



Spinach and Silverbeet

Strategic Agrichemical Review Process
(SARP)

October 2026

Hort Innovation
Project – MT25005

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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 spinach and silverbeet industry across Australia. The information in this report will assist the industry with its agrichemical selection and usage into the future.

Date of report:

October 2026

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**Hort
Innovation**
Strategic levy investment

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FUND**

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1. Summary

The strategic levy investment project Vegetable Industry SARP Report Updates (MT25005) 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 spinach and silverbeet 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
Cercospora Leaf Spot	<i>Cercospora</i> spp.
Alternaria Leaf Spot	<i>Alternaria</i> spp.
Bacterial Leaf Spot	<i>Xanthomonas</i> spp.
Phoma Leaf Spot	<i>Phoma beta</i>

1.2 Insects and Mites

The high priority insects and mites are:

Common name	Scientific name
Vegetable Leafminer	<i>Liriomyza sativae</i>
Serpentine Leafminer	<i>Liriomyza huidobrensis</i>
American Serpentine Leafminer	<i>Liriomyza trifolii</i>
Spinach Crown Mite	<i>Tyrophagus similis</i>

1.3 Weeds

The high priority weeds are:

Common Name	Scientific Name
Fat Hen	<i>Chenopodium album</i>
Stinging Nettle	<i>Urtica</i> spp.
Amaranthus	<i>Amaranthus</i> spp.
Redshank	<i>Amaranthus retroflexus</i>
Wireweed	<i>Polygonum aviculare</i>
Pigweed	<i>Portulaca oleracea</i>

2. The Australian Spinach and Silverbeet Industry

The Australian Spinach and Silverbeet industry is a minor horticultural industry.

Production statistics are available for fresh English spinach, silverbeet and kale.

Fresh English spinach, silverbeet and kale are grown in all states, with the largest production in Victoria. They are grown year-round, with most of the crop being supplied to the fresh domestic market.

Production of Fresh English spinach, silverbeet and kale for the year ending June 2025¹ was 6,737 tonnes with a value of \$24.6m. A total of 5,742 tonnes (85%) went to the fresh domestic market, with 506 tonnes (8%) to fresh export, and 493 tonnes (7%) to processing. Production volume and value was stable for the period 2021-2025.

Fresh English Spinach/Silverbeet/Kale Seasonality by State

State	24/25 Tonnes	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Victoria	3,036												
Queensland	2,120												
New South Wales	854												
Western Australia	356												
Tasmania	279												
South Australia	91												
Availability Legend			High		Medium		Low		None				

Australia is a net exporter of fresh English spinach, silverbeet and kale. For the year ending June 2025, Australia exported 506 tonnes of fresh English spinach, silverbeet and kale. Of this export volume, 59.5% was destined for Malaysia, followed by Singapore (17.7%), Thailand (10.4%), Hong Kong (6.9%) and UAE (1.6%).

¹ Hort Innovation (2026). Australian Horticulture Statistics Handbook 2024/25. [online] Available at: <https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/>

3. Introduction

3.1 Background

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

Growers may face severe losses from diseases, pests and weeds due to a lack of registered or approved (via a permit) chemical control tools. Environmental concerns, consumer demands, and public opinion are also significant influences in the marketplace related to pest management practices. Industry IPM practitioners must strive to implement best management practices and tools to incorporate a pest management regime where strategies work in harmony with each other to achieve the desired effects while posing the least risks.

In combination with cultural practices, pesticides are important tools in spinach and silverbeet 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 spinach and silverbeet industry regarding pesticide access, Hort Innovation undertook a review of the pesticide requirements via a Strategic Agrichemical Review Process (SARP) in 2021. The current project is to update the SARP with the latest information and progress.

The SARP identifies diseases, insect pests and weeds of major concern to the spinach and silverbeet 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 spinach and silverbeet 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 spinach and silverbeet 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 Industry² which covers spinach and silverbeet 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.

² <https://ausveg.com.au/app/uploads/2018/06/Industry-Biosecurity-Plan-for-the-Vegetable-Industry.pdf>

environmental factors, host range, vectors), the likely consequences and the cost to industry of control measures.

3.2 Minor use permits and registration

From a pesticide access perspective, the APVMA classifies spinach and silverbeet as a minor crop. The crop fits within the APVMA Group 013 (Codex group VL0053): Leafy vegetables, within the subgroup 013A (Codex code VL2050): Leafy greens. Access to minor use permits can be achieved as long as reasonable justification is provided in accordance with the APVMA's minor use guidance³.

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 and commercial arguments are required to justify any new permit applications. Another option for the spinach and silverbeet industry is for manufacturers to register new pesticides uses in the crop.

³ <https://apvma.gov.au/node/10931>

3.3 Methods

The current update of the Spinach and Silverbeet Strategic Agrichemical Review Process (SARP), which was last updated in 2021, was conducted by desktop audit using industry information gathered through consultation with growers, agronomists and industry bodies, as well as review current information related to pesticide use in the industry. The process included gathering, collating and confirming information:

Hort Innovation Project Reference	Process of Review - Activity
MT25005 - Vegetable Strategic Agrichemical Review Process (SARP) Report Updates	Engagement and consultation with growers and other relevant stakeholders, in conjunction with AUSVEG. Including small group workshops and one on one consultation nationally. Collation of information collected by commodity on applicable pests, diseases and weeds in order of priority.
MT24008 – Regulatory Support & Response Co-ordination (pesticides) DTS Pty Ltd	Spinach and Silverbeet 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 MT24008 to highlight the regulatory threats to agrichemicals currently approved for the management of the pests and diseases in Spinach and Silverbeet as well as current initiatives aimed at addressing identified pest management deficiencies.
MT25005 – 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 MT24008 Regulatory Support & Response Co-ordination (pesticides) – DTS Pty Ltd. 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 spinach and silverbeet
- Appendix 2. Products available for control of insects and mites in spinach and silverbeet
- Appendix 3. Products available for weed control in spinach and silverbeet
- Appendix 4. Current permits for use in spinach and silverbeet
- Appendix 5. Spinach and silverbeet Maximum Residue Limits (MRLs)
- Appendix 6. Spinach and silverbeet Agrichemical Regulatory Risk Assessment

4. Diseases, Pests and Weeds of Spinach and Silverbeet

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 website⁴.

In Chapter 4 information on regulatory risk derived from project MT24008 (Regulatory support and response coordination) has been incorporated.

Some of the suggested options have no overseas MRLs (see Appendix 5). Some importing countries may defer to MRLs established by the Codex Alimentarius Commission (Codex MRLs) but this cannot be automatically assumed.

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

⁴ <https://www.croplife.org.au/resources/programs/resistance-management/>

4.1 Diseases of spinach and silverbeet

4.1.1 Disease priorities

Common name	Scientific name
High	
Cercospora Leaf Spot	<i>Cercospora</i> spp.
Alternaria Leaf Spot	<i>Alternaria</i> spp.
Bacterial Leaf Spot	<i>Xanthomonas</i> spp.
Phoma Leaf Spot	<i>Phoma beta</i>
Moderate	
Damping Off	<i>Pythium</i> spp., <i>Phytophthora</i> spp., <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp.
Sclerotinia Rot	<i>Sclerotinia</i> spp.
Downy Mildew	<i>Peronospora</i> spp.
Powdery Mildew	<i>Erysiphe betae</i>
Rust	<i>Uromyces betae</i>
Low	
Anthraxnose	<i>Colletotrichum</i> spp.
Grey Mould	<i>Botrytis cinerea</i>

The high priority diseases in spinach and silverbeet are Cercospora Leaf Spot, Alternaria Leaf Spot, Bacterial Leaf Spot and Phoma Leaf Spot. Available and potential products for controlling diseases of spinach and silverbeet are listed in Section 4.1.2.

Foliar diseases should be managed using a planned disease management strategy incorporating cultural measures as well as strategic use of fungicides.

Resistance Management

CropLife Australia has resistance management strategies⁵ related to the control of diseases in various crops, and users should refer to those strategies before using any product.

⁵ <https://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 risk: Critical concern over retaining access < 1 year
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term risk: Maintaining access of significant concern <2-5 years
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required < 5 years
		R4	No current risk / concerns
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	
Grazing	G	No Grazing Permitted	
		NR	NG

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Cercospora Leaf Spot (<i>Cercospora</i> spp.) Priority: High Cercospora Leaf Spot is rated as a high priority. Infection is favoured by warm, humid conditions and is exacerbated by close plant spacings and overhead irrigation. It survives between crop cycles in residues, weed hosts and on seed, and can spread in the field by wind, rain splash and on people and machinery. Control measures should include the use of disease-free planting material, plant populations, irrigation management and general farm hygiene in conjunction with a planned fungicide program.							
Mancozeb	M3	Protectant	14	A	ALL	Registered in silverbeet & spinach for control of Cercospora Leaf Spot and Downy Mildew. Apply as a foliar spray at first sign of disease. Use a retreatment interval of 7-10 days. Maximum number of applications per crop not specified.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Propiconazole (Tilt) PER14479	3	Protectant & Curative	7 NG	A	ALL (excl. VIC)	Permitted in spinach for control of Leaf Spot (<i>Cercospora</i> spp.) Apply as a foliar spray when disease symptoms are first observed. Use a retreatment interval of 14 days. Maximum of 5 applications per crop, with no more than 3 consecutive applications. Permitted in silverbeet for suppression of Leaf Spot (<i>Cercospora beticola</i>), Powdery Mildew (<i>Erysiphe polygoni</i>) and Rust (<i>Uromyces betae</i>). Apply as a foliar spray when conditions favour disease development or when disease symptoms are first observed. Use a minimum retreatment interval of 10 days. Maximum of 2 applications per crop.	R3
Copper	M1	Protectant	1	P-A	ALL	Registered in spinach and silverbeet for control of Downy Mildew. Registered for control of Cercospora spp. in bananas, fig and celery.	R4
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant	3 NG	P-A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Grey Mould (<i>Botrytis cinerea</i>) and White Mould (<i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i>). US registration for control of Cercospora in brassicas, carrots, cucurbits, stalk vegetables and root and tuber vegetables.	R4
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of <i>Botrytis</i> in grapes and strawberries. US registration for control of Cercospora in leafy vegetables, sugar beet and tobacco.	R4
Florylpicoxamid (Verpixo Adavelt) Corteva	21	Protectant & Curative		P		Registered for control of various diseases in cucurbits, capsicum, chilli, eggplant, okra, tomato, lettuce and strawberry. Pending US registration for control of Cercospora in sugar beet.	R4
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 a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, <i>Botrytis</i> , <i>Cladosporium</i> , Cercospora , <i>Sclerotinia</i> and Anthracnose in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of various leaf diseases in almonds, pome fruit, stone fruit and tropical and sub-tropical fruit (inedible peel). US registration for control of Cercospora in peanuts and sugarbeet.	R4
Hydrogen Peroxide + Peroxyacetic Acid (Peratec Plus)	M	Protectant		P		Registered for control of Cercospora Leaf Spot (<i>Cercospora</i> spp.) in celery.	R4
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative		P		Registered for control of Black Spot in apples and Powdery Mildew in grapes. US registration for control of Cercospora in corn, legume vegetables, peanuts, sorghum, millet, soybean and sugar beet.	R4
Pydiflumetofen + Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant		P		Registered for control of Cercospora Leaf Spot in fruiting vegetables, cucurbits, root vegetables and celery.	R3
Tebuconazole + Azoxystrobin (Veritas) Adama	3+11	Protectant		P		Registered for control of Cercospora Leaf Spot in faba beans and broad beans.	R4
Alternaria Leaf Spot (<i>Alternaria</i> spp.)							
Priority: High							
Alternaria Leaf Spot is rated as a high priority. Infection is favoured by warm, humid weather. A disease management program should include crop rotation, irrigation management, plant spacing to promote airflow, general farm hygiene and a planned fungicide program.							
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Protectant	3 NG	A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Downy Mildew (<i>Hyaloperonospora</i> spp., <i>Peronospora</i> spp.) and suppression of Alternaria Leaf Spot (<i>Alternaria</i> spp.) and Sclerotinia Rot (<i>Sclerotinia</i> spp.) Apply as a foliar spray before appearance of disease symptoms. Use a retreatment interval of 7-14 days. Maximum of 3 applications per crop.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Chlorothalonil (Bravo) PER82895	M5	Protectant	7	A	ALL (excl. VIC)	Permitted in spinach & silverbeet for control of Downy Mildew, Alternaria Leaf Blight (<i>Alternaria</i> spp.) and Grey Mould (<i>Botrytis cinerea</i>). Apply as a foliar spray when conditions are favourable for disease development. Use a minimum retreatment interval of 7-10 days. Maximum number of applications per crop not specified.	R2
Copper	M1	Protectant	1	P-A	ALL	Registered in spinach and silverbeet for control of Downy Mildew. Registered for control of Alternaria spp. in carrots and potatoes.	R4
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant	3 NG	P-A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Grey Mould (<i>Botrytis cinerea</i>) and White Mould (<i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i>). Registered for control of Alternaria spp. in potatoes.	R4
<i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered in grapes and strawberries for control of Botrytis, in tomatoes, capsicums and chillies for suppression of Bacterial Spot and in avocado, other tropical fruit crops (excluding banana) and mango for control of Anthracnose and suppression of Stem End Rot. US registration for control of Alternaria in berries, brassica vegetables, citrus, bulb vegetables, herbs/spices, root/tuber and corm vegetables, stone fruit and tree nuts.	R4
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapevines and strawberries. US registration for control of Alternaria in artichoke, asparagus, berries, brassica leafy vegetables, bulb vegetables, citrus, cucurbits, pome fruit, stone fruit and tobacco.	R4
Florylpicoxamid (Verpixo Adavelt) Corteva	21	Protectant & Curative		P		Registered for control of Target Spot (Alternaria solani) in capsicum, chilli, eggplant, okra and tomato.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of Alternaria , Black Spot and Powdery Mildew in apples, Black Spot in pears, Blossom Blight, Brown Rot, Hull Rot, Shot Hole and Rust in stone fruit, and various leaf diseases in tropical fruits. US registration for control of Alternaria in almond, Brassica vegetables, Brassica leafy vegetables, carrot, citrus, pome fruit, small vine climbing fruit except kiwi fruit, leafy greens, cucurbits, tree nuts, fruiting vegetables & root vegetables except sugar beet.	R4
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Registered for control of Alternaria Leaf Spot, Black Spot, Brown Rot Nut Scab, Shot Hole and Rust in almond, Brown Rot in cherries and Husk Spot in macadamia. US registration for control of Alternaria Leaf Blight , Powdery Mildew, Anthracnose, Cercospora Leaf Spot, Gummy Stem Blight, Microdochium Blight, Target Leaf Spot and suppression of Downy Mildew in cucurbits.	R4
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative		P		Registered for suppression of Alternaria (<i>Alternaria mali</i>) in apples.	R4
Pydiflumetofen + Difenconazole (Miravis Duo) Syngenta	7+3	Protectant		P		Registered for control of Alternaria spp. in fruiting vegetables, cucurbits and root vegetables.	R3
Bacterial Leaf Spot (<i>Xanthomonas</i> spp.) Priority: High Bacterial Leaf Spot is rated as a high priority. Infection is favoured by cool, wet or humid conditions. The disease spreads through infected seed, crop residues or water splash. A disease management program should include disease-free planting material, crop rotation, irrigation management and general farm hygiene. Fungicides can be used but their effectiveness is limited.							
Copper	M1	Protectant	1	P-A	ALL	Registered in spinach and silverbeet for control of Downy Mildew. Registered for control of Xanthomonas spp. in mangoes, stone fruit, brassicas, capsicums, cucurbits, lettuce and tomatoes.	R4

