The Spruce / K. Dave

Green Peas

Strategic Agrichemical Review Process (SARP)

September 2021

Hort Innovation
Project – VG18004

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

SARP Service Provider:
AGK Services

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

Date of report:
September 2021

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1. Summary

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 Green Pea 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 disease is:

Common Name	Scientific Name
Ascochyta Blight	*Ascochyta* spp.

1.2 Insects and mites

The high priority insect and mite pests are:

Common Name	Scientific Name
Cotton Bollworm / Corn Earworm	*Helicoverpa armigera*
Native Budworm	*Helicoverpa punctigera*
Cluster Caterpillar	*Spodoptera litura*
Green Peach Aphid	*Myzus persicae*
Western Flower Thrips	*Frankliniella occidentalis*
Plague Thrips	*Thrips imaginis*
Onion Thrips	*Thrips tabaci*
Slugs and Snails	Gastropoda

1.3 Weeds

The high priority weeds are:

Common name	Scientific name
Blackberry Nightshade	*Solanum nigrum*
Cleavers	*Galium aparine* L.
Fat Hen	*Chenopodium album*
Annual Ryegrass	*Lolium rigidum*

2. The Australian Green Pea Industry

Green Peas are a round pea with a firm pod and are the variety most commonly used in processing (frozen and dried). Production data for green peas is combined with snow peas and sugar snap peas, which are more commonly grown for fresh market. Green peas account for 81% of total production.

Total production (all peas) for the year ending June 2020[1] was 29,104 tonnes with a value of $59.2m. Eighty percent was used for processing, 20% for the fresh market and <1% was exported.

Peas are grown in most states of Australia, with the largest volume of production occurring in Tasmania.

Fresh Pea Seasonality by State

State	19/20 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales (<1%)	104												
Victoria (7%)	1,980												
Queensland (2%)	479												
Western Australia (<1%)	60												
South Australia (<1%)	2												
Tasmania (91%)	26,480												
Availability legend			High			Medium			Low			None	

Seasonality by Pea Variety

State	19/20 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Snow Peas	4,767												
Sugar Snap	908												
Green/Processed	23,429												
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

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 green pea 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 green pea 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 green pea 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 green pea 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 green peas 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[2] for the Vegetable Industry which covers green peas 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.

[2] 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 Green Peas as a major crop. The crop fits within the APVMA crop group 014: Legume vegetables. Therefore, access to minor use permits can be difficult and permit requests need to be in accordance with the APVMA's minor use guidance[3].

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 Green Pea industry is for manufacturers to register new pesticides uses in the crop.

[3] https://apvma.gov.au/node/10931

3.3 Methods

The current update of the Green Pea Strategic Agrichemical Review Process (SARP), which was last updated in 2014 as part of the SARP for Beans and Peas, 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)	**Green Pea 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 Green Peas 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 green peas
Appendix 2. Products available for control of insects and mites in green peas
Appendix 3. Products available for weed control in green peas
Appendix 4. Current permits for use in green peas
Appendix 5. Green Peas Maximum Residue Limits (MRLs)
Appendix 6. Green Peas Agrichemical Regulatory Risk Assessment

4. Diseases, Pests and Weeds of Green Peas

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[4].

In Chapter 4 information on regulatory risk derived from project MT17019 (Regulatory support and coordination) has been incorporated.

Some of the suggested options have no overseas MRLs (see Appendix 5).

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] https://www.croplife.org.au/resources/programs/resistance-management/

4.1 Diseases of green peas

4.1.1 Disease priorities

Common name	Scientific name
High	
Ascochyta Blight	*Ascochyta* spp.
Moderate	
Fusarium Wilt	*Fusarium oxysporum*
Chocolate Spot / Botrytis Rot	*Botrytis* spp.
Downy Mildew	*Peronospora viciae*
Powdery Mildew	*Erysiphe pisi*
Low	
Bacterial Blight	*Pseudomonas syringae*
Damping Off	*Pythium* spp., *Phytophthora* spp., *Fusarium* spp., *Rhizoctonia* spp.
Black Root Rot	*Aphanomyces euteiches*
Sclerotinia Rot	*Sclerotinia* spp.
Angular Leaf Spot	*Pseudomonas syringae*
Anthracnose	*Colletotrichum* spp.
Rust	*Uromyces viciae-fabae*

The most important disease issue based on the feedback received was Ascochyta Blight. Available and potential products for control of diseases are listed in Section 4.1.2.

Fungicides should be supplemented by cultural practices to increase airflow and minimise moisture in the plant canopy. This can include planting configuration and irrigation management. Other cultural controls include the use of disease-free seed and/or transplants, resistant varieties, and general farm hygiene including removal of crop residues and controlling weeds in and around crops.

Resistance Management
Downy Mildew and Powdery Mildew are both 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.
There are several disease strategies that apply to various vegetables on the CropLife website[5], including Downy Mildew and Powdery Mildew.

[5] 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
Ascochyta Blight (*Ascochyta* spp.) **Priority: High**							
Rated as a high priority. The crop may be infected by Ascochyta Blight from two major sources: Sowing infected seed and spores produced on stubble from the previous year. Good farm hygiene is recommended.							
Chlorothalonil (Bravo) PER82895	M5	Protectant	7	A	WA	Permitted in garden peas for control of **Black Spot** (*Ascochyta pisi*, *Mycosphaerella pinodes*, *Phoma medicaginis* var. *pinodella*). [Max. 4 applications per season; retreatment interval 7-14 d].	R3
Copper	M1	Protectant	1	A	ALL	Registered in peas for control of **Ascochyta Blight** and Bacterial Spot (*Pseudomonas syringae* pv. *pisi*). [Max. no. of applications not specified; re-treatment interval: 10-14 d]	-
Mancozeb	M3	Protectant	7 G:7	A	ALL	Registered in peas for control of Rust and suppression of **Ascochyta Leaf Blight**. [Max. no. of applications not specified; re-treatment interval 7-10 d]	R2
Thiram + Thiabendazole (P-Pickel T)	M3+1	Protectant	NR	A	ALL	Registered in green peas as a seed treatment for control of **Black Spot** (*Mycosphaerella pinodes*, *Ascochyta pisi* and *Phoma medicaginis* var. *pinodella*) and Seedling Root Rots (*Fusarium* spp., *Pythium* spp. and *Macrophomina phaseolina*).	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Azoxystrobin + Tebuconazole (Veritas) Adama	3+11	Protectant		P		Registered in faba beans and broad beans for control of **Ascochyta Blight,** Chocolate Spot, Cercospora Leaf Spot & Rust.	R3
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative		P		Registered for control of Black Spot in apples and Powdery Mildew in grapes. US registration for the control of Ascochyta Blight in legume vegetables.	R3
Prothioconazole + Bixafen (Aviator XPro) Bayer	3+7	Protectant		P		Registered in field peas for control of Black Spot complex (*Mycosphaerella pinodes*, ***Ascochyta pisi*** and *Phoma medicaginis* var. *pinodella*).	R3
Fusarium Wilt (*Fusarium oxysporum*) **Priority: Moderate**							
Rated as a moderate priority. A soil-borne disease that is widespread in most regions. Infected leaves show yellowing, curling and eventually wither and decay because of the compromised root system. Cultural controls recommended include soil fumigation, crop rotation and the use of resistant varieties. Good farm hygiene is critical.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Soil Fumigant	NR	A	ALL (Restricted use TAS, VIC, SA)	Registered in vegetable crops for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases (including ***Fusarium*** and *Verticillium* wilts, *Rhizoctonia, Pythium*) and suppression of weeds. ***For use by professional and registered fumigators only.***	-
Chloropicrin (Agrocelhone CE Soil Fumigant)	8	Soil Fumigant	NR	A	ALL	Registered in vegetable crops for control of soil-borne nematodes, insects and diseases caused by certain species of *Pythium*, *Phytophthora*, ***Fusarium***, *Verticillium* and bacteria. ***For use by professional and registered fumigators only.***	-
Dazomet (Basamid)	8F	Soil Fumigant	NR	A	ALL	Registered in broadacre seed beds for control of soil fungi (including ***Fusarium*** spp.), nematodes (cyst and non-cyst forming), soil insects and germinating seeds of weeds.	-
Metham Sodium	-	Soil 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
Thiram + Thiabendazole (P-Pickel T)	M3+1	Protectant	NR	A	ALL	Registered in green peas as a seed treatment for control of Black Spot (*Mycosphaerella pinodes*, *Ascochyta pisi* and *Phoma medicaginis* var. *pinodella*) and **Seedling Root Rots** (*Fusarium* spp., *Pythium* spp. and *Macrophomina phaseolina*).	R2
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 for control of *Aphanomyces* spp., ***Fusarium* spp.**, *Macrophomina* spp., *Phytophthora* spp., *Pythium* spp., *Rhizoctonia* spp. and *Verticillium* spp. as a soil application in legume vegetables.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of *Botrytis* in grapes and strawberries. US registration for the control of White Mould (*Sclerotinia sclerotium*), Botrytis Grey Mould, Powdery Mildew, **Fusarium Wilt**, Phytophthora Root Rot, Pythium Damping Off, Rhizoctonia Root Rot and Verticillium Wilt in legume vegetables.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of Botrytis in grapes and strawberries, Bacterial Spot in fruiting vegetables and Anthracnose in avocado and mango. US registration for control of White Mould (*Sclerotinia sclerotium*) and Grey Mould (*Botrytis* spp.) in legume vegetables.	-
Fludioxonil + Sedaxane (Vibrance Premium Seed Treatment) Syngenta	12+7	Protective Seed Treatment		P		Registered in potatoes for control of Black Scurf, Silver Scurf, Black Rot, Gangrene and ***Fusarium*** and suppression of Scab. Hort Innovation is pursuing studies on control of Rhizoctonia in beetroot.	R3
NUL3163 Nufarm	TBC			P		New active in development from Nufarm with activity on ***Fusarium,*** *Pythium & Rhizoctonia*.	-
Streptomyces lydicus WYEC108 (Actinovate) Novozymes Bioag	BM 02	Biological	NR	P		Registered for control of Phytophthora and as a seed treatment in vegetables for control of Pythium, ***Fusarium*** and Rhizoctonia in strawberries and tomato.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Chocolate Spot / Botrytis Rot (*Botrytis spp.*) **Priority: Moderate**							
Rated as a moderate priority. Chocolate Spot, caused by *Botrytis fabae* and *Botrytis cinerea*, can survive either as sclerotia in the soil or on crop debris, in infected seed, or on self-sown volunteer plants. Use of disease-free seed or transplants in conjunction with good farm hygiene are recommended.							
Azoxystrobin (Amistar)	11	Protectant & Curative	NR NG	A	ALL	Registered in green peas for control of *Stemphyllium* spp. and suppression of **Botrytis Grey Mould.** [Max. 3 applications per crop; re-treatment interval 7-14 d]	-
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant	7 NG	A	ALL	Registered in green peas including garden peas, snow & sugar snap peas for control of ***Botrytis* spp**. & Sclerotinia Rot. [Max. 2 applications per crop; re-treatment interval 7-10 d]	R3
Boscalid (Filan) BASF	7	Protectant	7 G:7	P-A	ALL	Registered in legume vegetables (field) for control of Sclerotinia Rot. Registered for control of ***Botrytis*** in grapevines and onions.	-
Chlorothalonil (Bravo) PER82895	M5	Protectant	7 NG	P-A	ALL (excl. VIC)	Permitted in garden peas for control of Black Spot. Permitted in snow and sugar snap peas for control of Downy Mildew and **Chocolate Spot**.	R3
Copper	M1	Protectant	1	P-A	ALL	Registered in peas for control of Ascochyta Blight and Bacterial Spot (*Pseudomonas syringae* pv. *pisi*). Registered for control of ***Botrytis* spp.** in beans.	-
Aureobasidium pullulans (Botector) Nufarm	BM 02	Biological	NR	P		Registered for control of ***Botrytis*** in grapes and berries. US registration for control of ***Botrytis* spp.** in berries, grapes, pome fruit, stone fruit, almonds, fruiting vegetables, cucurbits, leafy vegetables, ornamentals and hops.	-
Azoxystrobin + Tebuconazole (Veritas) Adama	3+11	Protectant & Curative		P		Registered in field peas for control of **Botrytis Mould**.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Bacillus amyloliquefaciens (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of *Botrytis* in grapes. US registration for the control of White Mould (*Sclerotinia sclerotium*), **Botrytis Grey Mould**, Powdery Mildew, Fusarium Wilt, Phytophthora Root Rot, Pythium Damping Off, Rhizoctonia Root Rot and Verticillium Wilt in legume vegetables.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of ***Botrytis*** in tomato, capsicum, chilli & several fruits. US registration for control of White Mould (*Sclerotinia sclerotium*) and Grey Mould (***Botrytis* spp.**) in legume vegetables.	-
BLAD (ProBlad Plus)	BM 01	Biological	NR	P		Registered for control of Brown Rot and Blossom Blight in stone fruit. US registration for control of ***Botrytis*** in fruiting vegetables, grapes, strawberries and ornamentals.	-
Fenpyrazamine (Prolectus) Sumitomo	17	Protectant & Curative		P		Registered for control of ***Botrytis*** in grapes.	-
Florylpicoxamid (Adavelt) Corteva	21	Protectant & Curative		P		New Mode of Action fungicide being developed in Australia AU with activity on Powdery Mildew, ***Botrytis* spp.**, *Septoria* spp., Anthracnose, *Alternaria* spp., Scab, *Monilinia* spp. and *Mycosphaerella* spp. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, Botrytis, Cladosporium, Cercospora, Sclerotinia, Rust and Anthracnose and suppression of Rhizoctonia in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of Powdery Mildew, Black Spot and Alternaria in apples. US registration for control of ***Botrytis*** in almonds, artichoke, berries, brassica vegetables, stone fruit, pome fruit, herbs, hops, cucurbits, pistachio, tomatoes and root vegetables.	-
Isofetamid (Kenja) ISK / AgNova	7	Protectant		P		Registered in berries for control of ***Botrytis.***	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
NUL3195 Nufarm	TBC			P		New product from Nufarm with ***Botrytis*** activity.	-
Penthiopyrad (Fontelis) Corteva	7	Protectant		P		Registered for control of White Mould in Brassica vegetables and for control of **Grey Mould** in cucurbits and leafy vegetables.	-
Pydiflumetofen + Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Submitted for registration in June 2021 for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. Canadian registration for control of **Botrytis** in potato, tuberous and corm vegetables, bulb vegetables and fruiting vegetables.	R3
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of ***Botrytis*** in berries, grapes and strawberries and control of ***Botrytis*** and *Sclerotinia* in leafy vegetables, lettuce and potatoes.	R3
Downy Mildew (*Peronospora viciae*) **Priority: Moderate**							
Rated as a moderate priority. Downy Mildew is a common disease that is characterised by a white downy fungal growth that develops on the underside of the leaf. Warm, moist weather favours the spread of the disease. Management options include farm hygiene, crop rotation, planting space and the use of protectant and curative fungicide spray applications when conditions favour disease outbreaks.							
Chlorothalonil (Bravo)	M5	Protectant	14 G:14	A	QLD, TAS & WA	Registered in peas for control of **Downy Mildew**. [Max. number of applications not specified; re-treatment interval 7-14 d]	R3
Phosphorous Acid PER11951	33	Curative	NR	A	NSW & TAS	Permitted in processing peas for control of **Downy Mildew**. [Max. number of applications and retreatment intervals not specified]	-
Zineb	M3	Protectant	7	A	ALL	Registered in peas (field) for control of **Downy Mildew**. [Max. no. applications not specified; re-treatment interval 7-14 d]	R2
Copper	M1	Protectant	1	P-A	ALL	Registered in peas for control of Ascochyta Blight and Bacterial Spot (*Pseudomonas syringae* pv. *pisi*). Registered for control of **Downy Mildew** in brassica vegetables, cucurbits, bulb vegetables, grapes, ornamentals, red beet and stalk vegetables.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant		P		Registered for the suppression of Powdery Mildew in tomatoes. US registration for control of **Downy Mildew** in Brassica vegetables.	-
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Protectant & Curative		P		Registered for control of **Downy Mildew** in onions.	-
Dimethomorph + Amitoctradin (Zampro) AgNova/BASF	45+40	Protectant		P		Registered for control of **Downy Mildew** in grape vines. US registration for disease control in Brassica leafy vegetables, bulb vegetables, cucurbit vegetables, fruiting vegetables, grapes, hops, leafy vegetables, and potato. 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.	-
Cyazofamid (Ranman) ISK / UPL	21	Protectant & Curative		P		Registered for the control of **Downy Mildew** in Brassica leafy vegetable seedlings. US registration for control of *Pythium* spp., **Downy Mildew** & Phytophthora Blight in beans and blackeyed peas.	-
Fluoxapiprolin (Cambalio 20SC) Bayer	49	Protectant & Curative		P		Bayer is seeking registration for control of **Downy Mildew** in grapes.	-
Mandipropamid (Revus) Syngenta	40	Protectant		P		Registered for control of **Downy Mildew** in grapes, lettuce and leafy vegetables.	-
Metalaxyl-M + Mancozeb (Ridomil Gold MZ) Syngenta	4+M3	Protectant		P		Registered for control of **Downy Mildew** in cucurbits, grapes, lettuce, onions, ornamentals, poppy and rhubarb.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Oxathiapiprolin (Zorvec Enicade) Corteva	49	Protectant & Curative		P		Registered for control of **Downy Mildew** in bulb vegetables, brassicas, cucurbits, leafy vegetables & brassica leafy vegetables and poppies.	-
Propamocarb + Fluopicolide (Infinito) Bayer	28+43	Protectant & Curative		P		Registered for control of **Downy Mildew** in Brassica vegetables, Bulb vegetables, Cucumber, Cucurbits, Leafy vegetables, Brassica leafy vegetables & Lettuce.	-
Powdery Mildew (*Erysiphe pisi*) **Priority: Moderate**							
Rated as a moderate priority. Characterised by white, powdery growth that occurs on the leaves of infected plants. 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.							
Sulphur	M2	Protectant & Curative	NR	A	ALL	Registered in vegetables for control of **Powdery Mildew** and Rust. Do not apply during the heat of the day. [Max. no. of applications not specified; re-treatment interval 14-21 d]	-
Tebuconazole	3	Protectant & Curative	3 G:21	A	ALL	Registered in peas for control of **Powdery Mildew**. [Max. 2 applications per crop; re-treatment interval 14 d]	R3
Triadimefon	3	Protectant & Curative	14	A	NSW, VIC & TAS	Registered in peas for control of **Powdery Mildew**. [Max. 2 applications per crop; re-treatment interval 14 d]	
ADM1700F Adama	TBC			P		Fungicide in development from Adama with **Powdery Mildew** activity	-
Azoxystrobin + Difenoconazole (Amistar Top) Syngenta	3+11	Protectant & 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 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of *Botrytis* in grapes. US registration for the control of White Mould (*Sclerotinia sclerotium*), Botrytis Grey Mould, **Powdery Mildew**, Fusarium Wilt, Phytophthora Root Rot, Pythium Damping Off, Rhizoctonia Root Rot and Verticillium Wilt in legume vegetables.	-

