



Fennel Bulb

Strategic Agrichemical Review Process
(SARP)

October 2026

Hort Innovation
Project – MT25005

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SARP Service Provider:

AGK Services

Purpose of the report:

This report was funded by Hort Innovation to investigate the pest problem, agrichemical usage and pest management alternatives for the fennel bulb 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 fennel bulb 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
Sclerotinia Rot	<i>Sclerotinia</i> spp.
Leaf Blight	<i>Cercosporidium</i> spp.
Septoria Leaf Spot	<i>Septoria</i> spp.
Phytophthora Root Rot	<i>Phytophthora</i> spp.

1.2 Insects and Mites

The high priority insects and mites are:

Common name	Scientific name
Melon Thrips	<i>Thrips palmi</i>
Plague Thrips	<i>Thrips imaginis</i>
Western Flower Thrips	<i>Frankliniella occidentalis</i>
Green Peach Aphid	<i>Myzus persicae</i>

1.3 Weeds

There are no high priority weeds but the following are rated as moderate priority:

Common Name	Scientific Name
Annual Ryegrass	<i>Lolium rigidum</i>
Fat Hen	<i>Chenopodium album</i>
Wireweed	<i>Polygonum aviculare</i>
Shepherd's Purse	<i>Capsella bursa pastoris</i>
Wild Radish	<i>Raphanus raphanistrum</i>
Capeweed	<i>Arctotheca calendula</i>
Awnless Barnyard Grass	<i>Echinochloa colona</i>
Amaranthus	<i>Amaranthus</i> spp.
Blackberry Nightshade	<i>Solanum nigrum</i>
Nutgrass	<i>Cyperus rotundus</i>
Pigweed	<i>Portulaca oleracea</i>

2. The Australian Fennel Bulb Industry

The Australian fennel bulb industry is a minor horticultural industry. Production statistics are available for fresh fennel production which includes fennel grown for the bulb and for the leaf (grown as an herb) in Australia. Statistics for fennel bulb cannot be separated in this data. Most of the production occurs in Victoria and it is confined to the cooler months of the year.

Total production for the year ending June 2025 was 1,330 tonnes, with a wholesale value of production of \$3.5 million. Fresh supply to the domestic market accounted for 1,291 tonnes (97%), with 38 tonnes going to processing (3%). No exports were recorded. Total production and crop value have been stable for the past 5 years.

Fresh Fennel Seasonality by State

State	24/25 Tonnes	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Victoria	1,064												
Queensland	146												
New South Wales	66												
Western Australia	40												
South Australia	13												
Availability Legend			High		Medium		Low					None	

Fresh fennel is exclusively supplied to the domestic market, and no exports are occurring at this time.

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 fennel bulb 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 fennel bulb 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 fennel bulb industry. Against these threats, available registered or permitted pesticides are evaluated for overall suitability in terms of IPM, resistance management, 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 fennel bulb 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 fennel bulb 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 Industry¹ which covers fennel bulb outlines key threats to the industry, risk mitigation plans, identification and categorisation of exotic pests and contingency plans. High priority exotic pests have been assessed based on their potential to enter, establish, and spread in Australia (e.g. environmental factors, host range, vectors), the likely consequences and the cost to industry of control measures.

¹ <https://ausveg.com.au/app/uploads/2018/06/Industry-Biosecurity-Plan-for-the-Vegetable-Industry.pdf>

3.2 Minor use permits and registration

From a pesticide access perspective, the APVMA classifies bulb fennel as a minor crop. It falls within APVMA crop group VS0078 (stalk and stem vegetables) and subgroup 017A (stems and petioles). Bulb fennel has the Codex commodity code VS 0380.

Fennel bulb was previously included in the bulb vegetable crop group and some historical product registrations reference the crop in that group. The APVMA standard is currently under review and there may be further changes to the registration status of products in relation to fennel bulb. It is important to check the registration status of any products at the time of use and not rely solely on the information listed in this report. Access to minor use permits can be achieved as long as reasonable justification is provided in accordance with the APVMA's minor use guidance².

