworm**. (field & protected). [Max. 4 applications per season; re-treatment interval 7-14 d]	L L-Bees	-
Methomyl (Lannate) PER89293						Permitted in Vegetables: Brassica vegetables, Capsicums (sweet peppers), Sweet corn, Beans (legume only), Peas (legume only), Potatoes, Tomatoes, Shallots, Spring onion, Fruiting vegetables (including cucurbits), Fruiting vegetables (excluding cucurbits), Legume vegetables (snow and sugar snap peas), Sweet Potato, Radish, Swede, Turnip, Lettuce (head and leafy lettuce), Root and tuber vegetables, Celeriac, Silverbeet, Myoga, Ginger, Rakkyo, Parsley, Spinach, Fennel, Brassica leafy vegetables, Bulb onion, Fennel bulb, Leeks & Celery		

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Indoxacarb (Avatar) PER89278	22A	Contact & stomach	3	A	All	Permitted in Vegetables: Broccoli, Brussels sprouts, Cabbage (closed head varieties only), Cauliflower, Celery, Capsicum, Eggplant, Peppers Tomato (field or trellis), Leafy vegetables, Chinese leafy vegetables	M Bee:M	R3
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on **Lepidoptera**, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**.		-
Spodoptera Frugiperda Multiple Nucleopolyhedrovirus (SfMNPV) (Fawligen Fall Armyworm Biocontrol)	TBC			P		PER90820 - Fawligen Fall Armyworm Biocontrol) / Various Crops including Sweetcorn, Root and Tuber Vegetables, Legume Vegetables & Ornamentals Flowers and Plants / Fall Armyworm		
Amorphous Silica (Abrade Abrasive Barrier Insecticide)	NA			P-A		PER90841 - Amorphous Silica (Abrade Abrasive Barrier Insecticide) / Sweet Corn / Fall Armyworm Abrade is registered for the control of Helicoverpa spp. in cotton, Brassica vegetables and Capsicums & Diamondback moth in Brassica vegetables.		
Tetraniliprole (Vayego 200 SC) Bayer	28	Disrupts feeding		P		Tetraniliprole differs from most other group 28 insecticides as the spectrum of control expands beyond Lepidoptera control to include Coleoptera and Diptera plus other specific sucking pests. Label registration in vegetable crops in Indonesia for Leafminers - *Liriomyza huidobrensis* and Fall armyworms (FAW) *Spodoptera frugiperda.*	M Bee:VH	

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Fungus Gnats (*Bradysia* spp., Sciaridae) **Priority: Unknown**								
Fungus Gnats were not ranked as a pest in peppers. Fungus Gnats are small, mosquito-like flies which are a common problem in nurseries and greenhouses where propagation material and seedlings are being grown. It is important to monitor crops for eggs and larvae of pest species by regular field scouting. Target sprays against mature eggs and newly hatched larvae before pests become entrenched.								
Bacillus thuringiensis (Vertobac) PER14694	11A	Biological	NR	A	ALL (excl. VIC)	Permitted for use in capsicums (Protected situations only) for control of **Fungus Gnats**. Will only control larvae. For existing infestations make 3 weekly applications.	VL L-Bees	-
Tomato Potato Psyllid (*Bactericera cockerelli*) **Priority: Unknown**								
Tomato Potato Psyllid was not ranked as a pest in peppers. It is an exotic pest that could affect most vegetable crops. It is important to monitor crops for eggs and larvae of pest species by regular field scouting. Target sprays against mature eggs and newly hatched larvae before pests become entrenched.								
Abamectin	6	Contact	3 G:3	A	ALL	Registered in fruiting vegetables, including peppers, for control of Two-Spotted Mite, Tomato Red Spider Mite, Tomato Russet Mite, **Tomato Potato Psyllid** and Tobacco Leafminer. [Max 2 applications per crop; re-treatment interval 28 d.]	M H-Bees	-
Bifenthrin (Talstar) PER84229	3A	Contact	3	A	ALL	Permitted for use in capsicum and chilli (field and protected cropping) for control of **Tomato Potato Psyllid**. [Max. 2 application per crop; re-treatment interval 14-20 d]	VH H-Bees	R3
Cyantraniliprole (Benevia) FMC PER84805	28	Ingestion	1	A	ALL (excl. VIC)	Permitted for use in peppers tomato and eggplant for control of **Tomato Potato Psyllid**. [Max. 2 application per crop; re-treatment interval 7-10 d]	M VH-Bees	-
Methomyl (Lannate) PER84229	1A	Contact	3	A	ALL	Permitted for use in capsicum and chilli (field and protected cropping) for control of **Tomato Potato Psyllid**. [Max. 6 application per crop; re-treatment interval 7 d]	H H-Bees	R2
Spinetoram (Success Neo) Corteva PER84757	5	Ingestion	1	A	ALL (excl. VIC)	Permitted for use in fruiting vegetables including peppers (field grown only) for control of **Tomato Potato Psyllid**. [Max. 4 application per crop; re-treatment interval 7-14 d]	M H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spirotetramat (Movento) Bayer PER84245	23	Ingestion	1	A	ALL	Permitted for use in fruiting vegetables including peppers (field & protected) for control of **Tomato Potato Psyllid**. [Max. 4 application per crop; re-treatment interval 7-14 d]	M VL-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in capsicum for control of Green Peach Aphid, Greenhouse Whitefly, Rutherglen Bug and **Tomato Potato Psyllid**. Do not use if honeybees are foraging. [Max. no. of applications not specified; re-treatment interval 7-10 d].	M VH-bees	-
Sulfoxaflor (Transform) Corteva PER84743	4C	Contact & Ingestion	1	A	ALL (excl. VIC)	Permitted for use in fruiting vegetables including peppers (field grown only) for control of **Tomato Potato Psyllid**. [Max. 4 application per crop; 2 consecutive; re-treatment interval 7-10 d]	M VH-Bees	-
Leafminers (*Liriomyza* spp.) **Priority: Unknown**								
Leaf Miner was not ranked as a pest in celery. Dipteran Leaf Miners (*Liriomyza* spp.) are exotic pests that have recently been detected and become problematic in Australia. For example, the Serpentine leaf miner was first detected in the Sydney area in October 2020 and has since been found in crops in SE Qld. As a group they are destructive pests and can cause significant economic loss through reduced yields and quality when uncontrolled.								
Abamectin PER81876	4C	Contact	7 NG	A	ALL (excl. VIC)	Permitted for use in fruiting vegetables for control of ***Liriomyza* spp.** [Max. 2 application per crop; re-treatment interval 7-14 d]	M H-Bees	-
Cyromazine (Diptex 150 WP) PER81867	17	Insect Growth Regulator	7 NG	A	ALL	Permitted for use in fruiting vegetables for control of ***Liriomyza* spp.** [Max. 6 applications per crop; re-treatment interval 7 d]	L H-Bees	-
Cyantraniliprole (Benevia) PER90387	28	Ingestion	1 NG	A	ALL (excl. VIC)	Permitted for use in fruiting vegetables for control of Leaf miners (*Liriomyza* spp.) [Max. 2 applications per crop; re-treatment interval 7 d]	M VH-Bees	-
Spinosad (Entrust Organic) Corteva PER90928	5	Ingestion	3 G:14	A	ALL (excl. VIC)	Permitted for use in fruiting vegetables for control of **Liriomyza Leafminers**. [Max. 4 applications per crop; min. re-treatment interval 4 d]	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spirotetramat (Movento) PER88640	23	Ingestion	1	A	ALL (excl. VIC)	Permitted for use in capsicum and chilli (field & protected) for control of ***Liriomyza* spp.** [Max. 3 applications per crop; re-treatment interval 7 d]	M VL-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in fruiting vegetables for control of Cotton Bollworm, Native Budworm, Tomato Leaf Miner and Western Flower Thrips. Permitted for control of **Liriomyza Leafminers** in snow peas, sugar snap peas and green beans.	M Bee:H	-
Tetraniliprole (Vayego 200 SC) Bayer	28	Disrupts feeding		P		Tetraniliprole differs from most other group 28 insecticides as the spectrum of control expands beyond Lepidoptera control to include Coleoptera and Diptera plus other specific sucking pests. Label registration in vegetable crops in Indonesia for Leafminers - *Liriomyza huidobrensis* and Fall armyworms (FAW) *Spodoptera frugiperda.*	M Bee:VH	

4.3 Weeds in capsicum and chilli

4.3.1 Weed priorities

Common Name	Scientific Name
High	
Blackberry Nightshade	*Solanum nigrum*
Marshmallow	*Malva parviflora*
Pigweed	*Portulaca* spp.

The high priority weeds based on the feedback received were Blackberry Nightshade, Marshmallow and Pigweed. These are managed by using herbicides mentioned in Appendix 3 or by various management practices such as soil fumigation, pre-crop spraying, spot spraying, or using mechanical devices.

Growers generally use a pre-plant weed control (general knockdown herbicides) to prepare the paddock. Growers then either alternate the herbicides used or use them in combination for effective weed control. All the herbicides registered/permitted are either pre-emergent herbicides or early post-emergent herbicides. Most weeds can be controlled with currently available herbicides.

Resistance management
Of the weeds listed in the table above there are confirmed cases of resistance in Australia for Blackberry Nightshade (Group L at 2 sites).

Specific resistance management strategies for high resistance risk (A and B) and moderate resistance risk (C, D, F, G, I, J, K, L, M, N, Q and Z) herbicide modes of action are available on the CropLife Australia webpage[6].

[6] https://www.croplife.org.au/resources/programs/resistance-management/herbicide-resistance-management-strategies-2/

4.3.2 Available and potential products for weed control

TABLE KEY: Note that blank fields in the table indicate no information has been provided.

