Snow Pea and Sugar Snap Pea

Strategic Agrichemical Review Process
(SARP)

April 2021

Hort Innovation
Project – VG18004

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

SARP Service Provider:
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Purpose of the report:
This report was funded by Hort Innovation to investigate the pest problem, agrichemical usage and pest management alternatives for the Snow pea and Sugar snap 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:
April 2021

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Hort Innovation Strategic levy investment | VEGETABLE FUND

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

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1. Summary

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

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

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

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

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

Alternative pesticides should ideally be selected for benefits of:

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

The results of this process will provide the Snow pea and Sugar snap 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 diseases are:

Common Name	Scientific Name
Ascochyta Blight	*Ascochyta* spp.
Fusarium Wilt	*Fusarium oxysporum*
Chocolate Spot / Botrytis Rot	*Botrytis* 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*
Western Flower Thrips	*Frankliniella occidentalis*
Thrips	*Thrips* spp.
Green Peach Aphid	*Myzus persicae*
Two-Spotted Mite	*Tetranychus urticae*

1.3 Weeds

The high priority weeds are:

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

2. The Australian Snow Pea and Sugar Snap Pea Industry

The Australian Snow pea and Sugar Snap Pea industry are both minor horticultural industries. The varieties referred to in this SARP are:

Crop Subgroup	Common Name	Scientific Name
Podded pea (young pods) VP 0538	Snow peas	*Pisum sativum* var. saccharatum
	Sugar snap peas	*Pisum sativum* var. macrocarpon

Snow peas and Sugar Snap Peas are grouped with Garden Peas for production and trade data purposes. Therefore, it is difficult to determine accurate supply chain data due to the high volume of Garden Peas sent for processing.

For the year ending in June 2020[1] total production 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. Of the 20% that was sent to fresh market, 16% were snow peas, 3% were sugar snap peas and 81% garden peas.

Peas are grown in most states of Australia, with the largest volume of production occurring in Victoria and Queensland. The major production areas include Bundaberg and the Lockyer Valley in Queensland; Goulburn Valley in Victoria; the Perth region in Western Australia, and North-West 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												
Garden/Processed	23,429												
Availability legend		High		Medium		Low		None					

Australia is a net importer of fresh peas. For the year ending in June 2020, Australia imported 764 tonnes of fresh peas. Of the exported produce of 6 tonnes, 29% was destined for New Caledonia followed by Fiji (25%), PNG (16%), UAE (10%) and Indonesia (9%).

[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

3.1 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 Snow pea and Sugar snap 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 Snow pea and Sugar snap 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 Snow pea and Sugar snap 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 Snow pea and Sugar snap 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 Snow pea and Sugar snap but attempts to prioritise the major problems.

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

3.2 Minor use permits and registration

From a pesticide access perspective, the APVMA classifies Snow pea and Sugar snap pea as a minor crop. The crop fits within the APVMA crop group 014: Legume vegetables. Therefore, access to minor use permits can be relatively straight forward as long as a reasonable justification is provided in accordance to the APVMA's minor use guidance[2].

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 Snow pea and Sugar snap pea industry is for manufacturers to register new pesticides uses in the crop.

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

3.3 Methods

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

Hort Innovation Project Reference	Process of Review - Activity
VG16060 - Vegetable Agrichemical Pest Management Needs and Priorities (AUSVEG) - Commenced: 2 May 2017	Engagement and consultation with growers and other relevant stakeholders. Including; Online crop specific surveys, workshops and one on one consultation Nationally. Collation of information collected by commodity on applicable pests, diseases and weeds in order of priority.
MT17019 – Regulatory Support & Co-ordination (AKC)	**Snow pea and Sugar Snap 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 Snow pea and Sugar snap 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 snow pea and sugar snap peas
Appendix 2. Products available for control of insects and mites in snow pea and sugar snap peas
Appendix 3. Products available for weed control in snow pea and sugar snap peas
Appendix 4. Current permits for use in snow pea and sugar snap peas
Appendix 5. Snow pea and Sugar snap Peas Maximum Residue Limits (MRLs)
Appendix 6. Snow pea and Sugar snap Peas Agrichemical Regulatory Risk Assessment

4. Diseases, Pests and Weeds of Snow Pea and Sugar Snap 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[3].

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.

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

4.1 Diseases of Snow pea and Sugar snap peas

4.1.1 Disease priorities

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

The most important disease issue based on the feedback received were Ascochyta Blight, Fusarium Wilt and Chocolate Spot / Botrytis Rot. Available and potential products for all these diseases are listed in Section 4.1.2.

Some of the fungal and bacterial diseases that have received moderate to low priority have few options to suppress or control but should be supplemented by management practices that would increase airflow and minimise moisture in the plant canopy. Soil fumigation also helps in preventing some diseases.

Bacterial rots caused by *Pseudomonas* species are common diseases on many vegetables. The causal organisms may be carried on cutting knives or on residue in produce bins. Therefore, good farm hygiene is also important in preventing such occurrences.

Viruses are transmitted by several aphid species in a non-persistent manner. A key aspect of virus disease management is to accurately identify the virus causing the disease and then implement appropriate management strategies as there are no chemical controls at present.

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

Resistance Management

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[4], including Downy Mildew and Powdery Mildew.

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

4.1.2 Available and potential products for priority diseases

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

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

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Ascochyta Blight (*Ascochyta* spp.) **Priority: High**							
Ascochyta Blight was ranked as a high priority in VIC, QLD & TAS and as a moderate priority in NSW. 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 on-farm sanitation is recommended.							
Copper PER14038	M1	Protectant	1	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of **Black Spot**, Bacterial Spot and Downy Mildew. [Max. number of applications and retreatment intervals not specified]	-
Copper Ammonium Acetate	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]	-
Copper Oxychloride	M1	Protectant	1	A	ALL	Registered in peas for control of **Ascochyta Blight** and Bacterial Blight. [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
Chlorothalonil (Bravo) PER82895	M5	Protectant	7 NG	P-A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas for control of Downy Mildew and Chocolate Spot. Registered for control of **Ascochyta Blight** in garden peas.	R3

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
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
Thiram + Thiabendazole (P-Pickel T)	M3+1	Protectant		P		Registered in field and garden peas as a seed dressing 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
Fusarium Wilt (*Fusarium oxysporum*) **Priority: High**							
Fusarium Wilt was ranked as a high priority in VIC, QLD & NSW, and as a moderate priority in TAS. 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 on-farm sanitation is recommended.							
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 NE Soil Fumigant)	8	Soil Fumigant	NR	A	ALL	Registered as a general fumigant to control various soil borne fungi. Do not plant for 10 d after soil treatment. ***For use by professional and registered fumigators only.***	-
Dazomet (Basamid, Cerlong)	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.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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.	-
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) Syngenta	7+12	Protective Seed Treatment		P		Registered in potatoes for control of Black scurf, Silver surf, 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
Thiram + Thiabendazole (P-Pickel T)	1+M3	Protective		P		Registered in field & garden peas for control of Black spot (*Mycosphaerella pinodes*) & Seedling root rots (***Fusarium,*** *Pythium* & *Macrofomina* spp.). Use as a liquid seed dressing.	R2
Chocolate Spot / Botrytis Rot (*Botrytis spp.*) **Priority: High**							
Chocolate Spot / Botrytis Rot was ranked as a high priority in VIC & QLD and as a moderate priority in NSW & TAS. 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 clean seeds and good on-farm sanitation are recommended.							
Azoxystrobin (Amistar)	11	Protectant & Curative	NR NG	A	ALL	Registered in snow peas and sugar snap peas for control of *Stemphyllium* spp. and suppression of ***Botrytis* spp.** [Max. 3 applications per crop; re-treatment interval 7-14 d]	-
Chlorothalonil (Bravo) PER82895	M5	Protectant	7 NG	A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas for control of Downy Mildew and **Chocolate Spot**. [Max. number of applications not specified; re-treatment interval 7-14 d]	R3
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
Fenhexamid (Teldor)	J	Protectant	3 G:3	A	ALL	Registered in snow & sugar snap peas (field & protected) for control of Grey Mould and **Chocolate Spot**. [Max. 2 applications per crop; re-treatment interval 7-10 d]	-
Iprodione (Rovral) PER81589	2	Protectant	7 NG	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of Sclerotinia Rot and ***Botrytis* spp.** Seedling drench soon after emergence or transplanting. [Max. 3 applications per crop; re-treatment interval 10-14 d]	R2
Pyrimethanil (Scala) Bayer PER14505	9	Protectant & Curative	3 NG	A	ALL (excl. VIC)	Pemitted for use in snow & sugar snap peas (field & protected) for control of ***Botrytis* spp**. [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7-10 d]	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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.	-
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.	-
Boscalid (Filan) BASF	7	Protectant		P		Registered for control of ***Botrytis*** in grapevines and onions.	-
DC-126 Bayer	TBC			P		New product from Bayer with ***Botrytis*** activity.	-
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. Corteva claims activity on ***Botrytis***. Scheduled for JMPR evaluation in 2023.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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.***	-
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 + 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
SYNCUF29 Syngenta	TBC			P		New product from Syngenta with ***Botrytis*** activity.	-
Tebuconazole + Azoxystrobin (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
Downy Mildew (*Peronospora viciae*) **Priority: Moderate**							
Downy Mildew was ranked as high priority in QLD and as a moderate priority in VIC, NSW & TAS. 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 general farm hygiene, crop rotation, planting space and the use of protectant and curative fungicide spray applications when conditions favour disease outbreaks.							
Chlorothalonil (Bravo) PER82895	M5	Protectant	7 NG	A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas for control of **Downy Mildew** and Chocolate Spot. [Max. number of applications not specified; re-treatment interval 7-14 d]	R3
Copper PER14038	M1	Protectant	1	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of Black Spot, Bacterial Spot and **Downy Mildew**. [Max. number of applications and retreatment intervals not specified]	-
Dimethomorph + Mancozeb (Acrobat + Mancozeb) PER14470	40+M3	Protectant & Curative	7 NG	A	ALL (excl. VIC)	Permitted for use in snow peas (field & protected) for control of **Downy Mildew**. [Max. 4 applications per season; 2 consecutive; re-treatment interval 7-10 d]	R2
Metalaxyl-M + Mancozeb (Ridomil Gold MZ) PER82456	4+M3	Protectant	14	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of **Downy Mildew**. [Max. 2 consecutive applications per crop; re-treatment interval 7-10 d]	R2
Zineb	M3	Protectant	3	A	ALL	Registered in snow and sugar snap peas for control of **Downy Mildew**. [Max. 5 applications per crop; re-treatment interval 7-14 d]	R2
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.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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.	-
Mandipropamid (Revus) Syngenta	40	Protectant		P		Registered for control of **Downy Mildew** in grapes, lettuce and leafy vegetables.	-
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.	-
Phosphorous Acid	33	Curative		P		Registered in cucurbits, poppies & grapes for control of Downy Mildew. Permitted in processing peas (shelled) under PER11951	-
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.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Powdery Mildew (*Erysiphe pisi*) **Priority: Moderate**							
Powdery Mildew was ranked as a high priority in QLD and as a moderate priority in VIC, NSW & TAS. A characteristic white, powdery growth occurs on plants infected by this fungus. Photosynthetic efficiency is reduced in affected leaves and fruit can be scarred and damaged, causing produce to be downgraded. Severe outbreaks can cause defoliation, exposing fruit to sunburn and predisposing them to secondary rots.							
Potassium Bicarbonate (Ecocarb) PER13695	M2	Protectant	NR	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of **Powdery Mildew**. [Max. no. of applications not specified; re-treatment interval 10-14 d]	-
Spiroxamine (Prosper 500EC) Bayer PER11764	5	Protectant & Curative	14 G:14	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of **Powdery Mildew**. [Max. 2 applications per crop; re-treatment interval 14 d]	-
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
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 AU. Corteva claim activity on **Powdery Mildew**. 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	-
NUL3195 Nufarm	TBC			P		Fungicide in development from Nufarm with activity on **Powdery Mildew** and *Botrytis*.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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 + 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.	-
Streptomyces lydicus WYEC108 (Actinovate) Novozymes Bioag	BM 02	Biological		P		Registered for the suppression of **Powdery Mildew** in strawberries.	-
Bacterial Blight (*Pseudomonas syringae*) **Priority: Moderate**							
Bacterial Blight was ranked as a moderate priority in QLD & NSW and as a low priority in VIC & TAS. The bacterium is seed borne but spreads through irrigation water and runoff as well as 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. Management includes non-chemical options; using clean seeds and transplant material; eliminating alternative hosts; and through early detection and disposal of infected seedlings.							
Copper Ammonium Acetate	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]	-
Copper Oxychloride	M1	Protectant	1	A	ALL	Registered in peas for control of Ascochyta Blight and **Bacterial Blight**. [Max. no. of applications not specified; re-treatment interval: 10-14 d]	-
Copper PER14038	M1	Protectant	1	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of Black Spot, **Bacterial Spot** and Downy Mildew. [Max. number of applications and retreatment intervals not specified]	-