Possible justification for future permit applications could be based on:

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

With each of these options, sound, scientific argument (or commercial argument) is required to justify any new permit applications. Another option for the fennel bulb industry is for manufacturers to register new pesticides uses in the crop.

² <https://apvma.gov.au/node/10931>

3.3 Methods

The current update of the Fennel Bulb 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	Fennel Bulb 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 Fennel Bulb 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 rated 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 fennel bulb

Appendix 2. Products available for control of insects and mites in fennel bulb

Appendix 3. Products available for weed control in fennel bulb

Appendix 4. Current permits for use in fennel bulb

Appendix 5. Fennel bulb Maximum Residue Limits (MRLs)

Appendix 6. Fennel bulb Agrichemical Regulatory Risk Assessment

4. Diseases, Pests and Weeds of Fennel Bulb

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 and not rely on singular tools and rotate between different modes of action. It is always essential to follow all the label instructions or directions for use on the permit. Specific resistance management strategies may apply. These can be found, along with other useful information, on the CropLife Australia website³.

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.

³ <https://www.croplife.org.au/resources/programs/resistance-management/>

4.1 Diseases of fennel bulb

4.1.1 Disease priorities

Common name	Scientific name
High	
Sclerotinia Rot	<i>Sclerotinia</i> spp.
Leaf Blight	<i>Cercosporidium</i> spp.
Septoria Leaf Spot	<i>Septoria</i> spp.
Phytophthora Root Rot	<i>Phytophthora</i> spp.
Moderate	
Damping Off	<i>Pythium</i> spp., <i>Phytophthora</i> spp., <i>Fusarium</i> spp., <i>Rhizoctonia</i> spp.
Fusarium Root Rot	<i>Fusarium solani</i>
Low	
Downy Mildew	<i>Plasmopara petroselini</i>
Grey Mould	<i>Botrytis cinerea</i>
Bacterial Soft Rot	<i>Erwinia</i> spp.
Powdery Mildew	<i>Erysiphe</i> spp.
Rust	<i>Puccinia menthae</i>

The high priority diseases of fennel bulb are Sclerotinia Rot, Leaf Blight, Septoria Leaf Spot and Phytophthora Root Rot. Available and potential products for controlling diseases of fennel bulb 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 strategies⁴ related to the control of diseases in various crops, and users should refer to those strategies before using any product.

⁴ <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
Sclerotinia Rot (<i>Sclerotinia</i> spp.) Priority: High Sclerotinia Rot is rated as a high priority. Soil-borne disease that is favoured by cool, humid conditions. It primarily infects the lower stems and bulb, eventually causing plant collapse and unmarketable produce. Sclerotia can survive in the soil for 5-7 years. Management options include farm hygiene, canopy management, crop rotation and strategic use of fungicides when conditions favour infection.							
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>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
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> , <i>Sclerotinia</i> 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