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		US registration for control of various bacterial diseases in brassica leafy vegetables, citrus, cucurbits, low growing berries, bulb onion, pepper, pome fruit and tomato.	R4
<i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for suppression of Bacterial Spot in tomatoes, capsicums and chillies.	R4
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapevines, strawberries and berries. US registration for control of bacterial diseases in root & tuber vegetables (except sugar beet), tree nuts, berries, fruiting vegetables, leafy vegetables and stone fruit.	R4
Phoma Leaf Spot (<i>Phoma beta</i>) Priority: High Phoma Leaf Spot is rated as a high priority. Infection is favoured by cool, humid conditions and it is spread through infected seed, or in crop via wind, water splash and machinery. Management should include use of disease-free planting material, irrigation management and general farm hygiene. Fungicide options are limited.							
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant	7	P-A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Sclerotinia (<i>Sclerotinia minor</i> , <i>S.sclerotiorum</i>). Registered for control of Phoma spp. in pyrethrum.	R4
Fludioxonil + Sedaxane (Vibrance Premium) Syngenta	12+7	Seed Dressing		P		Registered as a seed treatment for control of Phoma spp. in potatoes.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Damping Off (<i>Pythium</i> spp., <i>Phytophthora</i> spp., <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp.) Priority: Moderate Damping Off is rated as a moderate priority. Symptoms of Damping Off consist of poor seed germination, pre-emergence and death of seedlings, post-emergence death of newly emerged seedlings, stunted plants, yellowed lower leaves, general poor growth, wilting, and eventual collapse and death of older plants. Roots of infected plants can appear water-soaked or brown to black in colour. In severe cases, nearly all roots may be girdled or rotted off. While all stages of spinach and silverbeet can be infected by root rot organisms, newly emerging plants and young seedlings are very susceptible. Control options are limited and include the use of crop rotation to break the disease cycle.							
Cyazofamid (Ranman) UPL	21	Protectant	3	A	ALL	Registered in spinach & silverbeet (field grown) for control of Pythium Damping Off (<i>Pythium</i> spp.) Apply to the soil as a directed, post-transplant or post planting application before the disease appears. Use a minimum retreatment interval of 7-10 days. Maximum of 6 applications per crop, with no more than 3 consecutive applications.	R4
Metalaxyl-M + Fludioxonil (Maxim XL) Syngenta	4+12	Protectant	NR G:28	A	ALL	Registered as a seed dressing in spinach & silverbeet for control of Damping Off (<i>Rhizoctonia solani</i> , <i>Phytophthora</i> spp.) Maximum of 1 application per crop prior to planting seed.	R4
<i>Streptomyces lydicus</i> WYEC108 (Actinovate) Novozymes Bioag	BM 02	Biological	NR	A	ALL	Registered in vegetables as a seed treatment for <i>Fusarium</i> , <i>Rhizoctonia</i> & Pythium Management.	R4
Thiram PER97200	M3	Protectant	NR	A	VIC	Permitted as a seed dressing in spinach & silverbeet for control of Damping Off (<i>Pythium</i> spp., <i>Rhizoctonia solani</i> , <i>Fusarium</i> spp., <i>Sclerotium rolfsi</i>). Maximum of 1 application per crop.	R2
Amisulbrom (Amishield) Nufarm	21	Protectant		P		Registered for suppression of Damping Off in brassica vegetables.	R4
<i>Bacillus amyloliquefaciens</i> (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of <i>Botrytis</i> in grapes. US registration for control of Pythium Damping Off in artichoke, asparagus, brassica leafy vegetables, bulb vegetables, citrus, cucurbits, corn, fruiting vegetables, legume vegetables, oilseeds, soybean, strawberry and root and tuber vegetables (except sugar beet).	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
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 , <i>Phytophthora</i> , <i>Rhizoctonia</i> and <i>Thielaviopsis</i> .	R4
Sclerotinia Rot (<i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i>) Priority: Moderate Sclerotinia Rot is rated as a moderate priority. Sclerotinia is a soil-borne disease that tends to be a problem at canopy closure, particularly if plants have sustained mechanical injuries. Management options include general farm hygiene, crop rotation, planting space (to allow air movement) and the use of fungicides when conditions favour disease outbreaks. Correct timing and good penetration of foliage are essential for effective control.							
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Protectant	3 NG	A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Downy Mildew (<i>Hyaloperonospora</i> spp., <i>Peronospora</i> spp.) and suppression of Alternaria Leaf Spot (<i>Alternaria</i> spp.) and Sclerotinia Rot (<i>Sclerotinia</i> spp.) Apply as a foliar spray before appearance of disease symptoms. Use a retreatment interval of 7-14 days. Maximum of 3 applications per crop.	R4
Boscalid (Filan)	7	Protectant	7	A	ALL	Registered in leafy vegetables for control of Sclerotinia Rot (<i>Sclerotinia minor</i> , <i>S. sclerotiorum</i>). Apply as a foliar spray prior to disease development. Use a retreatment interval of 7-14 days. Maximum of 4 applications per crop.	R4
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant	7	A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Sclerotinia (<i>Sclerotinia minor</i> , <i>S.sclerotiorum</i>). Apply as a foliar spray prior to onset of disease. Use a retreatment interval of 7-14 days. Maximum of 2 applications per crop.	R4
Dazomet (Basamid)	8F	Soil Fumigant	NR	A	ALL	Pre-plant fumigant in seed beds for control of soil fungi including <i>Pythium</i> , <i>Phytophthora</i> , Sclerotinia , <i>Sclerotium</i> , <i>Rhizoctonia</i> , <i>Verticillium</i> , <i>Plasmidiophora</i> , <i>Armillaria</i> and <i>Fusarium</i> spp. Apply granules to the soil surface and incorporate and seal the soil surface immediately. Do not plant into soil until a positive germination test has been conducted.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Iprodione (Rovral) PER84955	2	Protectant	7 NG	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Sclerotinia (<i>Sclerotinia</i> spp.) and Grey Mould (<i>Botrytis cinerea</i>). Apply as a foliar spray when conditions favour disease development. Use a retreatment interval of 7-10 days. Maximum of 4 applications per crop.	R4
Metham Sodium	-	Fumigant	NR	A	ALL	Registered in food crops as a pre-plant fumigant for control of fungus diseases including <i>Rhizoctonia</i> , <i>Pythium</i> , <i>Fusarium</i> , <i>Phytophthora</i> , <i>Verticillium</i> , 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.	R4
Penthiopyrad (Fontelis) Corteva	7	Protectant	3	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Sclerotina Rot / Lettuce Drop (<i>Sclerotinia</i> spp.), Grey Mould (<i>Botrytis cinerea</i>) and Powdery Mildew (<i>Erysiphe cichoracearum</i>). Apply as a foliar spray, commencing prior to disease development. Use a retreatment interval of 7-10 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	R4
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant	3 NG	A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Grey Mould (<i>Botrytis cinerea</i>) and White Mould (<i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i>). Apply as a foliar spray as part of a protectant program. Use a retreatment interval of 7-14 days. Maximum of 2 applications per crop.	R4
Tebuconazole	3	Protectant & Curative	35 NG	A	ALL	Registered in silverbeet & spinach for control of Sclerotina Rot (<i>Sclerotinia</i> spp.) Apply as a foliar spray in the early stages of crop development. Use a retreatment interval of 7-10 days. Maximum of 2 applications per crop.	R4
<i>Aureobasidium pullulans</i> (Botector) Nufarm	BM 02	Biological	NR	P		Registered for suppression of Sclerotinia in fruiting vegetables.	R4
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered for control of various diseases in various fruit and vegetable crops, tree nuts and pyrethrum. US registration for control of Sclerotinia in brassica leafy greens and sunflowers.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of Sclerotinia in lettuce.	R4
Mandestrobin (Intuity) Sumitomo	11	Protectant		P		Registered for control of White Mould in green beans and lettuce and control of Blossom Blight and Brown Rot in stone fruit.	R4
Downy Mildew (<i>Peronospora</i> spp.) Priority: Moderate Downy Mildew is rated as a moderate priority. Infection is favoured by cool, wet and humid conditions. Management options include irrigation management, plant spacing to promote airflow, general farm hygiene, resistant varieties and fungicide applications when conditions favour disease development.							
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Protectant	3 NG	A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Downy Mildew (<i>Hyaloperonospora</i> spp., <i>Peronospora</i> spp.) and suppression of Alternaria Leaf Spot (<i>Alternaria</i> spp.) and Sclerotinia Rot (<i>Sclerotinia</i> spp.) Apply as a foliar spray before appearance of disease symptoms. Use a retreatment interval of 7-14 days. Maximum of 3 applications per crop.	R4
Chlorothalonil (Bravo) PER82895	M5	Protectant	7	A	ALL (excl. VIC)	Permitted in spinach & silverbeet for control of Downy Mildew , Alternaria Leaf Blight (<i>Alternaria</i> spp.) and Grey Mould (<i>Botrytis cinerea</i>). Apply as a foliar spray when conditions are favourable for disease development. Use a minimum retreatment interval of 7-10 days. Maximum number of applications per crop not specified.	R2
Copper	M1	Protectant	1	A	ALL	Registered in spinach & silverbeet for control of Downy Mildew . Apply as a foliar spray when conditions favour disease infection. Use a retreatment interval of 10-14 days. Maximum number of applications per crop not specified.	R4
Cyazofamid (Ranman) UPL	21	Protectant	3	A	ALL	Registered in spinach for control of Downy Mildew (<i>Peronospora</i> spp.) Apply as a foliar spray when conditions favour disease development. Use a retreatment interval of 7-10 days. Maximum of 6 applications per crop, with no more than 3 consecutive applications.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Dimethomorph + Ametoctradin (Zampro) AgNova	40+45	Protectant	3	A	ALL	Registered in leafy vegetables for control of Downy Mildew (<i>Hyaloperonospora parasitica</i> , <i>Peronospora farinosa</i> , <i>Bremia lactucae</i>). Apply as a foliar spray when conditions favour disease development and before disease is evident. Use a retreatment interval of 7-10 days. Maximum of 2 applications per crop.	R4
Dimethomorph (Acrobat) & Mancozeb PER14958	40 + M3	Protectant	14 NG	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Downy Mildew (<i>Peronospora</i> spp.) Apply as a foliar spray when conditions favour disease development and before appearance of symptoms. Use a retreatment interval of 7-10 days. Maximum of 4 applications per crop, with no more than 2 sequential applications.	R2
Mancozeb	M3	Protectant	14	A	ALL	Registered in silverbeet & spinach for control of Cercospora Leaf Spot and Downy Mildew . Apply as a foliar spray at first sign of disease. Use a retreatment interval of 7-10 days. Maximum number of applications per crop not specified.	R2
Mandipropamid (Revus) Syngenta	40	Protectant	1 NG	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Downy Mildew (<i>Hyaloperonospora</i> spp., <i>Peronospora</i> spp.) Apply as a foliar spray prior to first signs of disease. Use a retreatment interval of 7-10 days. Maximum of 4 applications per crop.	R4
Metalaxyl-M + Mancozeb (Ridomil Gold MZ) Syngenta PER13673	4+M3	Protectant	14	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Downy Mildew (<i>Peronospora</i> spp.) Apply as a foliar spray when conditions favour disease development. Use a retreatment interval of 7- 10 days. Maximum of 2 consecutive applications per crop.	R2
Oxathiapiprolin (Zorvec Enicade) Corteva	49	Protectant	3 NG	A	ALL	Registered in spinach for control of Downy Mildew (<i>Bremia lactucae</i> , <i>Peronospora farinose</i>). Apply as a foliar spray when conditions favour disease development and before disease is evident. Use a retreatment interval of 7-10 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Oxathiapiprolin + Famoxadone (Zorvec Encantia) Corteva	49+11	Protectant	3 NG	A	ALL	Registered in spinach for control of Downy Mildew (<i>Bremia lactucae</i> , <i>Peronospora farinose</i>). Apply as a foliar spray when conditions favour disease development and before disease is evident. Use a retreatment interval of 7-10 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	R4
Phosphorous Acid PER11951	33	Protectant & Curative	NR	A	ALL (excl. VIC)	Permitted in spinach & silverbeet for control of Downy Mildew . Apply as a foliar spray when conditions favour disease development. Retreatment interval not specified. Maximum of 3 applications per crop prior to inflorescence emergence when crop interception is minimal.	R4
Propamocarb Hydrochloride + Fluopicolide (Infinito) Bayer	28+43	Protectant	7	A	ALL	Registered in leafy vegetables for control of Downy Mildew (<i>Peronospora farinosa</i> , <i>Peronospora parasitica</i>). Apply as a foliar spray, commencing when conditions favour disease development. Use a retreatment interval of 7-10 days. Maximum of 3 applications per crop.	R4
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant		P		Registered in tomatoes for the suppression of Bacterial Speck, Bacterial Spot, Bacterial Canker and Powdery Mildew. US registration for control of Downy Mildew in brassica leafy vegetables, cucurbits, leafy vegetables, spinach, and suppression of Downy Mildew in bulb onion.	R4
Fluoxapiprolin (Xivana Prime 20SC) Bayer	49	Protectant & Curative		P		Registered for control of Downy Mildew in grapevines.	R4
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Registered in almonds, cherries and macadamia for control of various leaf diseases. US registration for suppression of Downy Mildew in bulb vegetables, cucurbits and leafy vegetables.	R4
Hydrogen Peroxide + Peroxyacetic Acid (Peratec Plus)	M	Protectant		P		Registered for control of Downy Mildew in brassica vegetables, bulb vegetables and grapes.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Mandestrobin (Intuity) Sumitomo	11	Protectant		P		Registered for suppression Downy Mildew in onions.	R4
Orange Oil (Prev-Am) Oro Agri	-	Protectant	NR	P		Registered for control of Downy Mildew in bulb vegetables.	R4
Polyoxin-D (Intervene) Nufarm	19	Protectant		P		Pending registration for control of Botrytis and Powdery Mildew in grapes, Botrytis, Powdery Mildew and Rhizopus Fruit Rot in berries, and Powdery Mildew, Alternaria and Fruit Spot in apples. US registration for control of Downy Mildew in ornamentals.	R4
Powdery Mildew (<i>Erysiphe betae</i>) Priority: Moderate Powdery Mildew is rated as a moderate priority. Infection is favoured by warm, dry days in conjunction with humid nights. Management options include irrigation management, plant spacing to promote airflow, general farm hygiene and fungicide applications when conditions favour disease development.							
Difenoconazole PER87973	3	Protectant & Curative	7 NG	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Powdery Mildew (<i>Erysiphe betae</i>). Apply as a foliar spray at first sign of disease. Use a minimum retreatment interval of 10 days. Maximum of 2 applications per crop.	R3
Penthiopyrad (Fontelis) Corteva	7	Protectant	3	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Sclerotinia Rot / Lettuce Drop (<i>Sclerotinia</i> spp.), Grey Mould (<i>Botrytis cinerea</i>) and Powdery Mildew (<i>Erysiphe cichoracearum</i>). Apply as a foliar spray, commencing prior to disease development. Use a retreatment interval of 7-10 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	R4
Potassium Bicarbonate (EcoCarb) PER13695	M2	Protectant	NR	A	ALL (excl. VIC)	Permitted in silverbeet for control of Powdery Mildew . Apply as a foliar spray at first sign of disease. Use a retreatment interval of 10-14 days. Maximum number of applications per crop not specified.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Propiconazole (Tilt) PER14479	3	Protectant & Curative	7 NG	A	ALL (excl. VIC)	Permitted in silverbeet for suppression of Leaf Spot (<i>Cercospora beticola</i>), Powdery Mildew (<i>Erysiphe polygoni</i>) and Rust (<i>Uromyces betae</i>). Apply as a foliar spray when conditions favour disease development or when disease symptoms are first observed. Use a minimum retreatment interval of 10 days. Maximum of 2 applications per crop.	R3
Quinoxifen (Vitae)	13	Protectant	7	A	ALL	Registered in silverbeet, including Swiss chard & spinach beet, for control of Powdery Mildew (<i>Erysiphe betae</i>). Apply as a foliar spray when conditions favour disease development. Use a minimum retreatment interval of 10 days. Maximum number of treatments per crop not specified.	R4
Sulphur	M2	Protectant	NR	A	ALL	Registered in vegetables for control of Powdery Mildew and Rust. Apply as a foliar spray when disease is first seen. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	R4
Trifloxystrobin (Flint) PER14494	11	Protectant	3	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Powdery Mildew (<i>Erysiphe</i> spp.) Apply as a foliar spray when conditions favour disease development. Use a minimum retreatment interval of 10 days. Do not apply consecutive treatments. Maximum of 3 applications per crop.	R4
<i>Streptomyces lydicus</i> WYEC108 (Actinovate) Novozymes Bioag	BM 02	Biological	NR	P-A	ALL	Registered in vegetables as a seed treatment for <i>Fusarium</i> , <i>Rhizoctonia</i> & <i>Pythium</i> Management. Registered for suppression of Powdery Mildew in cucurbits.	R4
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant		P		Registered in tomatoes for the suppression of Bacterial Speck, Bacterial Spot, Bacterial Canker and Powdery Mildew. US registration for control of Powdery Mildew in cucurbits.	R4
<i>Bacillus amyloliquefaciens</i> (Serifel) BASF	BM02	Biological	NR	P		Registered in strawberries and berries (including blackberries, blueberries and raspberries) for control of Grey Mould (<i>Botrytis cinerea</i>). US registration for control of Powdery Mildew in artichoke, berries, brassica leafy vegetables, bulb vegetables, cucurbits, fruiting vegetables, grapes, hops, leafy vegetables, legume vegetables, pome fruit, stone fruit, sugar beet and tobacco.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Opti) Bayer	BM02	Biological	NR	P		Registered in strawberries for control of Botrytis (<i>Botrytis cinerea</i>). Permitted for control of Powdery Mildew in eggplant. US registration for control of Powdery Mildew in cucurbits, grapes, pome fruit, stone fruit and strawberries.	R4
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 Powdery Mildew in cucurbits, fruiting vegetables, grapes, hops, pome fruit and strawberries.	R4
Bupirimate (Nimrod) Adama	8	Protectant & Curative		P		Registered for control of Powdery Mildew in apples, cucurbits, cut flower, eggplant, melons, nursery stock, ornamentals, peppers and strawberries.	R4
Cyflufenamid (Flute) AgNova	U6	Protectant & Curative		P		Registered for control of Powdery Mildew in cucurbits, grapevines and strawberries.	R4
Florypicoxamid (Verpixo Adavelt) Corteva	21	Protectant & Curative		P		Registered for control of Powdery Mildew in cucurbits, capsicum, chilli, eggplant, okra, tomato, strawberries and grapevines.	R4
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 in almonds, brassica leafy greens, cucurbits, grapes, hops, dry and succulent beans, stone fruit and sunflowers.	R4
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Registered for control of Powdery Mildew in fruiting vegetables, cucurbits and mangoes.	R4
Hydrogen Peroxide + Peroxyacetic Acid (Peratec Plus)	M	Protectant		P		Registered for control of Powdery Mildew in grapes, fruiting vegetables, cucurbits and potatoes.	R4
Mandestrobin (Intuity) Sumitomo	11	Protectant		P		Registered for control of Powdery Mildew in cucurbits.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative		P		Registered for control of Powdery Mildew in grapes, apples, cucurbits and fruiting vegetables.	R4
Metrafenone (Vivando) BASF	U8	Protectant		P		Registered for control of Powdery Mildew in cucurbits and grapes.	R4
Orange Oil (Prev-Am) Oro Agri	-	Protectant	NR	P		Registered for control of Powdery Mildew in fruiting vegetables, cucurbits, berries, apples and winegrapes.	R4
Polyoxin-D (Intervene) Nufarm	19	Protectant		P		Pending registration for control of Botrytis and Powdery Mildew in grapes, Botrytis, Powdery Mildew and Rhizopus Fruit Rot in berries, and Powdery Mildew , Alternaria and Fruit Spot in apples.	R4
Proquinazid (Talendo) Corteva	13	Protectant		P		Registered for control of Powdery Mildew in fruiting vegetables, cucurbits, grapes and pome fruit.	R4
Pydiflumetofen + Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Registered for control of Powdery Mildew in fruiting vegetables, cucurbits and root vegetables.	R3
Pyriofenone (Kusabi) AgNova	50	Protectant & Curative		P		Registered for control of Powdery Mildew in cucurbits and grapes.	R4
Tea Tree Oil (Timorex)	46	Protectant		P		Registered for control of Powdery Mildew in fruiting vegetables, cucurbits and grapes.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Rust (<i>Uromyces betae</i>) Priority: Moderate Rust is rated as a moderate priority. Foliar disease that can be managed by irrigation management, plant spacing to promote airflow, general farm hygiene and fungicide applications when conditions favour disease development.							
Propiconazole (Tilt) PER14479	3	Protectant & Curative	7 NG	A	ALL (excl. VIC)	Permitted in silverbeet for suppression of Leaf Spot (<i>Cercospora beticola</i>), Powdery Mildew (<i>Erysiphe polygoni</i>) and Rust (<i>Uromyces betae</i>). Apply as a foliar spray when conditions favour disease development or when disease symptoms are first observed. Use a minimum retreatment interval of 10 days. Maximum of 2 applications per crop.	R3
Sulphur	M2	Protectant	NR	A	ALL	Registered in vegetables for control of Powdery Mildew and Rust . Apply as a foliar spray when disease is first seen. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	R4
Azoxystrobin + Cyproconazole (Amistar Xtra) Syngenta	11+3	Protectant & Curative		P		Registered for control of Rust in maize, sweet corn and peanuts.	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 of Rust in almond, bulb vegetables, dry and succulent beans, stone fruit and sunflower.	R4
Pydiflumetofen + Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Registered for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. US registration for control of Rust in stone fruit.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Anthracnose (<i>Colletotrichum</i> spp.) Priority: Low Anthracnose is rated as a low priority. Foliar disease that is favoured by warm, humid conditions. Control options should include the use of disease-free planting material, avoid overhead irrigation, general farm hygiene practices and crop rotation. Fungicide controls can be effective, but options are currently limited.							
Zineb PER14839	M3	Protectant	14	A	ALL (excl. VIC)	Permitted in spinach & silverbeet for control of Anthracnose (<i>Colletotrichum</i> spp.) Apply as a foliar spray when conditions favour disease. Use a retreatment interval of 7 days. Maximum number of applications per crop not specified.	R2
Copper	M1	Protectant	1	P-A	ALL	Registered in celery for control of Leaf Spot (<i>Septoria apiicola</i>) and Bacterial Soft Rot (<i>Erwinia carotovora</i> pv <i>carotovora</i>). Registered for control of Anthracnose in avocados.	R4
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant	3 NG	P-A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Grey Mould (<i>Botrytis cinerea</i>) and White Mould (<i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i>). US registration for control of Anthracnose in grape and small fruit vine climbing (except fuzzy kiwifruit), lemon & lime, low-growing berries, specific tree nuts, almonds and bushberries.	R4
<i>Aureobasidium pullulans</i> Strain DSM 14940 & DSM 14941 (Botector) Nufarm	-	Biological / Protectant	NR	P		Registered for control of Botrytis and other diseases in grapes, berries and fruiting vegetables, including the suppression of Anthracnose Fruit Rot in berries.	R4
<i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of Anthracnose in avocado, other tropical fruit crops (excluding banana) and mango.	R4
Benzovindiflupyr + Propiconazole (Elatus) Syngenta	7+3	Protectant & Curative		P		Registered for control of various disease in wheat and barley. US registration for Anthracnose in sweet corn.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
BLAD (Problad Plus)	BM 01	Biological	NR	P		Registered for suppression of Brown Rot in stone fruit. US registration for control of Anthracnose in grapes and strawberries.	R4
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered for control of various diseases in various fruit and vegetable crops, tree nuts and pyrethrum. US registration for control of Anthracnose in almonds, cucurbits and tree nuts.	R4
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of Anthracnose in avocado, mango and other tropical & sub-tropical fruits, inedible peel (excluding banana, papaya, passionfruit, pineapples) and Japanese persimmons.	R4
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Registered for control of various leaf diseases in almonds, cherries and macadamia. Registered for control of Anthracnose in almonds. US registration for control of Leaf Spot, Powdery Mildew, Anthracnose and Grey Mould in strawberries. US registration for control of Grey Mould, Powdery Mildew and Anthracnose in strawberries.	R4
Isofetamid (Kenja) ISK / AgNova	7	Protectant & Curative		P		Registered for control of Botrytis Grey Mould in strawberries. US registration for control of Grey Mould, Powdery Mildew and Anthracnose in low-growing berries.	R4
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative		P		Registered for control of various diseases in grapes, apples, almonds, macadamias, cucurbits and fruiting vegetables. US registration for control of Anthracnose in fruiting vegetables and tree nuts.	R4
Grey Mould (<i>Botrytis cinerea</i>)							
Priority: Low							
Grey Mould is rated as a low priority. Infection is favoured by cool, moist conditions. Management options include reducing humidity through plant spacing and irrigation management and a well-planned fungicide program.							
Chlorothalonil (Bravo) PER82895	M5	Protectant	7	A	ALL (excl. VIC)	Permitted in spinach & silverbeet for control of Downy Mildew, Alternaria Leaf Blight (<i>Alternaria</i> spp.) and Grey Mould (<i>Botrytis cinerea</i>) . Apply as a foliar spray when conditions are favourable for disease development. Use a minimum retreatment interval of 7-10 days. Maximum number of applications per crop not specified.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Iprodione (Rovral) PER84955	2	Protectant	7 NG	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Sclerotinia (<i>Sclerotinia</i> spp.) and Grey Mould (<i>Botrytis cinerea</i>). Apply as a foliar spray when conditions favour disease development. Use a retreatment interval of 7-10 days. Maximum of 4 applications per crop.	R4
Penthiopyrad (Fontelis) Corteva	7	Protectant	3	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Sclerotinia Rot / Lettuce Drop (<i>Sclerotinia</i> spp.), Grey Mould (<i>Botrytis cinerea</i>) and Powdery Mildew (<i>Erysiphe cichoracearum</i>). Apply as a foliar spray, commencing prior to disease development. Use a retreatment interval of 7-10 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	R4
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant	3 NG	A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Grey Mould (<i>Botrytis cinerea</i>) and White Mould (<i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i>). Apply as a foliar spray as part of a protectant program. Use a retreatment interval of 7-14 days. Maximum of 2 applications per crop.	R4
Copper	M1	Protectant	1	P-A	ALL	Registered in celery for control of Leaf Spot (<i>Septoria apiicola</i>) and Bacterial Soft Rot (<i>Erwinia carotovora pv carotovora</i>). Registered for control of Botrytis in beans, faba beans and strawberries.	R4
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant	7	P-A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Sclerotinia (<i>Sclerotinia minor</i> , <i>S.sclerotiorum</i>). Registered for control of Botrytis in capsicum, cut flowers, grapes, onions, alliums, strawberries, lettuce, nursery stock and ornamentals.	R4
<i>Aureobasidium pullulans</i> (Botector) Nufarm	BM 02	Biological	NR	P		Registered for control of Botrytis in berries, fruiting vegetables, cucurbits and grapes.	R4
<i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of Botrytis in grapes and strawberries.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<i>Bacillus amyloliquefaciens strain MBI 600</i> (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapes and strawberries.	R4
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.	R4
Eugenol + Geraniol + Thymol (Novellus) Eden Research PLC	1	Protectant & Curative		P		Registered for control of Botrytis in grapes.	R4
Fenhexamid (Teldor) Bayer	17	Protectant		P		Registered for control of Botrytis in grapevines, strawberries, peppers, cucumber, lettuce, rubus, snow peas, sugar snap peas and tree nursery stock.	R4
Fenpyrazamine (Prolectus) Sumitomo	17	Protectant & Curative		P		Registered for Botrytis control in grapes. US registration for control of Botrytis in almonds, berries, lettuce, pistachios and ornamentals.	R4
Florypicoxamid (Verpixo Adavelt) Corteva	21	Protectant		P		Registered for control of Botrytis in capsicum, chilli, eggplant, okra, tomato, lettuce, strawberry and grapevines.	R4
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered for control of Botrytis in citrus, grapevines, strawberries, macadamias and pistachios.	R4
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of Botrytis in strawberries and cane berries.	R4
Hydrogen Peroxide + Peroxyacetic Acid (Peratec Plus)	M	Protectant		P		Registered for control of Botrytis in grapes.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Ipflufenquin (Migiwa Kinoprol) AgNova	52	Protectant		P		Registered for control of Botrytis in strawberries.	R4
Isofetamid (Kenja) AgNova	7	Protectant		P		Registered for control of Botrytis in low growing berries, cane berries and bush berries.	R4
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant		P		Registered for control of Botrytis in almonds, berries and grapes.	R4
Pyrimethanil (Scala) Bayer	9	Protectant & Curative		P		Registered for control of Botrytis in grapevines, ornamentals and strawberries.	R4