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 control of Powdery Mildew and Bacterial Spot in tomatoes.	-
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.	-
Damping Off (*Pythium* spp., *Phytophthora* spp., *Fusarium* spp., *Rhizoctonia* spp.) **Priority: Moderate**							
Damping Off was ranked as a moderate priority in VIC & QLD, and as a low priority in NSW & TAS. The 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 NE Soil Fumigant)	8	Soil Fumigant	NR	A	ALL	Registered as a general fumigant to control various soil borne fungi. Do not plant for 10 d after soil treatment. ***For use by professional and registered fumigators only.***	-
Dazomet (Basamid, Cerlong)	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.	-

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.	-
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 + Sedaxane (Vibrance Premium) Syngenta	7+12	Protective Seed Treatment		P		Registered for control of Black Scurf (***Rhizoctonia***), Silver Surf, Black Rot, Gangrene and Fusarium Dry Rot and suppression of Scab in potatoes. Hort innovation is pursuing studies to control Rhizoctonia in beetroot.	R3
Fosetyl-Aluminium (Aliette)	33	Curative		P		Registered for control of ***Phytophthora* spp.** in apples, peaches, avocados & pineapples.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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*.	-
Thiram + Thiabendazole (Evershield) UPL	1+M3	Protectant		P		Registered in field & garden peas for control of Black Spot (*Mycosphaerella pinodes*) & Seedling Root Rots (***Fusarium, Pythium*** & *Macrophomina* spp.).	R2
Black Root Rot (*Aphanomyces euteiches*) **Priority: Low**							
Black Root Rot was ranked as a moderate priority in VIC and as a low priority in QLD, NSW & TAS. 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. In greenhouse studies, the application of calcium carbonate or calcium sulfate to soil with a high *Aphanomyces* potential has significantly reduced disease severity.							
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.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Sclerotinia Rot (*Sclerotinia* spp.) **Priority: Low**							
Sclerotinia Rot was ranked as a moderate priority in QLD and as a low priority in VIC, NSW & TAS. The fungus can survive in the soil for many years. Management options include general farm hygiene, crop rotation, planting space and the use of protectant and curative 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 NE Soil Fumigant)	8	Soil Fumigant	NR	A	ALL	Registered as a general fumigant to control various soil borne fungi. Do not plant for 10 d after soil treatment. ***For use by professional and registered fumigators only.***	-
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, Cerlong)	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.	-
Iprodione (Rovral) PER81589	2	Protectant	7 NG	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of **Sclerotinia Rot** and Grey Mould. Seedling drench soon after emergence or transplanting. [Max. 3 applications per crop; re-treatment interval 10-14 d]	R2
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
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.	-
Aureobasidium pullulans (Botector) Nufarm	BM 02	Biological	NR	P		Registered for suppression of **Sclerotinia Rot** in fruiting vegetables.	-
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.	**-**
Boscalid (Filan) BASF	7	Protectant		P		Registered in Brassica vegetables for the control of **Sclerotinia Rot**.	-
Fluazinam (Shirlan)	29	Protectant		P		Registered for control of Club Root in brassica vegetables. US registration for control of ***Sclerotinia*** and *Alternaria* in carrots.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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.	**-**
Prothioconazole + Tebuconazole (Prosaro) Bayer	3	Protectant		P		Registered for control of **Sclerotinia** and other diseases in canola and pyrethrum.	R3
Tomato Spotted Wilt Virus (TSWV) **Priority: Low**							
Tomato Spotted Wilt Virus (TSWV) was ranked as a moderate priority in VIC and as a low priority in QLD & NSW. Viruses are transmitted by several aphid species in a non-persistent manner.							
Angular Leaf Spot (*Pseudomonas syringae*) **Priority: Low**							
Angular Leaf Spot was ranked as a low priority in VIC, QLD, NSW & TAS. *Pseudomonas syringae* can be moved by wind, rain, and transportation via nursery material. Mechanical equipment and pruning tools may be a frequently overlooked means of dispersal. Cultural management, host resistance, biological control with microbial antagonists assists in controlling this disease.							
Copper Ammonium Acetate	M1	Protectant	1	P-A	ALL	Registered for control of Ascochyta Blight and Bacterial Blight (***Pseudomonas syringae***) in peas.	-
Copper Oxychloride	M1	Protectant	1	P-A	ALL	Registered for control of Ascochyta Blight and Bacterial Blight (***Pseudomonas syringae***) in peas.	-

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 *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.	-
Anthracnose (*Colletotrichum spp.*) **Priority: Low**							
Anthracnose was ranked as a low priority in VIC, QLD, NSW & TAS. Anthracnose requires both pre- and post-harvest treatments. This fungus can be seed-borne and carry over on crop residue in the soil. It is spread in water droplets and worse in warm, humid weather. It is thought that protectants that target Downy Mildew and Botrytis will have some effect and post-harvest treatments would afford protection as well. Regular spraying and farm hygiene are important to prevent crop damage.							
Chlorothalonil (Bravo) PER82895	M5	Protectant	7 NG	P-A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas for control of Downy Mildew and Chocolate Spot. Registered for control of **Anthracnose** in capsicum and peppers.	R3
Copper Oxychloride	M1	Protectant		P-A		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.	-
Dimethomorph + Mancozeb (Acrobat + Mancozeb) PER14470	40+M3	Protectant & Curative	7 NG	P-A	ALL (excl. VIC)	Permitted for use in snow peas (field & protected) for control of Downy Mildew. Registered for the control of Downy Mildew, **Anthracnose** and Septoria Leaf Spot in head varieties of lettuce.	R2
Zineb	M3	Protectant	3	P-A	ALL	Registered in snow and sugar snap 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.	-

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 **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.	-
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.	-
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
Rust (*Uromyces viciae - fabae*) **Priority: Low**							
Rust was ranked as a low priority in VIC, QLD, NSW & TAS. 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 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

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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:3	P-A	ALL	Registered in peas for control of Powdery Mildew. Registered in green bean for control of **Rust.**	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

4.2 Insect and mite pests of snow pea and sugar snap peas

4.2.1 Insect and mite pest priorities

Common name	Scientific name
High	
Cotton Bollworm / Corn Earworm	*Helicoverpa armigera*
Native Budworm	*Helicoverpa punctigera*
Cluster Caterpillar	*Spodoptera litura*
Western Flower Thrips	*Frankliniella occidentalis*
Thrips	*Thrips* spp.
Green Peach Aphid	*Myzus persicae*
Two-Spotted Mite	*Tetranychus urticae*
Moderate	
Looper Caterpillar	*Chrysodeixis* spp.
Slugs and Snails	Gastropoda
Low	
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*
Wireworm and False Wireworms	*Elateridae, 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*

The high priority insect pests identified by the survey are Helicoverpa, Thrips and Western flower thrips, Cluster caterpillar, Green peach aphid and Two-spotted mite. Available and potential products for all these insects and mites are 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[5], 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.