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in vegetables for application to soil to improve bioavailability of soil resources to horticultural crops.	R4
<i>Aureobasidium pullulans</i> (Botector) Nufarm	BM 02	Biological	NR	P		Registered for suppression of Sclerotinia in fruiting vegetables.	R4
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Protectant & Curative		P		Registered for suppression of Sclerotinia in brassica vegetables, cucurbits, endive, leafy vegetables and lettuce.	R4
Boscalid (Filan)	7	Protectant		P		Registered for control of Sclerotinia in brassica vegetables, leafy vegetables, brassica leafy vegetables, legume vegetables and root & tuber vegetables.	R4
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant		P		Registered for control of Sclerotinia in capsicum, green beans, garden peas, snow peas, sugar snap peas, leafy vegetables, lettuce, nursery stock and ornamentals.	R3
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
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Registered for control of Sclerotinia in lettuce.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
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
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of Sclerotinia in lettuce, leafy vegetables and root vegetables.	R4
Leaf Blight (<i>Cercosporidium</i> spp.) Priority: High Leaf Blight is rated as a high priority. Foliar disease that impacts the foliage rather than the bulb. Severe infections can weaken the plant, stunt growth and reduce marketability. Management options include crop rotation, farm hygiene, canopy management and strategic use of fungicides when conditions favour infection.							
Mancozeb	M3	Protectant	14	A	TAS	Registered in fennel for control of Leaf Blight (<i>Cercosporidium</i> spp.) Apply as a foliar spray if disease symptoms are evident in November. Use a retreatment interval of 10-14 days. Maximum of 2 applications per crop.	R2
Chlorothalonil (Bravo) PER82895	M5	Protectant	7	P-A	ALL (excl. VIC)	Permitted in fennel for control of Downy Mildew and Purple Blotch (<i>Alternaria porri</i>). Registered for control of <i>Cercosporidium</i> spp. in peanuts.	R2
Septoria Leaf Spot (<i>Septoria</i> spp.) Priority: High Septoria Leaf Spot is rated as a high priority. Foliar disease that attacks the leaves and stalks of fennel bulb as it matures. Infection is favoured by cool, wet conditions. Septoria can be managed by using an integrated disease program including the use of disease-free planting material, farm hygiene, irrigation management and crop rotation. Fungicide options are not currently available.							
Boscalid + Pyraclostrobin (Pristine) BASF	7+11	Protectant / Curative		P		Registered for control of Blackspot, Powdery Mildew and Alternaria in apple and Blackspot in pear. US registration for control of <i>Septoria</i> spp. in berries and celery.	R4
Copper	M1	Protectant		P		Registered for control of <i>Septoria</i> spp. in carrots, celery, parsnips and tomatoes.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant / Curative		P		Registered for control of various fungal diseases in alliums, apples, capsicum, cucumber, cut flowers, garlic, grapes, green beans, leafy vegetables, lettuce, nursery stock, ornamentals, pyrethrum and strawberries. US registration for control of Septoria in celery.	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 Septoria in dry and succulent beans and pistachio.	R4
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Registered for control of various leaf diseases in almonds, cherries and macadamia. US registration for control of Septoria in leafy vegetables.	R4
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of various diseases in cherries, grapes, berries, leafy vegetables, lettuce and potato. US registration for control of Septoria in cucurbits, fruiting vegetables, grape and small fruit vine climbing (except fuzzy kiwifruit), leaf petiole vegetables, leafy greens, potato, specific tree nuts and tuberous & corm vegetables.	R4
Phytophthora Root Rot (<i>Phytophthora</i> spp.) Priority: High Phytophthora Root Rot is rated as a high priority. Soil-borne disease that thrives under prolonged periods of warm, humid weather and is exacerbated in poorly drained soils. Fungicide controls are effective but should be used in conjunction with good farm hygiene, resistant varieties, rotation with non-host crops and avoiding waterlogged fields if possible.							
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. 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 fungus 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. Applied as a soil injection, soil surface spray in front of a rotary tiller or through approved trickle irrigation systems.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in vegetables for application to soil to improve bioavailability of soil resources to horticultural crops.	R4