4.2 Insect and mite pests of spinach and silverbeet

4.2.1 Insect and mite pest priorities

Common name	Scientific name
High	
Vegetable Leafminer	<i>Liriomyza sativae</i>
Serpentine Leafminer	<i>Liriomyza huidobrensis</i>
American Serpentine Leafminer	<i>Liriomyza trifolii</i>
Spinach Crown Mite	<i>Tyrophagus similis</i>
Moderate	
Western Flower Thrips	<i>Frankliniella occidentalis</i>
Plague Thrips	<i>Thrips imaginis</i>
African Black Beetle	<i>Heteronychus arator</i>
Low	
Beet Webworm	<i>Spoladea recurvalis</i>
Cotton Bollworm	<i>Helicoverpa armigera</i>
Native Budworm	<i>Helicoverpa punctigera</i>
Green Peach Aphid	<i>Myzus persicae</i>
Rutherglen Bug	<i>Nysius vinitor</i>
Two-Spotted Mite	<i>Tetranychus urticae</i>
Tomato Russet Mite	<i>Aculops lycopersici</i>
European Red Mite	<i>Panonychus ulmi</i>
Green Vegetable Bug	<i>Nezara viridula</i>
Jassids / Leafhoppers	Cicadellidae
Loopers	<i>Chrysodeixis</i> spp.
Vegetable Weevil	<i>Listroderes difficilis</i>
Snails & Slugs	<i>Helix</i> spp.
Root-Knot Nematode	<i>Meloidogyne</i> spp.
Cutworms	<i>Agrotis</i> spp.

The high priority insect pests of spinach and silverbeet are Vegetable Leafminer, Serpentine Leafminer, American Serpentine Leafminer and Spinach Crown Mite. Available and potential products for these pests are listed in Section 4.2.2.

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

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

Resistance management strategies⁶ are available on the Croplife Australia website.

⁶ <https://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 risk: Critical concern over retaining access < 1 year
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term risk: Maintaining access of significant concern <2-5 years
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required < 5 years
		R4	No current risk / concerns
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 2025-26 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
Vegetable Leafminer (<i>Liriomyza sativae</i>) Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) American Serpentine Leafminer (<i>Liriomyza trifolii</i>) Priority: High Liriomyza Leafminers are rated as a high priority. They are recent arrivals to Australia which can cause widespread damage to a range of crops. The larvae tunnel through leaf tissue, leading to reduced photosynthesis, leaf death or premature leaf death. They can cause significant economic loss through reduced yields and serious cosmetic damage when uncontrolled. Control measures are limited. Interstate quarantine conditions are in place that require in-field chemical controls for entry of host produce into Western Australia.								
Abamectin PER96481	6	Contact	14 NG	A	ALL (excl. VIC)	Permitted in leafy vegetables (except lettuce) for suppression of Liriomyza Leafminers, including Vegetable Leafminer (<i>Liriomyza sativae</i>) and Serpentine Leafminer (<i>Liriomyza huidobrensis</i>). Apply as a foliar spray when pest first appears. Use a retreatment interval of 7-14 days. Maximum of 2 applications per crop.	M Bee:H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole (Coragen) FMC PER87631	28	Ingestion	3 G:7	A	ALL (excl. VIC)	Permitted in spinach & silverbeet for suppression of Leafminers (<i>Liriomyza</i> spp.) including Cabbage Leaf Miner (<i>Liriomyza brassicae</i>), Vegetable Leaf Miner (<i>Liriomyza sativae</i>) and Serpentine Leaf Miner (<i>Liriomyza huidobrensis</i>). Apply as a foliar spray targeting eggs and newly hatched larvae before they become entrenched. Use a minimum retreatment interval of 7 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	L Bee:VL	R4
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER94452	28+4A	Contact & Ingestion	28	A	ALL (excl. VIC)	Permitted in leafy vegetables, including silverbeet & spinach, for control of Liriomyza Leafminers, including Vegetable Leafminer (<i>Liriomyza sativae</i>), Pea Leafminer / Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) and American Serpentine Leafminer (<i>Liriomyza trifolii</i>). Apply as a seedling tray or planting hole drench. Maximum of 1 application per crop.	L-H Bee:H	R2
Spinetoram (Success Neo) Corteva PER94451	5	Ingestion	3 NG	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Leafminers (<i>Liriomyza</i> spp.) including Vegetable Leafminer (<i>Liriomyza sativae</i>), Pea Leafminer / Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) and American Serpentine Leafminer (<i>Liriomyza trifolii</i>). Apply as a foliar spray when pest first appears. Use a retreatment interval of 7-14 days. Maximum of 4 applications per crop.	M Bee:H	R4
Spinosad (Entrust Organic) Corteva PER96806	5	Ingestion	3 G:14	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Leafminers (<i>Liriomyza</i> spp.) including Vegetable Leafminer (<i>Liriomyza sativae</i>), Pea Leafminer / Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) and American Serpentine Leafminer (<i>Liriomyza trifolii</i>). Apply as a foliar spray when pest first appears. Use a minimum retreatment interval of 5 days. Maximum of 4 applications per crop, and no more than 3 consecutive applications.	L Bee:L	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cyantraniliprole (Benevia) FMC	28	Ingestion		P		Permitted for control of <i>Liriomyza</i> species, including Vegetable Leafminer (<i>Liriomyza sativae</i>), Pea Leafminer/Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) and American Serpentine Leafminer (<i>Liriomyza trifolii</i>) in bulb vegetables, fruiting vegetables (all) and potatoes.	M Bee:VH	R4
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Permitted for control of Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) in celery, baby leaf spinach, baby leaf lettuce, kale, open leaf lettuce, parsley, coriander, shallots & leek, tomato and capsicum.	H Bee:H	R4
Orange Oil (Prev-Am) Oro Agri	-	Contact		P		Registered for suppression of Serpentine Leafminer (<i>Liriomyza brassicae</i>) in fruiting vegetables, cucurbits, legume vegetables, brassica vegetables and celery.	VL Bee:VL	R4
Spinach Crown Mite (<i>Tyrophagus similis</i>) Priority: High Spinach Crown Mite is rated as a high priority. Soil-borne pest that feeds on the developing leaves of spinach, causing twisted, deformed and ragged growth. Management options are limited, with general farm hygiene and destruction of crop residues important strategies. Fungicide control is unreliable due to the challenge of achieving coverage in the crown of the plant.								
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites , Rutherglen Bug and Thrips. Apply as a foliar spray when pest is present. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:L	R4
Sulphur	UN	Contact	NR	A	ALL	Registered in vegetables for control of Mites . Apply as a foliar spray when pest is first seen. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	-	R4
Acequinocyl (Kanemite) UPL	20B	Contact & Ingestion		P		Registered for control of Two-Spotted Mite in pome fruit and stone fruit.	L Bee:L	R4
Bifenazate (Acramite) UPL	20D	Contact & Ingestion		P		Registered for control of various mites in almonds, pome fruit, stone fruit, cucurbits, eggplant, pawpaw, pepper, strawberries and tomatoes.	L Bee:H	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cyflumetofen (Danisaraba) BASF	25A	Contact		P		Registered for control of Two Spotted Mite (<i>Tetranychus urticae</i>) in pome fruit, almond, citrus, grapes, strawberries, fruiting vegetables and ornamentals.	L Bee:L	R4
Etoxazole (Paramite) Sumitomo	10B	Contact		P		Registered for control of Two-Spotted Mites in pome fruit, stone fruit, almonds and grapes.	L Bee:VL	R4
Isocycloseram (Simodis Plinazolin) Syngenta	30	Ingestion		P		Registered for control of Two Spotted Mite in cucurbits and fruiting vegetables.	H Bee:H	R4
Orange Oil (Prev-Am) Oro Agri	-	Contact		P		Registered for control of Two Spotted Mite in fruiting vegetables, cucurbits, legume vegetables, berries, apples, citrus and pawpaw.	VL Bee:VL	R4
Spiromesifen (Interrupt) Bayer	23	Ingestion		P		Registered for control of Two Spotted Mite in pome fruit and stone fruit.	M Bee:VL	R4
Western Flower Thrips (<i>Frankliniella occidentalis</i>) Plague Thrips (<i>Thrips imaginis</i>) Priority: Moderate								
Plague Thrips and Western Flower Thrips are rated as a moderate priority. Thrips are a rasping pest that are difficult to control with insecticides. Cultural measures including field hygiene should be used, as well as avoiding disruptive insecticide early season to preserve beneficials.								
Abamectin	6	Contact	3 G:3	A	ALL	Registered in leafy vegetables including silverbeet & spinach for control of Western Flower Thrips (<i>Frankliniella occidentalis</i>). Apply as a foliar spray before pest reached economically damaging level. Use a minimum retreatment interval of 28 days. Maximum of 2 applications per crop.	M Bee:H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<i>Beauveria bassiana</i> (Velifer) BASF	UNF	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 and Two-Spotted Spider Mites. Apply as a foliar spray when pests are first detected or above economic threshold. Use a retreatment interval of 3-14 days. Maximum number of applications per crop not specified.	L Bee:L	R4
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Contact & Ingestion	28	A	ALL	Permitted in leafy vegetables, including silverbeet & spinach, for control of Corn Earworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>), Cluster Caterpillar (<i>Spodoptera litura</i>), Looper (<i>Chrysodeixis</i> spp.), Lettuce Aphid (<i>Nasonovia ribis-nigr</i>), Green Peach Aphid (<i>Myzus persicae</i>), Brown Sowthistle Aphid (<i>Uroleucon sonch</i>), Silverleaf Whitefly (<i>Bemisia tabaci</i>), Western Flower Thrips (<i>Frankliniella occidentalis</i>), Vegetable Leafhopper (<i>Austroasca viridigrisea</i>) and Lucerne Leafroller (<i>Merophyas divulsana</i>). Apply as a seedling tray or planting hole drench. Maximum of 1 application per crop.	L-H Bee:H	R2
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 foliar spray when pest is evident. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	VH Bee:H	R4
Methomyl PER82428	1A	Contact	14	A	ALL	Permitted in silverbeet for control of <i>Helicoverpa</i> spp., Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug and Thrips including Western Flower Thrips . Apply as 3 consecutive foliar sprays when infestation reaches an economically damaging level. Use a retreatment interval of 6 days at temperatures of 10-20°C and 3-5 days at temperatures of 20-30°C. Maximum of 3 applications per crop.	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	-	Contact	1	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and Thrips . Apply as a foliar spray when pest is present. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:L	R4
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 as a foliar spray as need. Use a retreatment interval of 5-7 days. Maximum number of applications per crop not specified.	L Bee:L	R4
Spinetoram (Success Neo) Corteva	5	Ingestion	3 NG	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Loopers, Heliothis (<i>Helicoverpa</i> spp.) and Western Flower Thrips . Apply as a foliar spray targeting mature eggs and newly hatched larvae. Use a retreatment interval of 3-5 days (temperature greater than 20°C) or 6-12 days (temperature less than 20°C) for 3 consecutive applications. Maximum of 4 applications per crop.	M Bee:H	R4
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Loopers, Heliothis and Western Flower Thrips . Apply as a foliar spray targeting mature eggs and newly hatched larvae. Use a retreatment interval of 3-5 days (temperature greater than 20°C) or 6-12 days (temperature less than 20°C) for 3 consecutive applications. Maximum of 4 applications per crop.	L Bee:L	R4
Spirotetramat (Movento) Bayer	23	Ingestion	3	P-A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Green Peach Aphid (<i>Myzus persicae</i>). Registered for control of Western Flower Thrips (<i>Frankliniella occidentalis</i>) in green beans, eggplant, peppers, tomato and lettuce, and control of Western Flower Thrips (<i>Frankliniella occidentalis</i>) and Plague Thrips (<i>Thrips imaginis</i>) in celery, rhubarb, herbs and bulb vegetables (excluding bulb onions).	M Bee:VL	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cyantraniliprole (Benevia) FMC	28	Ingestion		P		Registered for suppression of Western Flower Thrips in fruiting vegetables, cucurbits, Plague Thrips in potatoes, and Western Flower Thrips and Plague Thrips in strawberries.	M Bee:VH	R4
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for suppression of Plague Thrips (<i>Thrips imaginis</i>) in bulb vegetables, and Western Flower Thrips (<i>Frankliniella occidentalis</i>) and Plague Thrips (<i>Thrips imaginis</i>) in cucurbits and fruiting vegetables.	H Bee:H	R4
Orange Oil (Prev-Am) Oro Agri	-	Contact		P		Registered for suppression of Western Flower Thrips (<i>Frankliniella occidentalis</i>) in fruiting vegetables, cucurbits, legume vegetables, berries, brassica vegetables, celery and herbs.	VL Bee:VL	R4

African Black Beetle (*Heteronychus arator*)

Priority: Moderate

African Black Beetle is rated as a moderate priority. They are a soil-borne pest that have a voracious appetite and can cause severe damage to foliage and stems if the numbers get high. Control options are limited, particularly with the withdrawal of chlorpyrifos from the market.

Dazomet (Basamid)	8F	Soil Fumigant	NR	A	ALL	Pre-plant fumigant in seed beds for control of soil fungi including <i>Pythium</i> , <i>Phytophthora</i> , <i>Sclerotinia</i> , <i>Sclerotium</i> , <i>Rhizoctonia</i> , <i>Verticillium</i> , <i>Plasmodiophora</i> , <i>Armillaria</i> and <i>Fusarium</i> spp, nematodes, soil insects and weeds. Apply granules to the soil surface and incorporate and seal the soil surface immediately. Do not plant into soil until a positive germination test has been conducted.	-	R4
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3 G:7	P-A	ALL	Registered in leafy vegetables including spinach & silverbeet for control of Cotton Bollworm (<i>Helicoverpa armigera</i>) and Native Budworm (<i>Helicoverpa punctigera</i>). Chlorantraniliprole has activity on African Black Beetle at high rates.	L Bee:VL	R4
Broflanilide (Cimegra) BASF	30	Contact & Ingestion		P		Registered in brassica vegetables and Chinese cabbage for control of Diamondback Moth. Broad-spectrum activity on soil-dwelling pests although specific effect on beetles is currently unknown.	H Bee:VH	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole (Acelepryn) Syngenta	28	Ingestion		P		Registered for control of African Black Beetle in turf. Note that rate in turf is higher than in vegetables.	L Bee:VL	R4
Cyantraniliprole + Thiamethoxam (Spinner) Syngenta	28+4A	Contact & Ingestion		P		Registered for control of African Black Beetle in turf.	M Bee:VH	R2
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of Sigastus Weevil in macadamia and control of Apple Weevil, Fuller's Rose Weevil and Garden Weevil in pome fruit and stone fruit.	M Bee:VH	R4
Beet Webworm (<i>Spoladea recurvalis</i>) Priority: Low Beet Webworm is rated as a low priority. Webworm larvae are leaf-chewing pests of seedlings. They are a sporadic pest and insecticide options are limited.								
<i>Bacillus thuringiensis subsp. kurstaki</i> (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of Lepidoptera . Time spraying to coincide with egg hatch. Treatments per season not limited.	VL Bee:VL	R4
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 foliar spray when pest is evident. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	VH Bee:H	R4
Methomyl PER82428	1A	Contact	14	A	ALL	Permitted in silverbeet for control of <i>Helicoverpa</i> spp., Cucumber Moth, Cluster Caterpillar, Loopers, Webworm , Rutherglen Bug and Thrips including Western Flower Thrips. Apply as a foliar spray when infestation reaches an economically damaging level. Use a retreatment interval of 7 days. Maximum of 3 applications per crop.	H Bee:H	R2
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3 G:7	P-A	ALL	Registered in leafy vegetables including spinach & silverbeet for control of Cotton Bollworm (<i>Helicoverpa armigera</i>) and Native Budworm (<i>Helicoverpa punctigera</i>).	L Bee:VL	R4

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 NG	P-A	ALL	Registered in leafy vegetables including spinach & silverbeet for control of Diamondback Moth /Cabbage Moth (<i>Plutella xylostella</i>), Cabbage White Butterfly (<i>Pieris rapae</i>), Heliothis (<i>Helicoverpa</i> spp.), Cluster Caterpillar (<i>Spodoptera litura</i>), Loopers (<i>Chrysodeixis</i> spp.) and Cabbage Centre Grub (<i>Hellula hydralis</i>).	M Bee:H	R3
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Heliothis (<i>Helicoverpa</i> spp.)	L-M Bee:L	R4
Indoxacarb (Avatar Evo) FMC	22A	Ingestion	3 NG	P-A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Cotton Bollworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>) Lucerne Leafroller (<i>Merophyas divulsana</i>).	L Bee:H	R4
Spinetoram (Success Neo) Corteva	5	Ingestion	3 NG	P-A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Loopers, Heliothis (<i>Helicoverpa</i> spp.) and Western Flower Thrips.	M Bee:H	R4
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Loopers, Heliothis and Western Flower Thrips.	L Bee:L	R4
Isocycloseram (Simodis Plinazolin) Syngenta	30	Ingestion		P		Registered for control of various lepidopteran pests in brassica vegetables, cucurbits and fruiting vegetables.	H Bee:H	R4
Methoxyfenozide (Prodigy) Corteva	18	Insect Growth Regulator		P		Registered for control of various lepidopteran pests in almonds, apples, pears, avocado, blueberry, carob, citrus, coffee, custard apple, grapevines, kiwifruit, longan, lychee, macadamia, tomatoes, peppers, eggplant and okra.	VL Bee:VL	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cotton Bollworm (<i>Helicoverpa armigera</i>) Native Budworm (<i>Helicoverpa punctigera</i>) Priority: Low Cotton Bollworm and Native Budworm are rated as a low priority. <i>Helicoverpa armigera</i> is generally regarded as the more serious pest because of its greater capacity to develop resistance to insecticides, broader host range, and persistence in cropping areas from year to year. Larvae feed on leaves but are most damaging when feeding on the stems and growing terminals.								
<i>Bacillus thuringiensis</i> <i>subsp. kurstaki</i> (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of Lepidoptera . Time spraying to coincide with egg hatch. Treatments per season not limited.	VL Bee:VL	R4
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3 G:7	A	ALL	Registered in leafy vegetables including spinach & silverbeet for control of Cotton Bollworm (<i>Helicoverpa armigera</i>) and Native Budworm (<i>Helicoverpa punctigera</i>). Apply as a foliar spray, targeting eggs and newly hatched larvae before they become entrenched. Use a minimum retreatment interval of 7 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	L Bee:VL	R4
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Contact & Ingestion	28	A	ALL	Permitted in leafy vegetables, including silverbeet & spinach, for control of Corn Earworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>), Cluster Caterpillar (<i>Spodoptera litura</i>), Looper (<i>Chrysodeixis</i> spp.), Lettuce Aphid (<i>Nasonovia ribis-nigri</i>), Green Peach Aphid (<i>Myzus persicae</i>), Brown Sowthistle Aphid (<i>Uroleucon sonchi</i>), Silverleaf Whitefly (<i>Bemisia tabaci</i>), Western Flower Thrips (<i>Frankliniella occidentalis</i>), Vegetable Leafhopper (<i>Austroasca viridigrisea</i>) and Lucerne Leafroller (<i>Merophyas divulsana</i>). Apply as a seedling tray or planting hole drench. Maximum of 1 application per crop.	L-H Bee:H	R2