Availability			
A	Available via either registration or permit approval		
P	Potential – a possible candidate to pursue for registration or permit		
P-A	Potential, already approved in the crop for another use		
Resistance risk		**Regulatory risk (refer to Appendix 6)**	
		R1	Short-term: Critical concern over retaining access
**	Moderate resistance risk	R2	Medium-term: Maintaining access of significant concern
***	High resistance risk	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Blackberry Nightshade (*Solanum nigrum*) **Priority: High**							
Capsicum: Blackberry Nightshade was ranked as a high priority in QLD & SA, and as a moderate priority in WA & VIC. Chilli: Blackberry Nightshade was ranked as a high priority in QLD & SA, and as a moderate priority in WA & VIC. Blackberry Nightshade is a prolific weed that is widely adapted and difficult to eradicate, mainly due to its long-term seed viability.							
Glyphosate (Roundup)	M**	General knockdown. Pre-crop spray	Registered for control of grass and broadleaf weeds, including **Blackberry Nightshade**, as a pre-crop spray.	NR	A	ALL	R3
Glyphosate (Roundup) PER13901	M**	Capsicums / post-emergent / shielded spray	Permitted for use in capsicums for control of grass and broadleaf weeds, including **Blackberry Nightshade**, as an inter-row spray with shielded nozzles.	NR	A	NSW & QLD	R3
Paraquat + Diquat (SpraySeed)	L**	Vegetables/General seed bed preparation / Post-emergence inter-row weed control	Registered for use as a pre-crop spray to control grass and broadleaf weeds, including **Blackberry Nightshade**. Only used in field grown crops. Post-emergence inter-row weed control (shielded spray – do not touch the crop). [Max no of applications not specified]	1 G:1	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Bentazone (Basagran)	C**		Registered in legume crops and permitted in onions for control of various broadleaf weeds, including **Blackberry Nightshade**.		P		-
Chlorthal Dimethyl (Dacthal) Nufarm	D**		Registered in various vegetable and broadacre crops for control of various grass and broadleaf weeds, including **Blackberry Nightshade**.		P		-
Flumioxazin (Chateau)	G**		Registered in various tree and vine crops for control of **Blackberry Nightshade**.		P		-
Fluroxypyr (Starane)	I**		Registered in various crops for control of broadleaf weeds, including **Blackberry Nightshade**.		P		-
Methabenzthiazuron (Tribunil) AgNova	C**		Registered in onions for control of various grass and broadleaf weeds, including **Blackberry Nightshade**.		P		-
Norflurazon (Zoliar)	F**		Registered in various tree crops and cotton for control of grass and broadleaf weeds, including **Blackberry Nightshade**.		P		-
NUL3438 Nufarm	TBC		New active in development, Nufarm claim activity on broadleaf weeds.		P		-
Oryzalin	D**		Registered in various tree crops for control of grass and broadleaf weeds, including **Blackberry Nightshade**.		P		-
Oxyfluorfen (Goal)	G**		Registered in broccoli, cabbage & cauliflower for pre-emergent control of several broadleaf and grass weeds including **Blackberry Nightshade**.		P		-
S-Metolachlor (Dual Gold) Syngenta	K**		Registered in various crops including brassica vegetables for control of grass and broadleaf weeds, including **Blackberry Nightshade**.		P		-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Marshmallow (*Malva parviflora*) **Priority: High**							
Capsicum: Marshmallow was ranked as a high priority in QLD & WA and as a moderate priority in SA & VIC. Chilli: Marshmallow was ranked as a high priority in QLD & WA and as a moderate priority in VIC. Marshmallow is adapted to a wide variety of environments and highly competitive weed. Control with knockdown herbicides can be unreliable.							
Glyphosate (Roundup)	M**	General knockdown. Pre-crop spray	Registered for control of grass and broadleaf weeds, including **Marshmallow**, as a pre-crop spray.	NR	A	ALL	R3
Glyphosate (Roundup) PER13901	M**	Capsicums / post-emergent / shielded spray	Permitted for use in capsicums for control of grass and broadleaf weeds, including **Marshmallow**, as an inter-row spray with shielded nozzles.	NR	A	NSW & QLD	R3
Paraquat + Diquat (SpraySeed)	L**	Vegetables/General seed bed preparation / Post-emergence inter-row weed control	Registered for use as a pre-crop spray to control grass and broadleaf weeds, including **Marshmallow**. Only used in field grown crops. Post-emergence inter-row weed control (shielded spray – do not touch the crop). [Max no of applications not specified]	1 G:1	A	ALL	R3
Chloridazon (Pyramin) BASF	C**		Registered in silverbeet and baby spinach leaf (VIC & TAS) for control of a range of broadleaf weeds, including **Marshmallow**.		P		-
Fluroxypyr (Starane)	I**		Registered in various crops for control of broadleaf weeds, including **Marshmallow**.		P		-
Methabenzthiazuron (Tribunil) AgNova	C**		Registered in onions for control of various grass and broadleaf weeds, including **Marshmallow**.		P		-
NUL3438 Nufarm	TBC		New active in development, Nufarm claim activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered in broccoli, cabbage & cauliflower for pre-emergent control of several broadleaf and grass weeds including **Marshmallow.** Apply 4-7 days prior to transplanting. Irrigation or rainfall is essential for activation of this herbicide		P		-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Pigweed (*Portulaca* spp.) **Priority: High**							
Capsicum: Pigweed was ranked as a high priority in QLD & SA, as a moderate priority in VIC and as a low priority in WA. Chilli: Pigweed was ranked as a high priority in QLD, as a moderate priority in VIC and as a low priority in WA. Pigweed is a summer growing weed that competes aggressively in-crop and can be difficult to control with herbicides.							
Glufosinate (Basta) PER88349	N**	Capsicum / Directed or Spot Spray	Permitted for control of grass and broadleaf weeds, including **Pigweed**, in capsicum.	NR	A	ALL (excl. VIC)	R3
Glyphosate (Roundup)	M**	General knockdown. Pre-crop spray	Registered for control of grass and broadleaf weeds, including **Pigweed**, as a pre-crop spray.	NR	A	ALL	R3
Glyphosate (Roundup) PER13901	M**	Capsicums / post-emergent / shielded spray	Permitted for use in capsicums for control of grass and broadleaf weeds, including **Pigweed**, as an inter-row spray with shielded nozzles.	NR	A	NSW & QLD	R3
Paraquat + Diquat (SpraySeed)	L**	Vegetables/General seed bed preparation / Post-emergence inter-row weed control	Registered for use as a pre-crop spray to control grass and broadleaf weeds, including **Pigweed**. Only used in field grown crops. Post-emergence inter-row weed control (shielded spray – do not touch the crop). [Max no of applications not specified]	1 G:1	A	ALL	R3
Trifluralin	D**	Capsicum, chillies & paprika / Pre-emergent	Registered for use in peppers for control of various broadleaf and grass weeds, including suppression of **Pigweed**. [Max no. of applications not specified]	NR	A	ALL	-
Chloridazon (Pyramin) BASF	C**		Registered in silverbeet and baby spinach leaf (VIC & TAS) for control of a range of broadleaf weeds, including **Pigweed**.		P		-
Chlorthal Dimethyl (Dacthal) Nufarm	D**		Registered in various vegetable and broadacre crops for control of various grass and broadleaf weeds, including **Pigweed**.		P		-
Fluroxypyr (Starane)	I**		Registered in various crops for control of broadleaf weeds, including **Pigweed**.		P		-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glufosinate-ammonium (Basta)	N**		Registered in green beans, tomatoes & tropical & subtropical fruits for control of a range of grass and broadleaf weeds including **Pigweed**.		P		-
Methabenzthiazuron (Tribunil) AgNova	C**		Registered in onions for control of various grass and broadleaf weeds, including **Pigweed**.		P		-
Norflurazon (Zoliar)	F**		Registered in various tree crops and cotton for control of grass and broadleaf weeds, including **Pigweed**.		P		-
NUL3438 Nufarm	TBC		New active in development, Nufarm claim activity on broadleaf weeds.		P		-
Oryzalin	D**		Registered in various tree crops for control of grass and broadleaf weeds, including **Pigweed**.		P		-
Oxyfluorfen (Goal)	G**		Registered in broccoli, cabbage & cauliflower for pre-emergent control of broadleaf and grass weeds, including **Pigweed.**		P		-
Phenmedipham (Betanal) Bayer	C**		Registered in Silverbeet for control of a range of broadleaf weeds, including **Pigweed**.		P		R3
S-Metolachlor (Dual Gold) Syngenta	K**		Registered in various crops including brassica vegetables for control of grass and broadleaf weeds, including **Pigweed**.		P		-
Grass and Broadleaf Weeds Priority: Low							
Weed control is not generally a high priority issue in capsicum and chilli.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic nematodes, symphylans, wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Clethodim (Select) PER82459	A***	Chilli peppers/ grass weds/ post-emergent	Permitted for use as a spot spray for control of grass weeds. [Max. 1 application per crop]	28	A	ALL	R3
Fluazifop-P (Fusilade)	A***	Capsicum & various vegetables / Post-emergent	Registered in capsicum for control of various grass weeds as specified on the approved label. Spray at 3-leaf stage of crop. [Max. 1 application per crop]	H:77	A	Variable- refer to label	-
Glufosinate (Basta) PER88349	N**	Capsicum / Directed or Spot Spray	Permitted for control of grass and broadleaf weeds in capsicum.	NR	A	ALL (excl. VIC)	R3
Glyphosate (Roundup)	M**	General knockdown. Pre-crop spray	Registered for control of grass and broadleaf weeds, as a pre-crop spray.	NR	A	ALL	R3
Glyphosate (Roundup) PER13901	M**	Capsicums / post-emergent / shielded spray	Permitted for use in capsicums for control of grass and broadleaf weeds, as an inter-row spray with shielded nozzles.	NR	A	NSW & QLD	R3
Trifluralin	D**	Capsicum, chillies & paprika / Pre-emergent	Registered for use in peppers for control of various broadleaf and grass weeds. [Max no. of applications not specified]	NR	A	ALL	-

5. References

5.1 Information:

AgChem Access Priority Access Forum	https://www.agrifutures.com.au/national-rural-issues/agvet-chemicals/
Australian Pesticide and Veterinary Medicines Authority	www.apvma.gov.au
APVMA Chemical review	https://apvma.gov.au/chemicals-and-products/chemical-review/listing
APVMA MRLs	www.legislation.gov.au/Details/F2021C00236
APVMA Permit search	https://productsearch.apvma.gov.au/permits
APVMA Product search	https://productsearch.apvma.gov.au/products
AUSVEG	https://ausveg.com.au
Codex MRL database	http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/
Cotton Pest Management Guide 2019-20	https://www.cottoninfo.com.au/publications/cotton-pest-management-guide
CropLife Australia (resistance management)	https://www.croplife.org.au/resources/programs/resistance-management/
Growcom – Infopest Database	www.infopest.com.au
Hort Innovation	www.horticulture.com.au

5.2 Abbreviations and Definitions:

APVMA	Australian Pesticides and Veterinary Medicines Authority
IPM	Integrated pest management
LOQ	Limit of quantification
MRL	Maximum residue limit (mg/kg or ppm)
Pesticides	Plant protection products (fungicide, insecticide, herbicide, nematicides, rodenticides, etc.).
Plant pests	Diseases, insects, nematodes, rodents, viruses, weeds, etc.
SARP	Strategic Agrichemical Review Process
TBC	To be confirmed
WHP	Withholding Period

5.3 Acknowledgements:

Thanks go to the many industry people who contributed information and collaborated on the review of this report.

6. Appendices:

Appendix 1. Products available for disease control in capsicum and chilli
Appendix 2. Products available for control of insects and mites in capsicum and chilli
Appendix 3. Products available for weed control in capsicum and chilli
Appendix 4. Current permits for use in capsicum and chilli
Appendix 5. Capsicum and Chilli Maximum Residue Limits (MRLs)
Appendix 6. Capsicum and Chilli Agrichemical Regulatory Risk Assessment