Phosphorous Acid PER13698	33	Protectant	1	P-A	ALL (excl. VIC)	Permitted in fennel for suppression of Downy Mildew (<i>Peronospora</i> spp.) Registered for control of Phytophthora Root Rot in citrus, ornamentals and avocado.	R4
Cyazofamid (Ranman) UPL	21	Protectant		P		Registered for control of Phytophthora infestans in potatoes.	R4
Mandipropamid (Revus) Syngenta	40	Curative / Protectant		P		Registered for control of Downy Mildew in grapes, lettuce, leafy vegetables and oilseed poppies. US registration for control of Phytophthora in various crops, including as a foliar application for protection of citrus from Phytophthora Root Rot.	R4
Metalaxyl	4	Protectant		P		Registered as a seed treatment for control of Phytophthora Root Rot in chickpeas and Phytophthora Stem Rot in soybean.	R4
Oxathiopiprolin (Zorvec Enicade) Corteva	49	Protectant & Curative		P		Registered for control of Downy Mildew in bulb vegetables, brassicas, cucurbits, leafy vegetables and poppies. Permitted for control of Phytophthora Root Rot in raspberries and blackberries. US registration for control of Phytophthora Canker and Brown Rot in citrus.	R4
Propamocarb Hydrochloride + Fluopicolide (Infinito SC) Bayer	28+43	Protectant		P		Registered for control of Phytophthora infestans 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. While all stages of fennel bulb 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.							
1,3-Dichloropropene + Chloropicrin	8B	Soil Fumigant	NR	A	ALL	Registered in vegetables for control of plant parasitic Nematodes, Symphyllans, 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. For use by professional and registered fumigators only.	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> , <i>Sclerotinia</i> , <i>Sclerotium</i> , <i>Rhizoctonia</i> , <i>Verticillium</i> , <i>Plasmodiophora</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
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> , <i>Sclerotinia</i> 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
<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> & <i>Pythium</i> Management.	R4
<i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in vegetables for application to soil to improve bioavailability of soil resources to horticultural crops.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<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
Cyazofamid (Ranman) UPL	21	Protectant & Curative		P		Registered in Brassica leafy vegetable seedlings for the control of Downy Mildew. US registration for control of Pythium spp. in carrot, leafy greens, succulent-podded and succulent-shelled beans, tuberous and corm vegetables, tomato greenhouse transplants and greenhouse-grown bell peppers.	R4
Fludioxonil + Sedaxane (Vibrance Premium Seed Treatment) Syngenta	12 +7	Protective Seed Treatment		P		Registered for control of Black Scurf (<i>Rhizoctonia</i>), Silver Surf, Black Rot, Gangrene and Fusarium Dry Rot and suppression of Scab in potatoes.	R4
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
Fusarium Root Rot (<i>Fusarium solani</i>) Priority: Moderate							
Fusarium Root Rot is rated as a moderate priority. Soil-borne disease that is favoured by warm temperatures and poorly drained soils. Management options include improving soil drainage, long-term crop rotations, resistant varieties and use of seed treatments or soil fungicides prior to sowing.							
1,3-Dichloropropene + Chloropicrin	8B	Soil Fumigant	NR	A	ALL	Registered in vegetables for control of plant parasitic Nematodes, Symphyllans, Wireworms, soil borne diseases (including Fusarium and <i>Verticillium</i> wilts, <i>Rhizoctonia</i> , <i>Pythium</i>) and suppression of weeds. Restricted chemical. For use by professional and registered fumigators only.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	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. 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 fungus 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. Applied as a soil injection, soil surface spray in front of a rotary tiller or through approved trickle irrigation systems.	R4
<i>Streptomyces lydicus</i> WYEC108 (Actinovate) Novozymes Bioag	BM 02	Biological	NR	A	ALL	Registered in vegetables as a seed treatment for control of <i>Fusarium</i> , <i>Rhizoctonia</i> & <i>Pythium</i> .	R4
<i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in vegetables for application to soil to improve bioavailability of soil resources to horticultural crops.	R4
Acibenzolar-S-Methyl (Bion Plant Activator) Syngenta	P01	Protectant		P		Registered as a seed treatment for suppression of <i>Fusarium</i> Wilt in cotton.	R4
Fludioxonil (Maxim 100 FS) Syngenta	12	Protectant		P		Registered as a seed treatment for control of <i>Fusarium</i> Dry Rot (<i>Fusarium</i> spp.) in potatoes.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fludioxonil + Sedaxane (Vibrance Premium) Syngenta	12+7	Protectant		P		Registered as a seed treatment for control of Fusarium Dry Rot (<i>Fusarium</i> spp.) in potatoes.	R4