[5] 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: High**								
Helicoverpa was ranked as a high priority in VIC, QLD & NSW and as a moderate priority in TAS. 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 snow and sugar snap 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 fruiting vegetables 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 snow & sugar snap 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) PER82428	1A	Contact	3	A	ALL	Permitted for use in snow & sugar snap peas (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
Methoxyfenozide (Prodigy) Corteva PER80954	18	IGR / Ingestion	3 NG	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of ***Helicoverpa*** & Cluster Caterpillar. [Max 3 applications per crop; re-treatment interval: 7 d]	VL Bee:VL	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in legume vegetables (field) for control of Aphids, Thrips, Caterpillars, Ants, Earwigs, White Flies and Leafhoppers. Best results are achieved when applied 3-12 hours prior to harvest. [Max 3 applications per crop; retreatment interval: 3 d]	VH Bee:H	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, Caterpillars, Leafhoppers, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH Bee:H	-
Spinetoram (Success Neo) Corteva	5	Ingestion	3	A	ALL	Registered in snow and sugar snap peas 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 snow and sugar snap peas 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	-
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
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars.		-
Cluster Caterpillar (*Spodoptera litura*) **Priority: High**								
Cluster Caterpillar was ranked as a high priority in QLD & NSW and as a moderate priority in VIC & TAS. Young larvae feed on the leaf surface. Cluster caterpillars are controlled by most conventional pesticides targeting *Helicoverpa*.								
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3 G:21	A	ALL	Registered in fruiting vegetables for control of Heliothis, **Cluster Caterpillar** and Loopers. [Max 4 applications per crop; re-treatment interval min. 7 days]	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
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) PER82428	1A	Contact	3	A	ALL	Permitted for use in snow & sugar snap peas (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
Methoxyfenozide (Prodigy) Corteva PER80954	18	IGR / Ingestion	3 NG	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of *Helicoverpa* & **Cluster Caterpillar**. [Max 3 applications per crop; re-treatment interval: 7 d]	VL Bee:VL	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in legume vegetables (field) for control of Aphids, Thrips, Caterpillars, Ants, Earwigs, White Flies and Leafhoppers. Best results are achieved when applied 3-12 hours prior to harvest. [Max 3 applications per crop; retreatment interval: 3 d]	VH Bee:H	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, Caterpillars, Leafhoppers, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH Bee:H	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in legume vegetables including snow and sugar snap 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	P-A	ALL	Registered in snow and sugar snap peas 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 snow and sugar snap peas for control of Loopers, *Helicoverpa* & Western Flower Thrips. Registered for control of **Cluster Caterpillar** in brassica vegetables.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
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.	-	-
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 **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
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars.		-
Western Flower Thrips (*Frankliniella* occidentalis) **Priority: High**								
Western Flower Thrips were ranked as a high priority in VIC, QLD & NSW and as a moderate priority in TAS. They are a vector for many viruses including Tomato Spotted Wilt Virus. 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	-
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
Lambda-Cyhalothrin (Karate Zeon) PER14033	3A	Contact	2 G:7	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of Webworm, Cutworm, Rutherglen Bug and **Thrips**. [Max 2 applications per crop; re-treatment interval: 7 d]	VH Bee:H	-
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in snow & sugar snap peas (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
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas (field & protected) for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug & **Thrips**. [Max. no. of applications and re-treatment interval not specified]	VL Bee:L	-
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	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in legume vegetables (field) for control of Aphids, **Thrips**, Caterpillars, Ants, Earwigs, White Flies and Leafhoppers. Best results are achieved when applied 3-12 hours prior to harvest. [Max 3 applications per crop; retreatment interval: 3 d]	VH Bee:H	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, **Thrips**, Caterpillars, Leafhoppers, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH Bee:H	-
Spinetoram (Success Neo) Corteva	5	Ingestion	3	A	ALL	Registered in snow and sugar snap peas 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 snow and sugar snap peas for control of Loopers, *Helicoverpa* & **Western Flower Thrips**. [Max. 3 applications per season; re-treatment interval 7-14 d]	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spirotetramat (Movento) Bayer	23	Ingestion	7 G:7	P-A	ALL	Registered in snow peas & sugar snap peas for control of Green Peach Aphids and Silverleaf Whitefly. Registered for control of **Western Flower Thrips** in beans, bulb vegetables, fruiting vegetables, celery, herbs and lettuce.	M Bee:VL	-
Flonicamid (Mainman) ISK/UPL	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. ST17000 is generating data to support a minor use permit for **Thrips** control in bulb vegetables.	M Bee:L	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and **Thrips**.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for **Thrips**, Bugs, Mites and Caterpillars.		-
Thrips (*Thrips* spp.) **Priority: High**								
Thrips were ranked as a high priority in VIC & NSW and as a moderate priority in QLD & TAS. It can be difficult to distinguish between thrips species in the field. 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	-
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	-
Lambda-Cyhalothrin (Karate Zeon) PER14033	3A	Contact	2 G:7	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of Webworm, Cutworm, Rutherglen Bug and **Thrips**. [Max 2 applications per crop; re-treatment interval: 7 d]	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 snow & sugar snap peas (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
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas (field & protected) for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug & **Thrips**. [Max. no. of applications and re-treatment interval not specified]	VL Bee:L	-
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	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in legume vegetables (field) for control of Aphids, **Thrips**, Caterpillars, Ants, Earwigs, White Flies and Leafhoppers. Best results are achieved when applied 3-12 hours prior to harvest. [Max 3 applications per crop; retreatment interval: 3 d]	VH Bee:H	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, **Thrips**, Caterpillars, Leafhoppers, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH Bee:H	-
Spinetoram (Success Neo) Corteva	5	Ingestion	3	P-A	ALL	Registered in legume vegetables including snow and sugar snap peas for control of Loopers, Western Flower Thrips and *Helicoverpa* spp.	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3	P-A	ALL	Registered in snow and sugar snap peas for control of Loopers, *Helicoverpa* & Western Flower Thrips. US registration for control of Ants, Caterpillars, Colorado Potato Beetle, Corn Earworms, Flea Beetle, Leafminers, Loopers, Mites & **Thrips** in various vegetables.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spirotetramat (Movento) Bayer	23	Ingestion	7 G:7	P-A	ALL	Registered in snow peas & sugar snap peas for control of Green Peach Aphids and Silverleaf Whitefly. Registered for control of **Thrips** in beans, bulb vegetables, fruiting vegetables, grapes, celery, herbs and lettuce.	M Bee:VL	-
Flonicamid (Mainman) ISK/UPL	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. ST17000 is generating data to support a minor use permit for **Thrips** control in bulb vegetables.	M Bee:L	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and **Thrips**.		-
SYNFOI21 Syngenta	NEW	TBC		P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for **Thrips**, Bugs and Caterpillars.	-	-
Green Peach Aphid (*Myzus persicae*) **Priority: High**								
Green Peach Aphid was ranked as a high priority in QLD & NSW and as a moderate priority in VIC & TAS. 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	-
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	-
Imidacloprid (Confidor) PER10938	4A	Contact & Ingestion	7 G:7	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of **Green Peach Aphid** & Greenhouse Whitefly. [Max. 1 application per crop]	M M-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas (field & protected) for control of **Aphids**, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug & Thrips. [Max. no. of applications and re-treatment interval not specified]	VL Bee:L	-
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)	3A	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	-
Pyrethrins (Pyganic) Sumitomo	3A	Contact	1	A	ALL	Registered in legume vegetables (field) for control of **Aphids**, Thrips, Caterpillars, Ants, Earwigs, White Flies and Leafhoppers. Best results are achieved when applied 3-12 hours prior to harvest. [Max 3 applications per crop; retreatment interval: 3 d]	VH Bee:H	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of **Aphids**, Thrips, Caterpillars, Ants, Flies, Earwigs, Whitefly and Leafhoppers. [Max no. of applications not specified; Re-treatment interval: 7 d]	VH Bee:H	-
Spirotetramat (Movento) Bayer	23	Ingestion	7 G:7	A	ALL	Registered in snow peas & sugar snap peas for control of **Green Peach Aphids** and Silverleaf Whitefly. Spray when Aphids are detected. [Max. 2 applications per crop; re-treatment interval 7 d]	M Bee:VL	-
Pymetrozine (Chess) Syngenta PER14892	9B	Contact & Ingestion	14 NG	P-A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of Cowpea, Pea & Potato Aphids. 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

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	-
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	-
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	-
Two-Spotted Mite (*Tetranychus urticae*) **Priority: High**								
Two-Spotted Mites were ranked as a high priority in QLD, as a moderate priority in VIC & NSW and as a low priority in TAS. 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.								
Abamectin	6	Contact	1 G:2	A	ALL	Registered in snow & sugar snap peas for control of **Two-Spotted Mites** & Tomato Red Spider Mite. [Max 2 applications per crop; re-treatment 28 d]	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of 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	-
Bifenazate (Acramite) UPL PER80558	20D	Contact & Ingestion	3 G:3	A	ALL (excl. VIC & NT)	Permitted for use in snow & sugar snap peas (field & protected) for control of **Two-Spotted Mites,** Tomato Red Spider Mites, European Red Mite and Bryobia Mite. [Max 1 application per crop]	L Bee:H	-
Etoxazole (Paramite) Sumitomo PER82460	10B	Contact & Ingestion	14 G:14	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas for control of **Two-Spotted Mites** and Tomato Red Spider Mites. [Max 1 application per crop]	L Bee:VL	-
Hexythiazox (Calibre) Nufarm PER14765	10A	Contact & Ingestion	14 G:14	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of **Two-Spotted Mites**. [Max 1 application per crop]	L Bee:VL	-
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas (field & protected) for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, **Mites**, Rutherglen Bug & Thrips. [Max. no. of applications and re-treatment interval not specified]	VL Bee:L	-
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	Variable- refer to label	Registered in vegetables for control of Spider Mites (QLD and WA only) and **Two Spotted Mites** (All states). 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	Variable- refer to label	Registered in vegetables for control of Bean Spider Mite (NSW) and **Two Spotted Mites** (VIC, TAS, SA & WA). [Max no. of applications not specified; re-treatment interval 14-21 d]	L 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	
Looper Caterpillar (*Chrysodeixis spp.*) **Priority: Moderate**								
Looper Caterpillars were ranked as a moderate priority in VIC & QLD and as a low priority in NSW & TAS. 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	-
Emamectin (Proclaim Opti) Syngenta	6	Ingestion	3 G:21	A	ALL	Registered in fruiting vegetables 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) PER82428	1A	Contact	3	A	ALL	Permitted for use in snow & sugar snap peas (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	1	A	ALL	Registered in legume vegetables (field) for control of Aphids, Thrips, Caterpillars, Ants, Earwigs, White Flies and Leafhoppers. Best results are achieved when applied 3-12 hours prior to harvest. [Max 3 applications per crop; retreatment interval: 3 d]	VH Bee:H	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, Caterpillars, Leafhoppers, and Whitefly. [Max no. of applications not specified; re-treatment interval: 7 d]	VH Bee:H	-
Spinetoram (Success Neo) Corteva	5	Ingestion	3	A	ALL	Registered in legume vegetables including snow and sugar snap peas 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 snow and sugar snap peas 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 snow and sugar snap 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	-
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 **Loopers** in solanaceous fruit.	L Bee:H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars.		-
Slugs & Snails (Gastropoda) **Priority: Moderate**								
Slugs and Snails were ranked as a moderate priority in VIC & TAS. They are active after dusk when chemical treatments can be most effective.								
Iron EDTA Complex (Eradicate Snail)	-	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
Rutherglen Bug (*Nysius vinitor*) **Priority: Low**								
Rutherglen Bug was ranked as a moderate priority in QLD & NSW and as a low priority in VIC & TAS. 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.								
Lambda-Cyhalothrin (Karate Zeon) PER14033	3A	Contact	2 G:7	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of Webworm, Cutworm, **Rutherglen Bug** and Thrips. [Max 2 applications per crop; re-treatment interval: 7 d]	VH Bee:H	-
Methomyl (Lannate) PER82428	1A	Contact	3	A	ALL	Permitted for use in snow & sugar snap peas (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
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas (field & protected) for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, **Rutherglen Bug** & Thrips. [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
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	-
Maldison	1B	Contact		P		Registered for control of Aphid, Green Vegetable Bug, Jassid, Leafhopper, Red Legged Earth Mite, **Rutherglen Bug**, Twenty-Eight Spotted Ladybirds in vegetables including beans.	H	-
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	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, **Bugs**, Mites and Caterpillars.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Green Vegetable Bug (*Nezara viridula*) **Priority: Low**								
Green Vegetable Bug was ranked as a moderate priority in QLD and as a low priority in VIC, NSW & TAS. 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.								
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in snow and sugar snap peas (field & protected) for control of Aphids, Green Mirid, **Green Vegetable Bug**, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug & Thrips. [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
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	-
Maldison	1B	Contact		P		Registered in vegetables including beans for control of Aphid, **Green Vegetable Bug**, Jassid, Leafhopper, Red Legged Earth Mite, Rutherglen Bug, Twenty-Eight Spotted Ladybirds.	H Bee:H	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, **Bugs**, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for Thrips, **Bugs** and Caterpillars.	-	-