Appendix 1. Products available for disease control in capsicum and chilli

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / General fumigant	Soil borne fungi	ALL	NR	-
Aureobasidium pullalans (Botector) Nufarm	-	Fruiting Vegetables	Botrytis Grey Mould Sclerotinia	ALL	NR	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Tomato, capsicum, chilli & several fruits	Suppression of Bacterial Spot (*Xanthomonas* spp.)	ALL	NR	-
Benzalkonum Chloride + Poly Hydrochloride (Microtech 7000)	-	Disinfectant	General disinfection of hard surfaces and equipment	ALL	NR	-
Boscalid (Filan) BASF	7	Capsicums, peppers (field & protected)	Early Blight (*Alternaria solani*)	ALL	14	-
Boscalid (Filan) BASF PER11127	7	Peppers (field)	Sclerotinia	ALL (excl. VIC)	14	-
Bromo Chloro Methyl Hydantoin (BCDMH) Sanitiser	-	Sanitiser / Post-harvest treatment	Post-harvest treatment of external rot-causing organisms, and general disinfectant for equipment	ALL	NR	-
Bupirimate (Nimrod)	8	Peppers (capsicum, chillies, and paprika) (field & protected)	Powdery Mildew	ALL	1	-
Captan PER14326	M4	Chilli peppers (protected)	Grey Mould	ALL (excl. VIC)	7	-
Chlorine	-	Sanitiser / Post-harvest treatment	Post-harvest treatment for bacteria and fungi, and general disinfectant for equipment	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Chloropicrin (Agrocelhone NE Soil Fumigant)	8	Vegetables / General fumigant	Soil borne fungi	ALL	NR	-
Chlorothalonil (Bravo) Syngenta	M5	Capsicums, peppers (field)	Grey Mould, Anthracnose	ALL	1	R2
Copper Oxychloride	M1	Capsicum (field)	Bacterial Spot (All States) and Bacterial Canker	NSW, ACT & WA	1	-
Copper Oxychloride + Copper Hydroxide	M1	Capsicum (field)	Bacterial Spot and Bacterial Canker	ALL	1	-
Copper products PER14038	M1	Paprika and chilli (field)	Bacterial Spot	ALL (excl. VIC)	1	-
Copper Hydroxide	M1	Capsicum (field)	Bacterial Spots, Canker and Other Fungal and Bacterial Diseases	ALL	1	-
Cyprodinil + Fludioxonil (Switch) Syngenta PER84878	9+12	Capsicum (field & protected)	Botrytis Rot and Sclerotinia Rot	ALL (excl. VIC)	7	R3
Dazomet (Basamid, Cerlong)	8F	Vegetables	Soil fungi, nematodes, soil insects and weeds	ALL	NR	-
Fenhexamid (Fenhexamid 500SC) Imtrade	17	Peppers (field & protected)	Botrytis Rot	ALL (excl. VIC)	1	-
Hydrogen Peroxide + Peroxy Acetic Acid (Peratec Plus)	M	Peppers (field & protected)	Powdery Mildew	ALL	1	-
Iodine	-	Sanitiser / Post-harvest dip	Post-harvest dip for control of bacteria and fungi	ALL	NR	-
Iprodione (Rovral) PER14353	2	Capsicum, chillies & (field & protected)	Sclerotinia Rot	ALL (excl. VIC)	14	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Mancozeb	M3	Capsicum (field)	Target Spot	ALL	14	R2
Mancozeb + Metalaxyl-M (Ridomil Gold MZ WG) Syngenta PER82456	M3+4	Capsicums, chillies & paprika (field)	Downy Mildew	ALL (excl. VIC)	7	R2
Metalaxyl-M (Ridomil Gold 25G) Syngenta	4	Capsicums (field)	Damping Off (Pythium and *Phytopthora* spp)	ALL (excl. VIC)	7	-
Metham Sodium	-	General pre-plant soil fumigation	Nematodes, fungi, and weed seeds	ALL	NR	-
Metiram (Polyram) BASF	M3	Capsicum & Peppers (field)	Alternaria Leaf Spot and Cercospora Leaf Spot	ALL	14	R2
Metiram + Pyraclostrobin (Aero) BASF	M3+11	Capsicum & Peppers (field)	Early Blight (*Alternaria solani*)	ALL	28	R2
Penthiopyrad (Fontelis) Corteva	7	Capsicum & chilli (field & protected)	Early Blight, Grey Mould, And Powdery Mildew	ALL	NR	-
Peroxyacetic Acid	M	Sanitiser / Post-Harvest Treatment	Post-Harvest treatment for control of bacterial growth	ALL	NR	-
Phosphorous Acid (Agri-Fos) PER81408	33	Capsicums (protected)	Phytophthora soil fungus	ALL (excl. VIC)	1	-
Potassium Bicarbonate (Eco-Carb)	M2	Capsicums (field)	Powdery Mildew	ALL	NR	-
Potassium Bicarbonate (Eco-Carb) PER13695	M2	Peppers	Powdery Mildew	ALL (excl. VIC)	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Potassium Peroxomonosulfate Triple Salt (Virkon S)	-	Disinfectant	General disinfection of agricultural equipment and facilities	ALL	NR	-
Proquinazid (Talendo) Corteva	13	Capsicums (field)	Powdery Mildew	ALL	NR	-
Procymidone (Sumisclex) Sumitomo PER11440	2	Capsicums, chillies & paprika (field)	Sclerotinia Rot	ALL (excl. VIC)	9	R2
Pyrimethanil (Scala) Bayer PER12565	9	Capsicums (protected)	Botrytis Grey Mould	ALL (excl. VIC)	3	-
Quarternary Ammonium Compound	-	Disinfectant	General sanitising of farm equipment	ALL	NR	-
Sulphur	M2	Vegetables	Powdery Mildew, Rust, Tomato Russet Mite, Bean Spider Mite, and Two-Spotted Mite	Variable refer to label	NR	-
Tea Tree Oil	46	Capsicums (field & protected)	Powdery Mildew	ALL	NR	-
Triadimenol (Bayfidan) Bayer	3	Peppers (capsicums and chillies) (field)	Powdery Mildew	ALL	1	R3-
Trifloxystrobin (Flint) BASF PER14050	11	Capsicums (Peppers) (protected)	Powdery Mildew	ALL (excl. VIC)	3	-
Zineb	M3	Peppers (field)	Early Blight, Late Blight	ALL	7	R2

Appendix 2. Products available for control of insects, mites and other pests in capsicum and chilli