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		Registered for control of Botrytis in grapes and strawberries, Bacterial Spot in fruiting vegetables and Anthracnose in avocado and mango. US registration for control of White Mould (*Sclerotinia sclerotium*) and Grey Mould (*Botrytis* spp.) in legume vegetables and **Powdery Mildew** in cucurbits, grapes, pome fruit, stone fruit and strawberry.	-
BLAD (ProBlad Plus)	BM 01	Biological	NR	P		Registered in stone fruit for control of Brown Rot and Blossom Blight in stone fruit. US registration for control of **Powdery Mildew** in cucurbits, fruiting vegetables, grapes, hops, pome fruit, strawberries and ornamentals.	-
Bupirimate (Nimrod) ADAMA	8	Protectant & Curative		P		Registered for control of **Powdery Mildew** in apples, cucurbits, cut flowers, eggplant, nursery stock, ornamentals, peppers and strawberries.	-
Cyflufenamid (Flute) AgNova	U6	Protectant & Curative		P		Registered for control of **Powdery Mildew** in grapevines and cucurbits.	-
Florylpicoxamid (Adavelt) Corteva	21	Protectant & Curative		P		New Mode of Action fungicide being developed in Australia AU with activity on **Powdery Mildew**, *Botrytis* spp., *Septoria* spp., Anthracnose, *Alternaria* spp., Scab, *Monilinia* spp. and *Mycosphaerella* spp. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, Botrytis, Cladosporium, Cercospora, Sclerotinia, Rust and Anthracnose and suppression of Rhizoctonia in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of **Powdery Mildew**, Black Spot and Alternaria in apples. Registered in the US for control of Powdery Mildew in multiple crops including Artichoke, Brassica, Leafy greens, carrot, herbs, Fruiting vegetables, Root vegetables, Celery, Rhubarb & Fennel	-
Isopyrazam (Seguris Flexi) Syngenta	7	Protectant & Curative		P		Registered for control of **Powdery Mildew** in apples.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative		P		Registered for control of **Powdery Mildew** in grapes. US registration for control of **Powdery Mildew** in legume vegetables.	R3
NUL3195 Nufarm	TBC			P		Fungicide in development from Nufarm with activity on **Powdery Mildew** and *Botrytis*.	-
Penthiopyrad (Fontelis) Corteva	7	Protectant		P		Registered for control of **Powdery Mildew** in pome fruit, beetroot, brassica vegetables, fruiting vegetables, cucurbits, lettuce, root vegetables, stalk vegetables and strawberries.	-
Pydiflumetofen + Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Submitted for registration in June 2021 for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. US registration for control of **Powdery Mildew** in stone fruit and almonds and Canadian registration for control of **Powdery Mildew** in root and tuber vegetables, brassica leafy vegetables, brassica head and stem vegetables, fruiting vegetables and cucurbits.	R3
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of *Botrytis* in berries, grapes and strawberries and control of *Botrytis* and *Sclerotinia* in leafy vegetables, lettuce and potatoes. US registration for control of **Powdery Mildew** in cucurbits, fruiting vegetables, grape and small fruit vine climbing (except fuzzy Kiwifruit), specific leaf petioles, leafy greens, root and tuber vegetables, mustard greens, strawberries and tuberous and corm vegetables.	R3
Pyriofenone (Kusabi) ISK	50	Protectant		P		Registered for control of **Powdery Mildew** in cucurbits.	-
Spiroxamine (Prosper 500EC) Bayer	5	Protectant & Curative		P		Permitted for control of **Powdery Mildew** in snow peas and sugar snap peas.	-
Streptomyces lydicus WYEC108 (Actinovate) Novozymes Bioag	BM 02	Biological		P		Registered for the suppression of **Powdery Mildew** in strawberries.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Bacterial Blight (*Pseudomonas syringae*) **Priority: Low**							
Rated as a low priority. This disease is seed borne but spreads through irrigation water and runoff as well as being carried on machinery and by insects. It can survive in the soil on crop residues but has a limited host range, so crop rotation is an important control strategy. Cultural controls include the use of disease-free seed or transplants, eliminating alternative hosts and early detection and disposal of infected seedlings.							
Copper	M1	Protectant	1	A	ALL	Registered in peas for control of Ascochyta Blight and **Bacterial Blight** (*Pseudomonas syringae* pv. *pisi*). [Max. no. of applications not specified; re-treatment interval: 10-14 d]	-
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant		P		Registered for control of Powdery Mildew and Bacterial Spot in tomatoes.	-
Aureobasidium pullulans (Botector) Nufarm	BM 02	Biological	NR	P		Registered for control of *Botrytis* and suppression of several other fungal pathogens (*Anthracnose, Phomopsis* and *Rhizopus*) in grapes and berries.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of Bacterial Spot in tomato, capsicum, chilli in field and protected cropping systems. US registration for control of White Mould (*Sclerotinia sclerotium*) and Grey Mould (*Botrytis* spp.) in legume vegetables and control of ***Pseudomonas syringae*** in berries, cucurbits and stone fruit.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of *Botrytis*, in grapes and strawberries. US registration for control of *Botrytis,* Powdery Mildew and White Mould in legume vegetables.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Damping Off (*Pythium* spp., *Phytophthora* spp., *Fusarium* spp., *Rhizoctonia* spp.) **Priority: Low**							
Rated as a low priority. This disease attacks 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.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Soil Fumigant	NR	A	ALL	Registered for control of plant parasitic Nematodes, Symphylans, Wireworms, and **soil borne diseases** in field crops. ***For use by professional and registered fumigators only.***	-
Chloropicrin (Agrocelhone CE Soil Fumigant)	8	Soil Fumigant	NR	A	ALL	Registered in vegetable crops for control of soil-borne nematodes, insects and diseases caused by certain species of ***Pythium***, ***Phytophthora***, *Fusarium*, *Verticillium* and bacteria. ***For use by professional and registered fumigators only.***	-
Dazomet (Basamid)	8F	Soil 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.	-
Metalaxyl-M (Apron)	4	Protectant	NR	A	ALL	Registered in peas as a seed treatment for control of **Damping Off**.	-
Metham Sodium	-	Soil 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.	-
Thiram + Thiabendazole (P-Pickel T)	M3+1	Protectant	NR	A	ALL	Registered in green peas as a seed treatment for control of Black Spot (*Mycosphaerella pinodes*, *Ascochyta pisi* and *Phoma medicaginis* var. *pinodella*) and **Seedling Root Rots** (*Fusarium* spp., *Pythium* spp. and *Macrophomina phaseolina*).	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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 for control of *Aphanomyces* spp., ***Fusarium* spp.**, *Macrophomina* spp., ***Phytophthora* spp.**, ***Pythium* spp.**, ***Rhizoctonia* spp.** and *Verticillium* spp. as a soil application in legume vegetables.	-
Amisulbrom (Amishield 500WG) Nufarm	21	Protectant		P		Registered for control of Clubroot and suppression of **Damping Off** in brassica vegetables, and control of Powdery Scab and suppression of Pink Rot in potatoes.	-
Azoxystrobin + Difenoconazole (Amistar Top) Syngenta	11+3	Protectant & Curative		P		Registered for control of **Phytophthora** in potatoes.	R3
Bacillus amyloliquefaciens (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of *Botrytis* in grapes. US registration for the control of White Mould (*Sclerotinia sclerotium*), Botrytis Grey Mould, Powdery Mildew, Fusarium Wilt, Phytophthora Root Rot, **Pythium Damping Off**, Rhizoctonia Root Rot and Verticillium Wilt in legume vegetables.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of Botrytis in grapes and strawberries, Bacterial Spot in fruiting vegetables and Anthracnose in avocado and mango. US registration for control of White Mould (*Sclerotinia sclerotium*) and Grey Mould (*Botrytis* spp.) in legume vegetables.	-
Cyazofamid (Ranman) ISK / UPL	21	Protectant & Curative		P		Registered for the control of Downy Mildew in Brassica leafy vegetable seedlings. US registration for control of ***Pythium* spp.**, Downy Mildew and Phytophthora Blight in beans and blackeyed peas.	-
Fludioxonil + Metalaxyl-M (Maxim XL) Syngenta	12+4	Protectant & Curative		P		Registered for control of Damping Off in canola, industrial hemp, maize, oilseed mustard, silverbeet, sorghum, spinach and sweet corn.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Fludioxonil + Metalaxyl-M + Azoxystrobin (Dynasty Seed Treatment) Syngenta	12+4 +11	Protectant & Curative		P		Registered for control of **Damping Off** in cotton.	R3
Fludioxonil + Sedaxane (Vibrance Premium Seed Treatment) Syngenta	12+7	Protective Seed Treatment		P		Registered in potatoes for control of Black Scurf (***Rhizoctonia***), Silver Surf, Black Rot, Gangrene and Fusarium Dry Rot and suppression of Scab. Hort Innovation is conducting research for use in beetroot to control ***Rhizoctonia***.	R3
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered in Australia for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, Botrytis, Cladosporium, Cercospora, Sclerotinia, Rust and Anthracnose and suppression of **Rhizoctonia** in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
Metalaxyl-M (Ridomil Gold 25G) Syngenta	4	Systemic		P		Registered for control of **Damping Off** in broccoli, brussel sprouts, cabbage, capsicum or pepper, carrot, cauliflower, cucurbit and tomato. MT18018 is generating data to support a new minor use permit for control of **Damping Off** in beetroot.	-
NUL3163 Nufarm	TBC			P		New active in development from Nufarm with activity on ***Fusarium, Pythium & Rhizoctonia*****.**	-
Streptomyces lydicus WYEC108 (Actinovate) Novozymes Bioag	BM 02	Biological	NR	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	Protectant		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*.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Black Root Rot (*Aphanomyces euteiches*) **Priority: Low**							
Rated as a low priority. Fungicides, soil fumigants and biological control options have been explored but have proven ineffective for use in commercial production. Cover crops and green manure crops have been studied overseas as a means to lower the severity of *Aphanomyces* of pea. Differences in soil nutrient content have been shown to influence its activity.							
Thiram + Thiabendazole (P-Pickel T)	M3+1	Protectant	NR	A	ALL	Registered in green peas as a seed treatment for control of Black Spot (*Mycosphaerella pinodes*, *Ascochyta pisi* and *Phoma medicaginis* var. *pinodella*) and **Seedling Root Rots** (*Fusarium* spp., *Pythium* spp. and *Macrophomina phaseolina*).	R2
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 for control of ***Aphanomyces* spp.**, *Fusarium* spp., *Macrophomina* spp., *Phytophthora* spp., *Pythium* spp., *Rhizoctonia* spp. and *Verticillium* spp. as a soil application in legume vegetables.	-
Sclerotinia Rot (*Sclerotinia* spp.) **Priority: Low**							
Rated as a low priority. The fungus can survive in the soil for many years. Management options include farm hygiene, crop rotation, planting space and the use of protectant fungicide spray applications when conditions favour disease outbreaks. Correct timing and good penetration of foliage are essential for effective control.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Soil Fumigant	NR	A	ALL	Registered for control of plant parasitic Nematodes, Symphylans, Wireworms, and **soil borne diseases** in field crops. ***For use by professional and registered fumigators only.***	-
Boscalid (Filan) BASF	7	Protectant	7 G:7	A	ALL	Registered in legume vegetables (field) for control of **Sclerotinia Rot**. [Max. 4 applications per crop; re-treatment interval 7-14 d]	-
Chloropicrin (Agrocelhone CE Soil Fumigant)	8	Soil Fumigant	NR	A	ALL	Registered in vegetable crops for control of soil-borne nematodes, insects and diseases caused by certain species of *Pythium*, *Phytophthora*, *Fusarium*, *Verticillium* and bacteria. ***For use by professional and registered fumigators only.***	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant	7 NG	A	ALL	Registered in green peas including garden peas, snow & sugar snap peas for control of *Botrytis* spp. & **Sclerotinia Rot**. [Max. 2 applications per crop; re-treatment interval 7-10 d]	R3
Dazomet (Basamid)	8F	Soil 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	-	Soil 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.	-
Thiram + Thiabendazole (P-Pickel T)	M3+1	Protectant	NR	A	ALL	Registered in green peas as a seed treatment for control of Black Spot (*Mycosphaerella pinodes*, *Ascochyta pisi* and *Phoma medicaginis* var. *pinodella*) and **Seedling Root Rots** (*Fusarium* spp., *Pythium* spp. and *Macrophomina phaseolina*).	R2
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 for control of ***Sclerotinia* spp.** as a foliar application in legume vegetables, herbs and spices, oilseed crops, root and tuber vegetables and soybeans and as a soil application in leafy vegetables.	-
Boscalid (Filan) BASF	7	Protectant	7 G:7	P-A	ALL	Registered in legume vegetables (field) for control of Sclerotinia Rot. Registered in Brassica vegetables for the control of **Sclerotinia Rot**.	-
Aureobasidium pullulans (Botector) Nufarm	BM 02	Biological	NR	P		Registered for suppression of **Sclerotinia Rot** in fruiting vegetables.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Protectant & Curative		P		Registered for the control of Downy Mildew and suppression of *Alternaria* and ***Sclerotinia*** in Brassica leafy vegetables.	-
Bacillus amyloliquefaciens (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of *Botrytis* in grapes. US registration for the control of **White Mould (*Sclerotinia sclerotium*)**, Botrytis Grey Mould, Powdery Mildew, Fusarium Wilt, Phytophthora Root Rot, Pythium Damping Off, Rhizoctonia Root Rot and Verticillium Wilt in legume vegetables.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control Botrytis in strawberries and grapes, suppression of Bacterial Spot in tomato, chilli and capsicum and control of Anthracnose and suppression of Stem End Rot in tropical fruits. US registration for control of **White Mould (*Sclerotinia sclerotium*)** and Grey Mould (*Botrytis* spp.) in legume vegetables.	**-**
Fluazinam (Shirlan)	29	Protectant		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	Protectant & Curative		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, Botrytis, Cladosporium, Cercospora, **Sclerotinia**, Rust and Anthracnose and suppression of Rhizoctonia in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered in Lettuce (including leafy lettuce) for the control of *Sclerotinia sclerotiorum*.	
Mandestrobin (Intuity) Sumitomo	11	Protectant & Curative		P		Registered for control of **Sclerotinia White Mould** in green beans.	-
NUL3446	TBC			P		Fungicide in development from Nufarm with activity on ***Sclerotinia*** spp.	**-**