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**								
African Black Beetle was ranked as a low priority in VIC, QLD, NSW & TAS. 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.								
Chlorpyrifos (Lorsban) PER14583	1B	Contact	NR	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of **African Black Beetles**, False Wireworms & Wireworms. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R1
Imidacloprid (Confidor) PER10938	4A	Contact & Ingestion	7 G:7	P-A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of Green Peach Aphid & Greenhouse Whitefly. Registered in turf for the control of **African Black Beetle.**	M M-Bees	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.	-	-
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**								
Cutworms were ranked as a low priority in VIC, QLD, NSW & TAS. 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.								
Diazinon	1B	Contact	14 NG	A	ALL (excl. TAS)	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
Lambda-Cyhalothrin (Karate Zeon) PER14033	3A	Contact	2 G:7	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of Webworm, **Cutworm**, Rutherglen Bug and Thrips. [Max 2 applications per crop; re-treatment interval: 7 d]	VH Bee:H	-
Trichlorfon (Lepidex)	1B	Contact	2	A	QLD & NT	Registered in peas (field) for control of **Cutworms**. [Apply at first sight of infestation 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
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, **Bugs**, Mites and Caterpillars.		-
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**								
Webworm was ranked as a low priority in VIC, QLD, SA & TAS. 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.								
Bacillus thuringiensis subsp. kurstaki (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of Lepidopteran pests. Most effective on larvae < 8 mm. [Apply a minimum of 2 sprays, 3 d apart;re-treatment interval 3-5 d]	VL Bee:L	-
Lambda-Cyhalothrin (Karate Zeon) PER14033	3A	Contact	2 G:7	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field & protected) for control of **Webworm**, Cutworm, Rutherglen Bug and Thrips. [Max 2 applications per crop; re-treatment interval: 7 d]	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 snow & sugar snap peas (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.	-	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC	TBC		P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs and **Caterpillars**.		
Silverleaf Whitefly (*Bemisia tabaci*) **Priority: Low**								
Silverleaf Whitefly was ranked as a low priority in VIC, QLD, SA & TAS. 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	-
Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Thrips, Caterpillars, Leaf hoppers, and **Whitefly**. [Max no. of applications not specified; re-treatment interval: 7 d]	VH Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spirotetramat (Movento) Bayer	23	Ingestion	7 G:7	A	ALL	Registered in snow peas & sugar snap peas for control of Green Peach Aphids and **Silverleaf Whitefly**. Spray when Whitefly are detected. [Max. 2 applications per crop; re-treatment interval 7 d]	M Bee:VL	-
Pymetrozine (Chess) Syngenta PER14892	9B	Contact & Ingestion	14 NG	P-A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of Cowpea, Pea & Potato Aphids. Registered for suppression of **Silverleaf Whitefly** in brassica vegetables, fruiting vegetables and lettuce.	L Bee:VL	R3
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	-
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	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
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**.	-	-
Pyriproxyfen (Admiral) Sumitomo	7C	Contact / IGR		P		Registered for control of **Silverleaf Whitefly** in fruiting vegetables, cotton and rockmelon.	VL Bee L	-
Wireworm and False Wireworms (*Elateridae, Gonocephalum spp.*) **Priority: Low**								
Wireworm was ranked as a low priority in VIC, QLD, SA & TAS. 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.	-	-
Chlorpyrifos (Lorsban) PER14583	1B	Contact	NR	A	ALL (excl. VIC)	Permitted for use in snow & sugar snap peas (field) for control of African Black Beetles, **False Wireworms & Wireworms**. [Max no. of applications and re-treatment interval not specified]	H Bee:H	R1
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.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Fall Armyworm (*Spodoptera frugiperda*) **Priority: Unknown**								
Fall Armyworm was not ranked as a pest in snow and sugar snap 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 including Snow & Sugar snap peas (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 NG	A	ALL (excl. VIC)	Permitted for use in legume vegetables (field & protected) 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
Spinetoram (Success Neo) Corteva PER89241	5	Ingestion	3	A	ALL (excl. VIC)	Permitted for use in legume vegetables (field & protected) 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, field & protected) 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	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
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
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC	TBC		P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs and Caterpillars.		-
Tetraniliprole (Vayego 200 SC) 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	
Leafminers (*Liriomyza* spp.) **Priority: Unknown**								
Leafminers was not ranked as a pest in snow and sugar snap 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 for use in legume vegetables for suppression of **Liriomyza Leafminers** (*Liriomyza* spp.) including Vegetable & Serpentine Leafminer. Field cropping systems only. [Max. 2 applications per crop; re-treatment interval 7-14 d]	M H-Bees	-
Cyromazine (Diptex 150 WP) PER81867	17	Insect Growth Regulator	7 NG	A	ALL	Permitted for use in 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]	-	

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spinetoram (Success Neo) Corteva PER87878	5	Ingestion	3 G:14	A	ALL (excl. VIC)	Permitted for use in snow peas and sugar snap peas (field & protected) for control of **Vegetable Leafminer**. [Max 3 applications per crop; re-treatment interval: 7-14 d]	M Bee:H	-
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	-
Cyantraniliprole (Benevia) FMC	28	Ingestion		P		Permitted for control of **Liriomyza Leafminers** in bulb vegetables, fruiting vegetables and potatoes.	M Bee:VH	-
Tetraniliprole (Vayego 200 SC) 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 Snow peas and Sugar snap peas

4.3.1 Weed priorities

Common Name	Scientific Name
High	
Blackberry Nightshade	*Solanum nigrum*
Cleavers	*Galium aparine* L.
Fat Hen	*Chenopodium album*
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[6].

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

4.3.2 Available and potential products for weed control

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

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

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Blackberry Nightshade (*Solanum nigrum*) **Priority: High**							
Blackberry Nightshade was ranked as a moderate priority in VIC & TAS, and as a high priority in QLD. 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.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables/Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Bentazone-Sodium (Basagran) PER10976	C**	Snow peas, sugar snap peas / Post-emergent	Permitted for use in snow & sugar snap peas for control of broadleaf weeds including **Blackberry Nightshade**. Make first application at 2-3 node stage of crop. [Max. 2 applications per crop; re-treatment interval not specified]	28 NG	A	ALL (excl. VIC)	-
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]	28	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

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Cyanazine (Bladex 900 WG) PER10988	C**	Snow peas, sugar snap peas / Post-emergent	Permitted for use in snow & sugar snap peas for control of broadleaf weeds, including **Blackberry Nightshade**. [Max. 1 application per crop]	28 NG	A	ALL (excl. VIC)	R3
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) PER87865	D**	Sugar snap peas (Field) / Pre-emergent	Permitted for use in sugar snap peas (field) for control of grass and broadleaf weeds including suppression of **Blackberry Nightshade**. [max. 1 application per crop]	NR G:42	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		-
Dimethenamid-P (Outlook) BASF	K**		Registered for control of grass and broadleaf weeds, including **Blackberry Nightshade** in 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		-
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 **Blackberry Nightshade** in various crops and fallow situations. Compatible with glyphosate and diquat/paraquat.		P		-
Cleavers (*Galium aparine* L.) Priority: High							
Cleavers was ranked as a high priority in TAS. Germination occurs mainly in Autumn. Cleavers are a competitive weed and control with herbicides is difficult.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables/Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
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. Registered for control of **Cleavers** in pyrethrum.	NR	P-A	ALL (excl. VIC)	R3
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Fat Hen (*Chenopodium album*) **Priority: High**							
Fat Hen was ranked as a moderate priority in VIC & NSW and as a high priority in QLD. Herbicide control can be difficult and targeting weeds at early growth stages is critical.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables/Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Bentazone-Sodium (Basagran) PER10976	C**	Snow peas, sugar snap peas / Post-emergent	Permitted for use in snow & sugar snap peas for control of broadleaf weeds including **Fat Hen**. Make first application at 2-3 node stage of crop. [Max. 2 applications per crop; re-treatment interval not specified]	28 NG	A	ALL (excl. VIC)	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
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]	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 **Fat Hen**. [Max. 1 application per season]	NR	P	ALL (excl. VIC)	R3
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) PER87865	D**	Sugar snap peas (Field) / Pre-emergent	Permitted for use in sugar snap peas (field) for control of grass and broadleaf weeds including **Fat Hen**. [max. 1 application per crop]	NR G:42	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. **Fat Hen** is listed as susceptible.		P		-
Clomazone	Q**		Registered for control of broadleaf weeds, including **Fat Hen** in beans.		P		-
Dimethenamid-P (Outlook) BASF	K**		Registered for control of grass and broadleaf weeds, including **Fat Hen** in 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		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Ryegrass (*Lolium rigidum*) **Priority: High**							
Ryegrass was ranked as a high priority in TAS. 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.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables/Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
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]	28	A	ALL	-
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
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 **Annual Ryegrass**. [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 **Ryegrass**.	NR	A	ALL	R3
Glyphosate (Roundup) PER13901	M**	Snow & sugar snap peas / Shielded spray	Permitted for use in snow & sugar snap peas for control of grasses and broadleaf weeds, including **Ryegrass**.	NR	A	NSW & QLD	R3
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
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
Dimethenamid-P (Outlook) BASF	K**		Registered for control of grass and broadleaf weeds, including suppression of **Annual Ryegrass** in beans.		P		-
S-Metolachlor+ Prosulfocarb (Boxer Gold) Syngenta	J+K**	Potatoes / Pre-emergent weed control	Registered for control of **Ryegrass** in potatoes. Apply after planting, but no later than 25% potato shoot emergence. Hort Innovation is progressing to undertake the required studies in carrots for a label registration.		P		
Metribuzin	C**		Registered for control of grass and broadleaf weeds, including **Annual Ryegrass** in peas (not snow peas).		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**							
Wild Radish and Wild Turnip were ranked as a moderate priority in VIC, QLD & TAS. They are winter-growing weeds that compete aggressively with crops and run to seed quickly. Targeting early growth stages is critical.							
Bentazone-Sodium (Basagran) PER10976	C**	Snow peas, sugar snap peas / Post-emergent	Permitted for use in snow & sugar snap peas for control of broadleaf weeds including **Wild Radish** and **Wild Turnip**. Make first application at 2-3 node stage of crop. [Max. 2 applications per crop; re-treatment interval not specified]	28 NG	A	ALL (excl. VIC)	-
Cyanazine (Bladex 900 WG)	C**	Peas / Post-emergent	Registered in peas for control of broadleaf weeds, including **Wild Turnip**.	NR	A	TAS	R3
Cyanazine (Bladex 900 WG) PER10988	C**	Snow peas, sugar snap peas / Post-emergent	Permitted for use in snow & sugar snap peas for control of broadleaf weeds, including **Wild Turnip**. [Max. 1 application per crop]	28 NG	A	ALL (excl. VIC)	R3
Diflufenican (Brodal)	F**	Peas / Post-emergence	Registered in peas for control of broadleaf weeds, including **Wild Radish** and **Wild Turnip.**				