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Abamectin	6	Capsicums (field & protected)	Two-Spotted Mite, Tomato Red Spider Mite, Tomato Russet Mite, Tomato Potato Psyllid, Tobacco Leafminer / Potato Moth	ALL	3 G:3	-
Abamectin PER81876	6	Fruiting vegetables (field)	Suppression of Leaf Miners, including: Vegetable Leafminer (*Liriomyza sativae*) Serpentine Leafminer (*Liriomyza huidobrensis*)	ALL (excl. VIC)	7 NG	-
Abamectin PER84229	6	Capsicum & Chilli (field)	Tomato Potato Psyllid (*Bactericera cockerelli*)	ALL	3 NG	-
Abamectin (Tervigo Nematicide) Syngenta	6	Capsicum & Chilli	Root-Knot Nematode (*Meloidogyne* spp.)	ALL	NR	-
Acephate PER12378	1B	Capsicum	Western Flower Thrips (*Frankliniella occidentalis*)	ALL (excl. VIC)	3	R3
Afidopyropen (Versys) BASF	9D	Fruiting vegetables, excluding cucurbits (Field & Protected)	Green Peach Aphid, Cabbage Aphid, Currant Lettuce Aphid, Cotton/Melon Aphid, Cotton/Melon Aphid, Corn aphid and Suppression of Silverleaf Whitefly Biotype B	ALL	1	-
Afidopyropen (Versys) BASF PER87852 *Use now registered in protected cropping and permit to be surrendered	9D	Cucumber, capsicum & eggplant (protected)	Green Peach Aphid, Melon Aphid; Suppression of Silverleaf Whitefly.	ALL	3	-
Alpha-Cypermethrin PER80099	3A	Fruiting vegetables (field)	Queensland Fruit Fly and Mediterranean Fruit Fly	ALL (excl. VIC)	1	-
Amorphous Silica	-	Capsicums	Helicoverpa and Cluster Caterpillar	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Bacillus thuringiensis subsp. *kurstaki* (Dipel)	11A	Vegetables	Armyworm, Cotton Bollworm, Native Budworm, Cabbage Moth, Cabbage White Butterfly, Green Looper, Lightbrown Apple Moth, Pear Looper, Soybean Looper, Vine Moth, and Tobacco Looper.	ALL	NR	-
Bacillus thuringiensis (Vertobac) PER14694	11A	Capsicums (protected)	Fungus Gnats	ALL (excl. VIC)	NR	-
Beauveria bassiana (Velifer) BASF	UN	Protected vegetables & ornamentals	Suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites.	ALL	NR	-
Bifenazate (Acramite) UPL	20D	Capsicums & Peppers (field & protected)	Two-Spotted Mite and Bryobia Mite	ALL	1	-
Bifenazate (Acramite) UPL PER82341	20D	Peppers (field & protected)	Red Tomato Spider Mite	ALL (excl. VIC)	1	-
Bifenthrin (Talstar) PER13567	3A	Capsicums (field)	Fruit fly including Queensland Fruit Fly and Lesser Queensland Fruit Fly	Bowen & Gumlu regions of QLD	1	R3
Bifenthrin (Talstar) PER84229	3A	Capsicum & chilli (field)	Tomato Potato Psyllid	ALL	1 NG	R3
Buprofezin (Applaud) Corteva PER82467	16	Peppers (field & protected)	Greenhouse Whitefly, Sweet Potato Whitefly, Silverleaf Whitefly & Whitefly	ALL (excl. VIC)	3	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Chlorantraniliprole (Coragen) FMC	28	Capsicums & Peppers (field & protected)	Cotton Bollworm, Native Budworm, Tomato Leaf Miner, and Eggfruit Caterpillar	ALL	3	-
Chlorantraniliprole (Coragen) FMC PER89259	28	Fruiting vegetables including cucurbits (field)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	1	-
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Capsicums (field & protected)	Cotton Bollworm, Native Budworm, Potato Moth, Cluster Caterpillar, Green Peach Aphid, Silverleaf Whitefly, Greenhouse Whitefly, Western Flower Thrips, and Tomato Thrips	ALL	NR	R2
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER89280	28+4A	Fruiting vegetables including capsicum (seedling treatment)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	42	R2
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER87051	28+4A	Cucurbits & fruiting vegetables including eggplant (field & protected)	Various specified pests (including Corn Earworm, Native Budworm, Potato Moth, Cabbage Aphid, Green Peach Aphid, Silverleaf Whitefly – all biotypes, Greenhouse Whitefly, Western Flower Thrips, Onion Thrips)	QLD	35 NG	R2
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	General fumigant	Plant Parasitic Nematodes, Symphylans, Wireworms, Soil Borne Diseases (Including Fusarium and Verticillium Wilts, Rhizoctonia, Pythium) and suppression of weeds.	ALL (Restricted use TAS, VIC & SA)	NR	-
Chlorpyrifos (Lorsban)	1B	Capsicums (field)	Cutworms, Wingless Grasshopper, Field and Mole Crickets & Vegetable Weevils	Variable refer to label	Variable refer to label	R1
Clothianidin (Samurai) Sumitomo PER80100	4A	Fruiting vegetables (field and protected)	Mediterranean Fruit Fly Queensland Fruit Fly	ALL	7 NG	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Cyantraniliprole (Benevia) FMC	28	Capsicum & Peppers (field)	Silverleaf Whitefly, Cotton Bollworm, Native Budworm, Tomato Leaf Miner and suppression of Green Peach Aphid, Tomato Thrips and Western Flower Thrips	ALL	1	-
Cyantraniliprole (Benevia) FMC PER84805	28	Peppers (field)	Tomato Potato Psyllid	ALL (excl. VIC)	1	-
Cyantraniliprole (Benevia) FMC PER90387	28	Fruiting Vegetables	Leaf Miners including: Vegetable Leaf Miner (*Liriomyza sativae*) Pea Leaf Miner / Serpentine Leaf Miner (*Liriomyza huidobrensis*) American Serpentine Leaf Miner (*Liriomyza trifolii*)	ALL (excl. VIC)	1 NG	-
Cyromazine (Diptex 150WP) PER81867	17	Fruiting Vegetables (field and protected)	Vegetable Leafminer (*Liriomyza sativae*) Serpentine Leafminer (*Liriomyza huidobrensis*)	ALL	7 NG	-
Dazomet (Basamid, Cerlong)	8F	Vegetables	Soil fungi, nematodes, soil insects and weeds	ALL	NR	-
Diazinon	1B	Capsicums (field)	Cutworm	ALL (excl. TAS)	14	R3
Dimethoate	1B	Capsicums (field)	Cucumber Fly, Fruit Fly, Wingless Grasshoppers, Aphids, Jassids, Mites, Leaf Hoppers, Green Vegetable Bug, and Thrips	ALL	3	R1
Emamectin (Proclaim Opti) Syngenta	6	Capsicums (field & protected)	*Helicoverpa armigera, Helicoverpa punctigera* and Cluster Caterpillar	ALL	3 NG	-
Emamectin (Proclaim Opti) Syngenta PER89263	6	Fruiting vegetables (field & protected)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	3	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Emulsifiable Botanical Oil (Eco-Oil)	-	Vegetables	Greenhouse Whitefly	ALL	NR	-
Emulsifiable Botanical Oil (Eco-Oil)	-	Capsicums (field)	Two-Spotted Mite and Aphids	ALL	NR	-
Emulsifiable Botanical Oils (Eco-Oil) PER14077	-	Greenhouse & hydroponic capsicums (protected)	Silverleaf Whitefly Biotype B	ALL (excl. VIC)	Nil	-
Ethyl Formate	-	Capsicum- pre-plant soil fumigant	Western Flower Thrips	ALL	ALL	-
Etoxazole (Paramite) Sumitomo	10B	Capsicums (field & protected)	Two-Spotted Mite	ALL	7	-
Etoxazole (Paramite) Sumitomo PER82460	10B	Capsicums (field & protected)	Tomato Red Spider Mite	ALL (excl. VIC)	7	-
Flubendiamide (Belt) Bayer	28	Capsicums & Peppers (field & protected)	Helicoverpa spp. and Tomato Leaf Miner	ALL	1	-
Fluensulfone (Nimitz) Adama	-	Capsicum & Chilli (field)	Root-Knot Nematode (*Meloidogyne* spp.)	ALL	NR	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Vegetables	Ants, Aphids, Caterpillars, Earwigs, Whitefly, Thrips & Leafhoppers. Suitable for organic growers	ALL	1	-
Hexythiazox (Calibre) Nufarm PER14765	10A	Capsicum & chilli (field & protected)	Tomato Russet Mite, Broad Mite, Two-Spotted Mite, and Tomato Red Mite	ALL	3	-
Imidacloprid (Confidor)	4A	Capsicum (field)	Green Peach Aphid	ALL	7	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Imidacloprid (Confidor Guard)	4A	Capsicum / Trickle Irrigation, Furrow spray pre-plant or Plant Hole Drench	Silverleaf Whitefly	ALL	NR	R2
Imidacloprid (Confidor) PER12489	4A	Capsicum, chillies & paprika (field & protected)	Control of Greenhouse Thrips and Green Peach Aphid; and suppression of Plague and Onion Thrips	ALL (excl. VIC)	7	R2
Imidacloprid (Confidor) PER88558	4A	Chilli peppers (field)	Silverleaf Whitefly	ALL (excl. VIC)	NR	R2
Indoxacarb (Avatar) FMC	22A	Capsicums & Peppers (field)	Cotton Bollworm, Native Budworm and Potato Moth (Tomato Leaf Miner)	ALL	3	R3
Indoxacarb (Avatar) FMC PER89278	22A	Capsicums & Peppers (field)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	7	R3
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Capsicum & Chilli	Cotton Bollworm (*Helicoverpa armigera*) Native Budworm (*Helicoverpa punctigera*) Potato Moth / Tomato Leaf Miner (*Phthorimaea operculella*)	ALL	3 NG	R3
Iron EDTA Complex	-	Plants generally	Slugs and Snails	ALL	NR	-
Maldison	1B	Capsicum (field)	Fruit Fly	ALL	3	-
Metaldehyde	-	Plants generally	Slugs and Snails	ALL	7	-
Metham Sodium	-	General pre-plant soil fumigation	Nematodes, fungi, and weed seeds.	ALL	NR	-
Methomyl (Lannate)	1A	Capsicums (field)	*Helicoverpa* spp.	QLD, WA & NT	1	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Methomyl (Lannate) PER13566	1A	Capsicums (field)	Queensland Fruit Fly and Lesser Queensland Fruit Fly	Bowen and Gumlu regions of QLD	1	R2
Methomyl (Lannate) PER82428	1A	Peppers (capsicum, chilli & paprika) (field)	*Helicoverpa* spp., Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug, Thrips including Western Flower Thrips	ALL	7	R2
Methomyl (Lannate) PER84229	1A	Capsicum & chilli (field)	Tomato Potato Psyllid	ALL	3 NG	R2
Methomyl (Lannate) PER89293	1A	Fruiting Vegetables (field)	Fall Armyworm (*Spodoptera frugiperda*)	ALL	1	R2
Methoxyfenozide (Prodigy) Corteva	18	Peppers (capsicum & chilli) (field)	Native Budworm, Tomato Grub and Cluster Caterpillar	ALL	NR	-
Milbemectin (Milbeknock)	6	Capsicums (field)	Two-Spotted Mite	ALL	1	-
Nucle Nuclear Polyhedrosis Virus (Vivus) AgBiTech	31	Fruiting vegetables including Peppers	*Helicoverpa* spp.	ALL	NR	-
Oxamyl (Vydate) Corteva	1A	Capsicums (field)	Root Knot Nematode	ALL (excl. TAS)	NR	-
Petroleum Oil	-	Peppers	Aphids, Mites, Thrips & Leafhopper	ALL (excl. QLD)	1	-
Petroleum Oil PER12221	-	Capsicum, chilli & paprika (field & protected)	Greenhouse Whitefly, Sweet Potato Whitefly, Silverleaf Whitefly Biotype B & Whitefly Q Biotype	ALL (excl. VIC)	1	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Phorate (Thimet) PER8930	1B	Chillies, capsicums & paprika (field)	Aphids, Jassids, Mites, Thrips & Onion Maggot	ALL	70	R3
Pirimicarb (Pirimor)	1A	Capsicum & chilli Peppers (field)	Aphids	ALL	2	R3
Potassium Salts of Fatty Acids (Natrasoap)	-	Vegetables	Aphids, Thrips, Mealybug, Two-Spotted Mites, Spider Mite & White Fly	ALL	NR	-
Potassium Salts of Fatty Acids (Natrasoap) PER13920	-	Glasshouse and hydroponically grown capsicums (protected)	Greenhouse Whitefly & Silverleaf Whitefly	ALL (excl. VIC)	NR	-
Propargite (Omite)	12C	Vegetables	Spider Mite (QLD and WA only) & Two-Spotted Mite	Variable refer to label	7	R3
Pymetrozine (Chess) Syngenta	9B	Capsicum (field & protected)	Potato Aphid, Green Peach Aphid & Suppression of Silver Leaf & Greenhouse White Flies	ALL	14	R3
Pyrethrins (Pyganic)	3A	Vegetables (field)	Aphids, Thrips, Caterpillars, Ants, Earwigs, White Flies and Leafhoppers	ALL	1	-
Pyrethrins + Piperonyl Butoxide	3A	Vegetables	Ants, Aphids, Thrips, Caterpillars, Leaf Hoppers, and Whitefly	ALL	1	-
Pyriproxyfen (Admiral) Sumitomo	7C	Capsicum and other Peppers (field & protected)	Silverleaf Whitefly and Greenhouse Whitefly	ALL	1 NG	-
Spinetoram (Success Neo) Corteva	5	Peppers (capsicums and chillies) (field & protected)	Potato Moth (Tomato Leaf Miner), *Helicoverpa* spp. and Western Flower Thrips	ALL	1	-
Spinetoram (Success Neo) Corteva PER84757	5	Peppers (field)	Tomato Potato Psyllid	ALL (excl. VIC)	1	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spinetoram (Success Neo) Corteva PER89241	5	Fruiting vegetables (field & protected)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	1	
Spinosad (Naturalure) Corteva	5	Vegetables (field & protected)	Fruit Flies, including Queensland Fruit Fly and Mediterranean Fruit Fly	ALL	NR	-
Spinosad (Entrust Organic) Corteva	5	Fruiting vegetables including peppers, eggplant & sweet corn (field & protected)	Potato Moth, *Helicoverpa* & Western Flower Thrips	ALL	3 G:14	-
Spinosad (Entrust Organic) Corteva PER89870	5	Fruiting vegetables (field & protected)	Fall Armyworm (*Spodoptera frugiperda*)	ALL	3 G:14	-
Spinosad (Entrust Organic) Corteva PER90928	5	Fruiting Vegetables (field & protected)	Vegetable Leaf Miner (*Liriomyza sativae*) Pea Leaf Miner / Serpentine Leaf Miner (*Liriomyza huidobrensis*) American Serpentine Leaf Miner (*Liriomyza trifolii*)	ALL (excl. VIC)	3 G:14	-
Spirotetramat (Movento) Bayer	23	Capsicums & chillies (field & protected)	Green Peach Aphids, Silverleaf Whitefly & Western Flower Thrips	ALL	1	-
Spirotetramat (Movento) Bayer PER84245	23	Capsicum and chillies (field & protected)	Tomato Potato Psyllid	ALL	1	-
Spirotetramat (Movento) Bayer PER88640	23	Capsicums and chillies (field & protected)	Liriomyza Leafminers (*Liriomyza* spp.)	ALL	1	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Sulfoxaflor (Transform) Corteva	4C	Capsicums & chilli (field)	Green Peach Aphid and Greenhouse Whitefly Rutherglen Bug and Tomato Potato Psyllid	ALL	1	-
Sulfoxaflor (Transform) Corteva PER84743	4C	Peppers (field)	Tomato Potato Psyllid	ALL (excl. VIC)	1	-
Sulphur	M2	Vegetables	Powdery Mildew, Bean Rust, Tomato Russet Mite, and Two Spotted Mites.	Variable. Refer to label	NR	-
Trichlorfon (Lepidex)	1B	Vegetables	Cabbage White Butterfly, Cabbage Moth, Green Vegetable Bug, and Rutherglen Bug	ALL	2	R2
Trichlorfon (Lepidex)	1B	Capsicums and chillies (field)	Fruit Fly	QLD, NSW, VIC, WA & NT	2	R2

Appendix 3. Products available for weed control in capsicum and chilli

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables	Plant Parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds	NR	ALL	-
Clethodim (Select) PER82459	A***	Chilli Peppers	Grass weeds	28	ALL	R3
Fluazifop-P (Fusilade)	A***	Capsicum / Grass selective post-emergent	Grass weeds	77	ALL	-
Glufosinate (Basta) PER88349	N**	Capsicum	Grass and Broadleaf Weeds	NR	ALL (excl. VIC)	R3
Glyphosate (Roundup)	M**	General Pre-plant Spray	Annual and perennial grasses and broadleaf weeds	NR	ALL	R3
Glyphosate (Roundup) PER13901	M**	Capsicums (field) / Shielded Spray	Annual and perennial grasses and broadleaf weeds	NR	NSW & QLD	R3
Paraquat + Diquat (SpraySeed)	L**	General seed bed preparation	General weeds as a pre-crop spray	NR	ALL	R3
Trifluralin	D**	Capsicum, chillies and paprika / Residual pre-emergent	Various broadleaf and grass weeds. Occasionally used as a pre-planting (also under plastic mulch) to control annual broadleaf weeds.	NR	ALL	-