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 NG	A	ALL	Registered in leafy vegetables including spinach & silverbeet for control of Diamondback Moth /Cabbage Moth (<i>Plutella xylostella</i>), Cabbage White Butterfly (<i>Pieris rapae</i>), Heliothis (<i>Helicoverpa</i> spp.), Cluster Caterpillar (<i>Spodoptera litura</i>), Loopers (<i>Chrysodeixis</i> spp.) and Cabbage Centre Grub (<i>Hellula hydralis</i>). Apply as a foliar spray at first sign of infestation. Use a minimum retreatment interval of 7 days. Maximum of 4 applications per crop.	M Bee:H	R3
Emamectin (Proclaim Opti) Syngenta PER14907	6	Ingestion	1 NG	A	ALL (excl. VIC)	Permitted in leafy vegetables (protected) for control of Diamondback Moth (<i>Plutella xylostella</i>), Heliothis (<i>Helicoverpa</i> spp.), Cabbage White Butterfly (<i>Pieris rapae</i>) and Vegetable Looper (<i>Chrysodeixis</i> spp.). Apply as a foliar spray at first sign of infestation. Use a minimum retreatment interval of 7 days. Maximum of 4 applications per crop.	M Bee:H	R3
Flubendiamide (Belt) Bayer	28	Ingestion	1	A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Heliothis (<i>Helicoverpa</i> spp.) Apply as a foliar spray, commencing when local thresholds are reached. Use a retreatment interval of 7-14 days. Maximum of 3 applications per crop.	L-M Bee:L	R4
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 foliar spray when pest is evident. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	VH Bee:H	R4
Indoxacarb (Avatar Evo) FMC	22A	Ingestion	3 NG	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Cotton Bollworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>) Lucerne Leafroller (<i>Merophyas divulsana</i>). Apply as a foliar spray targeting eggs and newly hatched larvae before they become entrenched. Use a minimum retreatment interval of 7 days. Maximum of 3 applications per crop.	L Bee:H	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Methomyl PER82428	1A	Contact	14	A	ALL	Permitted in silverbeet for control of <i>Helicoverpa</i> spp. , Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug and Thrips including Western Flower Thrips. Apply as a foliar spray when infestation reaches an economically damaging level. Use a retreatment interval of 7 days. Maximum of 3 applications per crop.	H Bee:H	R2
Nuclear Polyhedrosis Virus of <i>Helicoverpa armigera</i> (Vivus Max) AgBiTech	31	Biological	NR	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Cotton Bollworm (<i>Helicoverpa armigera</i>) and Native Budworm (<i>Helicoverpa punctigera</i>). Apply as a foliar spray targeting early-stage larvae. Use a retreatment interval of 2-3 days. Maximum number of applications per crop not specified.	VL Bee:L	R4
Spinetoram (Success Neo) Corteva	5	Ingestion	3 NG	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Loopers, Heliothis (<i>Helicoverpa</i> spp.) and Western Flower Thrips. Apply as a foliar spray targeting mature eggs and newly hatched larvae. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	M Bee:H	R4
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Loopers, Heliothis and Western Flower Thrips. Apply as a foliar spray targeting mature eggs and newly hatched larvae. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	L Bee:L	R4
<i>Clitoria ternatea</i> Extract (Sero-X) Growth Agriculture	-	Biological	NR	P		Registered for control of <i>Helicoverpa</i> spp. in cotton, lucerne and tomato.	L Bee:VL	R4
Isocycloseram (Simodis Plinazolin) Syngenta	30	Ingestion		P		Registered for suppression of <i>Helicoverpa</i> spp. in brassica vegetables, cucurbits and fruiting vegetables.	H Bee:H	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Methoxyfenozide (Prodigy) Corteva	18	Insect Growth Regulator		P		Registered for control of Native Budworm in tomatoes, peppers, eggplant and okra.	VL Bee:VL	R4
Green Peach Aphid (<i>Myzus persicae</i>) Priority: Low								
Green Peach Aphid is rated as a low priority. Aphids suck on sap, causing loss of vigour, and in some cases yellowing, stunting or distortion of plant parts. Honeydew (unused sap) secreted by the insects can cause sooty mould to develop on leaves.								
Afidopyropen (Versys) BASF	9D	Ingestion	1	A	ALL	Registered in leafy vegetables for control of Green Peach Aphid (<i>Myzus persicae</i>), Cabbage Aphid (<i>Brevicoryne brassicae</i>), Currant Lettuce Aphid (<i>Nasonovia ribis-nigri</i>), Cotton Aphid / Melon Aphid (<i>Aphis gossypii</i>), Corn Aphid (<i>Rhopalosiphum maydis</i>) and suppression of Silverleaf Whitefly (<i>Bemisia tabaci</i>). Apply as a foliar spray, commencing when local thresholds are reached. Use a retreatment interval of 14 days. Maximum of 4 applications per crop, with no more than 2 consecutive applications.	L Bee:L	R4
<i>Beauveria bassiana</i> (Velifer) BASF	UNF	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 and Two-Spotted Spider Mites. Apply as a foliar spray when pests are first detected or above economic threshold. Use a retreatment interval of 3-14 days. Maximum number of applications per crop not specified.	L Bee:L	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Contact & Ingestion	28	A	ALL	Permitted in leafy vegetables, including silverbeet & spinach, for control of Corn Earworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>), Cluster Caterpillar (<i>Spodoptera litura</i>), Looper (<i>Chrysodeixis</i> spp.), Lettuce Aphid (<i>Nasonovia ribis-nigri</i>), Green Peach Aphid (<i>Myzus persicae</i>), Brown Sowthistle Aphid (<i>Uroleucon sonchi</i>), Silverleaf Whitefly (<i>Bemisia tabaci</i>), Western Flower Thrips (<i>Frankliniella occidentalis</i>), Vegetable Leafhopper (<i>Austroasca viridigrisea</i>) and Lucerne Leafroller (<i>Merophyas divulsana</i>). Apply as a seedling tray or planting hole drench. Maximum of 1 application per crop.	L-H Bee:H	R2
Dimpropyridaz (Efficon) BASF	36	Ingestion	1	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Green Peach Aphid (<i>Myzus persicae</i>) and Cabbage Aphid (<i>Brevicoryne brassicae</i>). Apply as a foliar spray, commencing when local thresholds are reached. Use a retreatment interval of 14 days. Maximum of 4 applications per crop, with no more than 2 consecutive applications.	M Bee:L	R4
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	R4
Imidacloprid PER10918	4A	Contact & Ingestion	7	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Greenhouse Whitefly (<i>Trialeurodes vaporariorum</i>) and Aphids . Apply as a foliar spray at the first sign of pest infestation. Retreatment interval not specified. Maximum of 1 application per crop.	M Bee:M	R2
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Aphids , Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and Thrips. Apply as a foliar spray when pest is present. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:L	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Pirimicarb (Aphidex)	1A	Contact & Ingestion	2	A	ALL	Registered in leafy vegetables for control of Aphids . Apply as a foliar spray when local thresholds are reached. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:VL	R4
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 as a foliar spray as need. Use a retreatment interval of 5-7 days. Maximum number of applications per crop not specified.	L Bee:L	R4
Pymetrozine (Chess) Syngenta	9B	Contact & Ingestion	3	A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Potato Aphid (<i>Macrosiphum euphorbiae</i>), Melon Aphid (<i>Aphis gossypii</i>) and Green Peach Aphid (<i>Myzus persicae</i>). Apply as a foliar spray at early stages of infestation. Use a minimum retreatment interval of 7 days. Maximum of 2 applications per crop.	L Bee:VL	R3
Spirotetramat (Movento) Bayer	23	Ingestion	3	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Green Peach Aphid (<i>Myzus persicae</i>). Apply as a foliar spray, commencing when local thresholds are reached. Use a minimum retreatment interval of 7 days. Maximum of 3 applications per crop.	M Bee:VL	R4
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	3	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Brown Sowthistle Aphid, Green Peach Aphid , Greenhouse Whitefly and Rutherglen Bug. Apply as a foliar spray when pest populations exceed threshold. Use a retreatment interval of 14-21 days. Maximum of 4 applications per crop, with no more than 2 consecutive applications.	M Bee:VH	R4
Cyantraniliprole (Benevia) FMC	28	Ingestion		P		Registered for suppression of Green Peach Aphid in fruiting vegetables, potatoes and strawberries.	M Bee:VH	R4
Flonicamid (Mainman) UPL	9C	Ingestion		P		Registered for control of Green Peach Aphid in canola, cucurbits and potato.	M Bee:L	R4

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 Green Peach Aphid in cucurbits, eggplant, peppers and tomatoes, green beans, potatoes and sweet potatoes.	L Bee:VL	R4
Orange Oil (Prev-Am) Oro Agri	-	Contact		P		Registered for suppression of Green Peach Aphid (<i>Myzus persicae</i>) in fruiting vegetables, cucurbits, legume vegetables, berries, brassica vegetables, celery, herbs and paw paw.	VL Bee:VL	R4
Rutherglen Bug (<i>Nysius vinitor</i>) Priority: Low Rutherglen Bug is rated as a low priority. This pest breeds up on weeds and scrub adjacent to cropping areas. It is important to monitor crops for eggs and nymphs by regular field scouting. Large numbers can cause significant feeding damage to foliage by sucking the sap and depleting the crop of nutrients. Growers should anticipate potential migrations of pests from one finishing crop to another emerging one. Rutherglen Bugs can be controlled by removing the weeds they use as hosts and by ploughing a deep furrow around the emerging crop, preventing wingless nymphs from migrating from weeds or harvested crops.								
Methomyl PER82428	1A	Contact	14	A	ALL	Permitted in silverbeet for control of <i>Helicoverpa</i> spp., Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug and Thrips including Western Flower Thrips. Apply as a foliar spray to late stage immature and adult bugs. Use a retreatment interval of 7 days. Maximum of 3 applications per crop.	H Bee:H	R2
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and Thrips. Apply as a foliar spray when pest is present. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:L	R4
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	3	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Brown Sowthistle Aphid, Green Peach Aphid, Greenhouse Whitefly and Rutherglen Bug . Apply as a foliar spray when pest populations exceed threshold. Use a retreatment interval of 14-21 days. Maximum of 4 applications per crop, with no more than 2 consecutive applications.	M Bee:VH	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in vegetables for control of Cabbage White Butterfly, Cabbage Moth, Rutherglen Bug and Green Vegetable Bug. Apply as a foliar spray when pests are first seen. Use a retreatment interval of 7-10 days. Maximum number of applications per crop not specified.	H Bee:H	R3
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Macadamia Lace Bug and Fruit Spotting Bugs in macadamia, Fruit Spotting Bugs in tropical & sub-tropical fruit, inedible peel (excluding banana, pineapple), and Olive Lace Bug in olives.	L Bee:VL	R4
Two Spotted Mite (<i>Tetranychus urticae</i>) Tomato Russet Mite (<i>Aculops lycopersici</i>) European Red Mite (<i>Panonychus ulmi</i>) Priority: Low								
Two Spotted Mite, Tomato Russet Mite and European Red Mite are rated as a low priority. Mites feed on aerial parts of the plant and tend to shelter on the underside of leaves. Severe infestations will cause reddening of leaves and can lead to leaf drop and reduced crop vigour in patches.								
<i>Beauveria bassiana</i> (Velifer) BASF	UNF	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 and Two-Spotted Spider Mites . Apply as a foliar spray when pests are first detected or above economic threshold. Use a retreatment interval of 3-14 days. Maximum number of applications per crop not specified.	L Bee:L	R4
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites , Rutherglen Bug and Thrips. Apply as a foliar spray when pest is present. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:L	R4
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 as a foliar spray as need. Use a retreatment interval of 5-7 days. Maximum number of applications per crop not specified.	L Bee:L	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Propargite (Omite)	12C	Contact	7	A	ALL	Registered in vegetables for control of Two-Spotted Mites and Spider Mites. Apply as a foliar spray when pests appear. Retreatment interval and maximum number of applications per crop not specified.	M Bee:L	R3
Sulphur	UN	Contact	NR	A	ALL	Registered in vegetables for control of Mites . Apply as a foliar spray when pest is first seen. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	-	R4
Abamectin	6	Contact	3 G:3	P-A	ALL	Registered in leafy vegetables including silverbeet & spinach for control of Western Flower Thrips (<i>Frankliniella occidentalis</i>). Registered for control of Two-Spotted Mite in pome fruit, berries, cotton, cucumber, squash, zucchini, spring onions, shallots, snow peas, sugar snap peas, sweet corn, fruiting vegetables, custard apple, hops, lettuce, lychee, ornamentals, papaya, passionfruit and strawberries.	M Bee:H	R3
Acequinocyl (Kanemite) UPL	20B	Contact & Ingestion		P		Registered for control of Two-Spotted Mite in pome fruit and stone fruit.	L Bee:L	R4
Bifenazate (Acrامة) UPL	20D	Contact & Ingestion		P		Registered for control of various mites in almonds, pome fruit, stone fruit, cucurbits, eggplant, pawpaw, pepper, strawberries and tomatoes.	L Bee:H	R4
Cyflumetofen (Danisaraba) BASF	25A	Contact		P		Registered for control of Two Spotted Mite (<i>Tetranychus urticae</i>) in pome fruit, almond, citrus, grapes, strawberries, fruiting vegetables and ornamentals.	L Bee:L	R4
Etoxazole (Paramite) Sumitomo	10B	Contact		P		Registered for control of Two-Spotted Mites in pome fruit, stone fruit, almonds and grapes.	L Bee:VL	R4
Isocycloseram (Simodis Plinazolin) Syngenta	30	Ingestion		P		Registered for control of Two Spotted Mite in cucurbits and fruiting vegetables.	H Bee:H	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Orange Oil (Prev-Am) Oro Agri	-	Contact		P		Registered for control of Two Spotted Mite in fruiting vegetables, cucurbits, legume vegetables, berries, apples, citrus and pawpaw.	VL Bee:VL	R4
Spiromesifen (Interrupt) Bayer	23	Ingestion		P		Registered for control of Two Spotted Mite in pome fruit and stone fruit.	M Bee:VL	R4
Green Vegetable Bug (<i>Nezara viridula</i>) Priority: Low								
Green Vegetable Bug are rated as a low priority. They are a sporadic sucking pest that will migrate into crops from shade lines and vegetation along watercourses. Symptoms include lack of crop vigour and in severe cases can lead to reduced yield.								
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Aphids, Green Mirid, Green Vegetable Bug , Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and Thrips. Apply as a foliar spray when pest is present. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:L	R4
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in vegetables for control of Cabbage White Butterfly, Cabbage Moth, Rutherglen Bug and Green Vegetable Bug . Apply as a foliar spray when pests are first seen. Use a retreatment interval of 7-10 days. Maximum number of applications per crop not specified.	H Bee:H	R3
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Macadamia Lace Bug and Fruit Spotting Bugs in macadamia, Fruit Spotting Bugs in tropical & sub-tropical fruit, inedible peel (excluding banana, pineapple), and Olive Lace Bug in olives.	L Bee:VL	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Jassids / Leafhoppers (Cicadellidae) Priority: Low Jassids are rated as a low priority. Jassids are a sap sucking insect that can damage crops in both adult and nymph stages, causing wilting, stunting and distortion of plants. Sooty mould may grow on honey dew after heavy infestations.								
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Contact & Ingestion	28	A	ALL	Permitted in leafy vegetables, including silverbeet & spinach, for control of Corn Earworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>), Cluster Caterpillar (<i>Spodoptera litura</i>), Looper (<i>Chrysodeixis</i> spp.), Lettuce Aphid (<i>Nasonovia ribis-nigri</i>), Green Peach Aphid (<i>Myzus persicae</i>), Brown Sowthistle Aphid (<i>Uroleucon sonchi</i>), Silverleaf Whitefly (<i>Bemisia tabaci</i>), Western Flower Thrips (<i>Frankliniella occidentalis</i>), Vegetable Leafhopper (<i>Austroasca viridigrisea</i>) and Lucerne Leafroller (<i>Merophyas divulsana</i>). Apply as a seedling tray or planting hole drench. Maximum of 1 application per crop.	L-H Bee:H	R2
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 foliar spray when pest is evident. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	VH Bee:H	R4
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in silverbeet & spinach for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers , Mites, Rutherglen Bug and Thrips. Apply as a foliar spray when pest is present. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:L	R4
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	3	P-A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Brown Sowthistle Aphid, Green Peach Aphid, Greenhouse Whitefly and Rutherglen Bug. US registration for control of Leafhoppers in berries, pome fruit and root and tuber vegetables.	M Bee:VH	R4

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 suppression of various pests in macadamias and various fruit and vegetables crops. US registration for control of Leafhoppers in alfalfa, brassica vegetables, clover, cucurbits, fruiting vegetables, kava, leaf petiole vegetables, celtuce, leafy vegetables, legume vegetables, peanut, pome fruit, root vegetables, small fruit vine climbing (except fuzzy kiwifruit), taro leaves and tuberous & corm vegetables.	L Bee:VL	R4
Loopers (<i>Chrysodeixis</i> spp.) Priority: Low								
Loopers are rated as a low priority. The larvae are voracious leaf feeders, but they do not usually inflict serious damage in celery. They are easily controlled by insecticides when present in large numbers.								
<i>Bacillus thuringiensis</i> <i>subsp. kurstaki</i> (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of Lepidoptera . Time spraying to coincide with egg hatch. Treatments per season not limited.	VL Bee:VL	R4
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Contact & Ingestion	28	A	ALL	Permitted in leafy vegetables, including silverbeet & spinach, for control of Corn Earworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>), Cluster Caterpillar (<i>Spodoptera litura</i>), Looper (<i>Chrysodeixis</i> spp.), Lettuce Aphid (<i>Nasonovia ribis-nigri</i>), Green Peach Aphid (<i>Myzus persicae</i>), Brown Sowthistle Aphid (<i>Uroleucon sonchi</i>), Silverleaf Whitefly (<i>Bemisia tabaci</i>), Western Flower Thrips (<i>Frankliniella occidentalis</i>), Vegetable Leafhopper (<i>Austroasca viridigrisea</i>) and Lucerne Leafroller (<i>Merophyas divulsana</i>). Apply as a seedling tray or planting hole drench. Maximum of 1 application per crop.	L-H Bee:H	R2