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
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 **Wild Radish**. [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 **Wild Turnip**.	NR	A	ALL	R3
Glyphosate (Roundup) PER13901	M**	Snow & sugar snap peas / Shielded spray	Permitted for use in snow & sugar snap peas for control of grasses and broadleaf weeds, including **Wild Turnip**.	NR	A	NSW & QLD	R3
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**. [Max no of applications not specified]	NR	A	ALL	R3
Pendimethalin (Stomp) PER87865	D**	Sugar snap peas (Field) / Pre-emergent	Permitted for use in sugar snap peas (field) for control of grass and broadleaf weeds including **Wild Radish**. [max. 1 application per crop]	NR G:42	A	TAS	-
Flumetsulam (Broadstrike)	B***		Registered for control of broadleaf weeds including **Wild Radish** and **Wild Turnip** in cereals and pulse crops.		P		-
Metribuzin	C**		Registered for control of grass and broadleaf weeds, including **Wild Radish** and **Wild Turnip** in peas (not snow peas).		P		-
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		-
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		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Amaranthus (*Amaranthus* spp.) **Priority: Moderate**							
Amaranthus was ranked as a moderate priority in VIC & QLD. It is a short-lived annual weed that can pose a problem every year as they are prolific seed producers.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
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]	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
Glyphosate (Roundup) PER13901	M**	Snow & sugar snap peas / Shielded spray	Permitted for use in snow & sugar snap peas for control of grasses and broadleaf weeds, including **Amaranthus**.	NR	A	NSW & QLD	R3
Paraquat + Diquat (SpraySeed)	L***	General seed bed preparation	General weeds as a pre-crop spray. for control of several broadleaf weeds including Marshmallow. [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
Pendimethalin (Stomp) PER87865	D**		Permitted for use in sugar snap peas for control of grass and broadleaf weeds including Chickweed, Fat Hen and Wireweed and suppression of various weeds including **Amaranthus**, Annual Nettles, Blackberry Nightshade, Sow Thistle, Fumitory, Nut Grass, Turnip Weed, Wild Radish and Winter Grass.	NR G:42	P-A	TAS	-
Clomazone	Q**		Registered for control of broadleaf weeds, including suppression of **Amaranthus** in beans.		P		-
Dimethenamid-P (Outlook) BASF	K**		Registered for control of grass and broadleaf weeds, including **Amaranthus** in beans.		P		-
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		-
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**							
Nutgrass was ranked as a moderate priority in VIC & QLD. 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]	28	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
Glyphosate (Roundup) PER13901	M**	Snow & sugar snap peas / Shielded spray	Permitted for use in snow & sugar snap peas for control of grasses and broadleaf weeds, including **Nutgrass**.	NR	A	NSW & QLD	R3
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**							
Fumitory was ranked as a moderate priority in QLD & TAS. 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-Sodium (Basagran) PER10976	C**	Snow peas, sugar snap peas / Post-emergent	Permitted for use in snow & sugar snap peas for control of broadleaf weeds including **Fumitory**. Make first application at 2-3 node stage of crop. [Max. 2 applications per crop; re-treatment interval not specified]	28 NG	A	ALL (excl. VIC)	-
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 **Fumitory**. [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 **Fumitory**.	NR	A	ALL	R3
Glyphosate (Roundup) PER13901	M**	Snow & sugar snap peas / Shielded spray	Permitted for use in snow & sugar snap peas for control of grasses and broadleaf weeds, including **Fumitory**.	NR	A	NSW & QLD	R3
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) PER87865	D**	Sugar snap peas (Field) / Pre-emergent	Permitted for use in sugar snap peas (field) for control of grass and broadleaf weeds including **Fumitory**. [max. 1 application per crop]	NR G:42	A	TAS	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
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	-
Metribuzin	C**		Registered for control of grass and broadleaf weeds, including **Fumitory** in peas (not snow peas).		P		-
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		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/F2020C00713
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 2018-19	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 snow peas and sugar snap peas
Appendix 2. Products available for control of insects and mites in snow peas and sugar snap peas
Appendix 3. Products available for weed control in snow peas and sugar snap peas
Appendix 4. Current permits for use in snow peas and sugar snap peas
Appendix 5. Snow peas and Sugar snap peas Maximum Residue Limits (MRLs)
Appendix 6. Snow peas and Sugar snap Peas Agrichemical Regulatory Risk Assessment

Appendix 1. Products available for disease control in snow peas and sugar snap 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 (Restricted use TAS, VIC, SA)	NR	-
Azoxystrobin (Amistar)	11	Snow peas & sugar snap 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 NE Soil Fumigant)	8	Soil fumigant	Soil borne fungi	ALL	NR	-
Chlorothalonil (Bravo) PER82895	M5	Snow peas & sugar snap peas (field)	Black Spot, Downy Mildew & Chocolate Spot	ALL (excl. VIC)	7 NG	R3
Copper Ammonium Acetate	M1	Peas / All types (field & protected)	Ascochyta Blight (*Ascochyta* spp.) and Bacterial Blight (*Pseudomonas syringae* pv. *pisi*)	ALL	1	-
Copper Oxychloride	M1	Peas / All types (field & protected)	Ascochyta Blight (*Ascochyta* spp.) and Bacterial Blight (*Pseudomonas syringae* pv. *Syringae*)	ALL	1	-
Copper PER14038	M1	Snow peas & sugar snap peas (field & protected)	Black Spot (*Ascochyta pisi* and *Mycosphaerella pinodes*) (leaf and pod spot), Bacterial Spot and Downy Mildew (*Peronospora viciae*)	ALL (excl. VIC)	1	-
Cyprodinil + Fludioxonil (Switch)	9+12	Snow peas & sugar snap peas (field & protected)	Grey Mould (*Botrytis cinerea*) and Sclerotinia (*Sclerotinia minor, S.sclerotium*)	ALL	14	R3
Dazomet (Basamid, Cerlong)	8F	Broadacre seed beds	Soil fungi (including *Fusarium* spp.), nematodes (cyst and non-cyst forming), soil insects and germinating seeds of weeds	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Dimethomorph + Mancozeb (Acrobat + Mancozeb) PER14470	40 + M3	Snow peas (field & protected)	Downy Mildew	ALL (excl. VIC)	7 NG	R2
Fenhexamid (Teldor)	17	Snow Peas & Sugar Snap Peas (field & protected)	Grey Mould (*Botrytis cinerea*) & Chocolate Spot (*Botrytis fabae*)	ALL	3 G:3	-
Iodine	-	Legumes / Post-Harvest Sanitiser	Bacteria & Fungi	ALL	NR	-
Iprodione (Rovral) PER81589	2	Snow peas & sugar snap peas (field)	Sclerotinia Rot, Grey Mould, & Alternaria Leaf Spot	ALL (excl. VIC)	7	R2
Mancozeb	M3	Snow peas & sugar snap peas (field)	Anthracnose, Rust & suppression of Leaf Blight (*Ascochyta fabae)*	ALL	7	R2
Metalaxyl-M + Mancozeb (Ridomil Gold MZ) Syngenta PER82456	4+M3	Snow peas & sugar snap peas (field)	Downy Mildew	ALL (excl. VIC)	14	R2
Metham Sodium	-	Field crops	Nematodes, various weeds and fungal diseases	ALL	NR	-
Potassium Bicarbonate (Ecocarb) PER13695	M2	Snow peas & sugar snap peas (field & protected)	Powdery Mildew	ALL (excl. VIC)	NR	-
Pyrimethanil (Scala) Bayer PER14505	9	Snow peas & sugar snap peas (field & protected)	Grey Mould (*Botrytis cinerea*)	ALL (excl. VIC)	3	-
Spiroxamine (Prosper 500EC) Bayer PER11764	5	Snow peas & sugar snap peas (field & protected)	Powdery Mildew	ALL (excl. VIC)	14	-
Sulphur	M2	Vegetables (field & protected)	Powdery Mildew & Bean Rust	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Tebuconazole	3	Peas (all types) (field)	Powdery Mildew	ALL	3	R3
Zineb	M3	Snow peas & sugar snap peas (field)	Downy Mildew	ALL	3	R2