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Prothioconazole + Tebuconazole (Prosaro) Bayer	3	Protectant		P		Registered for control of **Sclerotinia** and other diseases in canola and pyrethrum.	R3
Pydiflumetofen + Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Submitted for registration in June 2021 for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. Canadian registration for control of **Sclerotinia** in potato, root vegetables, tuberous and corm vegetables and fruiting vegetables.	R3
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of Botrytis in berries, grapes, and Botrytis and **Sclerotinia** in leafy vegetables and potato.	R3
Angular Leaf Spot (*Pseudomonas syringae*) **Priority: Low**							
Rated as a low priority. *Pseudomonas syringae* can be moved by wind, rain, and transportation via nursery material. Mechanical equipment and pruning tools are a key means of dispersal.							
Copper	M1	Protectant	1	P-A	ALL	Registered for control of Ascochyta Blight and Bacterial Blight (***Pseudomonas syringae***) in peas.	-
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant		P		Registered for control of Powdery Mildew and Bacterial Spot in tomatoes.	-
Aureobasidium pullulans (Botector) Nufarm	BM 02	Biological	NR	P		Registered for control of *Botrytis* and suppression of several other fungal pathogens (*Anthracnose, Phomopsis* and *Rhizopus*) in grapes and berries.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of Bacterial Spot in tomato, capsicum, chilli in field and protected cropping systems. US registration for control of White Mould (*Sclerotinia sclerotium*) and Grey Mould (*Botrytis* spp.) in legume vegetables and control of ***Pseudomonas syringae*** in berries, cucurbits and stone fruit.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Anthracnose (*Colletotrichum spp.*) **Priority: Low**							
Rated as a low priority. This disease can be seed-borne and carry over on crop residue in the soil. It is spread in water droplets and is worse in warm, humid weather. It is thought that protectants that target Downy Mildew and Botrytis will have some effect. Regular spraying and farm hygiene are important to prevent crop damage.							
Azoxystrobin (Amistar)	11	Protectant & Curative	NR NG	P-A	ALL	Registered in green peas for control of *Stemphyllium* spp. and suppression of Botrytis Grey Mould. Registered for control of **Anthracnose** in almonds, avocado, mango, olives, pistachio and berries.	-
Chlorothalonil (Bravo)	M5	Protectant	14 G:14	P-A	QLD, TAS & WA	Registered in peas for control of Downy Mildew. Registered for control of **Anthracnose** in capsicum and peppers.	R3
Copper	M1	Protectant	1	P-A	ALL	Registered in peas for control of Ascochyta Blight and Bacterial Blight. Registered for control of Angular Leaf Spot, Bacterial Leaf Spot, Downy Mildew, **Anthracnose**, Gummy Stem Blight in cucurbits.	-
Zineb	M3	Protectant	7	P-A	ALL	Registered in peas for control of Downy Mildew. Registered for control of Rust & **Anthracnose** in beans.	R2
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. US registration for control of **Anthracnose** in berries, stone fruit, almonds, fruiting vegetables, cucurbits, leafy vegetables, ornamentals and hops.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of **Anthracnose** in avocado and several tropical fruits. US registration for control of White Mould (*Sclerotinia sclerotium*) and Grey Mould (*Botrytis* spp.) in legume vegetables.	-
BLAD (Problad Plus)	BM 01	Biological	NR	P		Registered in stone fruit for suppression of Brown Rot. US registration for control of **Anthracnose**, Grey Mould and Powdery Mildew.	-
Dimethomorph + Mancozeb (Acrobat WDG)	40+M3	Protectant & Curative		P		Registered for the control of **Anthracnose** in cucurbits, grapevines, head varieties of lettuce and onions.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Florylpicoxamid (Adavelt) Corteva	21	Protectant & Curative		P		New Mode of Action fungicide being developed in Australia AU with activity on Powdery Mildew, *Botrytis* spp., *Septoria* spp., **Anthracnose**, *Alternaria* spp., Scab, *Monilinia* spp. and *Mycosphaerella* spp. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, Botrytis, Cladosporium, Cercospora, Sclerotinia, Rust and Anthracnose and suppression of Rhizoctonia in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of **Anthracnose** and Stem End Rot in tropical and sub-tropical fruit.	-
Isofetamid (Kenja) ISK / AgNova	7	Protectant & Curative		P	ALL	Registered for control of Botrytis Grey Mould in berries. US registration for control of Grey Mould, Powdery Mildew and **Anthracnose** in low-growing berries.	-
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative		P		Registered for control of Black Spot in apples and Powdery Mildew in grapes. US registration for control of **Anthracnose** in citrus, corn and tuberous and corm vegetables.	-
Pydiflumetofen + Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Submitted for registration in June 2021 for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. US registration for control of **Anthracnose** in almonds, stone fruit and tree nuts and Canadian registration for control of **Anthracnose** in fruiting vegetables and cucurbits.	R3
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of *Botrytis* in berries, grapes and strawberries and control of *Botrytis* and *Sclerotinia* in leafy vegetables, lettuce and potatoes. US registration for control of **Anthracnose** in berries and grape and small fruit vine climbing (except fuzzy Kiwifruit) and suppression of **Anthracnose** in lemon and lime.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Rust (*Uromyces viciae-fabae*) **Priority: Low**							
Rated as a low priority. Rusts are plant diseases caused by pathogenic fungi which are parasitic in their behaviour. Although not fatal, they can severely limit growth & fruiting ability.							
Mancozeb	M3	Protectant	7	A	ALL	Registered in Peas for control of **Rust** and suppression of Ascochyta Leaf Blight. [Max. no. of applications not specified; re-treatment interval 7-10 d]	R2
Sulphur	M2	Protectant & Curative	NR	A	ALL	Registered in vegetables for control of Powdery Mildew and **Rust.** Do not apply during the heat of the day. [Max. no. of applications not specified; re-treatment interval 14-21 d]	-
Azoxystrobin (Amistar)	11	Protectant & Curative	NR NG	P-A	ALL	Registered in green peas for control of *Stemphyllium* spp. and suppression of Botrytis Grey Mould. Registered for control of **Rust** in ornamentals and nursery stock and Syngenta has submitted a label extension for control of Brown Rot and **Rust** in almonds.	-
Tebuconazole	3	Protectant & Curative	3 G:3	P-A	ALL	Registered in peas for control of Powdery Mildew. Registered for control of **Rust** in green beans.	R3
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, Botrytis, Cladosporium, Cercospora, Sclerotinia, Rust and Anthracnose and suppression of Rhizoctonia in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
Isopyrazam (Seguris Flexi) Syngenta	7	Protectant & Curative		P		Registered for control of Powdery Mildew in apples. Syngenta has submitted a label extension for the control of Brown Rot and **Rust** in almonds.	-
Oxycarboxin (Plantvax) UPL	7	Protectant & Curative		P		Registered for control of **Rust** in green beans.	-

4.2 Insect and mite pests of green peas

4.2.1 Insect and mite pest priorities

Common name	Scientific name
Moderate	
Cotton Bollworm / Corn Earworm	*Helicoverpa armigera*
Native Budworm	*Helicoverpa punctigera*
Cluster Caterpillar	*Spodoptera litura*
Western Flower Thrips	*Frankliniella occidentalis*
Plague Thrips	*Thrips imaginis*
Onion Thrips	*Thrips tabaci*
Pea Thrips	*Kakothrips pisivorus*
Green Peach Aphid	*Myzus persicae*
Slugs and Snails	Gastropoda
Low	
Two-Spotted Mite	*Tetranychus urticae*
Looper Caterpillar	*Chrysodeixis* spp.
Rutherglen Bug	*Nysius vinitor*
Green Vegetable Bug	*Nezara viridula*
African Black Beetle	*Heteronychus arator*
Cutworms	*Agrotis* spp.
Webworm	*Hednota* spp.
Silverleaf Whitefly	*Bemisia tabaci Biotype B & Q*
True Wireworm	*Elateridae*
False Wireworm	*Gonocephalum* spp.

New incursions of an exotic pest which pose a potential threat and other non-ranked pests.

New Pest to Australia (unknown priority)	
Fall Armyworm	*Spodoptera frugiperda*
Vegetable Leafminer	*Liriomyza sativae*
Serpentine Leafminer	*Liriomyza huidobrensis*
American Serpentine Leafminer	*Liriomyza trifolii*

There were no high priority insect pests identified by the survey but Helicoverpa, Cluster Caterpillar, Green Peach Aphid, Thrips, Slugs and Snails were nominated as a moderate priority. Available and potential products for insect, mite and other pests are listed in Section 4.2.2.

Resistance to some insect groups has reduced control options despite a range of actives registered. Additionally, not all actives have broad registrations across Lepidoptera. Growers should not exceed the maximum number of applications permitted on the insecticide label.

Biological control involving other insects or fungal organisms in insect pest control is another option that need to be further evaluated. There are several identified biological control agents commercially available for pests in Australia.

Resistance Management

There are several insecticide management strategies that apply to vegetables on the CropLife website[6], including Silverleaf whitefly, Thrips & Aphids.

Further development and extension of IPM strategies and best management practices that can be implemented in the management of sucking insects and mites in Snow pea and Sugar snap peas may be warranted.