Chemical Group Resistance Risk: ** Moderate, *** High

Appendix 4. Current permits for use in capsicum and chilli

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER81876 Version 4	Abamectin / Fruiting vegetables, including cucurbits (except sweet corn & mushrooms), Leafy vegetables (except lettuce), Legume vegetables, Root & Tuber Vegetables, Bulb onions, cabbage, Celery, Rhubarb & Bulb Vegetables including leeks & spring onions) / Leaf miners (*Liriomyza* spp.)	24-Jun-16	30-Apr-24	Hort Innovation
PER84229 Version 2	Abamectin (field & protected), Bifenthrin (field) & Methomyl (field) / Tomato, eggplant, capsicum & chilli / Tomato potato psyllid	07-Apr-17	31-Mar-25	NSW DPI
PER12378 Version 4	Acephate / Ornamentals, Tomatoes & Peppers / Western flower thrips	25-Oct-10	31-Oct-25	Hort Innovation
PER87852	Afidopyropen (Versys) / Cucumber, eggplant & capsicum / Green peach aphid, Melon aphid & suppression of Silverleaf whitefly (protected) *Use now registered in protected cropping and permit to be surrendered	29-May-20	31-May-23	Hort Innovation
PER80099 Version 3	Alpha-cypermethrin / Fruiting vegetables / Queensland fruit fly and Mediterranean fruit fly (field)	26-Feb-15	31-Mar-25	Hort Innovation
PER14694 Version 3	Bacillus thuringiensis (Vertobac) / Capsicums / Fungus gnats (protected)	01-Jun-14	30-Jun-24	Hort Innovation
PER82341 Version 3	Bifenazate / Peppers / Red tomato spider mite (field & protected)	29-Mar-16	30-Apr-25	Hort Innovation
PER13567 Version 5	Bifenthrin / Capsicums / Fruit fly including Queensland fruit fly and lesser Queensland fruit fly (field) (Growing districts of Bowen and Gumlu QLD only)	07-Dec-12	31-Mar-26	Hort Innovation
PER11127 Version 3	Boscalid (Filan) / Peppers / Sclerotinia (field)	30-Jun-15	30-Jun-23	Hort Innovation
PER82467 Version 3	Buprofezin (Applaud) / Peppers / Greenhouse whitefly, sweet potato whitefly, silverleaf whitefly & whitefly (field & protected)	07-Jul-17	30-Jun-25	Hort Innovation
PER14326 Version 3	Captan / Capsicums and Chilli Peppers / Grey mould (protected)	19-Dec-13	30-Nov-21	Hort Innovation

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER89259	Chlorantraniliprole (Coragen) / Various Crops / Fall Armyworm (field)	06-Mar-20	31-Mar-23	Hort Innovation
PER89280	Chlorantraniliprole + Thiamethoxam (Durivo) / Various including, Fruiting vegetables / Fall armyworm (seedling treatment)	12-Mar-20	31-Mar-23	Hort Innovation
PER87051	Chlorantraniliprole + Thiamethoxam (Durivo) / Cucurbits & Fruiting vegetables (chemigation) / Various Pests	25-Feb-19	28-Feb-24	Bundaberg Fruit & Vegetable Growers
PER82459	Clethodim (Select) / Chilli Peppers / Various grasses (field)	19-Apr-17	30-Sep-21	Hort Innovation
PER80100 Version 3	Clothianidin (Samurai) / Fruiting vegetables / Mediterranean fruit fly and Queensland fruit fly (field & protected)	10-Nov-15	30-Sep-23	Hort Innovation
PER14038 Version 2	Copper products (various) / Paprika and chilli / Bacterial spot (field)	01-Apr-13	30-Sep-23	Hort Innovation
PER84805	Cyantraniliprole (Benevia) / Peppers / Tomato potato psyllid (field)	06-Dec-17	31-Dec-22	Hort Innovation
PER90387	Cyantraniliprole (Benevia) / Fruiting vegetables (all) / Leaf miners (Liriomyza spp.) Including: Vegetable leaf miner (Liriomyza sativae), Pea leaf miner/Serpentine leaf miner (Liriomyza huidobrensis), American serpentine leaf miner (Liriomyza trifolii)	3-Dec-20	31-Dec-23	Hort Innovation
PER84878	Cyprodinil + fludioxonil (Switch) / Capsicum / Botrytis rot & Sclerotinia rot (field & protected)	28-May-12	30-Nov-22	Hort Innovation
PER81867 Version 2	Cyromazine (Diptex 150 WP) / Various including Fruiting Vegetables / Liriomyza species, including: Vegetable Leafminer (Liriomyza sativa) Serpentine Leafminer (Liriomyza huidobrensis)	2-Dec-19	30-Nov-23	Hort Innovation
PER89263	Emamectin (Proclaim Opti) / Various crops, including Fruiting Vegetables / Fall Armyworm (field & protected)	10-Mar-20	31-Mar-23	Hort Innovation
PER14077 Version 2	Emulsifiable botanical oils (Eco-Oil) / Greenhouse and hydroponic capsicums / Silverleaf whitefly biotype B (protected)	01-Oct-13	30-Sep-23	Hort Innovation

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER82460 Version 2	Etoxazole (Paramite) / Capsicums / Tomato red spider mite (field & protected)	26-Jul-17	31-Jul-23	Hort Innovation
PER88349	Glufosinate-Ammonium (Basta) / Capsicums, Snow peas and Sugar snap peas / Broadleaf weeds & grasses as per product label	17-Apr-20	30-Apr-25	Hort Innovation
PER13901 Version 4	Glyphosate (various) (shielded sprayer only) / Capsicums / Annual and perennial grasses and broadleaf weeds (field)	06-Apr-13	30-Jun-24	Hort Innovation
PER14765 Version 4	Hexythiazox (Calibre) / Capsicum and chilli / Tomato russet mite, broad mite, two-spotted mite, and tomato red mite (field & protected)	21-Feb-15	30-Sep-23	Hort Innovation
PER12489 Version 3	Imidacloprid (Confidor) / Capsicum, chillies and paprika / Control of greenhouse thrips and green peach aphid; and suppression of plague and onion thrips (field & protected)	30-Jun-15	31-May-25	Hort Innovation
PER88558	Imidacloprid / Chilli peppers / Silverleaf whitefly (field only)	04-Sep-20	30-Sep-23	Hort Innovation
PER89278	Indoxacarb (Avatar) / Various Crops, including fruiting vegetables / Fall Armyworm	13-Mar-20	31-Mar-23	Hort Innovation
PER14353 Version 3	Iprodione (Rovral) / Capsicum, chillies, and paprika / Sclerotinia rot (field & protected)	01-Jul-14	31-Mar-22	Hort Innovation
PER82456	Mancozeb + Metalaxyl-M (Ridomil Gold MZ WG) / Capsicums, chillies & paprika / Downy mildew (field)	27-Jun-17	31-Jul-25	Hort Innovation
PER13566 Version 5	Methomyl (Lannate) / Capsicums / Queensland fruit fly and lesser Queensland fruit fly (field) (Growing districts of Bowen and Gumlu QLD only)	07-Dec-12	31-Mar-26	Hort Innovation
PER82428 Version 4	Methomyl (Lannate) / Various crops, including fruiting vegetables / Helicoverpa spp., Cucumber moth, Cluster caterpillar, Loopers, Webworm, Rutherglen bug, Thrips including Western Flower Thrips (field only)	22-Apr-16	31-Mar-24	Hort Innovation

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER84229 Version 2	Methomyl (Lannate L) / Various crops, including fruiting vegetables / Tomato Potato Psyllid	07-Apr-17	31-Mar-25	NSW DPI
PER89293	Methomyl (Lannate L) / Various crops, including fruiting vegetables / Fall Armyworm	10-Apr-20	30-Apr-23	Hort Innovation
PER12221 Version 4	Petroleum Oil / Capsicum, chilli and paprika / Greenhouse whitefly, sweet potato whitefly, silverleaf whitefly biotype B, and whitefly Q biotype (field and protected)	29-Jun-12	30-Nov-22	Hort Innovation
PER8930 Version 6	Phorate (Thimet) / Chillies, capsicums & paprika / Aphids, jassids, mites, thrips, and onion maggot (field)	14-Aug-11	30-Nov-24	Hort Innovation
PER81408 Version 3	Phosphorous Acid (Agri-Fos) / Capsicum / Phytophthora soil fungus (protected)	07-Sep-15	31-Jul-25	Hort Innovation
PER13695 Version 3	Potassium Bicarbonate (Ecocarb) / Peppers / Powdery Mildew	31-Oct-12	31-Jul-25	Hort Innovation
PER13920 Version 2	Potassium Salts of Fatty Acids (Natrasoap) / Glasshouse and hydroponically grown capsicums / Greenhouse whitefly and silverleaf whitefly (protected)	01-Mar-13	31-Mar-23	Hort Innovation
PER11440 Version 7	Procymidone (Sumisclex) / Capsicums, chillies and paprika / Sclerotinia rot (field)	01-Jun-09	30-Nov-24	Hort Innovation
PER12565 Version 4	Pyrimethanil (Scala) / Capsicums / Botrytis grey mould (Field & protected)	05-Apr-12	30-Jun-25	Hort Innovation
PER84757 Version 2	Spinetoram (Success Neo) / Various crops including fruiting vegetables / Tomato potato psyllid (field)	28-Nov-17	31-Aug-25	Hort Innovation
PER89241	Spinetoram (Success Neo and Delegate) / Various Crops including fruiting vegetables / Fall Armyworm (field & protected)	06-Mar-20	31-Mar-23	Hort Innovation
PER89870	Spinosad (Entrust Organic) / Various Crops including fruiting vegetables / Fall Armyworm (field & protected)	21-Jul-20	31-Jul-23	Hort Innovation
PER90928	Spinosad (Entrust Organic) / Various, including Fruiting Vegetables / Leafminers (field & protected)	23-Apr-21	30-Apr-24	Hort Innovation

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER84245 Version 2	Spirotetramat (Movento) / Various crops including Capsicum and chillies / Tomato potato psyllid (field & protected)	07-Apr-17	30-Apr-25	NSW DPI
PER88640	Spirotetramat (Movento) / Various crops including Capsicums & Chilies/ Liriomyza leafminers (*Liriomyza* spp.) (including Vegetable leafminers, Pea leafminer and American serpentine leafminer) Suppression only (field & protected)	18-May-20	31-May-23	Hort Innovation
PER84743	Sulfoxaflor (Transform) / Peppers (field only) / Tomato potato psyllid (field)	24-Oct-17	31-Oct-22	Hort Innovation
PER14050 Version 2	Trifloxystrobin (Flint) / Capsicums (peppers) / Powdery mildew (protected)	01-Jun-13	30-Jun-23	Hort Innovation

Appendix 5. Capsicum and Chilli Maximum Residue Limits (MRLs)

CODEX commodity groupings of Fruiting vegetables and subgroups:

VO 0050	Fruiting vegetables other than cucurbits
VO 0051	Peppers
VO 04444	Peppers Chilli
HS 04444	Peppers Chilli, dried
	Peppers, Chilli, other cultivars
VO 0445	Peppers, Sweet (including pimento)

Note: Major export markets for capsicums/chillies include New Zealand, PNG, Fiji, New Caledonia and French Polynesia. Available information indicates that in the absence specific limits in legislation the most countries defers to Codex, followed by EU MRL standards or applies a 0.01ppm default value. Food exported to New Zealand from Australia may be legally sold if it complies with Australian requirements. MRLs and legislation are subject to change; the values presented should not be relied on.