Appendix 2. Products available for control of insects and mites in snow peas and sugar snap 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	6	Snow peas & sugar snap peas (field)	Two Spotted Mites & Tomato Red Spider Mite	ALL	1 G:2	-
Abamectin (Vertimec) 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 & Two-Spotted Spider Mites.	ALL	NR	-
Bifenazate (Acramite) UPL PER80558	20D	Snow peas & sugar snap peas (field & protected)	Two Spotted Mite, Red Tomato Spider Mite, European Red Mite & Bryobia Mite	ALL (excl. VIC & NT)	3	-
Chlorantraniliprole (Coragen) FMC	28	Snow peas & sugar snap peas (field)	Cotton Bollworm & Native Budworm	ALL	1	-
Chlorantraniliprole (Coragen) FMC PER89259	28	Legume vegetables (field)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	1	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Chlorpyrifos (Lorsban)	1B	Peas	Wingless Grasshopper	NSW, VIC, TAS, SA and WA	NR G:2	R1
			Cutworm	ALL		
			Field Crickets, Moles Crickets	QLD & WA		
			Vegetable Weevil	NSW & WA		
Chlorpyrifos (Lorsban) PER14583	1B	Snow peas & sugar snap peas (field)	African Black Beetle, False Wireworms, Wireworms, Vegetable Weevil	ALL (excl. VIC)	NR	R1
Cyromazine (Diptex) PER81867	17	Legume vegetables (field & protected)	*Liriomyza* spp.	ALL	7	-
Diazinon	1B	Peas / all types (field)	Caterpillars & Cutworms	ALL (excl. VIC)	14	R3
Emamectin (Proclaim Opti) Syngenta	6	Snow Peas & Sugar Snap Peas	Heliothis (*Helicoverpa* spp.), Cluster Caterpillar (*Spodoptera litura*) & Loopers (*Chrysodeixis* spp.)	ALL	3 G:21	-
Emamectin (Proclaim Opti) Syngenta PER89263	6	Legume vegetables (field & protected)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	3	-
Etoxazole (Paramite) Sumitomo PER82460	10B	Snow peas & sugar snap peas (field)	Two Spotted Mite & Tomato Red Spider Mite	ALL (excl. VIC))	14	-
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	Snow peas & sugar snap peas (field & protected)	Cotton Bollworm / Corn Earworm (*Helicoverpa armigera*) & Tobacco Budworm / Native Budworm (*Helicoverpa punctigera*)	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Hexythiazox (Calibre) Nufarm PER14765	10A	Snow peas & sugar snap peas (field & protected)	Two-Spotted Mite	ALL	14	-
Imidacloprid (Confidor) PER10938	4A	Snow peas & sugar snap peas (field)	Green Peach Aphid & Greenhouse Whitefly	ALL (excl. VIC)	7 NG	R2
Iron EDTA Complex (Eradicate Snail)	-	All plants	Snails & slugs	ALL	NR	-
Lambda-Cyhalothrin (Karate Zeon) Syngenta PER14033	3A	Snow peas & sugar snap peas (field & protected)	Pasture Webworm, Cutworm, Rutherglen Bug & Thrips	ALL (excl. VIC)	2 G:7	-
Metaldehyde	-	Vegetables	Snails & slugs	ALL	7	-
Methomyl (Lannate) PER82428	1A	Snow peas & sugar snap peas (field)	Helicoverpa, Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug & Thrips Including Western Flower Thrips	ALL	3	R2
Methomyl (Lannate) PER89263	1B	Snow peas & sugar snap peas (field)	Fall Armyworm	ALL	3	R2
Methoxyfenozide (Prodigy) Corteva PER80954	18	Snow peas & sugar snap peas (field)	*Helicoverpa* spp. (Native Budworm, Tomato Grub/Corn Earworm) & Cluster Caterpillar	ALL (excl. VIC)	3	-
Petroleum Oil PER12221	UN	Snow peas & sugar snap peas (field & protected)	Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug, and Thrips	ALL (excl. VIC)	1	-
Pirimicarb (Pirimor)	1A	Peas / all types (field)	Aphids	ALL	2	R3

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Potassium Salts of Fatty Acids (Natrasoap)	3A	Vegetables (field & protected)	Aphids, Thrips, Mealybug, Two Spotted Mite, Spider Mite and Whitefly	ALL	NR	
Propargite (Omite)	12C	Vegetables (field)	Two Spotted Mites (All states) & Spider Mites (QLD and WA only)	Variable	7	R3
Pymetrozine (Chess) Syngenta PER14892	9B	Snow peas & sugar snap peas (field)	Cowpea Aphid, Pea Aphid and Potato Aphid	ALL (excl. VIC)	14 NG	R3
Pyrethrins (Pyganic) Sumitomo	3A	Vegetables (field)	Aphids, Thrips, Caterpillars, Ants, Earwigs, White Flies and Leafhoppers	ALL	1	-
Pyrethrins + Piperonyl Butoxide	3A	Vegetables (field)	Aphids, Thrips, Caterpillars, Ants, Flies, Earwigs, Whitefly and Leafhoppers	ALL	1	-
Spinetoram (Success Neo) Corteva	5A	Legume vegetables (field & protected)	Caterpillars (Heliothis and Loopers) & Western Flower Thrips	ALL	3	-
Spinetoram (Success Neo) Corteva PER87878	5	Snow peas & sugar snap peas (field & protected)	Vegetable Leafminer	ALL (excl. VIC)	3 G:14	-
Spinetoram (Success Neo) Corteva PER89241	5	Legume vegetables (field & protected)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	1	
Spinosad (Entrust Organic) Corteva	5	Snow peas & sugar snap peas (field & protected)	Loopers, *Helicoverpa* & Western Flower Thrips	ALL	3	-
Spinosad (Entrust Organic) Corteva PER89870	5	Legume vegetables / (succulent seeds & immature pods) (Protected)	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	3 G:14	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spinosad (Entrust Organic) Corteva PER90928	5	Legume Vegetables (field & protected)	Vegetable Leaf Miner (*Liriomyza sativae*) Pea Leaf Miner / Serpentine Leaf Miner (*Liriomyza huidobrensis*) American Serpentine Leaf Miner (*Liriomyza trifolii*)	ALL (excl. VIC)	3 G:14	-
Spirotetramat (Movento) Bayer	23	Snow peas & sugar snap peas (field & protected)	Green Peach Aphid and Silverleaf Whitefly	ALL	3	-
Spirotetramat (Movento) Bayer PER88640	23	Snow peas & sugar snap peas (field & protected)	Liriomyza Leafminers (*Liriomyza* spp.)	ALL (excl. VIC)	1	-
Spodoptera frugiperda Multiple Nucleopolyhedrovirus (Fawligen) AgBiTech PER90820	31	Legume Vegetables	Fall Armyworm (*Spodoptera frugiperda*)	ALL	NR	-
Sulphur	UN	Vegetables (field & protected)	Tomato Russet Mite and Two Spotted Mite	Variable. Refer to label.	NR	-
Trichlorfon (Lepidex)	1B	Peas/all types (field)	Cutworm	QLD & NT	2	R2
Trichlorfon (Lepidex)	1B	Vegetables (field)	Cabbage White Butterfly, Cabbage Moth, Green Vegetable Bug, and Rutherglen Bug	ALL	2	R2

Appendix 3. Products available for weed control in snow peas and sugar snap 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 (Restricted use TAS, VIC, SA)	-
Bentazone-sodium (Basagran) PER10976	C**	Snow peas & sugar snap peas	Broadleaf Weeds	28 NG	ALL (excl. VIC)	-
Chlorthal-Dimethyl (Dacthal)	D**	Peas / All types	Grass and Broadleaf Weeds	NR	ALL (excl. NSW)	-
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
Cyanazine (Bladex 900 WG) PER10988	C**	Snow peas, sugar snap peas	Broadleaf Weeds	28 NG	ALL (excl. VIC)	R3
Diflufenican	F**	Snow Peas, Sugar Snap Peas	Broadleaf Weeds	NR	NSW, ACT, VIC, SA, WA & TAS	-
Glufosinate (Basta) BASF PER88349	N**	Snow peas, sugar snap peas / Post-emergent	Weeds listed on product label including Amaranthus, Bindweed, Fat Hen, Annual Rye Grass, Fumitory, Pigweed & Wild Radish	NR	ALL (excl. VIC)	R3
Glyphosate (Roundup)	M**	General knockdown	Grass and Broadleaf Weeds as a pre-crop spray	NR	ALL	R3
Glyphosate (Roundup) PER13901	M**	Snow & sugar snap peas / Shielded spray	Grass and Broadleaf Weeds	NR	NSW & QLD	R3

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 Xtra) PER87865	D**	Sugar snap peas (Field) / Pre-emergent	Grass and Broadleaf Weeds including Chick Weed, Fat Hen and Wireweed and suppression of various weeds including Annual Nettles, Blackberry Nightshade, Sow Thistle, Fumitory, Turnip Weed, Wild Radish and Winter Grass.	NR G:42	TAS	-
Trifluralin	D**	Peas (all types)	Grass and broadleaf weeds including Amaranthus, Fat Hen, Pigweed, Wireweed and Annual Ryegrass	NR	ALL	-

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

Appendix 4. Current permits for use in snow peas and sugar snap 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
PER10976 Version 4	Bentazone-sodium (Basagran) / Snow peas and sugar snap peas / Broadleaf weeds	10-Aug-09	31-Mar-25	Hort Innovation
PER80558 Version 3	Bifenazate (Acramite) / Snow peas and Sugar snap peas / Two spotted mite, Red tomato spider mite, European red mite, Bryobia mite	10-Nov-15	30-Jun-25	Hort Innovation
PER89259	Chlorantraniliprole (Coragen) / Legume vegetables / Fall Armyworm	06-Mar-20	31-Mar-23	Hort Innovation
PER82895 Version 2	Chlorothalonil (Bravo) / Garden peas (WA only), snow peas, and sugar snap peas / Black spot, Downy mildew & Chocolate spot	4-Aug-17	31-Aug-25	Hort Innovation
PER14583 Version 4	Chlorpyrifos (Lorsban) / Snow peas & sugar snap peas / African black beetle, false wireworms, wireworms, vegetable weevil (field only)	1-Apr-14	31-Oct-21	Hort Innovation
PER82459	Clethodim (Select) / Peas, fresh and processing / Various grass weeds	19-Apr-17	30-Sep-21	Hort Innovation
PER14038 Version 2	Copper (Copper Oxychloride / Cuprous Oxide / Cupric Hydroxide) / Snow peas, sugar snap peas / Various diseases	1-Apr-13	30-Sep-23	Hort Innovation
PER10988 Version 4	Cyanazine (Bladex 900 WG) / Snow peas and sugar snap peas / Broadleaf weeds	1-Apr-15	31-Mar-25	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
PER82460 Version 2	Etoxazole (Paramite) / Snow peas, Sugar snap peas / Two spotted mite &Tomato Red spider mite (field only)	26-Jul-17	31-Jul-23	Hort Innovation
PER88349	Glufosinate-Ammonium (Basta) / Capsicums, Snow peas and Sugar snap peas / Broadleaf weeds & grasses as per label	17-Apr-20	30-Apr-25	Hort Innovation