[6] www.croplife.org.au/resources/programs/resistance-management/

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
Cotton Bollworm / Corn Earworm (*Helicoverpa armigera*) **Native Budworm (***Helicoverpa punctigera*) **Priority: Moderate**								
Rated as a moderate priority. 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.								
Bacillus thuringiensis subsp. kurstaki (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of Armyworm, Cabbage Moth, Cabbage White Butterfly, Green Looper, Lightbrown Apple Moth, Pear Looper, Soybean Looper, Vine Moth, Tobacco Looper, **Cotton Bollworm** and **Native Budworm.** Most effective on larvae < 8 mm. [Apply a minimum of 2 sprays, 3 d apart; re-treatment interval 3-5 d]	VL Bee:L	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	1	A	ALL	Registered in legume vegetables including green peas and processing peas for control of **Cotton Bollworm** and **Native Budworm.** Spray during egg laying/hatching. [Max of 3 sprays per crop; max 2 consecutive; Re-treatment interval 7 d]	L Bee:VL	-
Diazinon	1B	Contact	14 NG	A	ALL (excl. VIC)	Registered in peas for control of Cutworms and Caterpillars. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3 G:21	A	ALL	Registered in legume vegetables including green peas for control of **Heliothis**, Cluster Caterpillar and Loopers. [Max 4 applications per crop; re-treatment interval min. 7 days]	M Bee:H	-
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 Bee:H	-
Helicoverpa NPV (Vivus Max) AgBiTech	31	Biological	NR	A	ALL	Registered in legume vegetables including green peas for control of **Cotton Bollworm** and **Native Budworm.** [Max no. of applications not specified; re-treatment interval 2-3 d]	VL Bee:L	-
Methomyl (Lannate)	1A	Contact	1	A	ALL	Registered in peas for control of **Heliothis**. [Max no. applications and re-treatment not specified]	H Bee:H	R2
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in legume vegetables (field) for control of ***Helicoverpa***, Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug & Thrips including Western Flower Thrips. [Max 6 applications per crop; re-treatment interval: 7 d]	H Bee:H	R2
Permethrin (Ambush)	3A	Contact	3	A	NSW	Registered in green peas for control of ***Helicoverpa* spp.** [Max no. applications and re-treatment not specified]		
Spinetoram (Success Neo) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in legume vegetables for control of Loopers, Western Flower Thrips and ***Helicoverpa* spp.** [Max 3 applications per crop; re-treatment interval 7-14 d]	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in legume vegetables for control of Loopers, ***Helicoverpa*** & Western Flower Thrips. [Max. 3 applications per season; re-treatment interval 7-14 d]	L Bee:L	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.	-	-
Chlorfenapyr (Phantom) BASF	13	Contact / IGR		P		Registered for control of Diamondback Moth and Cabbage White Butterfly in Brassica vegetables.	H Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Clitorea ternatia extract (Sero-X) Innovate Ag	UN	Biological	NR	P		Registered for control of Diamondback Moth in Brassicas and control of **Cotton Bollworm**, **Native Budworm**, Green Mirid and Silverleaf Whitefly in cotton.	L Bee:L	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of **Cotton Bollworm** and **Native Budworm** in brassica vegetables, celery, Chinese leafy vegetables, leafy vegetables, solanaceous fruit, stone fruit and sweet corn.	L Bee:H	R3
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Contact & Ingestion		P		Registered for control of various Lepidoptera including ***Helicoverpa* spp.** in brassica vegetables, leafy vegetables and fruiting vegetables.	M Bee:H	R3
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and **Helicoverpa** in fruiting vegetables.	-	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.	-	-
Cluster Caterpillar (*Spodoptera litura*) **Priority: Moderate**								
Rated as a moderate priority. Young larvae feed on the leaf surface. Cluster caterpillars are controlled by most conventional pesticides targeting *Helicoverpa*.								
Diazinon	1B	Contact	14 NG	A	ALL (excl. VIC)	Registered in peas for control of Cutworms and Caterpillars. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R3
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3 G:21	A	ALL	Registered in legume vegetables including green peas for control of Heliothis, **Cluster Caterpillar** and Loopers. [Max 4 applications per crop; re-treatment interval min. 7 days]	M Bee:H	-
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 Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in legume vegetables (field) for control of *Helicoverpa*, Cucumber Moth, **Cluster Caterpillar**, Loopers, Webworm, Rutherglen Bug & Thrips including Western Flower Thrips. [Max 6 applications per crop; re-treatment interval: 7 d]	H Bee:H	R2
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in legume vegetables including green peas and processing peas for control of *Helicoverpa*. Registered for control of **Cluster Caterpillar** in brassica vegetables and strawberries.	L Bee:VL	-
Spinetoram (Success Neo) Corteva	5	Ingestion	3 G:14	P-A	ALL	Registered in legume vegetables for control of Loopers, Western Flower Thrips and *Helicoverpa* spp. Registered for control of **Cluster Caterpillar** in brassica vegetables, swedes and turnips.	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	P-A	ALL	Registered in legume vegetables for control of Loopers, *Helicoverpa* & Western Flower Thrips. Registered for control of **Cluster Caterpillar** in brassica vegetables.	L Bee:L	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.	-	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of **Cluster Caterpillar** in brassica vegetables and solanaceous fruit.	L Bee:H	R3
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Contact & Ingestion		P		Registered for control of various Lepidoptera including **Cluster Caterpillar** in brassica vegetables and leafy vegetables.	M Bee:H	R3
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
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
Western Flower Thrips (*Frankliniella occidentalis*) **Plague Thrips** (*Thrips imaginis*) **Onion Thrips** (*Thrips tabaci*) **Pea Thrips** (*Kakothrips pisivorus*) **Priority: Moderate**								
Rated as a moderate priority. 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 **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 Bee:L	-
Dimethoate	1B	Contact	7 G:7	A	ALL	Registered in peas for control of Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, **Thrips** and Wingless Grasshoppers. [Max no. of applications and re-treatment interval not specified]	H Bee:H	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 Bee:H	-
Methomyl (Lannate)	1A	Contact	1	A	QLD, NSW, SA & WA	Registered in peas for control of Loopers and **Pea Thrips**. [Max no. of applications and re-treatment interval not specified]	H Bee:H	-
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in legume vegetables (field) for control of *Helicoverpa*, Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug & Thrips including **Western Flower Thrips**. [Max 6 applications per crop; re-treatment interval: 7 d]	H Bee:H	R2
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	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 Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spinetoram (Success Neo) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in legume vegetables for control of Loopers, **Western Flower Thrips**, and *Helicoverpa* spp. [Max 3 applications per crop; re-treatment interval 7-14 d]	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in legume vegetables for control of Loopers, *Helicoverpa* & **Western Flower Thrips**. [Max. 3 applications per season; re-treatment interval 7-14 d]	L Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	7 G:7	P-A	ALL	Registered in green peas for control of Green Peach Aphid and Silverleaf Whitefly. Registered for control of **Western Flower Thrips** in beans, bulb vegetables, fruiting vegetables, celery, herbs and lettuce.	M Bee:VL	-
Clitoria ternatea Extract (Sero-X) Growth Agriculture	-	Biological		P		Registered in cotton for control of *Helicoverpa* spp., Green Mirids and Silverleaf Whitefly and in brassica leafy vegetables for control of Diamondback Moth. Label extension has been submitted seeking to add new uses for control of Silverleaf Whitefly and **Thrips** in brassicas and cucurbits.	L Bee VL	-
Cyantraniliprole (Benevia) FMC	28	Ingestion		P		Registered for suppression of **Onion Thrips** in bulb vegetables, **Western Flower Thrips** and Tomato Thrips in fruiting vegetables, **Western Flower Thrips** in cucurbits, **Plague Thrips** in potatoes, and **Onion Thrips**, **Plague Thrips** and **Western Flower Thrips** in strawberries.	M Bee:VH	-
Dimpropyridaz (Axalion) BASF	7			P		BASF has applied for registration to control Whitefly, Aphid and **Thrips** in leafy vegetables, brassica vegetables, fruiting vegetables and cucurbits. Registration is expected in 2023.	-	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for **Thrips**, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, **Thrips** and Helicoverpa in fruiting vegetables.	-	-
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
Green Peach Aphid (*Myzus persicae*) **Priority: Moderate**								
Ranked as a moderate priority. 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 plant viruses.								
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of 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 Bee:L	-
Dimethoate	1B	Contact	7 G:7	A	ALL	Registered in peas for control of **Aphids**, Jassids, Mites, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshoppers. [Max no. of applications and re-treatment interval not specified]	H Bee:H	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 Bee:H	-
Pirimicarb (Pirimor)	1A	Contact & Ingestion	2	A	ALL	Registered in peas for control of **Aphids**. Spray when Aphids are detected. [Max. no. of applications & re-treatment interval not specified]	VL Bee:VL	R3
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	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 Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	7 G:7	A	ALL	Registered in green peas for control of **Green Peach Aphid** and Silverleaf Whitefly. [Max. 2 applications per crop; re-treatment interval 7 d]	M Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Afidopyropen (Versys) BASF	9D	Ingestion		P		Registered for control of **Green Peach Aphid** in brassica vegetables, celery, cotton, cucurbits, fruiting vegetables, ginger, leafy vegetables, Brassica leafy vegetables, ornamentals, parsley, potato and sweet potato. Hort Innovation Data Generation Project ST17000 is undertaking trials to support a label extension for green beans, snow peas and sugar snap peas for control of Aphids and Silverleaf Whitefly in conjunction with BASF. Project is due for completion by the end of 2021.	L Bee:L	-
Dimpropyridaz (Axalion) BASF	7			P		BASF has applied for registration to control Whitefly, **Aphid** and Thrips in leafy vegetables, brassica vegetables, fruiting vegetables and cucurbits. Registration is expected in 2023.	-	-
Flonicamid (Mainman) ISK / UPL	29	Ingestion		P		Registered for control of **Green Peach Aphid**, Melon Aphid and Silverleaf Whitefly in cucurbits.	M Bee:VL	
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips in macadamia. US registration for control of Leafhoppers, Aphids and Whiteflies in legume vegetables. Bayer label extension submitted in October 2020 to include whitefly in vegetables such as cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits & potatoes.	L Bee:VL	-
Pymetrozine (Chess) Syngenta	9B	Contact & Ingestion		P		Registered for control of **Green Peach Aphid** in tree nuts, brassica vegetables, beetroot, fruiting vegetables, lettuce, potato, leafy vegetables and stone fruit.	L Bee:VL	R3
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of **Green Peach Aphid** in tree nuts, brassica vegetables, fruiting vegetables, cucurbits, lettuce, root vegetables, silver beet, stone fruit, strawberries and sweet corn.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Slugs & Snails (Gastropoda) **Priority: Moderate**								
Rated as a moderate priority. They are active after dusk when chemical treatments can be most effective.								
Iron EDTA Complex	-	Contact & Ingestion	NR	A	ALL	Registered in all plants for the control of **Snails and Slugs**. Spread pellets evenly on ground. [Max no. of applications and re-treatment not specified]	-	-
Metaldehyde	-	Contact & Ingestion	7	A	ALL	Registered in vegetables for the control of **Snails and Slugs**. Spread pellets evenly on ground. [Max no. of applications and re-treatment not specified]	-	-
Methiocarb (Mesurol) Bayer	1A	Contact & Ingestion		P		Registered for control of common Garden Snails, Slugs, White Snail & Italian White Snail in Brassica vegetables.	H Bee:M	R2
Two-Spotted Mite (*Tetranychus urticae*) **Priority: Low**								
Ranked as a low priority. Mites feed on aerial parts of the plant with the damage caused providing entry points for soil-borne disease. Predatory mites (*Phytoseiulus persimilis*) which attack Two-Spotted Mites are available commercially.								
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of 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 Bee:L	-
Dimethoate	1B	Contact	7 G:7	A	ALL	Registered in peas for control of Aphids, Jassids, **Mites**, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshoppers. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R1
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	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 Bee:L	-
Propargite (Omite)	12C	Contact	7	A	ALL	Registered in vegetables for control of **Two Spotted Mites**. Apply when pests appear and repeat when necessary. [Max. no. of applications and re-treatment interval not specified].	M Bee:L	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Sulphur	UN	Contact	NR	A	ALL	Registered in vegetables for control of **Mites**. [Max no. of applications not specified; re-treatment interval 14-21 d]	L Bee:L	-
Abamectin PER81876	6	Contact	7 NG	P-A	ALL (excl. VIC)	Permitted in legume vegetables for suppression of Liriomyza Leafminers. Registered for control of **Two-Spotted Mite** in apples, pears, blackcurrants, cucumber, squash, zucchini, snow peas, sugar snap peas, sweet corn, fruiting vegetables other than cucurbits, custard apple, hops, lettuce, lychees, ornamentals, papaya, passionfruit and strawberries.	M H-Bees	-
Bifenazate (Acramite) UPL	20D	Contact & Ingestion		P		Registered for control of **Two-Spotted Mite** in almonds, pome fruit and stone fruit.	L Bee:H	-
Cyflumetofen (Danisaraba) BASF	25A	Contact		P		BASF is seeking registration in Australia for the control of Spider Mites in various crops. US registration for control of Spider Mites in citrus, grapes, pome fruit, stone fruit, tomato, tree nuts and ornamentals.	L Bee L	-
Etoxazole (Paramite) Sumitomo	10B	Contact & Ingestion		P		Registered for control of **Two-Spotted Mite** in almonds, peppers, cotton, grapes, pome fruit, stone fruit, tomatoes and turf.	L Bee:VL	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, **Mites** and Caterpillars. Registration submitted May 2021 for Simodis to control **Mites**, Thrips and Helicoverpa in fruiting vegetables.	-	-
Petroleum Oil	UN	Contact		P		Registered for control of **Mites** in berries, asparagus, beans, beet, corn, cucurbits, peppers, radish, squash, tomatoes, sweet corn and sugar beet.	VL Bee:L	-
Spiromesifen (Oberon) Bayer	23	Ingestion		P		Hort Innovation Data Generation Project ST19020 is undertaking trials to support a new Australian label registration for green beans, snow peas and sugar snap peas for various mite species including Broad Mite and Two-Spotted Mites. Project is due for completion by 2023/24.	M Bee:VL	