Imazalil (Magnate 750 WSP)	3	Protectant & Curative		P		Registered for control of Dry Rot (<i>Fusarium</i> spp.) in potato tubers.	R4
Thiabendazole (Tecto)	1	Protectant		P		Registered for control of Dry Rot (<i>Fusarium</i> spp.) in potatoes.	R4
Downy Mildew (<i>Plasmopara petroselini</i>) Priority: Low Downy Mildew is rated as a low priority. Foliar disease that is favoured by cool, humid weather and extended periods of leaf wetness. Management options include crop rotation, irrigation and canopy management to reduce leaf wetness, as well as farm hygiene and fungicide controls.							
Azoxystrobin (Amistar) PER96304	11	Protectant & Curative	1 NG	A	ALL	Permitted in herbs, including fennel, for control of Downy Mildew (<i>Bremia</i> spp., <i>Peronospora</i> spp., <i>Plasmopara</i> spp., <i>Pseudoperonospora</i> spp.) and Powdery Mildew (<i>Erysiphe</i> spp., <i>Leveillula</i> spp., <i>Microsphaera</i> spp., <i>Oidium</i> spp. and <i>Sphaerotheca</i> spp.) Apply as a foliar spray when conditions favour disease development and before the disease is evident. Use a retreatment interval of 7-14 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	R4
Chlorothalonil (Bravo) PER82895	M5	Protectant	7	A	ALL (excl. VIC)	Permitted in fennel for control of Downy Mildew and Purple Blotch (<i>Alternaria porri</i>). Apply as a foliar spray when conditions favour disease infection and development. Use a retreatment interval of 7-14 days. Maximum number of applications per crop not specified.	R2
Oxathiapiprolin (Zorvec Enicade) Corteva	49	Protectant	10	A	ALL	Registered in bulb vegetables, including fennel bulb, for control of Downy Mildew (<i>Peronospora destructor</i>). Apply as a foliar spray when conditions favour disease development but before disease is evident. Use a retreatment interval of 10 days. Maximum of 2 applications per crop.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Phosphorous Acid PER13698	33	Protectant	1	A	ALL (excl. VIC)	Permitted in fennel for suppression of Downy Mildew (<i>Peronospora</i> spp.) Apply as a foliar spray when conditions favour disease development. Retreatment interval and maximum number of applications per crop not specified.	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
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Protectant & Curative		P		Registered for the control of Downy Mildew in brassica vegetables.	R4
Cyazofamid (Ranman) UPL	21	Protectant & Curative		P		Registered for the control of Downy Mildew in brassica leafy vegetable seedlings. US registration for control of Downy Mildew in herbs, brassica leafy vegetables, cucurbits, grapes, hops, leafy greens, succulent-podded and succulent-shelled beans and bulb vegetables.	R4
Dimethomorph + Ametoctradin (Zampro) AgNova	40+45	Protectant		P		Registered for the control of Downy Mildew in grapevines, bulb vegetables, lettuce, brassica leafy vegetables, beetroot, cucurbits and poppies.	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
Mandipropamid (Revus) Syngenta	40	Protectant		P		Registered for control of Downy Mildew in grapes and brassica leafy crops.	R4
Orange Oil (Prev-Am) Oro Agri	-	Protectant	NR	P		Registered for control of Downy Mildew in bulb vegetables.	R4
Oxathiapiprolin + Mancozeb (Zorvec Enibel) Corteva	49+M3	Protectant		P		Registered for control of Downy Mildew in bulb vegetables.	R2
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
Propamocarb Hydrochloride + Fluopicolide (Infinito) Bayer	28+43	Protectant		P		Registered for control of Downy Mildew in brassica vegetables, bulb vegetables, cucurbits, leafy vegetables, lettuce, poppies and potato.	R4
Propineb (Antracol) Bayer	M3	Protectant		P		Registered for control of Downy Mildew in cucurbits and onions.	R2
Propineb + Oxadixyl (Rebound) Kiwi Rural Trading	M3+4	Protectant & Curative		P		Registered for control of Downy Mildew in cucurbits, grape vines, lettuce and onions.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Grey Mould (<i>Botrytis cinerea</i>) Priority: Low Grey Mould is rated as a low priority. Infection is favoured by cool, moist conditions and while it generally occurs in crop, often the symptoms don't appear until after harvest. In crop strategies include reducing humidity through plant spacing and irrigation management. Plant damage during harvest should be avoided and post-harvest storage should be in cool, low humidity environments. No fungicides are currently available.							
<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
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (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
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant		P		Registered for control of Botrytis in capsicum, cut flowers, grapes, onions, alliums, strawberries, lettuce, nursery stock and ornamentals.	R3
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