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Abamectin	HS0444	Peppers Chilli, dried	-	0.5
	VO0050	Fruiting vegetables other than cucurbits	T0.1	-
		Peppers, chilli and other cultivars	T0.1	-
	VO0445	Peppers, Sweet (including pimento)	-	0.09
	VO0444	Peppers Chilli	-	*0.005
Acephate	HS0444	Peppers Chilli, dried	-	50
	VO0445	Peppers, Sweet (capsicum)	5	-
Acetamiprid	HS0444	Peppers Chilli, dried	-	2
	VO0050	Fruiting vegetables other than cucurbits	-	0.2
Aldrin and dieldrin	VO0445	Peppers, Sweet (capsicum)	E0.1	-
Ametoctradin	HS0444	Peppers Chilli, dried	-	15
	VO0050	Fruiting vegetables other than cucurbits	-	1.5
Afidopyropen	VO0050	Fruiting vegetables other than cucurbits	0.2	0.1[7]
Azoxystrobin	HS0444	Peppers Chilli, dried	-	30
		Peppers, Chili, other	T2	-
	VO0050	Fruiting vegetables other than cucurbits	-	3
	VS0051	Peppers	T2	-
Bifenthrin	HS0444	Peppers Chilli, dried	-	5
	VO0050	Fruiting vegetables other than cucurbits	0.5	-
		Peppers, chilli, other cultivars	0.5	-
	VO0051	Peppers	-	0.5
Bifenazate	VO0444	Peppers Chilli	-	3
	VO0050	Fruiting vegetables other than cucurbits	1	-
	VO0445	Peppers, Sweet (including pimento)	-	2
Boscalid	HS0444	Peppers Chilli, dried	-	10
	VO0050	Fruiting vegetables other than cucurbits	1	3
Bromide ion	HS0444	Peppers Chilli, dried	-	200
	VO0445	Peppers, Sweet (including pimento)	-	20
Bupirimate	VS0051	Peppers	0.7	-

[7] JMPR 2019 Recommendation

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Buprofezin	HS0444	Peppers Chilli, dried	-	10
	VO0050	Fruiting vegetables other than cucurbits	T2	-
		Peppers, Chili, other cultivars	T2	-
	VO0051	Peppers	-	2
	VO0444	Peppers Chilli	-	10
Captan	VO0444	Peppers Chilli	T7	-
		Peppers, Chili, other cultivars	T7	-
	VO0445	Peppers, Sweet (capsicum)	T7	-
Carbaryl	HS0444	Peppers Chilli, dried	-	2
	VO0445	Peppers, Sweet (including pimento)	-	5
	VO0444	Peppers Chilli	-	0.5
Carbendazim	HS0444	Peppers Chilli, dried	-	20
	VO0444	Peppers Chilli	-	2
Chlorantraniliprole	HS0444	Peppers Chilli, dried	-	5
	VO0444	Peppers Chilli	1	-
	VO0050	Fruiting vegetables other than cucurbits	-	0.6
Chlorothalonil	HS0444	Peppers Chilli, dried	-	70
	VO0051	Peppers	-	7
Chlorpyrifos	HS0444	Peppers Chilli, dried	-	20
	VO0445	Peppers, Sweet (including pimento)	T1	2
Chlorpyrifos-methyl	HS0444	Peppers Chilli, dried	-	10
	VO0051	Peppers	-	1
Clothianidin	HS0444	Peppers Chilli, dried	-	0.5
	VO0050	Fruiting vegetables other than cucurbits	T0.7	0.05
Cyantraniliprole	HS0444	Peppers Chilli, dried	-	5
	VO0050	Fruiting vegetables other than cucurbits	2	0.5
Cyazofamid	VO0444	Peppers Chilli	-	0.8
	VO0445	Peppers, Sweet (including pimento)	-	0.4
Cycloxydim	HS0444	Peppers Chilli, dried	-	90
	VO0051	Peppers	-	9
Cyfluthrin/ beta-cyfluthrin	HS0444	Peppers Chilli, dried	-	1
	VO0445	Peppers, Sweet (capsicum)	T0.2	-
	VO0051	Peppers	-	0.2
Cyhalothrin	HS0444	Peppers Chilli, dried	-	3
	VO0050	Fruiting vegetables other than cucurbits	-	0.3
Cyhexatin	HS0444	Peppers Chilli, dried	-	5
Cypermethrin	HS0444	Peppers Chilli, dried	-	10
	VO0050	Fruiting vegetables other than cucurbits	T1	-
		Peppers, Chilli, other cultivars	T1	-
	VO0445	Peppers, Sweet (including pimento)	-	0.1
	VO0444	Peppers Chilli	-	2
Cyprodinil	HS0444	Peppers Chilli, dried	-	9
	VO0445	Peppers, Sweet (capsicum)	0.7	-
	VO0050	Fruiting vegetables other than cucurbits	-	2
Cyromazine	HS0444	Peppers Chilli, dried	-	10
	VO0050	Fruiting vegetables other than cucurbits	T1	1
Deltamethrin	VO0050	Fruiting vegetables other than cucurbits	0.1	-

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Diafenthiuron	VO0050	Fruiting vegetables other than cucurbits	0.5	
Diazinon	HS0444	Peppers Chilli, dried	-	0.5
	VO0445	Peppers, Sweet (including pimento)	-	0.05
Dichlobenil	HS0444	Peppers Chilli, dried	-	*0.01
	VO0050	Fruiting vegetables other than cucurbits	-	*0.01
Difenconazole	HS0444	Peppers Chilli, dried	-	5
	VO0444	Peppers Chilli	-	0.9
	VO0050	Fruiting vegetables other than cucurbits	-	0.6
Diflubenzuron	HS0444	Peppers Chilli, dried	-	20
	VO0445	Peppers, Sweet (including pimento)	-	0.7
	VO0444	Peppers Chilli	-	3
Dimethoate	HS0444	Peppers Chilli, dried	-	3
	VO0444	Peppers Chilli	T5	-
	VO0445	Peppers, Sweet (including pimento)	0.7	0.5
Dimethomorph	HS0444	Peppers Chilli, dried	-	5
	VO0050	Fruiting vegetables other than cucurbits	-	1.5
Dinocap	HS0444	Peppers Chilli, dried	-	2
	VO0051	Peppers	-	0.2
Dinotefuran	HS0444	Peppers Chilli, dried	-	5
	VO0050	Fruiting vegetables other than cucurbits	-	0.5
Dithiocarbamates		Peppers, Chili, other cultivars	T3	-
	VO0050	Fruiting vegetables other than cucurbits	3	-
	HS0444	Peppers Chilli, dried	-	20
	VO0445	Peppers, Sweet (including pimento)	-	1
Diquat	VO0050	Fruiting vegetables other than cucurbits	-	*0.01
Emamectin benzoate	HS0444	Peppers Chilli, dried	-	0.2
	VO0050	Fruiting vegetables other than cucurbits	0.1	0.02
Ethoprophos	HS0444	Peppers Chilli, dried	-	0.2
	VO0445	Peppers, Sweet (including pimento)	-	0.05
Etoxazole	VO0050	Fruiting vegetables other than cucurbits	0.05	-
Fenamidone	HS0444	Peppers Chilli, dried	-	30
	VO0444	Peppers Chilli	-	4
	VO0050	Fruiting vegetables other than cucurbits (except chilli peppers)	-	1.5
Fenarimol	HS0444	Peppers Chilli, dried	-	5
	VO0445	Peppers, Sweet (including pimento)	-	0.5
Fenbuconazole	HS0444	Peppers Chilli, dried	-	2
	VO0051	Peppers	-	0.6
Fenhexamid	VO0051	Peppers	T30	2
		Peppers, Chili, other cultivars	T30	-
Fenpropathrin	HS0444	Peppers Chilli, dried	-	10
	VO0051	Peppers	-	1
Flonicamid	VO0050	Fruiting vegetables other than cucurbits	-	0.4
Fluazifop-p-butyl	VO0445	Peppers, Sweet (capsicum)	*0.02	-
Flubendiamide	HS0444	Peppers Chilli, dried	-	7
	VO0050	Fruiting vegetables other than cucurbits	2	
	VO0051	Peppers	-	0.7

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Fludioxonil	HS0444	Peppers Chilli, dried	-	4
	VO0445	Peppers, Sweet (capsicum)	2	-
	VO0051	Peppers	-	1
Fluensulfone	HS0444	Peppers Chilli, dried	-	7
	VO0050	Fruiting vegetables other than cucurbits	1	0.7
Flumioxazin	VO0050	Fruiting vegetables other than cucurbits	-	*0.02
Fluopicolide	HS0444	Peppers Chilli, dried	-	7
	VO0050	Fruiting vegetables other than cucurbits	-	1
Flutriafol	HS0444	Peppers Chilli, dried	-	10
	VO0051	Peppers	-	1
Fluxapyroxad	HS0444	Peppers Chilli, dried	-	6
	VO0050	Fruiting vegetables other than cucurbits	-	0.6
Fosetyl	VO0050	Fruiting vegetables other than cucurbits	T0.02	-
Glufosinate	VO0445	Peppers, Sweet (capsicum)	*0.05	-
Glyphosate	VO0050	Fruiting vegetables other than cucurbits	*0.1	-
Hexythiazox	VO0050	Fruiting vegetables other than cucurbits	T1	-
Imidacloprid	HS0444	Peppers Chilli, dried	-	10
	VO0050	Fruiting vegetables other than cucurbits	0.5	-
	VO0051	Peppers	-	1
Indoxacarb	VO0051	Peppers (capsicum)	0.5	0.3
Inorganic bromide	VO0445	Peppers, Sweet (capsicum)	50	-
Iprodione	VO0051	Peppers	T3	-
		Peppers, Chili, other cultivars	T3	-
Lufenuron	VO0445	Peppers, Sweet (including pimento)	-	0.8
Malathion	HS0444	Peppers Chilli, dried	-	1
	VO0051	Peppers	-	0.1
Maldison	VO0445	Peppers, Sweet [capsicums]	T5	-
Mandipropamid	HS0444	Peppers Chilli, dried	-	10
	VO0051	Peppers	-	1
Metaflumizone	HS0444	Peppers Chilli, dried	-	6
	VO0051	Peppers	-	0.6
Metalaxyl	HS0444	Peppers Chilli, dried	-	10
		Peppers, Chili, other cultivars	T0.1	-
	VO0051	Peppers	T0.1	1
Methamidophos	VO0445	Peppers, Sweet (capsicum)	2	-
Methidathion	VO0051	Peppers	T0.1	-
		Peppers, Chili, other cultivars	T0.1	-
Methiocarb	VO0445	Peppers, Sweet (including pimento)	-	2
Methomyl	HS0444	Peppers Chilli, dried	-	10
		Peppers, Chili, other cultivars	T2	-
	VO0051	Peppers	T2	0.7
Methoxyfenozide	HS0444	Peppers Chilli, dried	-	20
	VO0050	Fruiting vegetables other than cucurbits	3	-
	VO0051	Peppers	-	2
Methyl bromide	VO0445	Peppers, Sweet (capsicum)	*0.05	-
Metrafenone	HS0444	Peppers Chilli, dried	-	20
	VO0445	Peppers, Sweet (including pimento)	-	2
	VO0444	Peppers Chilli	-	2