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Looper Caterpillar (*Chrysodeixis spp.*) **Priority: Low**								
Ranked as a low priority. 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 Armyworm, Cabbage Moth, Cabbage White Butterfly, Green Looper, Lightbrown Apple Moth, Pear Looper, Soybean Looper, Vine Moth, Tobacco Looper, Cotton Bollworm and Native Budworm**.** Most effective on larvae < 8 mm. [Apply a minimum of 2 sprays, 3 d apart; re-treatment interval 3-5 d]	VL Bee:L	-
Diazinon	1B	Contact	14 NG	A	ALL (excl. VIC)	Registered in peas for control of Cutworms and Caterpillars. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R3
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3 G:21	A	ALL	Registered in legume vegetables including green peas for control of Heliothis, Cluster Caterpillar and **Loopers**. [Max 4 applications per crop; re-treatment interval min. 7 days]	M Bee:H	-
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 Bee:H	-
Methomyl (Lannate)	1A	Contact	1	A	QLD, NSW, SA & WA	Registered in peas for control of **Loopers** and Pea Thrips. [Max no. of applications and re-treatment interval not specified]	H Bee:H	-
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in legume vegetables (field) for control of *Helicoverpa*, Cucumber Moth, Cluster Caterpillar, **Loopers**, Webworm, Rutherglen Bug & Thrips including Western Flower Thrips. [Max 6 applications per crop; re-treatment interval: 7 d]	H Bee:H	R2
Spinetoram (Success Neo) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in legume vegetables for control of **Loopers**, Western Flower Thrips and *Helicoverpa* spp. [Max 3 applications per crop; re-treatment interval 7-14 d]	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in legume vegetables for control of **Loopers**, *Helicoverpa* & Western Flower Thrips. [Max. 3 applications per season; re-treatment interval 7-14 d]	L Bee:L	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in legume vegetables including green peas and processing peas for control of *Helicoverpa*. Registered for control of **Loopers** in brassica vegetables.	L Bee:VL	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.	-	-
Chlorfenapyr (Phantom) BASF	13	Contact / IGR		P		Registered for control of Diamondback moth and Cabbage white butterfly in Brassica vegetables.	H Bee:H	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of **Loopers** in solanaceous fruit.	L Bee:H	R3
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
Rutherglen Bug (*Nysius vinitor*) **Priority: Low**								
Rated as a low priority. Rutherglen Bug breed on weeds surrounding crops. It is important to monitor crops for eggs and nymphs by regular field scouting. Repeated influxes of migrating adults can make repeat 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 in legume vegetables (field) for control of *Helicoverpa*, Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, **Rutherglen Bug** & Thrips including Western Flower Thrips. [Max 6 applications per crop; re-treatment interval: 7 d]	H Bee:H	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Pyrethrins (Pyganic) Sumitomo	3A	Contact	NR	A	ALL	Registered for use in legume vegetables as a clean up spray prior to harvest to control insects such as Fruit Fly, **Rutherglen Bug** and Spiders. [Max. no. of applications and re-treatment interval not specified]	VL Bee:L	-
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in vegetables (field) for control of Cabbage White Butterfly, Cabbage Moth, Green Vegetable Bug, and **Rutherglen Bug.** [Apply at first sight of infestation re-treatment interval 7-10 d]	H Bee:H	R2
Dimethoate	1B	Contact	7 G:7	P-A	ALL	Registered in peas for control of Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, Thrips and Wingless Grasshoppers.	H Bee:H	R1
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips in macadamia. US registration for control of Leafhoppers, Aphids and Whiteflies in legume vegetables. Bayer label extension submitted in October 2020 to include whitefly in vegetables such as cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits & potatoes.	L Bee:VL	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, **Bugs**, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, **Bugs**, Beetles/Weevils, Fruit Fly and Thrips.		-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of **Rutherglen Bug** in cucurbits, leafy vegetables, fruiting vegetables and root vegetables.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Green Vegetable Bug (*Nezara viridula*) **Priority: Low**								
Rated as a low priority. 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. The 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.								
Dimethoate	1B	Contact	7 G:7	A	ALL	Registered in peas for control of Aphids, Jassids, Mites, Leafhoppers, **Green Vegetable Bug**, Thrips and Wingless Grasshoppers. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R1
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in vegetables (field) for control of Cabbage White Butterfly, Cabbage Moth, **Green Vegetable Bug**, and Rutherglen Bug. [Apply at first sight of infestation re-treatment interval 7-10 d]	H Bee:H	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips in macadamia. US registration for control of Leafhoppers, Aphids and Whiteflies in legume vegetables. Bayer label extension submitted in October 2020 to include whitefly in vegetables such as cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits & potatoes.	L Bee:VL	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, **Bugs**, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
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
African Black Beetle (*Heteronychus arator*) **Priority: Low**								
Rated as a low priority. Larvae are soil dwelling and adults chew plants at or just beneath ground level. There is a commercially available nematode (*Heterorhabditis zealandica*) for the biological control of African Black Beetle in turf and other high value crops. A new and promising biopesticide based on the naturally occurring bacterium *Yersinia entomophaga*, is being evaluated in New Zealand.								
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.	-	-
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	Ingestion		P		Registered in Australia in multiple crops for various insect pests such as **Beetles**, Weevils & Lepidoptera. Hort Innovation has several projects underway towards assisting registration in minor crops.	M Bee:VH	-
Cutworms (*Agrotis* spp.) **Priority: Low**								
Rated as a low priority. 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	NR G:2	A	ALL	Registered in peas for control of **Cutworm**. [Max. no. of applications and re-treatment interval not specified]	H Bee:H	R1
Diazinon	1B	Contact	14 NG	A	ALL (excl. VIC)	Registered in peas for control of **Cutworms** and Caterpillars. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R3
Trichlorfon (Lepidex)	1B	Contact	2	A	QLD & NT	Registered in peas (field) for control of **Cutworms**. [Max. no. applications not specified; re-treatment interval 7-10 d]	H Bee:H	R2
Clothianidin + Imidacloprid (Poncho) BASF	4A	Contact & Ingestion		P		Registered as a seed treatment for control of **Cutworms** and Caterpillars in sweet corn.	M M-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
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	Ingestion		P		Registered in Australia in multiple crops for various insect pests such as Beetles, Weevils & **Lepidoptera**. Hort Innovation has several projects underway towards assisting registration in minor crops.	M Bee:VH	-
Webworms (*Hednota* spp.) **Priority: Low**								
Rated as a low priority. Webworm larvae are leaf-chewing pests of seedlings. 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.								
Diazinon	1B	Contact	14 NG	A	ALL (excl. VIC)	Registered in peas for control of Cutworms and Caterpillars. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R3
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in legume vegetables (field) for control of *Helicoverpa*, Cucumber Moth, Cluster Caterpillar, Loopers, **Webworm**, Rutherglen Bug & Thrips including Western Flower Thrips. [Max 6 applications per crop; re-treatment interval: 7 d]	H Bee:H	R2
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.	-	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
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
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered in Australia in multiple crops for various insect pests such as Beetles, Weevils & **Lepidoptera**. Hort Innovation has several projects underway towards assisting registration in minor crops.	M Bee:VH	-
Silverleaf Whitefly (*Bemisia tabaci*) **Priority: Low**								
Rated as a low priority. High reproduction rate and short generation time result in large numbers that can retard plants through sap feeding.								
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of 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 Bee:L	-
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 Bee:H	-
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	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 Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	7 G:7	A	ALL	Registered in green peas for control of Green Peach Aphid and **Silverleaf Whitefly**. [Max. 2 applications per crop; re-treatment interval 7 d]	M Bee:VL	-
Afidopyropen (Versys) BASF	9D	Ingestion		P		Registered for control of Aphids and suppression of **Silverleaf Whitefly** in brassica vegetables, celery, cotton, cucurbits, fruiting vegetables, ginger, leafy vegetables, Brassica leafy vegetables, ornamentals, parsley, potato and sweet potato. Hort Innovation Data Generation Project ST17000 is undertaking trials to support a label extension for green beans, snow peas and sugar snap peas for control of Aphids and **Silverleaf Whitefly** in conjunction with BASF. Project is due for completion by the end of 2021.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Clitorea ternatia extract (Sero-X) Innovate Ag	UN	Biological	NR	P		Registered for control of Diamondback Moth in Brassicas and control of Cotton Bollworm, Native Budworm, Green Mirid and **Silverleaf Whitefly** in cotton.	L Bee:L	-
Flonicamid (Mainman) ISK	29	Ingestion		P		Registered for control of Aphids and **Silverleaf Whitefly** in cucurbits; Aphids in potatoes; Aphids and Mealybugs in apples and pears; Aphids and Mirids in cotton. US registration for control of Aphids, Plant Bugs and Greenhouse Whitefly in legume vegetables.	M Bee:L	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips in macadamia. US registration for control of Leafhoppers, Aphids and Whiteflies in legume vegetables. Bayer label extension submitted in October 2020 to include whitefly in vegetables such as cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits & potatoes.	L Bee:VL	-
NUL3145 Nufarm	TBC			P		New product from Nufarm with activity on Scale, Nematodes, Mealybug and **Whitefly**.	-	-
Pymetrozine (Chess) Syngenta	9B	Contact & Ingestion		P		Registered for suppression of **Silverleaf Whitefly** in brassica vegetables, tomatoes, eggplants, capsicums, lettuce, cucurbits, cut flowers and nursery stock.	L Bee:VL	R3
Pyriproxyfen (Admiral) Sumitomo	7C	Contact / IGR		P		Registered for control of **Silverleaf Whitefly** in fruiting vegetables, cotton and rockmelon.	VL Bee L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Wireworm and False Wireworms (*Elateridae, Gonocephalum spp.*) **Priority: Low**								
Rated as a low priority. The larvae are soil-dwelling and will attack newly germinated seedlings by chewing the leaves and stems. This can lead to destruction of the whole plant.								
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Soil fumigant	NR	A	ALL	Registered in vegetables for control of plant parasitic Nematodes, Symphylans, **Wireworms**, and soil borne diseases. Leave soil undisturbed at least 7 d after treatment. Aeration before planting should be for a minimum of 21 days.	-	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.	-	-
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered in Australia in multiple crops for various insect pests such as **Beetles**, Weevils & Lepidoptera. Hort Innovation has several projects underway towards assisting registration in minor crops.	M Bee:VH	-
Fall Armyworm (*Spodoptera frugiperda*) **Priority: Unknown**								
Fall Armyworm was not ranked as a pest in green peas. It is an exotic pest that is considered a potential threat that could affect most vegetable crops if allowed to spread. 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 for use in legume vegetables (field) for control of **Fall Armyworm**. [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7 d]	L Bee:VL	-
Emamectin (Proclaim Opti) Syngenta PER89263	6	Ingestion	3	A	ALL (excl. VIC)	Permitted for use in legume vegetables for control of **Fall Armyworm.** [Max 4 applications per crop; re-treatment interval: 7 d]	M Bee:H	-
Methomyl (Lannate) PER89293	1A	Contact	1	A	ALL	Permitted for use in legume vegetables (field) for control of **Fall Armyworm**. [Max 6 applications per crop; re-treatment interval: 7 d]	H Bee:H	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spinetoram (Success Neo) Corteva PER89241	5	Ingestion	3 G:14	A	ALL (excl. VIC)	Permitted for use in legume vegetables for control of **Fall Armyworm**. [Max. 4 applications per crop; re-treatment interval 7-14 d]	M Bee:H	-
Spinosad (Entrust Organic) Corteva PER89870	5	Ingestion	3 G:14	A	ALL (excl. VIC)	Permitted for use in legume vegetables (succulent seeds & immature pods only) for control of **Fall Armyworm**. [Max. 3 applications per season; re-treatment interval 7-14 d]	L Bee:L	-
Spodoptera frugiperda Multiple Nucleopolyhedrovirus (Fawligen) AgBiTech PER90820	31	Biological	NR	A	ALL	Permitted for use in legume vegetables for control of **Fall Armyworm**. [Max 5 applications per crop; Min. re-treatment interval 7 d]	VL Bee:L	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.	-	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Permitted for control of **Fall Armyworm** in various vegetable crops.	L Bee:H	R3
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and **Caterpillars**. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
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	Ingestion		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 Armyworm**.	M Bee:VH	

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Leafminers (*Liriomyza* spp.) **Priority: Unknown**								
Leafminers was not ranked as a pest in green peas. Dipteran Leafminers (*Liriomyza* spp.) are exotic pests that have recently been detected and become problematic in Australia. For example, the Serpentine Leafminer 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	6	Contact	7 NG	A	ALL (excl. VIC)	Permitted in legume vegetables for suppression of **Liriomyza Leafminers** (*Liriomyza* spp.) including Vegetable Leafminer and Serpentine Leafminer. [Max. 2 applications per crop; re-treatment interval 7-14 d]	M H-Bees	-
Cyromazine (Diptex 150 WP) PER81867	17	Insect Growth Regulator	7	A	ALL	Permitted for use in legume vegetables for control of ***Liriomyza*** species, including: **Vegetable Leafminer** (*Liriomyza sativa*) and **Serpentine Leafminer** (*Liriomyza huidobrensis*). [Max. 6 applications per crop; re-treatment interval 7 d]	-	-
Spinosad (Entrust Organic) Corteva PER90928	5	Ingestion	3 G:14	A	ALL (excl. VIC)	Permitted for use in legume vegetables for control of **Liriomyza Leafminers**. [Max. 3 applications per crop; min. re-treatment interval 4 d]	L Bee:L	-
Spirotetramat (Movento) Bayer PER88640	23	Ingestion	3 G:3	A	ALL (excl. VIC)	Permitted for use in snow peas & sugar snap peas (field & protected) for control of **Liriomyza Leafminers**. [Max. 2 applications per crop; re-treatment interval 7 d]	M Bee:VL	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in legume vegetables including snow and sugar snap peas for control of *Helicoverpa*. Permitted for control of **Liriomyza Leafminers** in spinach and silverbeet.	L Bee:VL	-
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3 G:21	P-A	ALL	Registered in legume vegetables including green peas for control of Heliothis, Cluster Caterpillar and Loopers. Permitted for control of **Liriomyza Leafminers** in brassica vegetables.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spinetoram (Success Neo) Corteva	5	Ingestion	3 G:14	P-A	ALL	Registered in legume vegetables for control of Loopers, Western Flower Thrips and *Helicoverpa* spp. Permitted for control of **Liriomyza Leafminers** in snow peas, sugar snap peas and green beans.	M Bee:H	-
Spirotetramat (Movento) Bayer	23	Ingestion	7 G:7	P-A	ALL	Registered in green peas for control of Green Peach Aphid and Silverleaf Whitefly. Permitted for control of **Liriomyza Leafminers** in snow peas, sugar snap peas, lettuce, parsley, eggplant, capsicums, chilies, tomatoes, green beans, celery and rhubarb.	M Bee:VL	-
Cyantraniliprole (Benevia) FMC	28	Ingestion		P		Permitted for control of **Liriomyza Leafminers** in bulb vegetables, fruiting vegetables and potatoes.	M Bee:VH	-
Tetraniliprole (Vayego) Bayer	28	Ingestion		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 Armyworm.	M Bee:VH	-

4.3 Weeds in green peas

4.3.1 Weed priorities

Common Name	Scientific Name
High	
Blackberry Nightshade	*Solanum nigrum*
Cleavers	*Galium aparine* L.
Fat Hen	*Chenopodium album*
Annual Ryegrass	*Lolium rigidum*
Moderate	
Wild Radish	*Raphanus raphanistrum*
Wild Turnip	*Brassica rapa campestris*
Amaranthus	*Amaranthus* spp
Nutgrass	*Cyperus rotundus*
Fumitory	*Fumaria* spp.

The high priority weed issues based on the feedback received were Blackberry Nightshade, Cleavers, Fat Hen and Ryegrass. Management practices include soil fumigation, pre-crop spraying, spot spraying, plastic mulch and mechanical weed control.

Resistance management
There are confirmed cases of resistance in Australia for Awnless Barnyard Grass (Group M at more than 200 sites), Feather Top Rhodes Grass (Group M at 4 sites) and 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[7].