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 NG	A	ALL	Registered in leafy vegetables including spinach & silverbeet for control of Diamondback Moth /Cabbage Moth (<i>Plutella xylostella</i>), Cabbage White Butterfly (<i>Pieris rapae</i>), Heliothis (<i>Helicoverpa</i> spp.), Cluster Caterpillar (<i>Spodoptera litura</i>), Loopers (<i>Chrysodeixis</i> spp.) and Cabbage Centre Grub (<i>Hydrellia</i>). Apply as a foliar spray at first sign of infestation. Use a minimum retreatment interval of 7 days. Maximum of 4 applications per crop.	M Bee:H	R3
Emamectin (Proclaim Opti) Syngenta PER14907	6	Ingestion	1 NG	A	ALL (excl. VIC)	Permitted in leafy vegetables (protected) for control of Diamondback Moth (<i>Plutella xylostella</i>), Heliothis (<i>Helicoverpa</i> spp.), Cabbage White Butterfly (<i>Pieris rapae</i>) and Vegetable Looper (<i>Chrysodeixis</i> spp.). Apply as a foliar spray at first sign of infestation. Use a minimum retreatment interval of 7 days. Maximum of 4 applications per crop.	M Bee:H	R3
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 foliar spray when pest is evident. Use a retreatment interval of 14-21 days. Maximum number of applications per crop not specified.	VH Bee:H	R4
Methomyl PER82428	1A	Contact	14	A	ALL	Permitted in silverbeet for control of <i>Helicoverpa</i> spp., Cucumber Moth, Cluster Caterpillar, Loopers , Webworm, Rutherglen Bug and Thrips including Western Flower Thrips. Apply as a foliar spray when infestation reaches an economically damaging level. Use a retreatment interval of 7 days. Maximum of 3 applications per crop.	H Bee:H	R2
Spinetoram (Success Neo) Corteva	5	Ingestion	3 NG	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Loopers , Heliothis (<i>Helicoverpa</i> spp.) and Western Flower Thrips. Apply as a foliar spray targeting mature eggs and newly hatched larvae. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	M Bee:H	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Loopers , Heliothis and Western Flower Thrips. Apply as a foliar spray targeting mature eggs and newly hatched larvae. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	L Bee:L	R4
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3 G:7	P-A	ALL	Registered in leafy vegetables including spinach & silverbeet for control of Cotton Bollworm (<i>Helicoverpa armigera</i>) and Native Budworm (<i>Helicoverpa punctigera</i>).	L Bee:VL	R4
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in leafy vegetables, including spinach & silverbeet, for control of Heliothis (<i>Helicoverpa</i> spp.)	L-M Bee:L	R4
Indoxacarb (Avatar Evo) FMC	22A	Ingestion	3 NG	P-A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Cotton Bollworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>) Lucerne Leafroller (<i>Merophyas divulsana</i>).	L Bee:H	R4
Isocycloseram (Simodis Plinazolin) Syngenta	30	Ingestion		P		Registered for control of various lepidopteran pests in brassica vegetables, cucurbits and fruiting vegetables.	H Bee:H	R4
Methoxyfenozide (Prodigy) Corteva	18	Insect Growth Regulator		P		Registered for control of Loopers in pome fruit.	VL Bee:VL	R4
Vegetable Weevil (<i>Listroderes difficilis</i>) Priority: Low Vegetable Weevil is rated as a low priority. Weevils are soil-borne pests that cause direct feeding damage to celery stalks, making them unsaleable. Control options are limited.								
Indoxacarb (Avatar Evo) FMC	22A	Ingestion	3 NG	P-A	ALL	Registered in leafy vegetables, including silverbeet & spinach, for control of Cotton Bollworm (<i>Helicoverpa armigera</i>), Native Budworm (<i>Helicoverpa punctigera</i>) Lucerne Leafroller (<i>Merophyas divulsana</i>). Registered for control of Vegetable Weevil in celery.	L Bee:H	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of Sigastus Weevil in macadamia and control of Apple Weevil, Fuller's Rose Weevil and Garden Weevil in pome fruit and stone fruit.	M Bee:VH	R4
Snails & Slugs (<i>Helix</i> spp.) Priority: Low								
Snails and Slugs are rated as a low priority. Snails cause direct feeding damage to celery stalks leading to reduced yields or marketability. Molluscicides can be used as a broadcast across the field or applied to localised areas of infestation.								
Iron Powder	-	Contact	NR	A	ALL	Registered in vegetables for control of Slugs & Snails . Broadcast pellets around plants to be protected.	-	R4
Metaldehyde	-	Contact	7	A	ALL	Registered in horticultural crops for control of Snails and Slugs . Broadcast evenly over the ground where snails and slugs are active or incorporate with seed when direct drilling. Treatments per season not limited.	-	R4
Methiocarb (Mesurol)	1A	Contact	7 G:7	A	ALL	Registered in vegetables for control of Common Garden Snails, Slugs , White Italian Snail and White Snail. Scatter bait evenly onto ground where snails or slugs occur.	-	R4
Root-Knot Nematode (<i>Meloidogyne</i> spp.) Priority: Low								
Root-Knot Nematode is rated as a low priority. Soil-borne nematodes are minute, worm-like animals that can invade plant roots near the root tip. Affected plants have an unthrifty appearance and often show symptoms of stunting, wilting or chlorosis. Cultural measures such as crop rotation and good field hygiene are critical components of nematode management.								
1,3-Dichloropropene + Chloropicrin	8B	Soil Fumigant	NR	A	ALL	Registered in vegetables for control of plant parasitic Nematodes , Symphylans, Wireworms, soil borne diseases (including <i>Fusarium</i> and <i>Verticillium</i> wilts, <i>Rhizoctonia</i> , <i>Pythium</i>) and suppression of weeds. Restricted chemical. <i>For use by professional and registered fumigators only.</i>	-	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dazomet (Basamid)	8F	Soil Fumigant	NR	A	ALL	Pre-plant fumigant in seed beds for control of soil fungi including <i>Pythium</i> , <i>Phytophthora</i> , <i>Sclerotinia</i> , <i>Sclerotium</i> , <i>Rhizoctonia</i> , <i>Verticillium</i> , <i>Plasmodiophora</i> , <i>Armillaria</i> and <i>Fusarium</i> spp, nematodes , soil insects and weeds. Apply granules to the soil surface and incorporate and seal the soil surface immediately. Do not plant into soil until a positive germination test has been conducted.	-	R4
Metham Sodium	-	Fumigant	NR	A	ALL	Registered in food crops as a pre-plant fumigant for control of Plant Parasitic Nematodes , weed seeds, and various fungal diseases. Applied as a soil injection, soil surface spray in front of a rotary tiller or through approved trickle irrigation systems.	-	R4
Abamectin (Tervigo) Syngenta	N-2	Contact		P		Registered for control of Root-Knot Nematode (<i>Meloidogyne</i> spp.) in fruiting vegetables, cucurbits, potato and sweet potato.	M Bee:H	R3
Cadusafos (Rugby)	1B	Contact		P		Registered for control of Nematodes in banana, citrus, ginger, sugar cane, tobacco and tomato.	H Bee:H	R4
Cyclobutrifluram (Vaniva Tymirium) Syngenta	N-3	Contact		P		Registered for control of Root-Knot Nematode in fruiting vegetables and cucurbits.	L Bee:L	R4
Fenamiphos (Nemacur)	1B	Contact		P		Registered for control of Nematodes in aloe vera and bananas.	H Bee:H	R3
Fluazaindolizine (Salibro Reklamel) Corteva	N-UN	Contact		P		Registered for control of Root-Knot Nematode (<i>Meloidogyne</i> spp.) in cucurbits, fruiting vegetables, root & tuber vegetables and sweet potato.	-	R4
Fluensulfone (Nimitz) Adama	-	Contact		P		Registered for control of Root-Knot Nematode (<i>Meloidogyne</i> spp.) in cucurbits, tomatoes, capsicum, chilli, eggplant, okra, carrots, potatoes, sweet potatoes and sugar cane.	L Bee:L	R4
Fluopyram (Velum Prime) Bayer	N-3	Contact		P		Registered for control of Root-Knot Nematode (<i>Meloidogyne</i> spp.) in root & tuber vegetables.	L Bee:L	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Oxamyl (Vydate) Corteva	1A	Contact		P		Registered for control of Nematodes in bananas, capsicum, tomatoes and sweet potatoes.	H Bee:H	R4
Terbufos (Counter)	1B	Contact		P		Registered for control of Burrowing Nematode and Spiral Nematode in bananas.	H Bee:H	R3
Cutworms (<i>Agrotis spp.</i>) Priority: Low Cutworms are rated as a low priority. Cutworms are caterpillars that attack seedling crops by chewing through leaves and stems at ground level. Cutworms can be a pest of emerging seedlings but the incidence of this pest causing economic damage is generally rare in most crops, but it can impact plant densities. This pest is typically found along field margins that adjoin pastures or where crops have been sown into recently sprayed out weedy fallows. Soil pests can reduce plant establishment, row density and vigour. Symptoms can be confused with other establishment problems and may be worse if seedling development is slow due to climate or other factors. Soil pests, predominantly feed on germinating seed and seedling roots, resulting in poor establishment. Bait sampling prior to planting should be used to determine their presence. Clean fallows (free from weeds) generally cause pest insect numbers to decline.								
Dazomet (Basamid)	8F	Soil Fumigant	NR	A	ALL	Pre-plant fumigant in seed beds for control of soil fungi including <i>Pythium</i> , <i>Phytophthora</i> , <i>Sclerotinia</i> , <i>Sclerotium</i> , <i>Rhizoctonia</i> , <i>Verticillium</i> , <i>Plasmodiophora</i> , <i>Armillaria</i> and <i>Fusarium</i> spp., nematodes, soil insects and weeds. Apply granules to the soil surface and incorporate and seal the soil surface immediately. Do not plant into soil until a positive germination test has been conducted.	-	R4
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3 G:7	P-A	ALL	Registered in leafy vegetables including spinach & silverbeet for control of Cotton Bollworm (<i>Helicoverpa armigera</i>) and Native Budworm (<i>Helicoverpa punctigera</i>). US registration for control of Cutworms in legume vegetables and sweet corn.	L Bee:VL	R4
Broflanilide (Cimegra) BASF	30	Contact & Ingestion		P		Registered in brassica vegetables and Chinese cabbage for control of Diamondback Moth. Broad-spectrum activity on soil-dwelling pests although specific effect on Cutworm is currently unknown.	H Bee:VH	R4
Chlorantraniliprole (Acelepryn) Syngenta	28	Ingestion		P		Registered for control of Black Cutworm in turf. Note that rate in turf is higher than in vegetables.	L Bee:VL	R4

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Clothianidin + Imidacloprid (Poncho Plus Seed Treatment) Bayer	4A	Contact & Ingestion		P		Registered for control of Cutworms as seed treatment in canola, forage brassicas, maize, sweet corn, sorghum, sunflower and pastures.	M Bee:M	R2
Cyantraniliprole + Thiamethoxam (Spinner) Syngenta	28+4A	Contact & Ingestion		P		Registered for control of Black Cutworm in turf.	M Bee:VH	R2
Indoxacarb (Provaunt) Syngenta	22A	Ingestion		P		Registered for control of Black Cutworm in turf.	L Bee:H	R4

4.3 Weeds in Spinach and Silverbeet

4.3.1 Weed priorities

Common Name	Scientific Name
High	
Fat Hen	<i>Chenopodium album</i>
Stinging Nettle	<i>Urtica</i> spp.
Amaranthus	<i>Amaranthus</i> spp.
Redshank	<i>Amaranthus retroflexus</i>
Wireweed	<i>Polygonum aviculare</i>
Pigweed	<i>Portulaca oleracea</i>
Moderate	
Chickweed	<i>Stellaria media</i>
Annual Ryegrass	<i>Lolium rigidum</i>
Marshmallow	<i>Malva parviflora</i>
Couch Grass	<i>Cynodon dactylon</i>
Sowthistle	<i>Sonchus oleraceus</i>
Slender Celery	<i>Cyclospermum leptophyllum</i>
Feathertop Rhodes Grass	<i>Chloris virgata</i>

The high priority weed issues are Fat Hen, Stinging Nettle, Amaranthus, Redshank, Wireweed and Pigweed. Herbicide options are listed in Appendix 3 which can be used in conjunction with various management practices such as soil fumigation, pre-crop spraying, spot spraying and mechanical controls.

Growers generally use cultivation and knockdown herbicides as pre-plant weed control to ensure minimal weed populations at the start of the crop. There are limited pre-emergent and post-emergence herbicide options currently available for use in crop. Access to additional modes of action would be desirable to reduce reliance on mechanical weed control measures.

Resistance management

Specific resistance management strategies for high resistance risk (1 and 2) and moderate resistance risk (0, 3, 4, 5, 6, 9, 10, 12, 13, 14, 15, 22, 27, 31 and 34) herbicide modes of action are available on the CropLife Australia webpage⁷.

⁷ <https://www.croplife.org.au/resources/programs/resistance-management>

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)	
***	High resistance risk	R1	Short-term risk: Critical concern over retaining access < 1 year
		R2	Medium-term risk: Maintaining access of significant concern <2-5 years
**	Moderate resistance risk	R3	Long-term: Potential issues associated with use - Monitoring required < 5 years
		R4	No current risk / concerns
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
Fat Hen (<i>Chenopodium album</i>) Priority: High Fat Hen is ranked as a high priority. It is a fast-growing, annual broadleaf weed that germinates from spring to autumn. Herbicide control can be difficult and targeting weeds at early growth stages is critical.							
Chloridazon (Rydazin) AgNova	5**	Silverbeet / Pre-Emergence	Registered in silverbeet for control of various broadleaf weeds, including Fat Hen . Apply to the soil the day of sowing or as soon as possible after planting, but before the crop emerges. Irrigated within 10 days if soil moisture is inadequate to provide effective weed control.	NR	A	ALL	R4
Ethofumesate (Tramat) PER14703	15**	Silverbeet & Spinach / Pre-emergence	Permitted in silverbeet & spinach for control of various grass & broadleaf weeds, including Fat Hen . Apply to the soil before crop and weed emergence. Do not mechanically incorporate in spinach. Maximum of 1 application per crop.	NR	A	ALL (excl. VIC)	R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Phenmedipham (Betanal Flow) Bayer	5**	Silverbeet / Post- Emergence	Registered in silverbeet for control of various grass and broadleaf weeds, including Fat Hen . Apply as a foliar spray to weeds at uniform 2 leaf stage. Maximum number of applications per crop not specified.	28	A	ALL	R4
Phenmedipham (Betanal Flow) Bayer PER81241	5**	Spinach / Post- Emergence	Permitted in spinach for control of various grass and broadleaf weeds, including Fat Hen . Apply as a foliar spray within 14 days of transplanting or emergence of the crop. When the majority of weeds have germinated and are at the 2-4 leaf stage. Maximum of 1 application per crop.	28 NG	A	ALL (excl. VIC)	R4
Propachlor (Ramrod) PER12008	15**	Silverbeet & Spinach / Pre- Emergence	Permitted in silverbeet & spinach for control of various annual grass & broadleaf weeds, including Fat Hen . Apply to the soil surface immediately after planting or transplanting and incorporate as soon as possible by rainfall or irrigation.	NR	A	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre- Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including Fat Hen . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4
Aclonifen (Emerger) Bayer	32**	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		R4
Ethyl Dipropylthiocarbamate (Eptam)	15**		Registered for control of grass and broadleaf weeds, including Fat Hen , in beans, potatoes, maize and sweet corn.		P		R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of grass and broadleaf weeds including Fat Hen in asparagus, citrus, grapes, nuts, stone & pome fruits.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Oxyfluorfen (Goal)	14**		Registered for control of grass and broadleaf weeds, including Fat Hen in fallow, Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		R4
Stinging Nettle (<i>Urtica</i> spp.) Priority: High Stinging Nettle is ranked as a high priority. It is a soft herb whose leaves are sparsely covered with rigid, stinging hairs. Herbicide control options are limited.							
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Propachlor (Ramrod) PER12008	15**	Silverbeet & Spinach / Pre- Emergence	Permitted in silverbeet & spinach for control of various annual grass & broadleaf weeds, including Stinging Nettle . Apply to the soil surface immediately after planting or transplanting and incorporate as soon as possible by rainfall or irrigation.	NR	A	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre- Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including Stinging Nettle . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4
Oxyfluorfen (Goal)	14**		Registered for control of Stinging Nettle in fallow, Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		R4
Pendimethalin (Stomp)	3**		Registered for control of Nettles in carrots, processing peas, cabbage, cauliflower, broccoli and lettuce.		P		R4
Amaranthus (<i>Amaranthus</i> spp.) Priority: High Amaranthus is ranked as a high priority. Short-lived, summer-growing annual broadleaf weed that is a prolific seed producer. Herbicide control can be effective but application timing is critical to ensure small weeds are targeted.							
Ethofumesate (Tramat) PER14703	15**	Silverbeet & Spinach / Pre- emergence	Permitted in silverbeet & spinach for control of various grass & broadleaf weeds, including Amaranthus . Apply to the soil before crop and weed emergence. Do not mechanically incorporate in spinach. Maximum of 1 application per crop.	NR	A	ALL (excl. VIC)	R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Phenmedipham (Betanal Flow) Bayer	5**	Silverbeet / Post- Emergence	Registered in silverbeet for control of various grass and broadleaf weeds, including Green Amaranth . Apply as a foliar spray to weeds at uniform 2 leaf stage. Maximum number of applications per crop not specified.	28	A	ALL	R4
Phenmedipham (Betanal Flow) Bayer PER81241	5**	Spinach / Post- Emergence	Permitted in spinach for control of various grass and broadleaf weeds, including Green Amaranth . Apply as a foliar spray within 14 days of transplanting or emergence of the crop. When the majority of weeds have germinated and are at the 2-4 leaf stage. Maximum of 1 application per crop.	28 NG	A	ALL (excl. VIC)	R4
Clomazone	13**		Registered for control of broadleaf weeds including suppression of Amaranthus in beans, poppies, potato and tobacco transplants.		P		R4
Fluroxypyr (Starane)	4**		Registered for control of broadleaf weeds, including Amaranth in sorghum, maize, sweet corn and millet.		P		R4
Mesotrione (Callisto) Syngenta	27**		US registration for control of broadleaf weeds, including Amaranthus spp. , in rhubarb.		P		R4
Metobromuron (Soleto) GroChem	5**		Registered for control of Amaranth in potatoes.		P		R4
Redshank (<i>Amaranthus retroflexus</i>) Priority: High Redshank is ranked as a high priority. Short-lived, summer-growing annual broadleaf weed that is a prolific seed producer. Herbicide control can be effective but application timing is critical to ensure small weeds are targeted.							
Ethofumesate (Tramat) PER14703	15**	Silverbeet & Spinach / Pre- emergence	Permitted in silverbeet & spinach for control of various grass & broadleaf weeds, including Redshank . Apply to the soil before crop and weed emergence. Do not mechanically incorporate in spinach. Maximum of 1 application per crop.	NR	A	ALL (excl. VIC)	R4
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Phenmedipham (Betanal Flow) Bayer	5**	Silverbeet / Post- Emergence	Registered in silverbeet for control of various grass and broadleaf weeds, including Redshank . Apply as a foliar spray to weeds at uniform 2 leaf stage. Maximum number of applications per crop not specified.	28	A	ALL	R4
Phenmedipham (Betanal Flow) Bayer PER81241	5**	Spinach / Post- Emergence	Permitted in spinach for control of various grass and broadleaf weeds, including Redshank . Apply as a foliar spray within 14 days of transplanting or emergence of the crop. When the majority of weeds have germinated and are at the 2-4 leaf stage. Maximum of 1 application per crop.	28 NG	A	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre- Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including suppression of Red Root Amaranth . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4
Clomazone	13**		Registered for control of broadleaf weeds including suppression of Amaranthus in beans, poppies, potato and tobacco transplants.		P		R4
Fluroxypyr (Starane)	4**		Registered for control of broadleaf weeds, including Amaranth in sorghum, maize, sweet corn and millet.		P		R4
Mesotrione (Callisto) Syngenta	27**		US registration for control of broadleaf weeds, including Amaranthus spp. , in rhubarb.		P		R4
Metobromuron (Soleto) GroChem	5**		Registered for control of Amaranth in potatoes.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Wireweed (<i>Polygonum aviculare</i>) Priority: High							
Wireweed is ranked as a high priority. Wireweed needs a period of low soil temperature to germinate, but its long taproot allows it to persist through hot, dry weather. It grows rapidly in the warmer months and is difficult to control with herbicides. Application timing is critical to ensure small weeds are targeted.							
Ethofumesate (Tramat) PER14703	15**	Silverbeet & Spinach / Pre- emergence	Permitted in silverbeet & spinach for control of various grass & broadleaf weeds, including Wireweed . Apply to the soil before crop and weed emergence. Do not mechanically incorporate in spinach. Maximum of 1 application per crop.	NR	A	ALL (excl. VIC)	R4
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Propachlor (Ramrod) PER12008	15**	Silverbeet & Spinach / Pre- Emergence	Permitted in silverbeet & spinach for control of various annual grass & broadleaf weeds, including Wireweed . Apply to the soil surface immediately after planting or transplanting and incorporate as soon as possible by rainfall or irrigation.	NR	A	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre- Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including suppression of Wireweed . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4
Fluroxypyr (Starane) Corteva	4**		Registered for control of Wireweed in non-crop areas and pastures.		P		R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of Wireweed in citrus, grapes, almonds, pome fruit and stone fruit.		P		R4
Oxyfluorfen (Goal)	14**		Registered for control of grass and broadleaf weeds, including Wireweed in fallow, Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Pigweed (<i>Portulaca oleracea</i>) Priority: High Pigweed is ranked as a high priority. Summer growing broadleaf weed that competes aggressively in-crop and can be difficult to control with herbicides.							
Chloridazon (Rydazin) AgNova	5**	Silverbeet / Pre-Emergence	Registered in silverbeet for control of various broadleaf weeds, including Pigweed . Apply to the soil the day of sowing or as soon as possible after planting, but before the crop emerges. Irrigated within 10 days if soil moisture is inadequate to provide effective weed control.	NR	A	ALL	R4
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Phenmedipham (Betanal Flow) Bayer	5**	Silverbeet / Post-Emergence	Registered in silverbeet for control of various grass and broadleaf weeds, including Pigweed . Apply as a foliar spray to weeds at uniform 2 leaf stage. Maximum number of applications per crop not specified.	28	A	ALL	R4
Phenmedipham (Betanal Flow) Bayer PER81241	5**	Spinach / Post-Emergence	Permitted in spinach for control of various grass and broadleaf weeds, including Pigweed . Apply as a foliar spray within 14 days of transplanting or emergence of the crop. When the majority of weeds have germinated and are at the 2-4 leaf stage. Maximum of 1 application per crop.	28 NG	A	ALL (excl. VIC)	R4
Propachlor (Ramrod) PER12008	15**	Silverbeet & Spinach / Pre-Emergence	Permitted in silverbeet & spinach for control of various annual grass & broadleaf weeds, including Pigweed . Apply to the soil surface immediately after planting or transplanting and incorporate as soon as possible by rainfall or irrigation.	NR	A	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre-Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including suppression of Pigweed . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Clomazone	13**		Registered for control of Pig Weed in cucumber, pumpkins, kabocha squash, rockmelons, watermelon, zucchini, green beans, navy beans, poppies, potatoes and tobacco.		P		R4
Dimethenamid-P (Outlook) BASF	15**		Registered for control of grass and broadleaf weeds, including Pigweed in sweet corn, beans, peas, pumpkins and kabocha.		P		R4
Ethyl Dipropylthiocarbamate (Eptam)	15**		Registered for control of Pigweed in beans, potatoes, maize and sweet corn.		P		R4
Fluroxypyr (Starane) Corteva	4**		Registered for control of Pigweed in summer fallow, lucerne, sorghum, maize, millets and sweet corn.		P		R4
Metobromuron (Soleto) GroChem	5**		Registered for control of Pigweed in potatoes.		P		R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of Pigweed in citrus, grapes, almonds, pome fruit and stone fruit.		P		R4
Chickweed (<i>Stellaria media</i>) Priority: Moderate							
Chickweed is ranked as a moderate priority. Low growing, winter annual weed that can continue growing all through summer. Targeting weed control prior to flowering is critical.							
Chloridazon (Rydazin) AgNova	5**	Silverbeet / Pre-Emergence	Registered in silverbeet for control of various broadleaf weeds, including Chickweed . Apply to the soil the day of sowing or as soon as possible after planting, but before the crop emerges. Irrigated within 10 days if soil moisture is inadequate to provide effective weed control.	NR	A	ALL	R4
Ethofumesate (Tramat) PER14703	15**	Silverbeet & Spinach / Pre-emergence	Permitted in silverbeet & spinach for control of various grass & broadleaf weeds, including Chickweed . Apply to the soil before crop and weed emergence. Do not mechanically incorporate in spinach. Maximum of 1 application per crop.	NR	A	ALL (excl. VIC)	R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Phenmedipham (Betanal Flow) Bayer	5**	Silverbeet / Post- Emergence	Registered in silverbeet for control of various grass and broadleaf weeds, including Chickweed . Apply as a foliar spray to weeds at uniform 2 leaf stage. Maximum number of applications per crop not specified.	28	A	ALL	R4
Phenmedipham (Betanal Flow) Bayer PER81241	5**	Spinach / Post- Emergence	Permitted in spinach for control of various grass and broadleaf weeds, including Chickweed . Apply as a foliar spray within 14 days of transplanting or emergence of the crop. When the majority of weeds have germinated and are at the 2-4 leaf stage. Maximum of 1 application per crop.	28 NG	A	ALL (excl. VIC)	R4
Propachlor (Ramrod) PER12008	15**	Silverbeet & Spinach / Pre- Emergence	Permitted in silverbeet & spinach for control of various annual grass & broadleaf weeds, including Chickweed . Apply to the soil surface immediately after planting or transplanting and incorporate as soon as possible by rainfall or irrigation.	NR	A	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre- Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including suppression of Chickweed . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of grass and broadleaf weeds including Chickweed in asparagus, citrus, grapes, nuts, stone & pome fruits.		P		R4
Oxyfluorfen (Goal)	14**		Registered for control of grass and broadleaf weeds, including Chickweed in fallow, Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Annual Ryegrass (<i>Lolium rigidum</i>) Priority: Moderate							
Annual Ryegrass is ranked as a moderate priority. Annual Ryegrass is the most serious grass weed of southern Australia with distribution that is gradually extending north. Populations 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.							
Clethodim (Select) PER82459	1***	Silverbeet & Spinach / Post- Emergent	Permitted in silverbeet & spinach for control of various grass weeds, including Annual Ryegrass . Apply post-emergence when weeds are at 2-leaf to full tillered stage. Maximum of 1 application per crop.	28	A	ALL	R4
Fluazifop-P-Butyl (Fusilade)	1***	Silverbeet & Spinach / Post- Emergence	Registered in silverbeet & spinach for control of various grass weeds, including Annual Ryegrass . Apply as a foliar spray to young, actively growing weeds. Maximum of 1 application per crop.	28 G:28	A	ALL	R3
Fluazifop-P-Butyl (Fusilade) PER81244	1***	Silverbeet & Spinach / Post- Emergence	Permitted in silverbeet & spinach for control of various grass weeds, including Annual Ryegrass . Apply as a foliar spray to young, actively growing weeds. Maximum of 1 application per crop.	28 G:28	A	ALL (excl. VIC)	R3
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Propachlor (Ramrod) PER12008	15**	Silverbeet & Spinach / Pre- Emergence	Permitted in silverbeet & spinach for control of various annual grass & broadleaf weeds, including Annual Ryegrass . Apply to the soil surface immediately after planting or transplanting and incorporate as soon as possible by rainfall or irrigation.	NR	A	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre- Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including Annual Ryegrass . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4
Aclonifen (Emerger) Bayer	32**		Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Amitrole	34**		Registered for control of Annual Ryegrass in fallow and potatoes.		P		R4
Dimethenamid-P (Outlook)	15**		Registered for pre-emergent control of grass and broadleaf weeds in sweet corn, beans, peas, pumpkins and kabocha.		P		R4
Napropamide (Devrinol)	0**		Registered for control of Annual Ryegrass in almonds, grapevines, stone fruit, tomatoes and canola.		P		R4
Nonanoic Acid (Beloukha)	-		Registered for control of Annual Ryegrass in non-crop areas, turf, orchards & vineyards, fallow and forestry.		P		R4
Marshmallow (<i>Malva parviflora</i>) Priority: Moderate							
Marshmallow is ranked as a moderate priority. Annual broadleaf weed that is adapted to a wide variety of environments and is highly competitive. Control with knockdown herbicides can be unreliable.							
Chloridazon (Rydazin) AgNova	5**	Silverbeet / Pre-Emergence	Registered in silverbeet for control of various broadleaf weeds, including Marshmallow . Apply to the soil the day of sowing or as soon as possible after planting, but before the crop emerges. Irrigated within 10 days if soil moisture is inadequate to provide effective weed control.	NR	A	ALL	R4
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Flumioxazin (Chateau) Sumitomo	14**		Registered for control of Marshmallow in grapes, pome fruit, stone fruit, citrus, nut trees, olives, avocados and berries.		P		R4
Fluroxypyr (Starane) Corteva	4**		Registered for control of Small Flowered Mallow in fallows.		P		R4
Oxyfluorfen (Goal)	14**		Registered for control of grass and broadleaf weeds, including Small Flowered Mallow in fallow, Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Couch Grass (<i>Cynodon dactylon</i>) Priority: Moderate Couch Grass is ranked as a moderate priority. Aggressive and highly competitive perennial grass that grows year-round in most areas. Herbicide control is effectively provided it is targeted to young, actively growing weeds. Multiple applications are usually required. There are limited in-crop herbicide options available.							
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Aclonifen (Emerger) Bayer	32**		Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		R4
Dimethenamid-P (Outlook)	15**		Registered for pre-emergent control of grass and broadleaf weeds in sweet corn, beans, peas, pumpkins and kabocha.		P		R4
Nonanoic Acid (Beloukha)	-		Registered for control of Couch Grass in non-crop areas, turf, orchards & vineyards, fallow and forestry.		P		R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of various grass and broadleaf weeds, including suppression of Couch Grass in citrus, grapes, almonds, pome fruit and stone fruit.		P		R4
Sowthistle (<i>Sonchus oleraceus</i>) Priority: Moderate Sowthistle is ranked as a moderate priority. Annual broadleaf weed that is prolific and widespread in all regions, and is prone to development of herbicide resistance. Timely herbicide control can be effective provided that weeds are targeted when they are young and actively growing.							
Chloridazon (Rydazin) AgNova	5**	Silverbeet / Pre- Emergence	Registered in silverbeet for control of various broadleaf weeds, including Sowthistle . Apply to the soil the day of sowing or as soon as possible after planting, but before the crop emerges. Irrigated within 10 days if soil moisture is inadequate to provide effective weed control.	NR	A	ALL	R4
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Phenmedipham (Betanal Flow) Bayer	5**	Silverbeet / Post- Emergence	Registered in silverbeet for control of various grass and broadleaf weeds, including Sowthistle . Apply as a foliar spray to weeds at uniform 2 leaf stage. Maximum number of applications per crop not specified.	28	A	ALL	R4
Phenmedipham (Betanal Flow) Bayer PER81241	5**	Spinach / Post- Emergence	Permitted in spinach for control of various grass and broadleaf weeds, including Sowthistle . Apply as a foliar spray within 14 days of transplanting or emergence of the crop. When the majority of weeds have germinated and are at the 2-4 leaf stage. Maximum of 1 application per crop.	28 NG	A	ALL (excl. VIC)	R4
Propachlor (Ramrod) PER12008	15**	Silverbeet & Spinach / Pre- Emergence	Permitted in silverbeet & spinach for control of various annual grass & broadleaf weeds, including Sowthistle . Apply to the soil surface immediately after planting or transplanting and incorporate as soon as possible by rainfall or irrigation.	NR	A	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre- Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including suppression of Sowthistle . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4
Isoxaben (Gallery) Corteva	29**		Registered for control of Sowthistle in non-crop, forests, fencelines, tree fruit & nut orchards, vineyards, nursery & amenity tree plantings.		P		R4
Napropamide (Devrinol)	0**		Registered for control of Sowthistle in almonds, grapevines, stone fruit, tomatoes and canola.		P		R4
Nonanoic Acid (Beloukha)	-		Registered for control of Sowthistle in non-crop areas, turf, orchards & vineyards, fallow and forestry.		P		R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of grass and broadleaf weeds including Sowthistle in asparagus, citrus, grapes, nuts, stone & pome fruits.		P		R4
Oxyfluorfen (Goal)	14**		Registered for control of grass and broadleaf weeds, including Sowthistle in fallow, Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Slender Celery (<i>Cyclospermum leptophyllum</i>) Priority: Moderate Slender Celery is ranked as a moderate priority. Annual broadleaf that has fine, thread-like foliage and is difficult to control with post-emergence herbicides.							
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Aclonifen (Emerger) Bayer	32**		Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		R4
Feathertop Rhodes Grass (<i>Chloris virgata</i>) Priority: Moderate Feathertop Rhodes Grass is ranked as a moderate priority.							
Clethodim (Select) PER82459	1***	Silverbeet & Spinach / Post- Emergent	Permitted in silverbeet & spinach for control of various grass weeds, including Feathertop Rhodes Grass . Apply post-emergence when weeds are at 2-leaf to full tillered stage. Maximum of 1 application per crop.	28	A	ALL	R4
Glyphosate	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds as a pre-crop spray or fallow spray.	NR	A	ALL	R3
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet / Pre- Emergence	Registered in spinach & silverbeet for control of various annual grass & broadleaf weeds, including Feathertop Rhodes Grass . Apply to the soil immediately before, at or immediately after sowing, or in the case of transplanting, immediately before transplanting. Maximum of 1 application per crop.	NR G:56	A	ALL	R4
Aclonifen (Emerger) Bayer	32**		Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		R4
Dimethenamid-P (Outlook)	15**		Registered for pre-emergent control of grass and broadleaf weeds in sweet corn, beans, peas, pumpkins and kabocha.		P		R4