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Milbemectin	VO0444	Peppers, Chili, other cultivars	0.02	-
	VO0050	Fruiting vegetables other than cucurbits	0.02	-
Myclobutanil	HS0444	Peppers Chilli, dried	-	20
	VO0051	Peppers	-	3
Novaluron	VO0050	Fruiting vegetables other than cucurbits	-	0.7
Omethoate	VO0445	Peppers, Sweet (capsicum)	1	-
Oxamyl	VO0445	Peppers, Sweet (including pimento)	1	-
	VO0051	Peppers	-	0.01*
	HS0444	Peppers Chilli, dried	-	0.01*
Paclobutrazol	VO0050	Fruiting vegetables other than cucurbits	T*0.01	
Paraquat	VO0050	Fruiting vegetables other than cucurbits	-	0.05
Penthiopyrad	HS0444	Peppers Chilli, dried	-	14
	VO0050	Fruiting vegetables other than cucurbits	5	2
Permethrin	HS0444	Peppers Chilli, dried	-	10
	VO0051	Peppers	-	1
Phorate	VO0051	Peppers	0.5	-
Phosphorous acid	VO0050	Fruiting vegetables other than cucurbits	T100	-
Piperonyl Butoxide	HS0444	Peppers Chilli, dried	-	20
	VO0051	Peppers	-	2
Pirimicarb	HS0444	Peppers Chilli, dried	-	20
	VO0050	Fruiting vegetables other than cucurbits	-	0.5
Procymidone	VO0051	Peppers	T2	-
Profenofos	HS0444	Peppers Chilli, dried	-	20
	VO0444	Peppers Chilli	-	3
Propamocarb	HS0444	Peppers Chilli, dried	-	10
	VO0050	Fruiting vegetables other than cucurbits	T0.3	-
	VO0445	Peppers, Sweet (including pimento)	-	3
Proquinazid	VO0445	Peppers, Sweet (capsicum)	0.2	-
Pydiflumetofen	VO0050	Fruiting vegetables other than cucurbits	T0.7	0.5[8]
Pyraclostrobin	VO0051	Peppers	-	0.5
	VO0050	Fruiting vegetables other than cucurbits	0.3	-
Pyrethrins	HS0444	Peppers Chilli, dried	-	0.5
	VO0051	Peppers	-	*0.05
Pyrimethanil	VO0445	Peppers, Sweet (capsicum)	1	-
Pyriproxyfen	VO0050	Fruiting vegetables other than cucurbits	1	-
Pymetrozine	VO0050	Fruiting vegetables other than cucurbits	0.5	-
Quinoxyfen	HS0444	Peppers Chilli, dried	-	10
	VO0051	Peppers	-	1
Quintozene	HS0444	Peppers Chilli, dried	-	0.1
	VO0445	Peppers, Sweet (including pimento)	-	*0.05
Sethoxydim	VO0051	Peppers	T2	-
		Peppers, Chili, other cultivars	T2	-
Spinetoram	VO0050	Fruiting vegetables other than cucurbits	0.1	-
Spinosad	HS0444	Peppers Chilli, dried	-	3
	VO0050	Fruiting vegetables other than cucurbits	0.2	-
	VO0051	Peppers	-	0.3

[8] JMPR 2019 Recommendation

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Spirotetramat	HS0444	Peppers Chilli, dried	-	15
	VO0444	Peppers Chilli (non-bell)	-	2
	VO0050	Fruiting vegetables other than cucurbits	7	1
Spirodiclofen	VO0445	Peppers, Sweet (including pimento)	-	0.2
Sulfoxaflor	HS0444	Peppers Chilli, dried	-	15
	VO0050	Fruiting vegetables other than cucurbits	1	1.5
Tebuconazole	HS0444	Peppers Chilli, dried	-	10
	VO0445	Peppers, Sweet (including pimento)	-	1
Tebufenozide	HS0444	Peppers Chilli, dried	-	10
	VO0051	Peppers	-	1
Thiacloprid	VO0445	Peppers, Sweet (including pimento)	-	1
Thiamethoxam	HS0444	Peppers Chilli, dried	-	7
	VO0050	Fruiting vegetables other than cucurbits	T0.5	0.7
Triadimefon	HS0444	Peppers Chilli, dried	-	5
	VO0050	Fruiting vegetables other than cucurbits	0.2	1
Triadimenol	HS0444	Peppers Chilli, dried	-	5
	VO0050	Fruiting vegetables other than cucurbits	1	1
Trichlorfon	VO0051	Peppers	0.2	-
Trifloxystrobin	VO0445	Peppers, Sweet (including pimento)	T0.5	0.3

NOTE: MRLs are constantly under review and subject to change. Check for current MRLs and do not rely on the values stated above.

* Indicates that an MRL is at the Limit of Quantitation (LOQ)
NR - Uses of substances where MRLs are not necessary / required.
T =Temporary MRL
E = The MRL is based on extraneous residues

Sources: APVMA MRLs: Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2019. Compilation 4. Prepared 15 January 2020. CODEX MRLs: CODEX Alimentarius International Food Standards database (February 2020), http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/

Appendix 6. Capsicum and Chilli Agrichemical Regulatory Risk Assessment

Capsicum & Chilli Agrichemical Regulatory Risk Assessment

October 2020

Regulatory pressures on agrichemicals are increasing globally, with many being either restricted or withdrawn from use. For older agrichemicals these pressures are often the result of reconsiderations involving new or refined risk assessment methodologies that require the generation of new data. A consequence of which can be that many of these chemicals are not meeting contemporary risk assessment standards as the necessary data is unavailable, or where data is available, the risk posed is considered unacceptable.

The use of farm chemicals can also be impacted through differences in standards between trading partners. The lack of an appropriate pesticide maximum residue limit (MRL) in an importing country can, for practical purposes, effectively prohibiting the use in the exporting country to ensure compliance, as breaches of MRLs would adversely affect market access.

The effects of the above are greater pressure placed on the availability and use of individual chemicals or chemical groups. As a consequence, it is possible that the number of approved agrichemical options could be adversely impacted.

To assist strategic planning, with respect to future pest management options, the following tables have been developed to highlight the regulatory threats to agrichemicals currently approved for the management of the pests and diseases in leeks as well as current initiatives aimed at addressing identified pest management deficiencies.

Peppers (Capsicum & Chilli) Agrichemical Regulatory Risk Assessment

R1	Short-term: Critical concern over retaining access
R2	Medium-term: Maintaining access of significant concern
R3	Long-term: Potential issues associated with use - Monitoring required

Problem	Active Constituents	Chemical Group	Comment	Activities
INSECT AND MITE PESTS				
Aphids				
Aphids	Dimethoate	1B	Codex: MRL deletion recommended. EU: Proposing to set all MRLs to < 0.01 mg/kg	
	Paraffinic / petroleum oil	-		
	Phorate (PER8930)	1B	APVMA: Nominated for review EU: No authorisation in place PIC procedure (Rotterdam Convention)[i]	
	Pirimicarb	1A	Codex: JMPR Periodic re-evaluation 2022/23 EU: Candidate for substitution	
Cabbage aphid	Afidopyropen	9D		
	Chlorantraniliprole + thiamethoxam	28 + 4A	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered[ii] USA: Re-registration with new risk mitigation measures	
Cotton/melon aphid	Afidopyropen (PER87852)	9D		
Currant lettuce aphid	Afidopyropen	9D		

Problem	Active Constituents	Chemical Group	Comment	Activities
Green peach aphid	Afidopyropen (PER87852)	**9D**		
	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Cyantraniliprole	**28**		
	Diafenthiuron + cyantraniliprole	**12A + 28**	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
	Imidacloprid	**4A**	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
	Pymetrozine	**9B**	EU: Being phased out Codex: No registrant support	
	Spirotetramat	**23**		
	Sulfoxaflor	**4C**	USA: Pollinator concerns	
Potato aphid	Pymetrozine	**9B**	EU: Being phased out Codex: No registrant support	
Beetles				
Spotted vegetable weevil	Chlorpyrifos	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. EU: Proposed cancellation of use	
Vegetable weevil	Chlorpyrifos	**1B**	Canada: proposed cancellation of most uses. USA: EPA decision to allow continued use	
Wireworms	1,3-dichloropropene + chloropicrin	**8B**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Caterpillars/Lepidoptera				
Cabbage centre grub	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
Cluster caterpillar	Amorphous silica	**-**		
	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Diafenthiuron + cyantraniliprole	**12A + 28**	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
	Methoxyfenozide	**18**	EU: Proposed restricted authorisation & Candidate for substitution	
Cucumber moth	Methomyl	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
Cutworms	Chlorpyrifos	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. EU: Proposed cancellation of use Canada: proposed cancellation of most uses. USA: EPA decision to allow continued use	
	Diazinon	**1B**	EU: Deregistered Codex: To be reviewed by 2020/21.	

Problem	Active Constituents	Chemical Group	Comment	Activities
Diamondback moth	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
Eggfruit caterpillar	Chlorantraniliprole	**28**		
Fall armyworm	Chlorantraniliprole (PER89259)	**28**		
	Chlorantraniliprole + thiamethoxam (PER89280)	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Emamectin benzoate (PER89263)	**6**		
	Indoxacarb (PER89278)	**22A**	EU: Proposed non-renewal	
	Methomyl (PER89293)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
	Spinetoram (PER89241)	**5**		
	Spinosad (PER89870)	**5**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Helicoverpa species Native Budworm (*H. punctigera*) Corn earworm/Cotton bollworm (*H. armigera*)	Amorphous silica	-		
	Chlorantraniliprole	28		
	Chlorantraniliprole + thiamethoxam	28 + 4A	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Cyantraniliprole	28		
	Diafenthiuron + cyantraniliprole	12A + 28	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
	Emamectin	6		
	Flubendiamide	28		
	Helicoverpa NPV	31		
	Indoxacarb	22A	EU: Proposed non-renewal	
	Methomyl (PER82428)	1A	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
	Spinetoram	5		
	Spinosad	5		
Loopers	Methomyl (PER82428)	1A	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	

Problem	Active Constituents	Chemical Group	Comment	Activities
Lucerne leafroller	Chlorantraniliprole	**28**		
Potato moth (Leafminer)	Chlorantraniliprole	**28**		
	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Cyantraniliprole	**28**		
	Diafenthiuron + cyantraniliprole	**12A + 28**	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
	Flubendiamide	**28**		
	Indoxacarb	**22A**	EU: Proposed non-renewal	
	Spinetoram	**5**		
	Spinosad	**5**		
Soybean looper	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
Tomato grub	Emamectin	**6**		
	Methoxyfenozide	**18**	EU: Proposed restricted authorisation & Candidate for substitution	
	Spinetoram	**5**		
Webworm	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	

Problem	Active Constituents	Chemical Group	Comment	Activities
Fruit fly				
Cucumber fly	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
Fruit flies	Bifenthrin (PER13567)	**3A**	Canada: Subject to phase-out until 31/12/2020 EU: No authorisation in place	
	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Malathion/Maldison	**1B**	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
	Methomyl (PER13566)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
	Pyrethrins	**3A**		
	Trichlorfon	**1B**	APVMA: nominated for review Codex: No MRLs EU: deregistered US: No MRLs	
Mediterranean fruit fly	Clothianidin	**4A**	APVMA: Under review Canada: Proposal to cancel foliar use in orchards strawberries and turf EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures[iii]	
Queensland fruit fly & Lesser Queensland fruit fly	Alpha-cypermethrin (PER80099)	**3A**	EU: Proposed restricted authorisation & Candidate for substitution	
	Bifenthrin	**3A**	Canada: Subject to phase-out until 31/12/2020 EU: No authorisation in place	
	Clothianidin	**4A**	APVMA: Under review Canada: Proposal to cancel foliar use in orchards strawberries and turf EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	

Problem	Active Constituents	Chemical Group	Comment	Activities
Lesser Queensland fruit fly	Methomyl (PER13566)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
Grasshoppers/Locusts				
Black field cricket	Chlorpyrifos	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. EU: Proposed cancellation of use Canada: proposed cancellation of most uses. USA: EPA decision to allow continued use	
Field crickets	Chlorpyrifos	**1B**		
Mole crickets	Chlorpyrifos	**1B**		
Wingless grasshopper	Chlorpyrifos	**1B**		
	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	