[7] 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**							
Ranked as a high priority. Prolific weed that is widely adapted and difficult to eradicate, mainly due to its long-term seed viability. Management practices include soil fumigation, pre-crop spraying, spot spraying, or using mechanical devices.							
Chlorthal-Dimethyl (Dacthal)	D**	Peas / Pre-emergent	Registered in peas for control of grass and broadleaf weeds including **Blackberry Nightshade**. Spray at transplanting. [Max no of applications not specified]	NR NG	A	ALL	-
Cyanazine (Bladex 900 WG)	C**	Peas / Post-emergent	Registered in peas for control of broadleaf weeds, including **Blackberry Nightshade**.	NR	A	TAS	R3
		Processing Peas / Post-emergent	Registered in processing peas for control of broadleaf weeds, including **Blackberry Nightshade**.			ALL	
Dimethamid-P (Outlook)	K**	Green Peas / Pre-Emergent	Registered in green peas for control of grass and broadleaf weeds, including **Blackberry Nightshade**. Apply at or immediately after sowing and before crops and weeds emerge.	NR G:28	A	ALL	-
Glyphosate (Roundup)	M**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Paraquat + Diquat (SpraySeed)	L**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including seedling **Blackberry Nightshade**. [Max no of applications not specified]	NR	A	ALL	R3
Pendimethalin (Stomp)	D**	Processing peas / Pre-emergent	Registered in processing peas for control of grass and broadleaf weeds including suppression of **Blackberry Nightshade**. [Max. 1 application per crop]	NR	A	QLD, VIC & TAS	-
Terbutryn	C**	Canning Peas (Green Peas, Vining Peas, Processing Peas) / Post-emergent	Registered in canning peas for control of broadleaf weeds including **Blackberry Nightshade**. Apply when peas are 10-12cm high with 3-6 nodes.	28	A	TAS	-
Aclonifen (Emerger) Bayer	H**	Pre-Emergence	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals. **Blackberry Nightshade** is listed as moderately susceptible at a high rate.		P		-
Clomazone	Q**		Registered for control of broadleaf weeds, including **Blackberry Nightshade** in beans.		P		-
Fluroxypyr (Starane)	I**		Registered for control of broadleaf weeds, including **Blackberry Nightshade** in sweet corn and sugarcane.		P		-
S-Metolachlor (Dual Gold) Syngenta	K**		Registered for control of grass and broadleaf weeds, including **Blackberry Nightshade** in Brassica vegetables and beans.		P		-
S-Metolachlor + Prosulfocarb (Boxer Gold) Syngenta	J+K**		Registered for control of grass and broadleaf weeds including **Blackberry Nightshade** in cereal crops, pulse crops and potatoes**.** Hort Innovation is pursuing trials on onions and carrots.		P		-
Norflurazon (Zoliar) Agnova Technologies	F**		Registered for control of grass and broadleaf weeds, including **Blackberry Nightshade** in asparagus, citrus, grapes, nuts, stone and pome fruits.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including **Blackberry Nightshade** in various crops and fallow situations. Compatible with glyphosate and diquat/paraquat.		P		-
Cleavers (*Galium aparine* L.) **Priority: High**							
Ranked as a high priority. Germination occurs mainly in Autumn. Cleavers are a competitive weed and control with herbicides is difficult.							
Glyphosate (Roundup)	M**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds.	NR	A	ALL	R3
Paraquat + Diquat (SpraySeed)	L**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds [Max no of applications not specified]	NR	A	ALL	R3
Glufosinate-Ammonium (Basta) BASF	N**		Registered for control of **Cleavers** in pyrethrum.		P		R3
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Fat Hen (*Chenopodium album*) **Priority: High**							
Ranked as a high priority. Herbicide control can be difficult and targeting weeds at early growth stages is critical.							
Bentazone (Basagran) PER14896	C**	Green Peas & Processing Peas / Post-emergent	Permitted for use in green peas and processing peas for control of broadleaf weeds including **Fat Hen**. Do not apply before first 2 trifoliate leaves are fully expanded. [Max. 2 applications per crop; re-treatment interval not specified]	35 G:35	A	TAS	-
Chlorthal-Dimethyl (Dacthal)	D**	Peas / Pre-emergent	Registered in peas for control of grass and broadleaf weeds including **Fat Hen**. Spray at transplanting. [Max no of applications not specified]	NR NG	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Cyanazine (Bladex 900 WG)	C**	Peas / Post-emergent	Registered in peas for control of broadleaf weeds, including **Fat Hen**.	NR	A	TAS	R3
		Processing Peas / Post-emergent	Registered in processing peas for control of broadleaf weeds, including **Fat Hen**.			ALL	
Dimethamid-P (Outlook)	K**	Green Peas / Pre-Emergent	Registered in green peas for control of grass and broadleaf weeds, including **Fat Hen**. Apply at or immediately after sowing and before crops and weeds emerge.	NR G:28	A	ALL	-
Glyphosate (Roundup)	M**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds.	NR	A	ALL	R3
Glufosinate-Ammonium (Basta) BASF PER88349	N**	Snow Peas, Sugar Snap Peas / Post-emergent	Permitted for use in snow & sugar snap peas for control of grass and broadleaf weeds including **Fat Hen**. [Max. 1 application per season]	NR	P	ALL (excl. VIC)	R3
Metribuzin	C**	Green Peas / Pre-Emergent / Early Post-Emergent	Registered in green peas for control of grass and broadleaf weeds, including **Fat Hen**. Apply when crop is pre-emergence to 3-node stage.	NR	A	ALL	-
Paraquat + Diquat (SpraySeed)	L**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including seedling **Fat Hen**. [Max no of applications not specified]	NR	A	ALL	R3
Pendimethalin (Stomp)	D**	Processing peas / Pre-Emergent	Registered in processing peas for control of grass and broadleaf weeds, including **Fat Hen**. [Max. 1 application per crop]	NR	A	QLD, VIC & TAS	-
Terbutryn	C**	Canning Peas (Green Peas, Vining Peas, Processing Peas) / Post-emergent	Registered in canning peas for control of broadleaf weeds, including **Fat Hen**. Apply when peas are 10-12cm high with 3-6 nodes.	28	A	TAS	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Aclonifen (Emerger) Bayer	H**	Pre-Emergence	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals. **Fat Hen** is listed as susceptible.		P		-
Clomazone	Q**		Registered for control of broadleaf weeds, including **Fat Hen** in beans, poppies, potato and tobacco transplants.		P		-
Glufosinate-Ammonium (Basta) BASF	N**		Registered for control of grass and broadleaf weeds including **Fat Hen** in berries, tomatoes, beans and fallow.		P		R3
S-Metolachlor (Dual Gold) Syngenta	K**		Registered for control of grass and broadleaf weeds, including **Fat Hen** in Brassica vegetables and beans.		P		-
Norflurazon (Zoliar) Agnova Technologies	F**		Registered for control of grass and broadleaf weeds, including suppression of **Fat Hen** in asparagus, citrus, grapes, nuts, stone and pome fruits.		P		-
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including **Fat Hen** in various crops and fallow situations. Compatible with glyphosate and diquat/paraquat.		P		-
Annual Ryegrass (*Lolium rigidum*) **Priority: High**							
Ranked as a high priority. Populations of Annual Ryegrass are prone to herbicide resistance so integrated weed management and rotation of herbicide modes of action are important aspects of a long-term control strategy. It is important to use alternate, broad-spectrum products in non-crop periods.							
Chlorthal-Dimethyl (Dacthal)	D**	Peas / Pre-emergent	Registered in peas for control of grass and broadleaf weeds including **Ryegrass**. Spray at transplanting. [Max no of applications not specified]	NR NG	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Clethodim (Select) PER82459	A***	Peas, fresh & processing / Post-emergent	Permitted for use in peas for control of grass weeds, including **Annual Ryegrass**. [Max. 1 application per crop]	28 G:28	A	ALL	R3
Cyanazine (Bladex 900 WG)	C**	Peas / Post-emergent	Registered in peas for control of broadleaf weeds, including **Annual Ryegrass**.	NR	A	TAS	R3
		Processing Peas / Post-emergent	Registered in processing peas for control of broadleaf weeds, including **Annual Ryegrass**.			ALL	
Diclofop-Methyl	A***	Peas / Selective Post-Emergent	Registered in peas for control of grass weeds, including **Annual Ryegrass**.	NR G:49	A	ALL (excl. QLD)	-
Dimethamid-P (Outlook)	K**	Green Peas / Pre-Emergent	Registered in green peas for control of grass and broadleaf weeds, including suppression of **Annual Ryegrass**. Apply at or immediately after sowing and before crops and weeds emerge.	NR G:28	A	ALL	-
Fluazifop-P (Fusilade)	A***	Peas / Selective Post-Emergent	Registered in peas (including freezer peas) for control of grass weeds, including **Annual Ryegrass**.	49 G:49	A	ALL (excl. QLD)	-
Glyphosate (Roundup)	M**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds.	NR	A	ALL	R3
Metribuzin	C**	Green Peas / Pre-Emergent / Early Post-Emergent	Registered in green peas for control of grass and broadleaf weeds, including **Annual Ryegrass**. Apply when crop is pre-emergence to 3-node stage.	NR	A	ALL	-
Paraquat + Diquat (SpraySeed)	L**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including seedling **Ryegrass**. [Max no of applications not specified]	NR	A	ALL	R3
Sethoxydim (Sertin)	A***	Green Peas / Selective Post-Emergent	Registered in green (freezer) peas for control of grass weeds, including **Annual Ryegrass**.	42 G:14	A	ALL (excl. QLD)	-
Trifluralin	D**	Peas / Pre-emergent	Registered in peas for control of grass and broadleaf weeds, including **Annual Ryegrass**. Spray just before sowing. [Max no of applications not specified]	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Glufosinate-Ammonium (Basta) BASF	N**		Registered for control of grass and broadleaf weeds including **Annual Ryegrass** in berries, tomatoes, beans and fallow.		P		R3
S-Metolachlor+ Prosulfocarb (Boxer Gold) Syngenta	J+K**		Registered for control of **Ryegrass** in potatoes. Hort Innovation is progressing to undertake the required studies in carrots for a label registration.		P		-
Norflurazon (Zoliar) Agnova Technologies	F**		Registered for control of grass and broadleaf weeds, including **Annual Ryegrass** in asparagus, citrus, grapes, nuts, stone and pome fruits.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including **Ryegrass** in various crops and fallow situations. Compatible with glyphosate and diquat/paraquat.		P		-
Wild Radish (*Raphanus raphanistrum*) **Wild Turnip** (*Brassica rapa campestris*) **Priority: Moderate**							
Ranked as a moderate priority. They are winter-growing weeds that compete aggressively with crops and run to seed quickly. Targeting early growth stages is critical.							
Bentazone (Basagran) PER14896	C**	Green Peas & Processing Peas / Post-emergent	Permitted for use in green peas and processing peas for control of broadleaf weeds including **Wild Radish** and **Wild Turnip**. Do not apply before first 2 trifoliate leaves are fully expanded. [Max. 2 applications per crop; re-treatment interval not specified]	35 G:35	A	TAS	-
Cyanazine (Bladex 900 WG)	C**	Peas / Post-emergent	Registered in peas for control of broadleaf weeds, including **Wild Turnip** and **Wild Radish**.	NR	A	TAS	R3
		Processing Peas / Post-emergent	Registered in processing peas for control of broadleaf weeds, including **Wild Turnip** and **Wild Radish**.			ALL	
Diflufenican (Brodal)	F**	Peas / Post-emergence	Registered in peas for control of broadleaf weeds, including **Wild Radish** and **Wild Turnip.**	NR G:14	A	ALL (excl. QLD)	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Glyphosate (Roundup)	M**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds.	NR	A	ALL	R3
MCPA	I**	Peas / Post-emergent	Registered in peas for control of Charlock, Mustards and **Wild Turnip** (seedlings). Apply when crop is 10-15cm high prior to commencement of flowering.	NR G:7	A	ALL	-
Metribuzin	C**	Green Peas / Pre-Emergent / Early Post-Emergent	Registered in green peas for control of grass and broadleaf weeds, including **Wild Turnip** and **Wild Radish**. Apply when crop is pre-emergence to 3-node stage.	NR	A	ALL	-
Paraquat + Diquat (SpraySeed)	L**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including seedling **Wild Radish** and **Wild Turnip**. [Max no of applications not specified]	NR	A	ALL	R3
Pendimethalin (Stomp)	D**	Processing peas / Pre-Emergent	Registered in processing peas for control of grass and broadleaf weeds, including **Wild Radish**. [Max. 1 application per crop]	NR	A	QLD, VIC & TAS	-
Clomazone	Q**		Registered for control of broadleaf weeds including suppression of **Wild Radish** in poppies.		P		-
Fluroxypyr (Starane)	I**		Registered for control of broadleaf weeds, including **Wild Radish** in winter cereals.		P		-
Glufosinate-Ammonium (Basta) BASF	N**		Registered for control of grass and broadleaf weeds including **Wild Radish** in berries, tomatoes, beans and fallow.		P		R3
Norflurazon (Zoliar) Agnova Technologies	F**		Registered for control of grass and broadleaf weeds, including **Wild Radish** and **Wild Turnip** in asparagus, citrus, grapes, nuts, stone and pome fruits.		P		-
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including **Wild Radish** in various crops and fallow situations. Compatible with glyphosate and diquat/paraquat.		P		-
Amaranthus (*Amaranthus* spp.) **Priority: Moderate**							
Ranked as a moderate priority. It is a short-lived annual weed that can pose a problem every year as they are prolific seed producers.							
Chlorthal-Dimethyl (Dacthal)	D**	Peas / Pre-emergent	Registered in peas for control of grass and broadleaf weeds including **Amaranthus**. Spray at transplanting. [Max no of applications not specified]	NR NG	A	ALL	-
Dimethamid-P (Outlook)	K**	Green Peas / Pre-Emergent	Registered in green peas for control of grass and broadleaf weeds, including **Amaranthus**. Apply at or immediately after sowing and before crops and weeds emerge.	NR G:28	A	ALL	-
Glufosinate-Ammonium (Basta) BASF PER88349	N**	Snow Peas, Sugar Snap Peas / Post-emergent	Permitted for use in snow & sugar snap peas for control of grass and broadleaf weeds including **Amaranthus**. [Max. 1 application per season]	NR	P	ALL (excl. VIC)	R3
Glyphosate (Roundup)	M**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including **Amaranthus**.	NR	A	ALL	R3
Metribuzin	C**	Green Peas / Pre-Emergent / Early Post-Emergent	Registered in green peas for control of grass and broadleaf weeds, including **Amaranthus**. Apply when crop is pre-emergence to 3-node stage.	NR	A	ALL	-
Paraquat + Diquat (SpraySeed)	L**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including seedling **Amaranthus**. [Max no of applications not specified]	NR	A	ALL	R3
Trifluralin	D**	Peas / Pre-emergent	Registered in peas for control of grass and broadleaf weeds, including **Amaranthus**. Spray just before sowing. [Max no of applications not specified]	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Clomazone	Q**		Registered for control of broadleaf weeds, including suppression of **Amaranthus** in beans, poppies, potato and tobacco transplants.		P		-
Fluroxypyr (Starane)	I**		Registered for control of broadleaf weeds, including **Amaranth** in sorghum, maize, sweet corn and millet.		P		-
Glufosinate-Ammonium (Basta) BASF	N**		Registered for control of grass and broadleaf weeds including **Amaranth** in berries, tomatoes, beans and fallow.		P		R3
S-Metolachlor (Dual Gold) Syngenta	K**		Registered for control of several grass and broad leaf weeds including Fat Hen, Blackberry Nightshade, **Amaranthus** and Pigweed in green bean.		P		-
Norflurazon (Zoliar) Agnova Technologies	F**		Registered for control of grass and broadleaf weeds, including **Amaranthus** in asparagus, citrus, grapes, nuts, stone and pome fruits.		P		-
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including **Amaranthus** in various crops and fallow situations. Compatible with glyphosate and diquat/paraquat.		P		-
Nutgrass (*Cyperus rotundus*) **Priority: Moderate**							
Ranked as a moderate priority. Prefers damp, water-logged soils but can survive for years underground during dry times. Herbicide options are limited and unreliable. Improve soil drainage if possible.							
Chlorthal-Dimethyl (Dacthal)	D**	Peas / Pre-emergent	Registered in peas for control of grass and broadleaf weeds including ***Cyperus* spp**. Spray at transplanting. [Max no of applications not specified]	NR NG	A	ALL	-
Glyphosate (Roundup)	M**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including **Nutgrass**.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Norflurazon (Zoliar) AgNova	F**		Registered for control of grass and broadleaf weeds, including **Nutgrass** in asparagus, citrus, grapes, nuts, stone and pome fruits.		P		-
Fumitory (*Fumaria* spp.) **Priority: Moderate**							
Ranked as a moderate priority. It is a strongly competitive weed with highly persistent seeds making it an ongoing problem every year. Management practices include soil fumigation, pre-crop spraying, spot spraying and mechanical controls.							
Bentazone (Basagran) PER14896	C**	Green Peas & Processing Peas / Post-emergent	Permitted for use in green peas and processing peas for control of broadleaf weeds including **Fumitory**. Do not apply before first 2 trifoliate leaves are fully expanded. [Max. 2 applications per crop; re-treatment interval not specified]	35 G:35	A	TAS	-
Cyanazine (Bladex 900 WG)	C**	Peas / Post-emergent	Registered in peas for control of broadleaf weeds, including **Fumitory**.	NR	A	TAS	R3
		Processing Peas / Post-emergent	Registered in processing peas for control of broadleaf weeds, including **Fumitory**.			ALL	
Glyphosate (Roundup)	M**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including **Fumitory**.	NR	A	ALL	R3
Metribuzin	C**	Green Peas / Pre-Emergent / Early Post-Emergent	Registered in green peas for control of grass and broadleaf weeds, including **Fumitory**. Apply when crop is pre-emergence to 3-node stage.	NR	A	ALL	-
Paraquat + Diquat (SpraySeed)	L**	General seed bed preparation	Registered as a pre-plant spray for control of grass and broadleaf weeds, including seedling **Fumitory**. [Max no of applications not specified]	NR	A	ALL	R3
Pendimethalin (Stomp)	D**	Processing peas / Pre-Emergent	Registered in processing peas for control of grass and broadleaf weeds, including **Fumitory**. [Max. 1 application per crop]	NR	A	QLD, VIC & TAS	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Terbutryn	C**	Canning Peas (Green Peas, Vining Peas, Processing Peas) / Post-emergent	Registered in canning peas for control of broadleaf weeds including **Fumitory**. Apply when peas are 10-12cm high with 3-6 nodes.	28	A	TAS	-
Trifluralin	D**	Peas / Pre-emergent	Registered in peas for control of grass and broadleaf weeds, including **Fumitory**. Spray just before sowing. [Max no of applications not specified]	NR	A	ALL	-
Dimethamid-P (Outlook)	K**	Green Peas / Pre-Emergent	Registered in green peas for control of grass and broadleaf weeds. Registered for control of **Fumitory** in poppies.	NR G:28	P-A	ALL	-
Fluroxypyr (Starane)	I**		Registered for control of broadleaf weeds, including **Fumitory** in poppies.		P		-
Glufosinate-Ammonium (Basta) BASF	N**		Registered for control of grass and broadleaf weeds including **Fumitory** in berries, tomatoes, beans and fallow.		P		R3
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including **Fumitory** in onions. Compatible with glyphosate and diquat/paraquat.		P		-

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/F2021C00634
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 2020-21	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 green peas
Appendix 2. Products available for control of insects and mites in green peas
Appendix 3. Products available for weed control in green peas
Appendix 4. Current permits for use in green peas
Appendix 5. Green peas Maximum Residue Limits (MRLs)
Appendix 6. Green Peas Agrichemical Regulatory Risk Assessment