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
MRL Databases (DAFF)	https://www.agriculture.gov.au/agriculture-land/farm-food-drought/food/nrs/databases
APVMA Permit search	https://productsearch.apvma.gov.au/permits
APVMA Product search	https://productsearch.apvma.gov.au/products
AUSVEG	https://ausveg.com.au
Cotton Pest Management Guide 2025-26	https://www.cottoninfo.com.au/publications/cotton-pest-management-guide
CropLife Australia (resistance management)	https://www.croplife.org.au/resources/programs/resistance-management/
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, nematocides, 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 spinach and silverbeet

Appendix 2. Products available for control of insects and mites in spinach and silverbeet

Appendix 3. Products available for weed control in spinach and silverbeet

Appendix 4. Current permits for use in spinach and silverbeet

Appendix 5. Spinach and silverbeet Maximum Residue Limits (MRLs)

Appendix 6. Spinach and silverbeet Agrichemical Regulatory Risk Assessment

Appendix 1. Products available for disease control in spinach and silverbeet

Active Ingredient (Trade Name)	Chemical group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
1,3-dichloropropene + Chloropicrin	8B	Vegetables / Soil fumigant	Plant parasitic nematodes, symphylans, wireworms, soil borne diseases (including <i>Fusarium</i> , <i>Verticillium</i> wilts, <i>Rhizoctonia</i> , & <i>Pythium</i>) and suppression of weeds. <i>For use by professional and registered fumigators only.</i>	ALL	NR	R4
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Leafy Vegetables including spinach & silverbeet	Downy Mildew (<i>Hyaloperonospora</i> spp., <i>Peronospora</i> spp.) Suppression of: Alternaria Leaf Spot (<i>Alternaria</i> spp.) Sclerotinia Rot (<i>Sclerotinia</i> spp.)	ALL	3 NG	R4
Boscalid (Filan)	7	Leafy Vegetables	Sclerotinia Rot (<i>Sclerotinia minor</i> , <i>S. sclerotiorum</i>)	ALL	7	R4
Chlorothalonil (Bravo) PER82895	M5	Spinach & Silverbeet	Downy Mildew Alternaria Leaf Blight (<i>Alternaria</i> spp.) Grey Mould (<i>Botrytis cinerea</i>)	ALL (excl. VIC)	7	R2
Copper	M1	Spinach & Silverbeet	Downy Mildew	ALL	1	R4
Cyazofamid (Ranman) UPL	21	Spinach	Downy Mildew (<i>Peronospora</i> spp.)	ALL	3	R4
		Spinach & Silverbeet / Field Grown	Pythium Damping Off (<i>Pythium</i> spp.)			
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Leafy Vegetables including Spinach & Silverbeet	Sclerotinia (<i>Sclerotinia minor</i> , <i>S.sclerotiorum</i>)	ALL	7	R4
Dazomet (Basamid)	8F	General soil fumigant	Pre-plant fumigant in seed beds for control of soil fungi including <i>Pythium</i> , <i>Phytophthora</i> , <i>Sclerotinia</i> , <i>Sclerotium</i> , <i>Rhizoctonia</i> , <i>Verticillium</i> , <i>Plasmodiophora</i> , <i>Armillaria</i> and <i>Fusarium</i> spp. Nematodes, plus insects, weeds & soil fungi	ALL	NR	R4

Active Ingredient (Trade Name)	Chemical group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Difenoconazole PER87973	3	Silverbeet & Spinach	Powdery Mildew (<i>Erysiphe betae</i>)	ALL (excl. VIC)	7 NG	R3
Dimethomorph + Ametoctradin (Zampro) AgNova	40+45	Leafy Vegetables	Downy Mildew (<i>Hyaloperonospora parasitica</i> , <i>Peronospora farinosa</i> , <i>Bremia lactucae</i>)	ALL	3	R4
Dimethomorph (Acrobat) & Mancozeb PER14958	40 + M3	Silverbeet & Spinach	Downy Mildew (<i>Peronospora</i> spp.)	ALL (excl. VIC)	14 NG	R2
Iodine	-	Leafy Vegetables	Post-Harvest Sanitiser – Bacteria and Fungi	ALL	NR	R4
Iprodione (Rovral) PER84955	2	Silverbeet & Spinach	Sclerotinia (<i>Sclerotinia</i> spp.) Grey Mould (<i>Botrytis cinerea</i>)	ALL (excl. VIC)	7 NG	R4
Mancozeb	M3	Silverbeet & Spinach	Cercospora Leaf Spot Downy Mildew	ALL	14	R2
Mandipropamid (Revus) Syngenta	40	Leafy Vegetables including silverbeet & spinach	Downy Mildew (<i>Hyaloperonospora</i> spp., <i>Peronospora</i> spp.)	ALL	1 NG	R4
Metalaxyl-M + Fludioxonil (Maxim XL) Syngenta	4+12	Spinach & Silverbeet	Damping Off (<i>Rhizoctonia solani</i> , <i>Phytophthora</i> spp.)	ALL	NR G:28	R4
Metalaxyl-M + Mancozeb (Ridomil Gold MZ) Syngenta PER13673	4+M3	Silverbeet & Spinach	Downy Mildew (<i>Peronospora</i> spp.)	ALL (excl. VIC)	14	R2
Metham Sodium	-	Food Crops / Pre-Plant Fumigant	Fungal diseases including <i>Rhizoctonia</i> , <i>Pythium</i> , <i>Fusarium</i> , <i>Phytophthora</i> , <i>Verticillium</i> , <i>Sclerotinia</i> and Club Root of crucifers & Nematodes	ALL	NR	R4
Oxathiapiprolin (Zorvec Enicade) Corteva	49	Spinach	Downy Mildew (<i>Bremia lactucae</i> , <i>Peronospora</i> <i>farinose</i>)	ALL	3 NG	R4

Active Ingredient (Trade Name)	Chemical group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Oxathiapiprolin + Famoxadone (Zorvec Encantia) Corteva	49+11	Spinach	Downy Mildew (<i>Peronospora</i> spp.)	ALL	3 NG	R4
Penthiopyrad (Fontelis) Corteva	7	Leafy Vegetables including silverbeet & spinach	Sclerotinia Rot / Lettuce Drop (<i>Sclerotinia</i> spp.) Grey Mould (<i>Botrytis cinerea</i>) Powdery Mildew (<i>Erysiphe cichoracearum</i>)	ALL	3	R4
Phosphorous Acid PER11951	33	Spinach & Silverbeet	Downy Mildew	ALL (excl. VIC)	NR	R4
Potassium Bicarbonate (EcoCarb) PER13695	M2	Silverbeet	Powdery Mildew	ALL (excl. VIC)	NR	R4
Propamocarb Hydrochloride + Fluopicolide (Infinito) Bayer	28+43	Leafy Vegetables	Downy Mildew (<i>Peronospora farinosa</i> , <i>Peronospora parasitica</i>)	ALL	7	R4
Propiconazole (Tilt) PER14479	3	Spinach	Leaf Spot (<i>Cercospora</i> spp.)	ALL (excl. VIC)	7 NG	R3
		Silverbeet	Suppression of: Leaf Spot (<i>Cercospora beticola</i>) Powdery Mildew (<i>Erysiphe polygoni</i>) Rust (<i>Uromyces betae</i>)			
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Leafy Vegetables including spinach & silverbeet	Grey Mould (<i>Botrytis cinerea</i>) White Mould (<i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i>)	ALL	3 NG	R4
Quinoxifen (Vitae)	13	Silverbeet including Swiss chard & spinach beet	Powdery Mildew (<i>Erysiphe betae</i>)	ALL	7	R4

Active Ingredient (Trade Name)	Chemical group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
<i>Streptomyces lydicus</i> WYEC108 (Actinovate) Novozymes Bioag	BM 02	Vegetables	As a seed treatment for <i>Fusarium</i> , <i>Rhizoctonia</i> & <i>Pythium</i> Management	ALL	NR	R4
Sulphur	M2	Vegetables	Powdery Mildew and Rust	ALL	NR	R4
Tebuconazole	3	Silverbeet & Spinach	Sclerotinia Rot (<i>Sclerotinia</i> spp.)	ALL	35 NG	R4
Thiram PER97200	M3	Spinach & Silverbeet	Damping Off (<i>Pythium</i> spp., <i>Rhizoctonia solani</i> , <i>Fusarium</i> spp., <i>Sclerotium rolfsi</i>)	VIC	NR	R2
Trifloxystrobin (Flint) PER14494	11	Silverbeet & Spinach	Powdery Mildew (<i>Erysiphe</i> spp.)	ALL (excl. VIC)	3	R4
Zineb PER14839	M3	Spinach & Silverbeet	Anthracnose (<i>Colletotrichum</i> spp.)	ALL (excl. VIC)	14	R2

Appendix 2. Products available for control of insects and mites in spinach and silverbeet

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
1,3-dichloropropene + Chloropicrin	8	Vegetables	Soil borne pests including Nematodes. <i>For use by professional and registered fumigators only.</i>	ALL	NR	R4
Abamectin	6	Leafy Vegetables including Silverbeet & Spinach	Western Flower Thrips (<i>Frankliniella occidentalis</i>)	ALL	3 G:3	R3
Abamectin PER96481	6	Leafy Vegetables (except lettuce)	Suppression of: Liriomyza Leafminers, including: Vegetable Leafminer (<i>Liriomyza sativae</i>) Serpentine Leafminer (<i>Liriomyza huidobrensis</i>)	ALL (excl. VIC)	14 NG	R3
Afidopyropen (Versys) BASF	9D	Leafy Vegetables	Green Peach Aphid (<i>Myzus persicae</i>) Cabbage Aphid (<i>Brevicoryne brassicae</i>) Currant Lettuce Aphid (<i>Nasonovia ribis-nigri</i>) Cotton Aphid / Melon Aphid (<i>Aphis gossypii</i>) Corn Aphid (<i>Rhopalosiphum maydis</i>) Suppression of: Silverleaf Whitefly (<i>Bemisia tabaci</i>)	ALL	1	R4
<i>Bacillus thuringiensis subsp.</i> <i>kurstaki</i> (DiPel)	11A	Vegetables	Lepidoptera	ALL	NR	R4
<i>Beauveria bassiana</i> (Velifer) BASF	UNF	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	R4
Chlorantraniliprole (Coragen) FMC	28	Leafy Vegetables including spinach & silverbeet	Cotton Bollworm (<i>Helicoverpa armigera</i>) Native Budworm (<i>Helicoverpa punctigera</i>)	ALL	3 G:7	R4

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Chlorantraniliprole (Coragen) FMC PER87631	28	Spinach & Silverbeet	Suppression of Leaf miners (<i>Liriomyza</i> spp.) including: Cabbage Leaf Miner (<i>Liriomyza brassicae</i>) Vegetable Leaf Miner (<i>Liriomyza sativae</i>) Serpentine Leaf Miner (<i>Liriomyza huidobrensis</i>)	ALL (excl. VIC)	3 G:7	R4
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta	28+4A	Leafy Vegetables including silverbeet & spinach	Corn Earworm (<i>Helicoverpa armigera</i>) Native Budworm (<i>Helicoverpa punctigera</i>) Cluster Caterpillar (<i>Spodoptera litura</i>) Looper (<i>Chrysodeixis</i> spp.) Lettuce Aphid (<i>Nasonovia ribis-nigri</i>) Green Peach Aphid (<i>Myzus persicae</i>) Brown Sowthistle Aphid (<i>Uroleucon sonchi</i>) Silverleaf Whitefly (<i>Bemisia tabaci</i>) Western Flower Thrips (<i>Frankliniella occidentalis</i>) Vegetable Leafhopper (<i>Austroasca viridigrisea</i>) Lucerne Leafroller (<i>Merophyas divulsana</i>)	ALL	28	R2
Chlorantraniliprole + Thiamethoxam (Durivo) Syngenta PER94452	28+4A	Silverbeet & Spinach	Liriomyza Leafminers, including: Vegetable Leafminer (<i>Liriomyza sativae</i>) Pea Leafminer / Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) American Serpentine Leafminer (<i>Liriomyza trifolii</i>)	ALL (excl. VIC)	28	R2
Dazomet (Basamid)	8F	Soil fumigant	Soil fungi, Nematodes, soil insects and weeds.	ALL	NR	R4
Dimpropridaz (Efficon) BASF	36	Leafy Vegetables including silverbeet & spinach	Green Peach Aphid (<i>Myzus persicae</i>) Cabbage Aphid (<i>Brevicoryne brassicae</i>)	ALL	1	R4
Emamectin (Proclaim Opti) Syngenta	6	Leafy Vegetables including spinach & silverbeet	Diamondback Moth /Cabbage Moth (<i>Plutella xylostella</i>) Cabbage White Butterfly (<i>Pieris rapae</i>) Heliothis (<i>Helicoverpa</i> spp.) Cluster Caterpillar (<i>Spodoptera litura</i>) Loopers (<i>Chrysodeixis</i> spp.) Cabbage Centre Grub (<i>Hellula hydralis</i>)	ALL	3 NG	R3