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER13901 Version 4	Glyphosate / Snow peas & sugar snap peas / Annual and Perennial Grass and Broadleaf Weeds (shielded sprayer) (NSW & QLD only)	6-Apr-13	30-Jun-24	Hort Innovation
PER14765 Version 4	Hexythiazox (Calibre) / Various including Snow Peas & Sugar Snap Peas / Two-Spotted Mite	21-Feb-15	30-Sep-23	Hort Innovation
PER10938 Version 4	Imidacloprid (Confidor) / Snow peas & sugar snap peas / Green peach aphid & Greenhouse Whitefly	1-Jul-15	31-Jan-25	Hort Innovation
PER81589 Version 2	Iprodione (Rovral) / Snow peas, sugar snap peas / Sclerotinia rot, Grey mould,	21-Sep-16	31-Oct-21	Hort Innovation
PER14033 Version 2	Lambda-cyhalothrin (Karate Zeon) / Snow Peas and Sugar Snap Peas / Pasture Webworm, Cutworm, Rutherglen Bug & Thrips	1-Jun-13	31-May-23	Hort Innovation
PER14470 Version 2	Mancozeb (Dithane) + Dimethomorph (Acrobat) / Snow peas / Downy Mildew	01-May-14	30-Apr-22	Hort Innovation
PER82456 Version 2	Mancozeb + Metalaxyl-M (Ridomil Gold MZ) / Snow peas & sugar snap peas / Downy Mildew (field only)	27-Jun-17	31-Jul-25	Hort Innovation
PER82428 Version 4	Methomyl / Various including Snow & sugar snap peas / 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 Snow peas & Sugar snap peas / Fall Armyworm (field only)	10-Apr-20	30-Apr-23	Hort Innovation
PER80954 Version 2	Methoxyfenozide (Prodigy) / Snow peas & sugar snap peas / Helicoverpa spp. & Cluster caterpillar	1-Oct-15	31-Jul-25	Hort Innovation
PER87865	Pendimethalin (Stomp Xtra) / Sugar snap peas / Annual grasses and broadleaf weeds (TAS only)	26-Sep-19	30-Sep-22	Simplot Australia
PER12221 Version 4	Petroleum oil / Snow peas and sugar snap peas / Aphids, Green mirid, Green vegetable bug, Grey cluster bug, Leafhoppers, Mites, Rutherglen bug and Thrips	29-Jun-12	30-Nov-22	Hort Innovation

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER13695 Version 3	Potassium bicarbonate (Ecocarb) / Various vegetables including snow peas and sugar snap peas / Powdery mildew	31-Oct-12	31-Jul-25	Hort Innovation
PER14892 Version 4	Pymetrozine (Chess) / Snow peas & sugar snap peas / Cowpea aphid, Pea aphid & Potato aphid (field only)	06-Jan-15	31-May-22	Hort Innovation
PER14505 Version 4	Pyrimethanil (Scala) / Snow peas & Sugar snap peas / Grey Mould (*Botrytis cinerea*)	1-Jul-14	30-Jun-24	Hort Innovation
PER87878	Spinetoram (Success Neo) / Snow Peas & Sugar Snap Peas / Leafminers (*Liriomyza* spp.)	11-Feb-20	28-Feb-23	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
PER88640	Spirotetramat (Movento 240 SC) / Snow Peas, Sugar Snap Peas, Lettuce (Head lettuce and Leafy lettuce), Parsley, Green Beans, Celery, Rhubarb, Eggplant, Capsicums, Chilies & Tomatoes / Liriomyza leafminers (*Liriomyza* spp.)	18-May-20	31-May-23	Hort innovation
PER11764 Version 4	Spiroxamine (Prosper 500EC) / Snow peas & sugar snap peas / Powdery mildew	1-Jul-15	31-Dec-21	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. Snow Pea and Sugar Snap 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 0538 Podded pea (young pods) (Snow and Sugar snap)
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 the most countries defers to Codex, followed by EU MRL standards or applies 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
1,3-dichloropropene		Soil fumigant / MRLs not required	NR	
2,4-D	VP0060	Legume vegetables	*0.05	
Abamectin	VP0063	Peas (pods and succulent = immature seeds)	T0.5	
Acifluorfen	VP0060	Legume vegetables	0.1	-
Aldrin and Dieldrin	VP0060	Legume vegetables	-	0.05
Azoxystrobin	VP0060	Legume vegetables	3	3
Bifenazate	VP0060	Legume vegetables	-	7
Bentazone	VP0063	Peas (pods and succulent=immature seeds)	-	1.5
	VP0538	Podded pea (young pods) [snow and sugar snap]	T0.05	-
Bifenazate	VP0538	Podded pea (young pods) [snow and sugar snap]	T1	7
Bifenthrin	VP0063	Peas (pods and succulent=immature seeds)	*0.01	0.9
Boscalid	VP0060	Legume vegetables	3	3
Butroxydim	VP0060	Legume vegetables	*0.01	-
Chlorantraniliprole	VP0060	Legume vegetables	1	-
	VP0063	Peas (pods and succulent=immature seeds)		2
	VP0064	Peas, shelled (succulent seeds)	-	0.05
Chloropicrin			NA	NA
Chlorothalonil	VP0063	Peas (pods and succulent=immature seeds)	10	
Chlorpyrifos		Vegetables	T*0.01	0.01
Chlorthal-dimethyl		Vegetables (except lettuce)	5	
Clethodim	VP0063	Peas (pods and succulent=immature seeds)	T0.7	
Clothianidin	VP0060	Legume vegetables	-	0.01
Cyanazine	VP0063	Peas	0.02	-
	VP0538	Podded pea (young pods) [snow and sugar snap]	T0.05	-
Cyantraniliprole	VP0063	Peas (pods and succulent=immature seeds)	-	2
	VP0064	Peas, shelled (succulent seeds)	-	15
Cyfluthrin	VP0060	Legume vegetables	0.5	-
Cyhalothrin (includes lambda-cyhalothrin)	VP0060	Legume vegetables	0.1	0.2

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Cypermethrins (including alpha- and zeta- cypermethrin)	VP0060	Legume vegetables	-	0.7
	VP0063	Peas	1	-
Cyprodinil	VP0063	Peas (pods and succulent=immature seeds)	0.5	-
Cyromazine	VP0060	Legume vegetables	T1	
Dazomet		Soil fumigant / MRLs not required	NR	
Deltamethrin	VP0060	Legume vegetables	0.1	0.2
Diclofop-methyl	VP0063	Peas	0.1	-
Difenoconazole	VP0063	Peas (pods and succulent=immature seeds)	-	0.7
Diflufenican	VP0063	Peas	0.05	-
Dimethoate	VP0063	Peas (pods and succulent=immature seeds)	-	1
	VP0060	Legume vegetables	T2	-
Dimethomorph	VP0063	Peas	1	-
Dimethenamid-P	VP0063	Peas	*0.02	-
Diquat	VP0063	Peas	0.1	-
Dithiocarbamate (mancozeb, metham, metiram, thiram, zineb and Ziram)	VP0063	Peas (pods and succulent = immature seeds)	2	-
Emamectin	VP0060	Legume vegetables	0.1	-
Etoxazole	VP0538	Podded pea (young pods) [snow and sugar snap]	T*0.02	-
Fenhexamid	VP0063	Peas (pods and succulent = immature seeds)	T5	-
Fenvalerate	VP0060	Legume vegetables	0.5	-
Fluazifop-p-butyl	VP0060	Legume vegetables	0.1	-
	VP0063	Peas (pods and succulent = immature seeds)		2
Flubendiamide	VP0060	Legume vegetables	-	2
Fludioxonil	VP0063	Peas (pods and succulent=immature seeds)	0.5	0.3
Flupyradifurone	VP0063	Peas (pods and succulent=immature seeds)	-	3
Fluxapyroxad	VP0063	Peas (pods and succulent=immature seeds)	-	2
Glufosinate and Glufosinate ammonium	VP0538	Podded pea (young pods) [snow and sugar snap]	T*0.05	-
Glyphosate	VP0060	Legume vegetables	*0.1	-
Haloxyfop	VP0063	Peas (pods and succulent=immature seeds)	-	0.7
Hexythiazox	VP0063	Peas	T*0.05	-
Imazethapyr	VP0060	Legume vegetables	*0.1	-
Imidacloprid	VP0063	Peas (pods and succulent=immature seeds)	-	5
	VP0538	Podded pea (young pods) [snow and sugar snap]	T0.2	-
Iprodione	VP0538	Podded pea (young pods) [snow and sugar snap]	T2	-
Iron EDTA Complex		MRLs not required	NR	
Maldison	VP 0060	Legume vegetables	2	-
MCPB	VP 0060	Legume vegetables	*0.02	-
Metalaxyl	VP 0538	Podded pea (young pods) [snow and sugar snap]	T0.1	-

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Metaldehyde		Vegetables	1	
Metham sodium	VP0063	Peas (pods and succulent = immature seeds)	2	-
Methidathion	VP0063	Peas (pods and succulent=immature seeds)	-	0.1
	VP0060	Legume vegetables	0.1	-
Methiocarb	VP0063	Peas (pods and succulent=immature seeds)	-	0.1
Methomyl	VP0060	Legume vegetables	1	-
	VP0063	Peas (pods and succulent=immature seeds)	-	5
Methoxyfenozide	VP0063	Peas (pods and succulent=immature seeds)	-	2
	VP0538	Podded pea (young pods) [snow and sugar snap]	T3	-
Metribuzin	VP0063	Peas [except Peas, shelled]	T*0.05	-
Oxathiapiprolin	VP0063	Peas (pods and succulent=immature seeds)	-	1
Paraquat		Vegetables (some exceptions)	*0.05	
Pendimethalin	VP0060	Legume vegetables	T0.2	-
Penthiopyrad	VP0063	Peas (pods and succulent=immature seeds)	-	3
Permethrin	VP0063	Peas	1	-
Petroleum oil		MRLs not required	NR	NR
Phosphine	VP0060	Legume vegetables	T*0.01	-
Piperonyl Butoxide		Vegetables	8	
Pirimicarb	VP0060	Legume vegetables	-	0.7
Potassium bicarbonate		MRLs not required	NR	
Potassium salts of fatty acids		MRLs not required	NR	
Procymidone	-	Snow peas	T5	
Propaquizafop	VP0063	Peas	*0.05	-
Propargite		Vegetables	3	
Pydiflumetofen	VP0060	Legume vegetables	T0.5	
Pymetrozine	VP0538	Podded pea (young pods) [snow and sugar snap]	0.3	
Pyraclostrobin	VP0063	Peas (pods and succulent=immature seeds)	-	0.02
Pyrethrins		Vegetables	1	
Pyrimethanil	VP0538	Podded pea (young pods) [snow and sugar snap]	T10	-
Saflufenacil	VP0063	Peas (pods and succulent=immature seeds)	-	0.01
	VP0060	Legume vegetables	*0.03	-
Sethoxydim	VP0063	Peas (pods and succulent=immature seeds)	T0.7	-
Spinetoram	VP0060	Legume vegetables	0.2	-
Spinosad	VP0060	Legume vegetables	-	0.3
	VP0063	Peas	0.5	-
Spirotetramat	VP0060	Legume vegetables	2	1.5
Spiroxamine	VP0538	Podded pea (young pods) [snow and sugar snap]	T*0.02	-
Sulphur		MRLs not required	NR	NR
Tebuconazole	VP0060	Legume vegetables	0.5	-
Terbutryn	VP0063	Peas	*0.1	-
Thiamethoxam	VP0060	Legume vegetables	-	0.01

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Tri-allate	VP0060	Legume vegetables	*0.05	-
Trichlorfon		Vegetables (some exceptions)	0.1	
Trifluralin		Vegetables	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)
NR - Uses of substances where MRLs are not necessary / required.
NA – MRLs are not in place.
T =Temporary MRL
E = The MRL is based on extraneous residues

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

Appendix 6. Snow pea and Sugar snap pea Agrichemical Regulatory Risk Assessment

Snow pea and Sugar snap pea
Agrichemical Regulatory
Risk Assessment

October 2020

Regulatory pressures on agrichemicals are increasing globally, with many being either restricted or withdrawn from use. For older agrichemicals these pressures are often the result of reconsiderations involving new or refined risk assessment methodologies that 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.