Appendix 1. Products available for disease control in green peas

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetable crops	Plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases (including *Fusarium* and *Verticillium* wilts, *Rhizoctonia, Pythium*) and suppression of weeds	ALL	NR	-
Azoxystrobin (Amistar)	11	Green peas (field)	*Stemphyllium* spp. and suppression of Botrytis Grey Mould	ALL	NR	-
Boscalid (Filan) BASF	7	Legume Vegetables (field grown only)	Sclerotinia Rot (*Sclerotinia minor, S.sclerotium*)	ALL	7 G:7	-
Chloropicrin (Agrocelhone CE Soil Fumigant)	8	Soil fumigant	Soil borne fungi	ALL	NR	-
Chlorothalonil (Bravo)	M5	Peas	Downy Mildew	QLD, TAS & WA	14 G:14	R3
Chlorothalonil (Bravo) PER82895	M5	Garden peas (field)	Black Spot	WA	7 NG	R3
Copper	M1	Peas	Ascochyta Blight (*Ascochyta* spp.) Bacterial Spot (*Pseudomonas syringae*)	ALL	1	-
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Green Peas	Grey Mould (*Botrytis cinerea*) Sclerotinia (*Sclerotinia minor*, *Sclerotinia sclerotiorium*)	ALL	14 NG	R3
Dazomet (Basamid)	8F	Broadacre seed beds	Soil fungi (including *Fusarium* spp.), nematodes (cyst and non-cyst forming), soil insects and germinating seeds of weeds	ALL	NR	-
Iodine	-	Legumes / Post-Harvest Sanitiser	Bacteria & Fungi	ALL	NR	-
Mancozeb	M3	Peas (field)	Rust Suppression of Ascochyta Leaf Blight	ALL	7	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Metalaxyl-M (Apron)	4	Peas / Seed Treatment	Damping Off	ALL	NR	-
Metham Sodium	-	Field crops	Nematodes, various weeds and fungal diseases	ALL	NR	-
Phosphorous Acid PER11951	33	Processing Peas	Downy Mildew	NSW & TAS	NR	-
Sulphur	M2	Vegetables	Powdery Mildew Bean Rust	ALL	NR	-
Tebuconazole	3	Peas (field)	Powdery Mildew	ALL	3	R3
Thiram + Thiabendazole (P-Pickel T)	M3+1	Green Peas / Seed Treatment	Black Spot Seedling Root Rots	ALL	NR	R2
Triadimefon	3	Peas	Powdery Mildew	NSW, VIC & TAS	14	R3
Zineb	M3	Peas (field)	Downy Mildew	ALL	7	R2

Appendix 2. Products available for control of insects and mites in green peas

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetable crops / general fumigant	Plant parasitic Nematodes, Symphylans, Wireworms, and soil borne diseases	ALL	NR	-
Abamectin PER81876	6	Legume vegetables	Suppression of Leafminer including Vegetable & Serpentine Leafminer.	ALL (excl. VIC)	7 NG	-
Bacillus thuringiensis subsp. Kurstaki (DiPel)	11A	Vegetables (field & protected)	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	-
Beauveria bassiana (Velifer) BASF	UN	Protected vegetables and ornamentals	Suppression of various pests including Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid and Two-Spotted Spider Mites.	ALL	NR	-
Chlorantraniliprole (Coragen) FMC	28	Legume Vegetables including green peas and processing peas (field)	Cotton Bollworm & Native Budworm	ALL	1	-
Chlorantraniliprole (Coragen) FMC PER89259	28	Legume vegetables (field)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	1	-
Chlorpyrifos (Lorsban)	1B	Peas	Wingless Grasshopper	NSW, ACT, WA, VIC & TAS	NR G:2	R1
			Cutworm	ALL		
			Field Crickets, Moles Crickets	QLD & WA		
			Vegetable Weevil	NSW, WA & ACT		

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Cyromazine (Diptex) PER81867	17	Legume vegetables (field & protected)	*Liriomyza* spp.	ALL	7	-
Diazinon	1B	Peas (field)	Caterpillars & Cutworms	ALL (excl. VIC)	14	R3
Dimethoate	1B	Peas	Aphids, Jassids, Mites, Leafhoppers, Green Vegetable Bug, Thrips, Wingless Grasshoppers	ALL	7 G:7	R1
Emamectin (Proclaim Opti) Syngenta	6	Legume Vegetables including Green Peas	Heliothis (*Helicoverpa* spp.), Cluster Caterpillar (*Spodoptera litura*) & Loopers (*Chrysodeixis* spp.)	ALL	3 G:21	-
Emamectin (Proclaim Opti) Syngenta PER89263	6	Legume vegetables	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	3	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Vegetables (field)	Ants, Aphids, Caterpillars, Earwigs, Whitefly, Thrips & Leafhoppers. Suitable for organic growers.	ALL	1	-
Helicoverpa NPV (Vivus Max) AgBiTech	31	Legume Vegetables including Green Peas	Cotton Bollworm / Corn Earworm (*Helicoverpa armigera*) & Tobacco Budworm / Native Budworm (*Helicoverpa punctigera*)	ALL	NR	-
Iron EDTA Complex	-	All plants	Snails & slugs	ALL	NR	-
Maldison	1B	Peas	Pea Weevil (*Bruchus pisonum*)	SA, VIC, WA & NT	3	R3
Metaldehyde	-	Vegetables	Snails & slugs	ALL	7	-
Methomyl (Lannate)	1A	Peas	Heliothis	ALL	1	R2
			Loopers, Pea Thrips	QLD, NSW, SA & WA		

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Methomyl (Lannate) PER82428	1A	Legume Vegetables (field)	Helicoverpa, Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug & Thrips Including Western Flower Thrips	ALL	3	R2
Methomyl (Lannate) PER89293	1B	Peas (field)	Fall Armyworm	ALL	1	R2
Permethrin (Ambush)	3A	Green Peas	*Helicoverpa* spp.	NSW	3	-
Pirimicarb (Pirimor)	1A	Peas (field)	Aphids	ALL	2	R3
Potassium Salts of Fatty Acids (Natrasoap)	-	Vegetables (field & protected)	Aphids, Thrips, Mealybug, Two Spotted Mite, Spider Mite and Whitefly	ALL	NR	-
Propargite (Omite)	12C	Vegetables (field)	Two-Spotted Mites	ALL	7	R3
			Spider Mite	QLD & WA		
Pyrethrins (Pyganic) Sumitomo	3A	Legume Vegetables	Clean up spray prior to harvest to control insects such as Fruit Fly, Rutherglen Bug and Spiders	ALL	NR	-
Pyriproxyfen (Distance Ant Bait)	7C	Vegetables	Invasive and nuisance ants	ALL	NR	-
Spinetoram (Success Neo) Corteva	5A	Legume vegetables	Loopers, Helicoverpa, Western Flower Thrips	ALL	3 G:14	-
Spinetoram (Success Neo) Corteva PER89241	5	Legume vegetables	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	3 G:14	
Spinosad (Entrust Organic) Corteva	5	Legume vegetables	Loopers, Heliothis, Western Flower Thrips	ALL	3 G:14	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spinosad (Entrust Organic) Corteva PER89870	5	Legume vegetables / (succulent seeds & immature pods)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	3 G:14	-
Spinosad (Entrust Organic) Corteva PER90928	5	Legume Vegetables	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	Green Peas	Green Peach Aphid, Silverleaf Whitefly	ALL	7 G:7	-
Spodoptera frugiperda Multiple Nucleopolyhedrovirus (Fawligen) AgBiTech PER90820	31	Legume Vegetables	Fall Armyworm (*Spodoptera frugiperda*)	ALL	NR	-
Sulphur	UN	Vegetables	Tomato Russet Mite, Two-Spotted Mite	ALL	NR	-
Trichlorfon (Lepidex)	1B	Peas (field)	Cutworm	QLD & NT	2	R2
		Vegetables (field)	Cabbage White Butterfly, Cabbage Moth, Green Vegetable Bug, and Rutherglen Bug	ALL		

Appendix 3. Products available for weed control in green peas

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	-
Bentazone (Basagran) PER14896	C**	Green / Processing Peas	Broadleaf Weeds	35 G:35	TAS	-
Chlorthal-Dimethyl (Dacthal)	D**	Peas / All types	Grass and Broadleaf Weeds	NR	ALL	-
Clethodim (Select) PER82459	A***	Peas, fresh & processing	Grass Weeds	28 G:28	ALL	R3
Cyanazine (Bladex 900 WG)	C**	Peas	Broadleaf Weeds	NR	TAS	R3
		Processing Peas	Grass and Broadleaf Weeds		ALL	
Diclofop-Methyl	A***	Peas	Grass Weeds	NR G:49	ALL (excl. QLD)	-
Diflufenican	F**	Peas	Broadleaf Weeds	NR G:14	ALL (excl. QLD)	-
Dimethamid-P (Outlook)	K**	Green Peas	Grass and Broadleaf Weeds	NR G:28	ALL	-
Fluazifop-P (Fusilade)	A***	Peas / Including freezer peas	Grass Weeds	49 G:49	ALL (excl. QLD)	-
Glyphosate (Roundup)	M**	General knockdown	Grass and Broadleaf Weeds as a pre-crop spray	NR	ALL	R3
MCPA	I**	Peas	Charlock, Mustards, Wild Turnip (seedlings)	NR G:7	ALL	-
Metribuzin	C**	Green Peas	Grass and Broadleaf Weeds	NR	ALL	-

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
Paraquat + Diquat (SpraySeed)	L***	General knockdown	Grass and Broadleaf Weeds as a pre-crop spray	NR	ALL	R3
Pendimethalin (Stomp)	D**	Processing Peas	Grass and Broadleaf Weeds	NR	QLD, VIC & TAS	-
Sethoxydim (Sertin)	A***	Green (freezer) Peas	Grass Weeds	42 G:14	ALL (excl. QLD)	-
Terbutryn	C**	Canning Peas (Green Peas, Vining Peas, Processing Peas)	Broadleaf Weeds	28	TAS	-
Triallate (Avadex)	J**	Peas	Wild Oats	NR	ALL	-
Trifluralin	D**	Peas	Grass and Broadleaf Weeds	NR	ALL	-

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

Appendix 4. Current permits for use in green peas

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER81876 Version 4	Abamectin / Various including Legume vegetables / Leafminers (*Liriomyza* spp.)	24-Jun-16	30-Apr-24	Hort Innovation
PER14896 Version 3	Bentazone (Basagran) / Green (Processing) Peas / Broadleaf Weeds	01-Oct-14	30-Sep-24	Hort Innovation
PER89259	Chlorantraniliprole (Coragen) / Legume vegetables / Fall Armyworm	06-Mar-20	31-Mar-23	Hort Innovation
PER82895 Version 2	Chlorothalonil (Bravo) / Green peas (WA only), snow peas, and sugar snap peas / Black spot, Downy mildew & Chocolate spot	4-Aug-17	31-Aug-25	Hort Innovation
PER82459	Clethodim (Select) / Peas, fresh and processing / Various grass weeds	19-Apr-17	30-Sep-21	Hort Innovation
PER81867 Version 2	Cyromazine (Diptex 150 WP) / Legume vegetables / Leafminers (*Liriomyza* spp.)	02-Dec-19	30-Nov-23	Hort Innovation
PER89263	Emamectin (Proclaim Opti) / Various including Legume vegetables / Fall Armyworm	10-Mar-20	31-Mar-23	Hort Innovation
PER82428 Version 4	Methomyl / Various including Legume 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
PER89293	Methomyl / Various including peas / Fall Armyworm (field only)	10-Apr-20	30-Apr-23	Hort Innovation
PER11951 Version 5	Phosphorous Acid / Processing Peas / Downy Mildew	05-Dec-14	31-Mar-25	Hort Innovation
PER89241	Spinetoram (Success Neo) / Various including Legume vegetables / Fall Armyworm	06-Mar-20	31-Mar-23	Hort Innovation
PER89870	Spinosad (Entrust Organic) / Legume vegetables (succulent seeds & immature pods) / Fall Armyworm	21-Jul-20	31-Jul-23	Hort Innovation
PER90928	Spinosad (Entrust Organic) / Various, including Legume Vegetables / Leafminers (field & protected)	23-Apr-21	30-Apr-24	Hort Innovation
PER90820 Version 2	Spodoptera frugiperda Multiple Nucleopolyhedrovirus (Fawligen) / Legume Vegetables / Fall Armyworm	30-Mar-21	31-Mar-24	Qld Dept of Agriculture & Fisheries

Appendix 5. Green Pea Maximum Residue Limits (MRLs)

CODEX commodity groupings of Legume vegetables and subgroups:

VP 0060	Legume vegetables
VP 0063	Peas (pods and succulent=immature seeds)
VP 0063	Peas
VP 0064	Peas, shelled (succulent seeds)
VP 0528	Garden Pea (young pods)
VP 0529	Garden Pea, shelled
VP 2061	Peas with pods
	Vegetables

Note: Major export markets for Snow and Sugar snap peas include Singapore, New Caledonia, PNG, Fiji and Indonesia. Available information indicates that in the absence specific limits in legislation that most countries defer to Codex, followed by EU MRL standards or apply a 0.01 ppm 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
2,2-DPA		Vegetables	*0.1	-
2,4-D	VP 0060	Legume vegetables	*0.05	-
Abamectin	VP 0063	Peas (pods and succulent=immature seeds)	0.5	-
Acetamiprid	VP 0064	Peas, shelled (succulent seeds)	-	0.3
Acifluorfen	VP 0060	Legume vegetables	0.1	-
Aldrin and Dieldrin	VP 0060	Legume vegetables	-	E0.05
	VP 0529	Garden Pea, shelled	-	E1
Azoxystrobin	VP 0060	Legume vegetables	3	3
Bifenazate	VP 0060	Legume vegetables	-	7
Bentazone	VP 0063	Peas (pods and succulent=immature seeds)	-	1.5
	VP 0529	Garden Pea, shelled	T*0.05	-
Bifenthrin	VP 0063	Peas	*0.01	0.9
	VP 0064	Peas, shelled (succulent seeds)	-	*0.05
Boscalid	VP 0060	Legume vegetables	3	3
Bromide Ion	VP 0528	Garden pea (young pods)	-	500
Butroxydim	VP 0060	Legume vegetables	*0.01	-
Carbendazim	VP 0529	Garden Pea, shelled	-	0.02
Chlorantraniliprole	VP 0060	Legume vegetables	1	-
	VP 0063	Peas (pods and succulent=immature seeds)	-	2
	VP 0064	Peas, shelled (succulent seeds)	-	0.05
Chlordane		Vegetables {except fruiting vegetables, cucurbits, sugar beet}	E0.02	-
Chlorothalonil	VP 0063	Peas	10	-
Chlorpyrifos		Vegetables (some exceptions)	T*0.01	-
	VP 0063	Peas (pods and succulent=immature seeds)	-	0.01
Chlorthal-dimethyl		Vegetables (except lettuce)	5	-
Clothianidin	VP 0060	Legume vegetables	-	*0.01
Cyanazine	VP 0063	Peas	0.02	-
Cyantraniliprole	VP 0063	Peas (pods and succulent=immature seeds)	-	2