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Emamectin (Proclaim Opti) Syngenta PER14907	6	Leafy Vegetables / Protected	Diamondback Moth (<i>Plutella xylostella</i>) Heliothis (<i>Helicoverpa</i> spp.) Cabbage White Butterfly (<i>Pieris rapae</i>) Vegetable Looper (<i>Chrysodeixis</i> spp.)	ALL (excl. VIC)	1 NG	R3
Emulsifiable Botanical Oil (Eco-Oil)	-	Vegetables	Greenhouse Whitefly	ALL	NR	R4
Flubendiamide (Belt) Bayer	28	Leafy Vegetables including spinach & silverbeet	Heliothis (<i>Helicoverpa</i> spp.)	ALL	1	R4
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Vegetables	Ants, Aphids, Caterpillars, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers	ALL	1	R4
Imidacloprid PER10918	4A	Silverbeet & Spinach	Greenhouse Whitefly (<i>Trialeurodes vaporariorum</i>) Aphids	ALL (excl. VIC)	7	R2
Indoxacarb (Avatar Evo) FMC	22A	Leafy Vegetables including silverbeet & spinach	Cotton Bollworm (<i>Helicoverpa armigera</i>) Native Budworm (<i>Helicoverpa punctigera</i>) Lucerne Leafroller (<i>Merophyas divulsana</i>)	ALL	3 NG	R4
Iron Powder	-	Vegetables	Slugs & Snails	ALL	NR	R4
Metaldehyde	-	Vegetables	Slugs & Snails	ALL	7 NG	R4
Metham Sodium	-	Pre-Plant Soil Fumigant	Plant parasitic Nematodes, weed seeds, and various fungal diseases	ALL	NR	R4
Methomyl PER82428	1A	Silverbeet	<i>Helicoverpa</i> spp. Cucumber Moth Cluster Caterpillar Loopers Webworm Rutherglen Bug Thrips including Western Flower Thrips	ALL	14	R2

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Nuclear Polyhedrosis Virus of <i>Helicoverpa armigera</i> (Vivus Max) AgBiTech	31	Leafy Vegetables including silverbeet & spinach	Cotton Bollworm (<i>Helicoverpa armigera</i>) Native Budworm (<i>Helicoverpa punctigera</i>)	ALL	NR	R4
Petroleum Oil PER12221	-	Silverbeet & Spinach	Aphids Green Mirid Green Vegetable Bug Grey Cluster Bug Leafhoppers Mites Rutherglen Bug Thrips	ALL (excl. VIC)	1	R4
Pirimicarb (Aphidex)	1A	Leafy Vegetables	Aphids	ALL	2	R4
Potassium Salts of Fatty Acids (Natrasoap)	-	Vegetables	Aphids, Thrips, Mealybug, Two Spotted Mites, Spider Mite and Whitefly	ALL	NR	R4
Propargite (Omite)	12C	Vegetables	Two-Spotted Mites & Spider Mites	ALL	7	R3
Pymetrozine (Chess) Syngenta	9B	Leafy Vegetables including spinach & silverbeet	Potato Aphid (<i>Macrosiphum euphorbiae</i>) Melon Aphid (<i>Aphis gossypii</i>) Green Peach Aphid (<i>Myzus persicae</i>)	ALL	3	R3
Spinetoram (Success Neo) Corteva	5	Leafy Vegetables including silverbeet & spinach	Loopers Heliothis (<i>Helicoverpa</i> spp.) Western Flower Thrips	ALL	3 NG	R4
Spinetoram (Success Neo) Corteva PER13322	5	Spinach	Potato Moth (<i>Phthorimaea operculella</i>)	ALL (excl. VIC)	3 NG	R4

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spinetoram (Success Neo) Corteva PER94451	5	Silverbeet & Spinach	Leafminers (<i>Liriomyza</i> spp.), including: Vegetable Leafminer (<i>Liriomyza sativae</i>) Pea Leafminer / Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) American Serpentine Leafminer (<i>Liriomyza trifolii</i>)	ALL (excl. VIC)	3 NG	R4
Spinosad (Entrust Organic) Corteva	5	Leafy Vegetables including silverbeet & spinach	Loopers Heliothis Western Flower Thrips	ALL	3 G:14	R4
Spinosad (Entrust Organic) Corteva PER89870	5	Leafy Vegetables	Fall Armyworm (<i>Spodoptera frugiperda</i>)	ALL (excl. VIC)	3 G:14	R4
Spinosad (Entrust Organic) Corteva PER96806	5	Silverbeet & Spinach	Leafminers (<i>Liriomyza</i> spp.), including: Vegetable Leafminer (<i>Liriomyza sativae</i>) Pea Leafminer / Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) American Serpentine Leafminer (<i>Liriomyza trifolii</i>)	ALL (excl. VIC)	3 G:14	R4
Spirotetramat (Movento) Bayer	23	Leafy Vegetables including silverbeet & spinach	Green Peach Aphid (<i>Myzus persicae</i>)	ALL	3	R4
<i>Spodoptera frugiperda</i> Multiple Nucleopolyhedrovirus (Fawligen) Agbitech PER90820	31	Leafy Vegetables	Fall Armyworm (<i>Spodoptera frugiperda</i>)	ALL	NR	R4
Sulfoxaflor (Transform) Corteva	4C	Leafy Vegetables including silverbeet & spinach	Brown Sowthistle Aphid Green Peach Aphid Greenhouse Whitefly Rutherglen Bug	ALL	3	R4

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Sulphur	UN	Vegetables	Mites	ALL	NR	R4
Trichlorfon (Lepidex)	1B	Vegetables	Cabbage White Butterfly, Cabbage Moth, Rutherglen Bug & Green Vegetable Bug	ALL	2	R3

Appendix 3. Products available for weed control in spinach and silverbeet

Active Ingredient (Trade Name)	Chemical Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
1,3-dichloropropene + Chloropicrin	8	Vegetables	Plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. <i>For use by professional and registered fumigators only.</i>	NR	ALL	R4
Chloridazon (Rydazin) AgNova	5**	Silverbeet	Bitter Cress, Blackberry Nightshade, Black Bindweed, Capeweed, Chamomile, Charlock, Chickweed, Common Sowthistle, Cotula, Deadnettle, Docks, Dwarf Nettle, Fat Hen, Field Poppy, Groundsel, Marshmallow, Mustard, Pale Persicaria, Penny Cress, Persicaria, Pig Weed, Potato-Weed, Scarlet Pimpernel, Shepherd's Purse, Sowthistle, Speedwell, Spurry, Stagger Weed, Wild Radish, Winter Grass	NR	ALL	R4
Clethodim (Select) PER82459	1***	Silverbeet & Spinach / Post-Emergent	Grass Weeds	28	ALL	R4
Ethofumesate (Tramat) PER14703	15**	Silverbeet & Spinach	Grass & Broadleaf Weeds	NR	ALL (excl. VIC)	R4
Fluazifop-P-Butyl (Fusilade)	1***	Silverbeet & Spinach	Grass Weeds	28 G:28	ALL	R3
Fluazifop-P-Butyl (Fusilade) PER81244	1***	Silverbeet & Spinach	Grass Weeds	28 G:28	ALL (excl. VIC)	R3
Glyphosate (Roundup)	9**	General Pre-Crop Spray	Grass and Broadleaf Weeds	NR	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
Phenmedipham (Betanal Flow) Bayer	5**	Silverbeet	Fat Hen, Chickweed, Potato Weed, Pigweed, Common Thornapple, Bitter Cress (Tas. Lesser Swine Cress), Bellvine, Penny Cress, Corn Spurry, Alkanet, Wild Radish, Common Groundsel, Charlock, Common Sowthistle, Shepherd's Purse, Dead Nettle, Dwarf Nettle, Common Fumitory, Redshank (Tas. Amaranthus), Green Amaranth, Bindweed, Persicaria (Tas. Redshank), Winter Grass, Blackberry Nightshade.	28	ALL	R4
Phenmedipham (Betanal Flow) Bayer PER81241	5**	Spinach	Grass and Broadleaf Weeds	28 NG	ALL (excl. VIC)	R4
Propachlor (Ramrod) PER12008	15**	Silverbeet & Spinach	Annual Grass & Broadleaf Weeds	NR	ALL (excl. VIC)	R4
S-Metolachlor (Dual Gold)	15**	Spinach & Silverbeet	Annual Ryegrass, Apple of Peru, Awnless Barnyard Grass, Blackberry Nightshade, Chickweed (suppression), Common Cotula, Common Sowthistle (suppression), Crowsfoot Grass, Deadnettle, Fat Hen, Feathertop Rhodes Grass, Fiddle Dock, Fierce Thornapple (suppression), Italian Ryegrass, Liverseed Grass, Love Grass, Nettleleaf Goosefoot (suppression), Pigeon Grass, Pigweed (suppression), Potato Weed, Redroot Amaranth (suppression), Shepherd's Purse, Stinging Nettle, Summer Grass, Twiggy Turnip (suppression), Winter Grass, Wireweed (suppression), Yellow Weed	NR G:56	ALL	R4

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

Appendix 4. Current permits for use in spinach and silverbeet

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER82459 Version 2	Clethodim (Select) / Silverbeet & Spinach / Grass Weeds	19-Apr-17	30-Sep-26	Hort Innovation
PER10918 Version 4	Imidacloprid / Silverbeet & Spinach / Greenhouse Whitefly, Aphids	30-Jun-15	31-Oct-26	Hort Innovation
PER13322 Version 3	Spinetoram (Success Neo) / Spinach / Potato Moth	12-Jun-12	31-Mar-27	Hort Innovation
PER90820 Version 4	Spodoptera frugiperda Multiple Nucleopolyhedrovirus (Fawligen) / Leafy Vegetables / Fall Armyworm	30-Mar-21	31-Mar-27	Agbitech Pty Ltd
PER97200	Thiram / Spinach & Silverbeet / Damping Off	24-Mar-26	31-Mar-27	Croda Aust Pty Ltd
PER81244 Version 4	Fluazifop-P-Butyl (Fusilade) / Silverbeet & Spinach / Grass Weeds	01-Jul-16	30-Apr-27	Hort Innovation
PER94451	Spinetoram (Success Neo) / Silverbeet & Spinach / Liriomyza Leafminers	05-Jul-24	31-Jul-27	Hort Innovation
PER14494 Version 3	Trifloxystrobin (Flint) / Silverbeet & Spinach / Powdery Mildew	01-Oct-14	31-Aug-27	Hort Innovation
PER12221 Version 5	Petroleum Oil / Silverbeet & Spinach / Various Insect Pests	29-Jun-12	30-Sep-27	Hort Innovation
PER14958 Version 3	Dimethomorph & Mancozeb / Silverbeet & Spinach / Downy Mildew	21-Dec-14	31-Oct-27	Hort Innovation
PER84955 Version 2	Iprodione (Rovral) / Silverbeet & Spinach / Sclerotinia & Grey Mould	12-Feb-18	30-Nov-27	Hort Innovation
PER81241 Version 4	Phenmedipham (Betanal) / Spinach / Grass & Broadleaf Weeds	29-May-15	31-Mar-28	Hort Innovation
PER94452 Version 2	Chlorantraniliprole + Thiamethoxam (Durivo) / Silverbeet & Spinach / Liriomyza Leafminers	11-Jun-24	31-Mar-28	Hort Innovation
PER96481	Abamectin / Leafy Vegetables / Liriomyza Leafminers	08-Aug-25	31-Jul-28	Hort Innovation
PER12008 Version 7	Propachlor (Ramrod) / Silverbeet & Spinach / Annual Grass & Broadleaf Weeds	18-Jun-12	31-Aug-28	Hort Innovation
PER82428 Version 5	Methomyl / Silverbeet / Various Insect Pests	22-Apr-16	31-Jan-29	Hort Innovation
PER87631 Version 3	Chlorantraniliprole (Coragen) / Spinach & Silverbeet / Liriomyza Leafminers	21-Jun-19	31-Mar-29	Hort Innovation
PER14703 Version 4	Ethofumesate (Tramat) / Silverbeet & Spinach / Grass & Broadleaf Weeds	01-Aug-14	31-May-29	Hort Innovation

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER14839 Version 4	Zineb / Spinach & Silverbeet / Anthracnose	01-Aug-14	31-Jul-29	Hort Innovation
PER14479 Version 6	Propiconazole / Spinach, Silverbeet / Leaf Spot, Powdery Mildew, Rust	12-May-14	31-Aug-29	Hort Innovation
PER11951 Version 6	Phosphorous Acid / Spinach, Silverbeet / Downy Mildew	05-Dec-14	28-Feb-30	Hort Innovation
PER82895 Version 3	Chlorothalonil / Spinach & Silverbeet / Downy Mildew, Alternaria, Grey Mould	04-Aug-17	31-May-30	Hort Innovation
PER13695 Version 5	Potassium Bicarbonate (EcoCarb) / Silverbeet / Powdery Mildew	31-Oct-12	30-Jun-30	Hort Innovation
PER87973 Version 2	Difenoconazole / Silverbeet & Spinach / Powdery Mildew	27-Aug-20	30-Jun-30	Hort Innovation
PER14907 Version 5	Emamectin (Proclaim Opti) / Silverbeet & Spinach / Diamondback Moth, Heliothis, Cabbage White Butterfly, Vegetable Looper	09-Dec-14	30-Sep-30	Hort Innovation
PER89870 Version 3	Spinosad (Entrust Organic) / Leafy Vegetables / Fall Armyworm	21-Jul-20	31-Oct-30	Hort Innovation
PER96806	Spinosad (Entrust Organic) / Silverbeet & Spinach / Liriomyza Leafminers	05-May-26	30-May-31	Hort Innovation
PER13673 Version 5	Metalaxyl-M + Mancozeb (Ridomil Gold MZ) / Silverbeet & Spinach / Downy Mildew	22-Apr-13	31-May-31	Hort Innovation

Appendix 5. Spinach and Silverbeet Maximum Residue Limits (MRLs)

CODEX commodity groupings of leafy vegetables and subgroups:

VL 0053	Leafy vegetables
VL 2050	Leafy greens
VL 0502	Spinach
VL 0464	Chard [silver beet]
VL 4373	Silverbeet
	Vegetables

Note: Major export markets for spinach and silverbeet include Malaysia, Singapore, Thailand, Hong Kong and UAE. Available information indicates that in the absence specific limits in legislation the most countries defer to Codex, followed by EU MRL standards, or apply a 0.01ppm default value. Food exported to New Zealand from Australia may be legally sold if it complies with Australian requirements. MRLs and legislation are subject to change; the values presented should not be relied on.

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
2,2-DPA		Vegetables	*0.1	-
Abamectin	VL0053	Leafy vegetables	T0.5	-
Acibenzolar-S-Methyl	VL0502	Spinach	-	0.6
Afidopyropen	VL0053	Leafy vegetables	5	-
	VL2050	Leafy greens	-	2
Aldrin & Dieldrin	VL0053	Leafy vegetables	-	E0.05
Ametoctradin	VL0053	Leafy vegetables	50	50
Azoxystrobin	VL0053	Leafy vegetables {except chervil; mizuna; rucola}	15	-
Bifenthrin	VL0053	Leafy vegetables {except chervil; mizuna; rucola[rocket]}	*0.01	-
Boscalid	VL0053	Leafy vegetables	30	40
Broflanilide	VL0053	Leafy vegetables	4	-
Chlorantraniliprole	VL0053	Leafy vegetables {except lettuce, head; rucola [rocket]}	15	-
	VL0053	Leafy vegetables {except radish leaves}	-	20
Chlordane		Vegetables {except fruiting vegetables, cucurbits, sugar beet}	E0.02	-
Chloridazon	VL0502	Spinach	1	-
	VL0464	Chard [silver beet]	1	-
Chlorothalonil	VL0053	Leafy vegetables {except lettuce}	T100	-
	VL0464	Chard [silver beet]		50
Chlorpyrifos		Vegetables {except asparagus; brassica vegetables; cassava; celery; leek; peppers, sweet [capsicum]; potato; swede; sweet potato; taro; tomato}	T*0.01	-
Clothianidin	VL0053	Leafy vegetables	0.7	2
Cyantraniliprole	VL0053	Leafy vegetables {except lettuce, head}	6	20

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Cyazofamid	VL0502	Spinach	15	-
	VL0464	Chard [silver beet]	15	-
	VL0053	Leafy vegetables {except brassica leafy vegetables}	-	10
Cyclaniliprole	VL0053	Leafy vegetables	4	-
	VL2050	Leafy greens	-	7
Cyhalothrin	VL0464	Chard [silver beet]	T0.5	-
Cypermethrin	VL0053	Leafy vegetables {except lettuce, head}	T5	-
Cypermethrins (including alpha- & zeta-cypermethrin)	VL0053	Leafy vegetables	-	0.7
Cyprodinil	VL0053	Leafy vegetables	10	-
	VL0053	Leafy vegetables {except brassica leafy vegetables}	-	50
DDT		Vegetables	E1	-
Deltamethrin	VL0053	Leafy vegetables	-	2
Diafenthiuron	VL0053	Leafy vegetables {except lettuce, head}	8	-
Diazinon		Vegetables	0.7	-
Dichlobenil	VL0053	Leafy vegetables	-	0.3
Dicofol		Vegetables {except cucumber; gherkin; tomato}	5	-
Difenoconazole	VL0502	Spinach	T5	-
	VL0464	Chard [silver beet]	T5	-
Dimethomorph	VL0053	Leafy vegetables	15	-
	VL0502	Spinach	-	30
Dimpropyridaz	VL0053	Leafy vegetables	15	-
Dinotefuran	VL0053	Leafy vegetables {except watercress}	-	6
Diquat		Vegetables {except beans; broad bean; lupin (dry); onion, bulb; peas; potato; soya bean (dry); sugar beet}	*0.05	-
Dithiocarbamates	VL0053	Leafy vegetables	5	-
EPTC		Vegetables	*0.04	-
Emamectin	VL0053	Leafy vegetables {except lettuce, head; lettuce, leaf}	T0.5	-
	VL0502	Spinach	-	0.05
Ethofumesate	VL0502	Spinach	T1	-
	VL0464	Chard [silver beet]	1	-
Famoxadone	VL0053	Leafy vegetables	40	-
Fipronil	VL0053	Leafy vegetables	-	0.01
Flonicamid	VL0502	Spinach	-	20
Floripicoxamid	VL 2050	Leafy greens	20	-
Fluazaindolizine	VL0053	Leafy vegetables	-	0.04
Fluazifop-p-butyl	VL0053	Leafy vegetables {except lettuce, head}	2	-
Flubendiamide	VL0053	Leafy vegetables {except lettuce, head}	10	-

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Fludioxonil	VL0053	Leafy vegetables	15	-
	VL0502	Spinach	-	30
Fluensulfone	VL0053	Leafy vegetables	-	1
	VL0502	Spinach	-	4
Fluopicolide	VL0053	Leafy vegetables	30	30
Fosetyl	VL0053	Leafy vegetables {except rucola[rocket]; spinach}	T0.2	-
	VL0502	Spinach	T0.7	20
Glyphosate	VL0053	Leafy vegetables	*0.1	-
Haloxypop	VL0053	Leafy vegetables	T0.5	-
Heptachlor		Vegetables {except carrot; soya bean (dry); tomato}	E0.05	-
Imidacloprid	VL0053	Leafy vegetables {except lettuce, head}	20	-
Indoxacarb	VL0053	Leafy vegetables {except lettuce, head}	5	-
Inorganic Bromide		Vegetables {except peppers, sweet [capsicum]}	20	-
Iprodione	VL0502	Spinach	T5	-
	VL0464	Chard [silver beet]	T15	-
Isocycloseram	VL 2050	Leafy greens	T8	-
Lindane		Vegetables	E2	-
Linuron	VS0624	Celery	*0.05	-
Malathion	VL0502	Spinach	-	3
Mandipropamid	VL0053	Leafy vegetables	30	25
Metalaxyl	VL0053	Leafy vegetables	0.3	-
	VL0502	Spinach	-	*0.02
Metaldehyde		Vegetables	1	-
Methomyl	VL0502	Spinach	T0.7	-
	VL0464	Chard [silver beet]	2	-
Methoxyfenozide	VS0624	Celery	-	-
Methyl Bromide		Vegetables {except cucumber; peppers}	T*0.05	-
Metolachlor	VL0502	Spinach	*0.01	-
	VL0464	Chard [silver beet]	*0.01	-
Myclobutanil	VL0053	Leafy vegetables	-	0.05
Novaluron	VL0053	Leafy vegetables	5	-
	VL0464	Chard [silver beet]	-	15
Oxadixyl	VL0053	Leafy vegetables	T5	-
Oxathiapiprolin	VL0053	Leafy vegetables {except lettuce, head}	15	-
			-	15
Paraquat		Vegetables {except potato, pulses}	*0.05	-
	VL0053	Leafy vegetables	-	0.07
Pendimethalin	VL0053	Leafy vegetables	*0.05	-
Penthiopyrad	VL0053	Leafy vegetables {except brassica leafy vegetables; lettuce, head}	50	-
	VL0053	Leafy vegetables {except brassica leafy vegetables}	-	30