Problem	Active Constituents	Chemical Group	Comment	Activities
Jassids/Plant bugs				
Bugs	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
Green vegetable bug	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
Jassids	Dimethoate	**1B**		
	Phorate (PER8930)	**1B**	APVMA: Nominated for review EU: No authorisation in place PIC procedure (Rotterdam Convention)	
Leafhoppers	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Paraffinic /petroleum oil			
Psyllids	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	

Problem	Active Constituents	Chemical Group	Comment	Activities
Rutherglen bug	Methidathion (PER14047)	**1B**	APVMA: Use will not be permitted after 4 February 2021. Registrant will remove from sale and all approvals will be cancelled. Codex: To be reviewed 2019/20. EU: Deregistered USA: Deregistered	
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
	Pyrethrins	**3A**		
Tomato / potato psyllid	Abamectin (PER84229)	**6**		
	Bifenthrin (PER84229)	**3A**	Canada: Subject to phase-out until 31/12/2020 EU: No authorisation in place	
	Cyantraniliprole (PER84805)	**28**		
	Methomyl (PER84229)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
	Spinetoram (PER84743)	**5**		
	Spirotetramat (PER84245)	**23**		
	Sulfoxaflor (PER84743)	**4C**	USA: Pollinator concerns	
Vegetable leafhopper	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	

Problem	Active Constituents	Chemical Group	Comment	Activities
Mites				
Broad mite	Hexythiazox	**10A**	Codex: No MRLs	ST19020 Project contracted for Spiromesifen (Oberon 240SC) Group 23 Crop Group Label registration.
Bryobia mite	Bifenazate	**20D**	EU: Proposed non-renewal	
Mites	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Paraffinic /petroleum oil			
	Phorate (PER8930)	**1B**	APVMA: Nominated for review EU: No authorisation in place PIC procedure (Rotterdam Convention)	
Tomato Red spider mite	Abamectin	**6**		
	Bifenazate	**UN**	EU: Proposed non-renewal	
	Etoxazole	**10B**	EU: Uses restricted to greenhouse ornamentals only & Candidate for substitution	
	Hexythiazox	**10A**	Codex: No MRLs	
Tomato russet mite	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Hexythiazox	**10A**	Codex: No MRLs	
Two-spotted (Red spider) mite	Abamectin	**6**		
	Bifenazate	**20D**	EU: Proposed non-renewal	
	Diafenthiuron + cyantraniliprole	**12A + 28**	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
	Etoxazole	**10B**	EU: Uses restricted to greenhouse ornamentals only & Candidate for substitution	
	Hexythiazox	**10A**	Codex: No MRLs	
	Milbemectin	**6**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Thrips				
Onion thrips	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Imidacloprid (PER12489)	**4A**	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
Plague thrips	Diafenthiuron + cyantraniliprole	**12A + 28**	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
	Imidacloprid (PER12489)	**4A**	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
Thrips	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
	Paraffinic /petroleum oil			
	Phorate (PER8930)	**1B**	APVMA: Nominated for review EU: No authorisation in place PIC procedure (Rotterdam Convention)	

Problem	Active Constituents	Chemical Group	Comment	Activities
Tomato thrips	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Cyantraniliprole	**28**		
	Diafenthiuron + cyantraniliprole	**12A + 28**	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
Western flower thrips	Acephate	**1B**	APVMA: Nominated for review Canada –Review completed continued use acceptable with risk mitigation[iv] EU: Deregistered	
	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Cyantraniliprole	**28**		
	Diafenthiuron + cyantraniliprole	**12A + 28**	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
	Ethyl formate (Po)	**8A**	EU: No authorisation in place	
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (expired 31/8/19)	
	Spinetoram	**5**		
	Spinosad	**5**		

Problem	Active Constituents	Chemical Group	Comment	Activities
White fly				
Greenhouse whitefly	Buprofezin (PER82467)	**16**	EU: In the process of deleting MRLs	
	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Fatty acids: K salt (PER13920)			
	Imidacloprid (PER12489)	**4A**	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
	Petroleum oil (PER12221)			
	Pymetrozine	**9B**	EU- Being phased out Codex: No registrant support	
	Pyriproxyfen	**7C**		
	Sulfoxaflor	**4C**	USA: Pollinator concerns	

Problem	Active Constituents	Chemical Group	Comment	Activities
Silverleaf whiteflies	Afidopyropen (PER87852)	**9D**		
	Botanical oil (PER14077)	**-**		
	Buprofezin (PER82467)	**16**	EU: In the process of deleting MRLs	
	Chlorantraniliprole + thiamethoxam	**28 + 4A**	Thiamethoxam: APVMA: Under review Canada: Proposal to deregister outdoor uses EU: Outdoor uses deregistered USA: Re-registration with new risk mitigation measures	
	Cyantraniliprole	**28**		
	Diafenthiuron + cyantraniliprole	**12A + 28**	Diafenthiuron Codex: No MRLs EU: No authorisation in place	
	Fatty acids: K salt (PER13920)			
	Imidacloprid	**4A**	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
	Petroleum oil (PER12221)			
	Pyriproxyfen	**7C**	EU: Authorisation renewal process underway	
	Pymetrozine	**9B**	EU- Being phased out Codex: No registrant support	
	Spirotetramat	**23**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Other				
Fungus gnats	*Bacillus thuringiensis* (PER14694)	**11A**		
Onion seedling maggot	Phorate (PER8930)	**1B**	APVMA: Nominated for review EU: No authorisation in place PIC procedure (Rotterdam Convention)	
Pear and cherry slug	Imidacloprid	**4A**	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
Symphylids	1,3-dichloropropene + chloropicrin	**8B**		
Vegetable leafminer (*Liriomyza spp.)*	Abamectin (PER81876)	**6**		
	Spirotetramat (PER88640)	**23**		
Nematodes				
Nematodes	1,3-dichloropropene + chloropicrin	**8B**		
Nematodes: cyst forming	1,3-dichloropropene + chloropicrin	**8B**		
	Dazomet	**-**		
Root-knot nematodes	Abamectin	**6**		
	Fluensulfone	**-**		
	Oxamyl	**1A**	EU: Under review	

Problem	Active Constituents	Chemical Group	Comment	Activities
DISEASES				
Alternaria leaf spots	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Metiram	**M3**	APVMA: Nominated for review Canada: Proposed cancelling of foliar uses Codex: To be reviewed 2022/23	
Anthracnose	Chlorothalonil	**M5**	APVMA: Nominated for review Canada: Review recently completed; continued use considered acceptable EU: Deregistered[v]	
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
Bacterial canker	Copper	**M1**	EU: Candidate for substitution	
Bacterial leaf spot	*Bacillus amyloliquefaciens*	**BM02**		
Bacterial spot	Copper	**M1**	EU: Candidate for substitution	
Bactericide	Iodine	**M**		
Botrytis grey mould	Captan (PER14326)	**M4**		
	Chlorothalonil	**M5**	APVMA: Nominated for review Canada: Review recently completed; continued use considered acceptable EU: Deregistered	
	Fenhexamid	**17**		
	Penthiopyrad	**7**		
	Pyrimethanil (PER12565)	**9**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Botrytis rot	Cyprodinil + fludioxonil (PER84878)	**9 + 12**	Cyprodinil Canada: Under review EU: Candidate for substitution Fludioxonil EU: Under review, candidate for substitution	
Cercospora leaf spot	Metiram	**M3**	APVMA: Nominated for review Canada: Proposed cancelling of foliar uses Codex: To be reviewed 2022/23	
Damping off	Dazomet			
	Metalaxyl	**4**		
Downy mildew	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Mancozeb +metalaxyl-M (PER82456)	**M3 + 4**	Mancozeb APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed Metalaxyl-M EU: Restricted use approval	
Fungi	Iodine (Post-harvest)	**M**		
Fusarium wilt	1,3-dichloropropene +chloropicrin	**8B**		
Late (Irish) blight	Zineb	**M3**	APVMA: Nominated for review Codex: To be reviewed 2022/23 EU: No authorisation in place	
Phytophthora soil fungus (Dieback)	Dazomet			
	Metalaxyl	**4**	EU: Candidate for substitution	
	Phosphorous acid (PER81408)	**33**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Powdery mildew	Bupirimate	**8**		
	Hydrogen peroxide + peroxyacetic acid	**M**		
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Melaleuca oil			
	Penthiopyrad	**7**		
	Potassium bicarbonate	**M2**		
	Proquinazid	**13**		
	Triadimenol	**3**	APVMA: Nominated for review EU: No authorisation in place	
	Trifloxystrobin (PER14050)	**11**		
Rhizoctonia	1,3-dichloropropene +chloropicrin	**8B**		
	Dazomet			
Sclerotinia rot	Cyprodinil + fludioxonil (PER84878)	**9 + 12**	Cyprodinil Canada: Under review EU: Candidate for substitution Fludioxonil EU: Under review, candidate for substitution	
	Dazomet			
	Iprodione (PER14353)	**2**	Canada: Majority of food crop uses deleted Codex: Review scheduled for 2022/23 EU: Deregistered	
	Procymidone (PER11440)	**2**	APVMA: Review in progress Codex: MRLs deleted EU: No authorisations	

Problem	Active Constituents	Chemical Group	Comment	Activities
Target spot (Early blight)	Boscalid	**7**		
	Copper + mancozeb	**M1 + M3**	Copper EU: Candidate for substitution Mancozeb APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Mancozeb	**M3**	Mancozeb APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Mancozeb + sulfur	**M2 + M3**		
	Metiram + pyraclostrobin	**M3 + 11**	Metiram APVMA: Nominated for review Canada: Proposed cancelling of foliar uses Codex: To be reviewed 2022/23	
	Penthiopyrad	**7**		
	Zineb	**M3**	APVMA: Nominated for review Codex: To be reviewed 2022/23 EU: No authorisation in place	
Verticillium wilt	1,3-dichloropropene +chloropicrin	**8B**		

Problem	Active Constituents	Chemical Group	Comment	Activities
WEEDS				
Grass weeds Broadleaf weeds	Fluazifop-P	**A**		
	Diquat	**L**	APVMA: Currently under review EU: No authorisation in place	
	Glufosinate (PER88349)	**N**	EU: No authorisation in place	
	Glyphosate (PER13901)	**M**	Ongoing issues internationally	
	Trifluralin	**D**	EU: No authorisation in place	
Plant Growth Regulators				
Compactness	Paclobutrazol			

MT17019: Regulatory support and coordination. This multi-industry project has been funded by Hort Innovation using industry research and development levies and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

[i] Conference of the Parties (COP-9) to the Rotterdam Convention added phorate to Annex III, making it subject to the prior Informed Consent Procedure

[ii] Use of thiamethoxam limited to permanent greenhouses and that the resulting crop stays its entire life cycle within a permanent greenhouse, so that it is not replanted outside.

[iii] Clothianidin: Berry fruit, fruiting vegetables, ornamentals, pome fruit, turf Reduction in yearly total rate

[iv] Acephate: SP formulations cancelled; handheld mistblowers prohibited; use in public areas prohibited; reduction in application rate, max number of applications; increased re-entry periods and re-treatment intervals and use on potatoes cancelled

[v] Chlorothalonil - Withdrawal authorisations by 20 November 2019. Max period of grace: 20 May 2020. Commission Implementing Regulation (EU) 2019/677 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019R0677&from=EN