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
	VP 0064	Peas, shelled (succulent seeds)	-	0.3
Cycloxydim	VP 0064	Peas, shelled (succulent seeds)	-	15
Cyhalothrin (includes lambda-cyhalothrin)	VP 0060	Legume vegetables	0.1	0.2
Cypermethrins (including alpha- and zeta- cypermethrin)	VP 0060	Legume vegetables	-	0.7
	VP 0063	Peas	1	-
Cyproconazole	VP 0064	Peas, shelled (succulent seeds)	-	0.01
Cyprodinil	VP 0063	Peas (pods and succulent=immature seeds)	0.5	-
Cyromazine	VP 0060	Legume vegetables	T1	-
DDT		Vegetables	E1	-
Deltamethrin	VP 0060	Legume vegetables	0.1	0.2
Diazinon		Vegetables	0.7	-
	VP 0529	Garden Pea, shelled	-	0.2
Diclofop-methyl	VP 0063	Peas	0.1	-
Dicofol		Vegetables {except cucumber, gherkin, tomato}	5	-
Difenoconazole	VP 0063	Peas (pods and succulent=immature seeds)	-	0.7
Diflufenican	VP 0063	Peas	0.05	-
Dimethoate	VP 0063	Peas (pods and succulent=immature seeds)	-	1
	VP 0060	Legume vegetables	2	-
Dimethomorph	VP 0063	Peas	1	-
	VP 0064	Peas, shelled (succulent seeds)	-	0.15
Dimethenamid-P	VP 0063	Peas	*0.02	-
Diquat	VP 0063	Peas	0.1	-
Disulfoton	VP 0528	Garden pea (young pods)	-	0.1
	VP 0529	Garden Pea, shelled	-	*0.02
Dithiocarbamates	VP 0063	Peas (pods and succulent = immature seeds)	2	-
Emamectin	VP 0060	Legume vegetables	0.1	-
EPTC		Vegetables	*0.04	-
Fenhexamid	VP 0063	Peas (pods and succulent = immature seeds)	T5	-
Fenvalerate	VP 0060	Legume vegetables	0.5	-
Flonicamid	VP 2061	Peas with pods	-	0.8
Fluazifop-p-butyl	VP 0060	Legume vegetables	0.1	-
	VP 0063	Peas (pods and succulent = immature seeds)	-	2
	VP 0064	Peas, shelled (succulent seeds)	-	15
Flubendiamide	VP 0060	Legume vegetables	-	2
Fludioxonil	VP 0063	Peas (pods and succulent=immature seeds)	0.5	0.3
	VP 0064	Peas, shelled (succulent seeds)	-	0.03
Fluensulfone	VP 0060	Legume vegetables	-	0.1
Flumetsulam	VP 0528	Garden pea (young pods)	*0.1	-
Fluopyram	VP 0064	Peas, shelled (succulent seeds)	-	0.2
Flupyradifurone	VP 0063	Peas (pods and succulent=immature seeds)	-	3
	VP 0064	Peas, shelled (succulent seeds)	-	3
Flutriafol	VP 0528	Garden pea (young pods)	*0.01	-
Fluxapyroxad	VP 0063	Peas (pods and succulent=immature seeds)	-	2

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
	VP 0064	Peas, shelled (succulent seeds)	-	0.09
Glyphosate	VP 0060	Legume vegetables	*0.1	-
Haloxyfop	VP 0063	Peas (pods and succulent=immature seeds)	-	0.7
	VP 0064	Peas, shelled (succulent seeds)	-	1
Heptachlor		Vegetables {except carrot, soya bean (dry), tomato}	E0.05	-
Hexythiazox	VP 0063	Peas	T*0.05	-
Inorganic Bromide		Vegetables {except peppers, sweet}	20	-
Imazamox	VP 0064	Peas, shelled (succulent seeds)	-	*0.05
Imazethapyr	VP 0060	Legume vegetables	*0.1	-
Imidacloprid	VP 0063	Peas (pods and succulent=immature seeds)	-	5
	VP 0064	Peas, shelled (succulent seeds)	-	2
Isofetamid	VP 2061	Peas with pods	-	0.6
Lindane		Vegetables	E2	-
Linuron		Vegetables {except celeriac, celery, leek, parsnip}	*0.05	-
Maldison	VP 0528	Garden Pea (young pods)	0.5	-
MCPB	VP 0060	Legume vegetables	*0.02	-
Metalaxyl		Vegetables (some exceptions)	T0.1	-
	VP 0064	Peas, shelled (succulent seeds)	-	*0.05
Metaldehyde		Vegetables	1	-
Methiocarb	VP 0063	Peas (pods and succulent=immature seeds)	-	0.1
		Vegetables	0.1	-
Methomyl	VP 0060	Legume vegetables	1	-
	VP 0063	Peas (pods and succulent=immature seeds)	-	5
Methoxyfenozide	VP 0063	Peas (pods and succulent=immature seeds)	-	2
	VP 0064	Peas, shelled (succulent seeds)	-	0.3
Methyl Bromide		Vegetables {except cucumber, peppers}	T*0.05	-
Metribuzin	VP 0063	Peas [except Peas, shelled]	T*0.05	-
	VP 0064	Peas, shelled	*0.05	-
Omethoate	VP 0060	Legume vegetables	1	-
Oxathiapiprolin	VP 0063	Peas (pods and succulent=immature seeds)	-	1
	VP 0064	Peas, shelled (succulent seeds)	-	0.05
Paraquat		Vegetables {except potato, pulses)	*0.05	-
Pendimethalin	VP 0060	Legume vegetables	T0.2	-
	VP 0063	Peas (pods and succulent=immature seeds)	-	0.05
	VP 0064	Peas, shelled (succulent seeds)	-	0.05
Penthiopyrad	VP 0063	Peas (pods and succulent=immature seeds)	-	3
	VP 0064	Peas, shelled (succulent seeds)	-	0.3
Permethrin	VP 0063	Peas	1	-
	VP 0064	Peas, shelled (succulent seeds)	-	0.1
Phosphine	VP 0060	Legume vegetables	T*0.01	-
Phosphorous Acid	VP 0064	Peas, shelled	T100	-
Piperonyl Butoxide		Vegetables	8	-
Pirimicarb	VP 0060	Legume vegetables	-	0.7
		Vegetables (some exceptions)	1	-
Prometryn		Vegetables	*0.1	-
Propaquizafop	VP 0063	Peas	*0.05	-

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Propargite		Vegetables	3	-
Propazine		Vegetables	*0.1	-
Pydiflumetofen	VP 0060	Legume vegetables	T0.5	-
Pyraclostrobin	VP 2061	Peas with pods	-	0.3
Pyrethrins		Vegetables	1	-
Saflufenacil	VP 0063	Peas (pods and succulent=immature seeds)	-	0.01
	VP 0060	Legume vegetables	*0.03	-
	VP 0064	Peas, shelled (succulent seeds)	-	0.01
Sethoxydim	VP 0063	Peas (pods and succulent=immature seeds)	T0.7	-
Spinetoram	VP 0060	Legume vegetables	0.2	-
Spinosad	VP 0060	Legume vegetables	-	0.3
	VP 0063	Peas	0.5	-
Spirotetramat	VP 0060	Legume vegetables	2	1.5
Tebuconazole	VP 0060	Legume vegetables	0.5	-
Terbutryn	VP 0063	Peas	*0.1	-
Thiamethoxam	VP 0060	Legume vegetables	-	*0.01
Tri-allate	VP 0060	Legume vegetables	*0.05	-
Triadimefon	VP 0528	Garden pea (young pods)	0.1	-
	VP 0529	Garden pea, shelled	0.1	-
Trichlorfon		Vegetables (some exceptions)	0.1	-
Trifluralin		Vegetables (some exceptions)	0.05	-

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)
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 10 July 2021. CODEX MRLs: CODEX Alimentarius International Food Standards database (September 2021), http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/

Appendix 6. Green Pea Agrichemical Regulatory Risk Assessment

Green Pea
Agrichemical Regulatory
Risk Assessment

July 2021

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 requiring the generation of new data. A consequence of which can be that many of these agrichemicals 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 agrichemicals 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 prohibit use in the exporting country so as to ensure compliance, as a MRL breach would adversely affect market access.

The effects of the above are greater regulatory pressure placed on the use of individual agrichemicals 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 lettuce as well as current initiatives aimed at addressing identified pest management deficiencies.

Green Pea 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: Non-renewal of authorisation	Hort Innovation data generation project ST17000 for **Afidopyropen** for registration
	Pirimicarb	**1A**	Codex: JMPR Periodic re-evaluation 2022/23 EU: Candidate for substitution	
Cowpea aphid	Dimethoate	**1B**	Codex: MRL deletion recommended. EU: Non-renewal of authorisation	
Green peach aphid	Spirotetramat	**23**		
Beetles				
Pea weevil	Malathion/Maldison	**1B**	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
Spotted vegetable weevil	Chlorpyrifos	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR Canada: Cancellation of all uses. EU: Cancellation of use USA:EPA decision to cancel uses	
Vegetable weevil	Chlorpyrifos	**1B**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Caterpillars/Lepidoptera				
Australian cabbage looper	Methomyl	**1A**	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
Budworm / Bollworm Corn earworm / Cotton bollworm (*Helicoverpa spp*)	Chlorantraniliprole	**28**		
	Emamectin benzoate	**6**	EU: Candidate for substitution	
	Esfenvalerate	**3A**		
	Helicoverpa NPV	**31**		
	Methomyl	**1A**	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
	Permethrin	**3A**	Codex: Re-evaluation scheduled. Support uncertain EU: No authorisation	
	Spinetoram	**5**		
	Spinosad	**5**		
Caterpillars	Diazinon	**1B**	EU: Deregistered Codex: To be reviewed	
	Spinetoram	**5**		
Cluster caterpillar	Emamectin benzoate	**6**	EU: Candidate for substitution	
	Methomyl	**1A**	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
Cucumber moth	Methomyl	**1A**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Cutworms	Chlorpyrifos	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR Canada: Cancellation of all uses. EU: Cancellation of use USA:EPA decision to cancel uses	
	Diazinon	**1B**	EU: Deregistered Codex: To be reviewed.	
	Trichlorfon	**1B**	APVMA: nominated for review Codex: No MRLs Europe: deregistered US: No MRLs	
Fall armyworm	Chlorantraniliprole (PER89259)	**28**		
	Emamectin benzoate (PER89263)	**6**	EU: Candidate for substitution	
	Methomyl (PER89293)	**1A**	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
	Spinetoram (PER89241)	**5**		
	Spinosad (PER89870)	**5**		
Looper caterpillars	Emamectin benzoate	**6**	EU: Candidate for substitution	
	Methomyl	**1A**	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
	Spinetoram	**5**		
	Spinosad	**5**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Webworms	Methomyl	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
Flies				
Bean fly	Dimethoate	1B	Codex: MRL deletion recommended. EU: Non-renewal of authorisation	
Vegetable leafminer	Abamectin (PER81876)	6		
	Cyromazine	17	EU: No authorisation	
Grasshoppers/Locusts				
Australian plague locust	Malathion/Maldison (PER11843)	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
	Chlorpyrifos (PER11843)	1B	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR Canada: Cancellation of all uses. EU: Cancellation of use USA:EPA decision to cancel uses	
Black field crickets	Chlorpyrifos	1B		
Field crickets	Chlorpyrifos	1B		
Migratory locust	Chlorpyrifos (PER11843)	1B		
	Malathion/Maldison (PER11843)	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
Mole crickets	Chlorpyrifos	1B	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR Canada: Cancellation of all uses. EU: Cancellation of use USA:EPA decision to cancel uses	
Spur-throated locust	Chlorpyrifos (PER11843)	1B		
	Malathion/Maldison (PER11843)	1B	APVMA: Under review – chemistry Codex: Re-evaluation scheduled for 2022/23 EU: Restricted approval	

Problem	Active Constituents	Chemical Group	Comment	Activities
Wingless grasshopper	Chlorpyrifos	1B	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR Canada: Cancellation of all uses. EU: Cancellation of use USA:EPA decision to cancel uses	
	Dimethoate	1B	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
Jassids/Plant bugs				
Green vegetable bug	Dimethoate	1B	Codex: MRL deletion recommended. EU: Non-renewal of authorisation	
	Methomyl	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
Jassids	Dimethoate	1B	Codex: MRL deletion recommended. EU: Non-renewal of authorisation	
Leafhoppers	Dimethoate	1B		
Rutherglen bug	Methomyl	1A	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
Mites				
Mites	Dimethoate	1B	Codex: MRL deletion recommended. EU: Non-renewal of authorisation	
Redlegged earth mite	Dimethoate	1B		
Spider mites (Red spider)	Dimethoate	1B		

Problem	Active Constituents	Chemical Group	Comment	Activities
Thrips				
Pea thrips	Methomyl	**1A**	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
Thrips	Dimethoate	**1B**	Codex: MRL deletion recommended. EU: Non-renewal of authorisation	
	Methomyl	**1A**	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
Western flower thrips	Methomyl	**1A**		
	Spinetoram	**5**		
	Spinosad	**5**		

Problem	Active Constituents	Chemical Group	Comment	Activities
DISEASES				
Angular leaf spot	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
Anthracnose	Mancozeb	**M3**		
Ascochyta blight	Copper	**M1**	EU: Candidate for substitution	
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
Ascochyta rot complex	Chlorothalonil	**M5**	APVMA: Nominated for review Canada: Review recently completed; continued use considered acceptable Europe: Deregistered[i].	
Bacterial blight	Copper	**M1**	EU: Candidate for substitution	
Black spot	Chlorothalonil (PER82895)	**M5**	APVMA: Nominated for review Canada: Review recently completed, continued use considered acceptable Europe: Deregistered.	
Blight (Peas)	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
Chocolate spot (Grey mould)	Mancozeb	**M3**		
Downy mildew	Chlorothalonil	**M5**	APVMA: Nominated for review Canada: Review recently completed, continued use considered acceptable Europe: Deregistered.	
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	

Problem	Active Constituents	Chemical Group	Comment	Activities
Downy mildew	Zineb	**M3**	APVMA: Nominated for review Codex: To be reviewed 2022/23 EU: No authorisation in place	
Leaf and pod spot	Chlorothalonil	**M5**	APVMA: Nominated for review Canada: Review recently completed, continued use considered acceptable Europe: Deregistered.	
	Copper	**M1**	EU: Candidate for substitution	
Leaf blight	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
Leaf spot	Azoxystrobin	**11**		
Powdery mildew	Copper	**M1**	EU: Candidate for substitution	
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Sulfur	**M2**		
	Tebuconazole	**3**	APVMA: Nominated for review EU: Candidate for substitution	
	Triadimefon	**3**	APVMA: Nominated for review EU: Authorisation expired 31/08/2019	
Pythium root rot	Thiabendazole + Thiram (ST)	**1 + M3**	Thiram APVMA: Nominated for review Canada: All foliar uses cancelled Codex: To be reviewed 2022/23 Europe: No authorisation in place	

Problem	Active Constituents	Chemical Group	Comment	Activities
Rust	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
Sclerotinia rot	Boscalid	**7**		
	Cyprodinil + fludioxonil	**9 + 12**	Cyprodinil Canada: Under review EU: Candidate for substitution Fludioxonil EU: Under review & Candidate for substitution	

Problem	Active Constituents	Chemical Group	Comment	Activities
WEEDS				
Broadleaf weeds and grasses	Atrazine	**5**	EU: No authorisations in place	
	Bentazone (PER14896)	**6**		
	Chlorthal-dimethyl	**3**	EU: No authorisation in place	
	Clethodim	**1**	Codex: MRLs proposed for deletion	
	Cyanazine	**5**	APVMA: Nominated for review EU: No authorisation in place	
	Diclofop-methyl	**1**	EU: Candidate for substitution	
	Diflufenican	**12**	EU: Candidate for substitution	
	Dimethenamid-P	**15**		
	Diquat	**22**	APVMA: Currently under review EU: No authorisation in place	
	Fluazifop-P	**1**		
	MCPA	**4**		
	Metribuzin	**5**	EU: Candidate for substitution	
	Pendimethalin (PER85352)	**3**	EU: Candidate for substitution	
	Quizalofop-P	**1**	Canada: Under re-evaluation: proposed completion June 2019. EU: Candidate for substitution	
	Sethoxydim	**1**	EU: No authorisation in place	
	Terbutryn	**5**	EU: No authorisation in place	
	Tri-allate	**15**	EU: Candidate for substitution	
	Trifluralin	**3**	EU: No authorisation in place	

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[i] 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