Snow pea & Sugar snap 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 proposing to set all MRLs to < 0.01 mg/kg	Hort Innovation data generation project ST17000 for **Afidopyropen** for registration
	Petroleum oil (PER12221)	-		
	Pirimicarb	**1A**	Codex: JMPR Periodic re-evaluation 2022/23	
Cowpea aphid	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Pymetrozine(PER14892)	**9B**	EU- Being phased out Codex: No registrant support	
Green peach aphid	Spirotetramat	**23**		
Pea aphid	Pymetrozine (PER14892)	**9B**	EU- Being phased out Codex: No registrant support	
Potato aphid	Pymetrozine (PER14892)	**9B**	EU- Being phased out Codex: No registrant support	
Beetles				
African black beetle	Chlorpyrifos (PER14583)	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR in 2021 Canada: Cancellation of most uses. EU: Cancellation of use USA:EPA decision to allow continued use	

Problem	Active Constituents	Chemical Group	Comment	Activities
False wireworm/wireworm	Chlorpyrifos (PER14583)	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR in 2021 Canada: Cancellation of most uses. EU: Cancellation of use USA:EPA decision to allow continued use	
Pea weevil	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 in 2021 Canada: Cancellation of most uses. EU: Cancellation of use USA:EPA decision to allow continued use	
Vegetable weevil	Chlorpyrifos	**1B**		
Lepidoptera				
Australian cabbage looper	Methomyl	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
Caterpillars	Diazinon	**1B**	EU: Deregistered Codex: To be reviewed by 2020/21.	
	Spinetoram	**5**		
Cluster caterpillar	Emamectin benzoate	**6**		
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
	Methoxyfenozide (PER80954)	**18**	EU: Candidate for substitution	

Problem	Active Constituents	Chemical Group	Comment	Activities
Cucumber moth	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
Cutworms	Chlorpyrifos	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR in 2021 Canada: Cancellation of most uses. EU: Cancellation of use USA:EPA decision to allow continued use	
	Diazinon	**1B**	EU: Deregistered Codex: To be reviewed by 2020/21.	
	Lambda-cyhalothrin (PER14033)	**3A**		
	Trichlorfon	**1B**	APVMA: nominated for review Codex: No MRLs Europe: deregistered US: No MRLs	
Fall armyworm	Chlorantraniliprole (PER89259)	**28**		
	Emamectin benzoate (PER89263)	**6**		
	Methomyl (PER89293)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
	Spinetoram (PER89241)	**5**		
	Spinosad (PER89870)	**5**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Helicoverpa species Native Budworm (*H. punctigera*) Corn earworm/Cotton bollworm (*H. armigera*)	Chlorantraniliprole	**28**		
	Emamectin benzoate	**6**		
	Helicoverpa NPV	**31**		
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
	Methoxyfenozide (PER80954)	**18**	EU: Candidate for substitution	
	Spinetoram	**5**		
	Spinosad	**5**		
Loopers	Deltamethrin	**3A**		
	Emamectin benzoate	**6**		
	Methidathion	**1B**	Codex: To be reviewed 2020/21. APVMA: Use will not be permitted in AU after 4 February 2021. EU: Deregistered USA: Deregistered	
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
	Spinetoram	**5**		
	Spinosad	**5**		
Pasture webworm	Lambda-cyhalothrin (PER14033)	**3A**		
Tomato grub	Methoxyfenozide (PER80954)	**18**	EU: Candidate for substitution	
Webworms	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	

Problem	Active Constituents	Chemical Group	Comment	Activities
Flies				
Bean fly	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
White fly				
Greenhouse whitefly	Imidacloprid (PER10938)	**4C**	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
Silverleaf (Poinsettia) whitefly	Spirotetramat	**23**		
Grasshoppers/Locusts				
Australian plague locust Migratory locust Spur-throated locust	Maldison	**1B**	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
	Chlorpyrifos	**1B**	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR in 2021 Canada: Cancellation of most uses. EU: Cancellation of use USA:EPA decision to allow continued use	
Black field crickets/Field crickets Mole crickets	Chlorpyrifos	**1B**		
Wingless grasshopper	Chlorpyrifos	**1B**		
	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
Jassids/Plant bugs				
Green mirid	Petroleum oil (PER12221)	**-**		
Green vegetable bug	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Methomyl	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
	Petroleum oil (PER12221)	-		
Grey cluster bug	Petroleum oil (PER12221)	**-**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Jassids	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
Leafhoppers	Dimethoate	**1B**		
	Petroleum oil (PER12221)	**-**		
Rutherglen bug	Lambda-cyhalothrin (PER14033)			
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
	Petroleum oil (PER12221)			
Mites				
Bryobia mite	Bifenazate (PER80558)	**20D**		Hort Innovation data generation project ST19020 for **spiromesifen** for label registration
European red mites	Bifenazate (PER80558)	**20D**		
Mites	Petroleum oil (PER12221)	**-**		
	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
Redlegged earth mite	Dimethoate	**1B**		
	Maldison	**1B**	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
	Omethoate	**1B**	Codex: No MRLs Canada: No approvals in place EU: No authorisations in place USA: No approvals in place	
Tomato red spider mite	Abamectin (PER14722)	**6**		
	Bifenazate (PER80558)	**20D**		
Two-spotted (Red spider) mite	Abamectin	**6**		
	Bifenazate (PER80558)	**20D**		
	Etoxazole	**10B**	EU: Uses restricted to greenhouse ornamentals only & Candidate for substitution	
	Hexythiazox (PER14765)	**10A**	Codex: No MRLs	

Problem	Active Constituents	Chemical Group	Comment	Activities
Thrips				
Thrips	Dimethoate	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Lambda-cyhalothrin (PER14033)	**3A**		
	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
	Petroleum oil (PER12221)	**-**		
Western flower thrips	Methomyl (PER82428)	**1A**	APVMA: nominated for review Canada: Majority of uses cancelled EU: No authorisations (Authorisation expired 31/8/19)	
	Spinetoram	**3A**		
	Spinosad	**5**		
Other				
Leafminer	Spinetoram (PER87878)	**5**		
	Spirotetramat (PER88640)	**23**		

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: Previously nominated for review Canada: Review recently completed; continued use considered acceptable Europe: Deregistered[i].	
Black spot	Copper (PER14038)	**M1**	EU: Candidate for substitution	
Bacterial blight/Spot	Copper (PER14038)	**M1**	EU: Candidate for substitution	
Blight	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Sulfur	**M2**		
Botrytis (Chocolate spot/Grey mould)	Azoxystrobin	**11**		
	Chlorothalonil (PER82895)	**M5**	APVMA: Nominated for review Canada: Review recently completed; continued use considered acceptable Europe: Deregistered.	
	Cyprodinil + fludioxonil	**9 + 12**	Cyprodinil: Canada: Currently under reviewed EU: Candidate for substitution Fludioxonil: EU: Currently under reviewed Candidate for substitution	

Problem	Active Constituents	Chemical Group	Comment	Activities
Botrytis (Chocolate spot/Grey mould)	Fenhexamid	**17**		
	Iprodione (PER81589)	**2**	Europe: Deregistered Canada: Majority of food crop uses deleted Codex: Review scheduled for 2022/23	
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Pyrimethanil (PER14505)	**9**		
Downy mildew	Chlorothalonil (PER82895)	**M5**	APVMA: Nominated for review Canada: Review recently completed; continued use considered acceptable Europe: Deregistration proposed.	
	Copper (PER14038)	**M1**	EU: Candidate for substitution	
	Dimethomorph + mancozeb (PER14470)	**40 + M3**	Mancozeb APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Metalaxyl-M (PER82456)	**4**	EU: Metalaxyl-M restricted use approval	
	Zineb	**M3**	APVMA: Nominated for review Codex: To be reviewed 2022/23 EU: No authorisation in place	
Leaf and pod spot	Copper (PER14038)	**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	

Problem	Active Constituents	Chemical Group	Comment	Activities
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	
	Potassium bicarbonate (PER13695)	**M2**		
	Spiroxamine (PER11764)	**5**		
	Tebuconazole	**3**	APVMA: Nominated for review EU: No authorisation in place	
	Triadimefon	**3**		
Rust	Mancozeb	**M3**	APVMA: Nominated for review Canada: Many uses cancelled Codex: To be reviewed 2022/23 EU: Authorisation not renewed	
	Sulfur	**M2**		
Sclerotinia rot	Boscalid	**7**		
	Cyprodinil + fludioxonil	**9 + 12**	Cyprodinil: Canada: Currently under reviewed EU: Candidate for substitution Fludioxonil: EU: Currently under reviewed Candidate for substitution	
	Iprodione (PER81589)	**2**	Europe: Deregistered Canada: Majority of food crop uses deleted Codex: Review scheduled for 2022	

Problem	Active Constituents	Chemical Group	Comment	Activities
WEEDS				
Broadleaf weeds and grasses	Bentazone (PER10976)	**C**		
	Chlorthal-dimethyl	**D**	EU: No authorisation in place	
	Clethodim	**A**	Codex: MRLs proposed for deletion	
	Cyanazine (PER10988)	**C**	APVMA: Nominated for review EU: No authorisation in place	
	Diclofop-methyl	**A**		
	Diquat	**L**	APVMA: Currently under review EU: No authorisation in place	
	Fluazifop-P	**A**		
	Glufosinate (PER88349)	**N**	EU: No authorisation in place	
	Glyphosate (PER13901)	**M**	Ongoing issues internationally	
	MCPA	**I**		
	MCPB	**I**		
	Pendimethalin (PER85447)	**D**	EU: Review outcome not positive	

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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