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Permethrin	VL0502	Spinach	-	2
Phenmedipham	VL0053	Leafy vegetables {except chard[silverbeet]}	T1	-
	VL0464	Chard [silver beet]	2	-
Phorate	VL0053	Leafy vegetables	T*0.01	-
Phosphorous Acid	VL0053	Leafy vegetables	T150	-
Piperonyl Butoxide		Vegetables	8	-
	VL0502	Spinach	-	50
Pirimicarb	VL0053	Leafy vegetables	7	-
Prometryn		Vegetables	*0.1	-
Propachlor	VL0053	Leafy vegetables {except cos lettuce; lettuce, head; lettuce, leaf}	T1	-
Propamocarb	VL0053	Leafy vegetables	70	-
	VL0502	Spinach	-	40
Propargite		Vegetables	3	-
Propiconazole	VL0502	Spinach	T0.7	-
	VL0464	Chard [silver beet]	T0.5	-
Pydiflumetofen	VL0053	Leafy vegetables	15	-
Pyraclostrobin	VL0502	Spinach	-	0.6
Pyrethrins		Vegetables	1	-
Pymetrozine	VL0053	Leafy vegetables	5	-
Quinoxifen	VL0464	Chard [silver beet]	3	-
Sethoxydim	VL0053	Leafy vegetables {except lettuce, head; lettuce, leaf}	T1	-
Spinetoram	VL0053	Leafy vegetables	0.7	-
	VL0502	Spinach	-	8
Spinosad	VL0053	Leafy vegetables	5	10
Spiromesifen	VL0053	Leafy vegetables	-	15
Spirotetramat	VL0053	Leafy vegetables {except brassica leafy vegetables; lettuce, head; lettuce, leaf}	5	-
	VL0053	Leafy vegetables	-	7
Sulfoxaflor	VL0053	Leafy vegetables {except lettuce, head}	5	-
	VL0053	Leafy vegetables	-	6
Tebuconazole	VL0502	Spinach	T2	-
	VL0464	Chard [silver beet]	T2	-
Tebufenozide	VL0053	Leafy vegetables	-	10
Thiamethoxam	VL0053	Leafy vegetables	2	3
Trichlorfon	VL0053	Leafy vegetables	15	-
Trifloxystrobin	VL0502	Spinach	T10	20
	VL0464	Chard [silver beet]	T10	-
Trifluralin		Vegetables {except carrot; parsnip; fennel, bulb; galangal, greater}	0.05	-

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

* Indicates that an MRL is at the Limit of Quantitation (LOQ)

T =Temporary MRL

E = The MRL is based on extraneous residues

Sources: APVMA MRLs: Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2023. Compilation 16. Prepared 21 August 2026. CODEX MRLs: CODEX Alimentarius International Food Standards database (September 2026), <http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/>

Appendix 6: Spinach and Silverbeet Agrichemical Regulatory Risk Assessment

Spinach and Silverbeet Agrichemical Regulatory Risk Assessment

May 2026

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

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

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

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

R0	Use no longer approved
R1	Short-term: Critical concern over retaining access < 1 year
R2	Medium-term: Maintaining access of significant concern <2-5 years
R3	Long-term: Potential issues associated with use – Monitoring required < 5 years
R4	No current risk/concerns

INSECTICIDES/MITICIDES/NEMATOCIDES - Insect and other pests

Blue text = new APVMA approved uses

Active Constituent	MoA Group	Pest	Risks and Comments
ABAMECTIN	6	Western flower thrips. PER96481 for the control of leaf miner.	Australia: APVMA nominated for reconsideration and spray drift assessment . Permit PER96481 Expiry date: 31/07/2028 Canada: Re-evaluation finalised. Label amendments to mitigate risks to human health and environment (July, 2025)
AFIDOPYROPEN	9D	Cabbage aphid Cotton aphid Currant lettuce aphid Green peach aphid Silverleaf (Poinsettia) whitefly	Australia: No current concerns. EU: Not approved
ALPHA-CYPERMETHRIN	3A	Plague thrips Redlegged earth mite Vegetable weevil	Australia: APVMA nominated for reconsideration after 2029 . EU: Not approved
BACILLUS THURINGIENSIS	11A	Helicoverpa	Australia: No current concerns.
CHLORANTRANILIPROLE	28	Helicoverpa Lucerne leafroller Cluster caterpillar Looper caterpillars Permit PER87631 for the control of Cabbage leaf miner	Australia: No current concerns. Permit PER87631 Expiry date: 31/03/2029 Codex MRL: 20 mg/Kg Canada: In re-evaluation

Active Constituent	MoA Group	Pest	Risks and Comments
CHLORANTRANILIPROLE THIAMETHOXAM	28 + 4A	Helicoverpa Cluster Caterpillar Looper Lettuce Aphid Green Peach Aphid Brown Sowthistle Aphid Silverleaf Whitefly Western Flower Thrips Vegetable Leafhopper Lucerne Leafroller Permit PER94452 for the control of Leaf miners	CHLORANTRANILIPROLE Australia: No current concerns. Permit PER87631 Expiry date: 31/03/2029 Codex MRL: 20 mg/Kg Canada: In re-evaluation THIAMETHOXAM Australia: APVMA: Neonicotinoids chemical review has been delayed. The proposed regulatory decision unlikely before 2027. Codex MRL: 3 mg/Kg EU: Not approved Canada: In re-evaluation
CHLOROPICRIN 1,3-DICHLOROPROPENE	8B + 8A	Soil born diseases	CHLOROPICRIN Australia: No current concerns. EU: Not approved 1,3-DICHLOROPROPENE Australia: No current concerns. EU: Pending Canada: Cancelled
CHLORPYRIFOS	1B	--	Australia: The chemical review was completed in September 2024 . Most uses in horticultural crops were removed. After 30 September 2025, products with previously approved labels must not be supplied. The only remaining approved use is in Brassica crops as specified on current labels. EU: Not approved Canada: Cancelled
CYROMAZINE	17	Permit PER81867 for the control of Leaf miner	Australia: No current concerns. EU: Not approved
DIAZINON	1B	--	Australia: APVMA made a Final Decision on 2024 . After 10 September 2025, crop uses are no longer approved. Codex: All MRLs deleted EU: Not approved Canada: Cancelled
DIMPROPYRIDAZ	36	Cabbage aphid Green peach aphid	Australia: No current concerns. EU: Pending

Active Constituent	MoA Group	Pest	Risks and Comments
EMAMECTIN	6	Cabbage white butterfly Cluster caterpillar Diamondback (Cabbage) moth Helicoverpa Looper caterpillars	Australia: Nominated for targeted spray drift reconsideration EU: Approved, candidate for substitution
FIPRONIL	2B	European Wasp	Australia: APVMA: Proposed Regulatory decision was expected by April 2026. APVMA is now advising the by end of 2026 at the earliest. Permit PER89402 Expiry date: 30/04/2027
FLUBENDIAMIDE	28	Helicoverpa	Australia: No current concerns. EU: Not approved
IMIDACLOPRID	4A	Permit PER10918 for the control of Greenhouse whitefly and aphids	Australia: APVMA: Neonicotinoids chemical review has been delayed. The proposed regulatory decision unlikely before 2027. Permit PER10918 Expiry date: 31/10/2026 EU: Not approved Canada: Very few uses allowed in greenhouses and seed treatment.
INDOXACARB	22A	Helicoverpa	Australia: No current concerns. EU: Not approved
IRON EDTA COMPLEX	--	Snails and slugs	Australia: No current concerns
ISOCYCLOSERAM	30	Permit PER94854 for the control of Serpentine leaf miner	Australia: No current concerns. Permit PER94854 Expiry date: 30/09/2028 Permit PER94552 Expiry date: 30/11/2027
METALDEHYDE	--	Snails and slugs	Australia: No current concerns
METHOMYL	1A	Permit PER82428 for the control of Helicoverpa spp. Cucumber moth Cluster caterpillar Loopers Webworm Rutherglen bug Thrips including Western Flower Thrip	Australia: APVMA reconsideration planned for 2028. Permit PER82428 Expiry date: 31/01/2029 EU: Not approved Canada: In re-evaluation
NUCLEAR POLYHEDROSIS VIRUS OF HELICOVERPA ARMIGERA	--	Helicoverpa	Australia: No current concerns.

Active Constituent	MoA Group	Pest	Risks and Comments
NUCLEAR POLYHEDROSIS VIRUS OF HELICOVERPA ZEA	--	Helicoverpa	Australia: No current concerns.
PETROLEUM OIL	UN	Permit PER12221 for the control of Aphids Green mirid Green vegetable bug Grey cluster bug Leafhoppers Mites Rutherglen bug Thrips	Australia: No current concerns. Permit PER12221 Expiry date: 30/09/2027 EU: Not approved
PIRIMICARB	1A	Aphids	Australia: No current concerns. EU: Approved, candidate for substitution Canada: Cancelled
PYMETROZINE	9B	Cotton aphid Green peach aphid: continued Potato aphid	Australia: APVMA nominated for reconsideration and spray drift assessment. EU: Not approved Canada: Cancelled
PYRETHRINS	3A	Ants Caterpillars Diamondback (Cabbage) moth Earwig Flies Leafhoppers Rutherglen bug Thrips Two-spotted (Red spider) mite Whitefly	Australia: No current concerns.
SPINETORAM	5	Cabbage white butterfly Caterpillars Helicoverpa Looper caterpillars Western flower thrips Permit PER13322 for the control of Potato Moth Permit PER94451 for the control of Leaf miners	Australia: No current concerns. Permit PER94451 Expiry date: 31/07/2027 Permit PER13322 Expiry date: 31/03/2027 Codex MRL: 8 mg/Kg EU: Not approved Canada: In re-evaluation

Active Constituent	MoA Group	Pest	Risks and Comments
SPINOSAD	5	Helicoverpa Looper caterpillars Western flower thrips	Australia: No current concerns. Permit PER89870 Expiry date: 31/10/2030 Permit PER96806 Expiry date: 30/05/2031 Codex MRL: 10 mg/Kg Canada: In re-evaluation
SPIROTETRAMAT	23	Green peach aphid	Australia: No current concerns. Codex MRL: 7 mg/Kg EU: Not approved Canada: In re-evaluation
SPODOPTERA FRUGIPERDA NPV	--	Permit PER90820 for the control of Fall Armyworm	Australia: No current concerns Permit PER90820 Expiry date: 31/03/2027
SULFOXAFLO	4C	Brown sowthistle aphid Green peach aphid Greenhouse whitefly	Australia: No current concerns. Codex MRL: 6 mg/Kg
TRICHLORFON	1B	Cabbage White Butterfly Cabbage Moth Green Vegetable Bug Rutherglen Bug	Australia: APVMA nominated for reconsideration after 2029. EU: Not approved Canada: Cancelled

FUNGICIDES – Disease Control

Blue text = new APVMA approved uses

Active Constituent	MoA Group	Pest	Risks and Comments
AZOXYSTROBIN OXATHIPIPROLIN	11 + 49	Alternaria leaf spots Downy mildew Sclerotinia rot	AZOXYSTROBIN Australia: No current concerns. UK: Withdrawn (2029). Canada: In re-evaluation OXATHIPIPROLIN Australia: No current concerns. Codex MRL: 15 mg/Kg
BOSCALID	7	Sclerotinia rot	Australia: No current concerns. Codex MRL: 40 mg/Kg Canada: In re-evaluation
CHLOROTHALONIL	M5	Permit PER82895 for the control of: Downy mildew Alternaria Leaf Blight Grey Mould	Australia: APVMA reconsideration. Prioritised to be commenced by 2029. Permit PER82895 Expiry date: 31/05/2030 Codex MRL: 50 mg/Kg EU: Not approved Canada: In re-evaluation USA: Under Registration Review (scheduled)
COPPER	M1	Downy mildew Leaf diseases/spot Powdery mildew Rust Target spot (Early blight)	Australia: No current concerns.
CYAZOFAMID	21	Damping off: Pythium	Australia: No current concerns. Codex MRL: 10 mg/Kg Canada: In re-evaluation
DIFENOCONAZOLE	3	Permit PER87973 for the control of Powdery mildew	Australia: APVMA nominated for reconsideration. Permit PER87973 Expiry date: 30/06/2030 EU: Approved, candidate for substitution Canada: In re-evaluation

Active Constituent	MoA Group	Pest	Risks and Comments
DIMETHOMORPH	40	Permit PER14958 for the control of Downy mildew	Australia: No current concerns. Permit PER14958 Expiry date: 31/10/2027 Codex MRL: 30 mg/Kg EU: Not approved Canada: In re-evaluation
DIMETHOMORPH AMETOCTRADIN	40 + 45	Downy mildew	DIMETHOMORPH Australia: No current concerns. Permit PER14958 Expiry date: 31/10/2027 Codex MRL: 30 mg/Kg EU: Not approved Canada: In re-evaluation AMETOCTRADIN Australia: No current concerns Codex MRL: 50 mg/Kg UK: Withdrawn (2031).
FAMOXADONE OXATHIPIPROLIN	49	Downy mildew	FAMOXADONE Australia: No current concerns. OXATHIPIPROLIN Australia: No current concerns. Codex MRL: 15 mg/Kg
FLUDIOXONIL CYPRODINIL	12 + 9	Sclerotinia rot	FLUDIOXONIL Australia: No current concerns. Codex MRL: 30 mg/Kg EU: Approved, candidate for substitution CYPRODINIL Australia: No current concerns. Codex MRL: 50 mg/Kg EU: Approved, candidate for substitution Canada: In re-evaluation

Active Constituent	MoA Group	Pest	Risks and Comments
FLUDIOXONIL METALAXYL-M	12 + 4	Damping off: Rhizoctonia/Phytophthora	FLUDIOXONIL Australia: No current concerns. Codex MRL: 30 mg/Kg EU: Approved, candidate for substitution METALAXYL-M Australia: No current concerns.
IPRODIONE	2	Permit PER84955 for the control of Sclerotinia and Grey mould	Australia: No current concerns. Permit PER84955 Expiry date: 30/11/2027 EU: Not approved USA: Under Registration Review (scheduled)
MANCOZEB	M3	Cercospora leaf spot Downy mildew Permit PER14958 for the control of Downy mildew	Australia: APVMA reconsideration. Prioritised to be commenced by 2030. Permit PER14958 Expiry date: 31/10/2027 EU: Not approved USA: Under Registration Review (scheduled)
MANCOZEB METALAXYL-M	M3 + 4	Permit PER13673 for the control of Downy mildew	MANCOZEB Australia: APVMA reconsideration. Prioritised to be commenced by 2030. Permit PER14958 Expiry date: 31/10/2027 EU: Not approved USA: Under Registration Review (scheduled) METALAXYL-M Australia: No current concerns.
MANDIPROPAMID	40	Downy mildew	Australia: No current concerns. Codex MRL: 25 mg/Kg Canada: In re-evaluation
OXATHIPIPROLIN	49	Downy mildew	Australia: No current concerns. Codex MRL: 15 mg/Kg
PENTHIOPYRAD	7	Botrytis grey mould Powdery mildew Sclerotinia rot	Australia: No current concerns. Codex MRL: 30 mg/Kg EU: Not approved
PHOSPHOROUS (PHOSPHONIC) ACID	P07 (33)	Permit PER11951 for the control of Downy mildew	Australia: No current concerns. Permit PER11951 Expiry date: 28/02/2030
POTASSIUM BICARBONATE	M2	Permit PER13695 for the control of Powdery mildew	Australia: No current concerns. Permit PER13695 Expiry date: 30/06/2030 Canada: In re-evaluation

Active Constituent	MoA Group	Pest	Risks and Comments
PROPAMOCARB HYDROCHLORIDE FLUOPICOLIDE	43	Downy mildew	PROPAMOCARB HYDROCHLORIDE Australia: No current concerns. FLUOPICOLIDE Australia: No current concerns Codex MRL: 30 mg/Kg EU: Approved, candidate for substitution
PROPICONAZOLE	3	Permit PER14479 for the control of Leaf spot	Australia: APVMA nominated for reconsideration and spray drift assessment. Permit PER14479 Expiry date: 31/08/2029 EU: Not approved Canada: In re-evaluation USA: Under Registration Review (scheduled)
PYDIFLUMETOFEN FLUDIOXONIL	7 + 12	Botrytis Sclerotinia	PYDIFLUMETOFEN Australia: No current concerns. EU: Pending Canada: In re-evaluation FLUDIOXONIL Australia: No current concerns. Codex MRL: 30 mg/Kg EU: Approved, candidate for substitution
QUINOXYFEN	13	Powdery mildew	Australia: No current concerns. EU: Not approved Canada: Cancelled
SULPHUR	M2	Downy mildew Leaf diseases/spot Rust Powdery mildew	Australia: No current concerns. Canada: In re-evaluation
TEBUCONAZOLE	3	Sclerotinia rot	Australia: APVMA: Removed from nomination list - maintain watching brief EU: Approved, candidate for substitution Canada: In re-evaluation USA: Under Registration Review (scheduled)
THIRAM	M3	Pythium spp, Rhizoctonia solani, Fusarium spp., Sclerotium rolfsi	Australia: APVMA reconsideration. Prioritised to be commenced by 2030. Permit PER97200 Expiry date: 31/03/2027

Active Constituent	MoA Group	Pest	Risks and Comments
TRIFLOXYSTROBIN	11	Permit PER14494 for the control of Powdery mildew	Australia: No current concerns. Permit PER14494 Expiry date: 31/08/2027 Codex MRL: 20 mg/Kg Canada: In re-evaluation
ZINEB	M3	Permit PER14839 for the control of Anthracnose	Australia: APVMA reconsideration. Prioritised to be commenced by 2030. Permit PER14839 Expiry date: 31/07/2029 EU: Not approved Canada: Cancelled

HERBICIDES – Weed Control

Blue text = new APVMA approved uses

Active Constituent	MoA Group	Risks and Comments
CHLORIDAZON	5	Australia: No current concerns. Permit PER92508 Expiry date: 30/06/2026
CLETHODIM	1	Australia: No current concerns. Permit PER82459 Expiry date: 30/09/2026
DIQUAT	22	Australia: APVMA: Final regulatory decision handed down in July 2026. 24 month phase out period. Significant restrictions EU: Not approved USA: No agricultural uses allowed. Aquatic herbicide.
ETHOFUMESATE	15	Australia: No current concerns. Permit PER14703 Expiry date: 31/05/2029 Canada: In re-evaluation
FLUAZIFOP-P PRESENT AS THE BUTYL ESTER	1	Australia: Nominated for targeted spray drift reconsideration Permit PER81244 Expiry date: 30/04/2027 Canada: Cancelled
METOLACHLOR	15	Australia: No current concerns. EU: Not approved Canada: Cancelled
PARAQUAT	22	Australia: APVMA: Currently under review Final regulatory decision handed down in July 2026. Significant restrictions and 24 month transition period. EU: Not approved Canada: Cancelled USA: Restricted use
PHENMEDIPHAM	5	Australia: No current concerns. Permit PER81241 Expiry date: 31/03/2028
PROPACHLOR	15	Australia: No current concerns. Permit PER12008 Expiry date: 31/08/2028 EU: Not approved
S-METOLACHLOR	15	Australia: No current concerns. EU: Not approved

FUMIGANTS

Blue text = new APVMA approved uses

Active Constituent	Use	Risks and Comments
1,3-DICHLOROPROPENE	Control of soil borne diseases, plant parasitic Nematodes, Symphylans and Wireworms	Australia: No current concerns. EU: Pending Canada: Cancelled
CHLOROPICRIN	Control of soil borne diseases, plant parasitic Nematodes, Symphylans and Wireworms	Australia: No current concerns. EU: Not approved USA: Restricted use
CHLOROPICRIN + 1,3-DICHLOROPROPENE	Control of soil borne diseases, plant parasitic Nematodes, Symphylans and Wireworms	CHLOROPICRIN Australia: No current concerns. EU: Not approved USA: Restricted use 1,3-DICHLOROPROPENE Australia: No current concerns. EU: Pending Canada: Cancelled
ETHANEDINITRILE	Soil borne pathogens, nematodes and weeds	Australia: No current concerns.
METHAM PRESENT AS SODIUM SALT	Germinating weeds and soil-borne fungus diseases	Australia: No current concerns.
METHYL BROMIDE	Fumigation of various fruits and vegetables	Australia: APVMA nominated for reconsideration . Permit PER96144 Expiry date: 31/01/2031 EU: Not approved Canada: Remaining pre-plant soil fumigation uses were cancelled (June 2025) USA: Restricted use

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