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
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
Florylpicoxamid (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
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
Penthiopyrad (Fontelis) Corteva	7	Protectant		P		Registered for control of Botrytis in strawberry, onions, shallots, spring onion, cucurbits, fruiting vegetables and leafy vegetables.	R4
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant		P		Registered for control of Botrytis in almonds, berries and grapes.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of Botrytis in berries, grapes, lettuce and potato.	R4
Pyrimethanil (Scala) Bayer	9	Protectant & Curative		P		Registered for control of Botrytis in grapevines, ornamentals and strawberries.	R4
Bacterial Soft Rot (<i>Erwinia</i> spp.) Priority: Low Bacterial Soft Rot is rated as a low priority. Infection is favoured by warm, moist conditions and while it generally occurs in crop, often the symptoms don't appear until after harvest. In crop strategies include reducing entry points through insect or mechanical damage and promoting good soil drainage. Plant damage during harvest should be avoided and post-harvest storage should be in cool, low humidity environments.							
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
Copper	M1	Protectant		P		Registered for control of various bacterial diseases in stone fruit, mangoes, beans, capsicum, celery, cucurbits, lettuce, peas and tomatoes.	R4

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Powdery Mildew (<i>Erysiphe</i> spp.) Priority: Low Powdery Mildew is rated as a low priority. Foliar disease that impacts bulb yield and quality by weakening the plant and stunting bulb development. Management options include farm hygiene, canopy and irrigation management, and strategic use of fungicides when conditions favour infection.							
Azoxystrobin (Amistar) PER96304	11	Protectant & Curative	1 NG	A	ALL	Permitted in herbs, including fennel, for control of Downy Mildew (<i>Bremia</i> spp., <i>Peronospora</i> spp., <i>Plasmopara</i> spp., <i>Pseudoperonospora</i> spp.) and Powdery Mildew (<i>Erysiphe</i> spp., <i>Leveillula</i> spp., <i>Microsphaera</i> spp., <i>Oidium</i> spp. and <i>Sphaerotheca</i> spp.) Apply as a foliar spray when conditions favour disease development and before the disease is evident. Use a retreatment interval of 7-14 days. Maximum of 3 applications per crop, with no more than 2 consecutive applications.	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. Retreatment interval and maximum number of applications per crop not specified.	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
Boscalid + Kresoxim-Methyl (Colliss) BASF	7+11	Protectant & Curative		P		Registered for control of Powdery Mildew in cucurbits.	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
Florylpicoxamid (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

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Mandestrobin (Intuity) Sumitomo	11	Protectant		P		Registered for control of Powdery Mildew in cucurbits.	R4
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
Penthiopyrad (Fontelis) Corteva	7	Protectant		P		Registered for control of Powdery Mildew in pome fruit, strawberry, stone fruit, cucurbits, fruiting vegetables, leafy vegetables and root & tuber 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.	R4
Proquinazid (Talendo) Corteva	13	Protectant		P		Registered for control of Powdery Mildew in fruiting vegetables, cucurbits, grapes and pome fruit.	R4
Pydiflumetofen + Difenconazole (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>Puccinia menthae</i>) Priority: Low Rust is rated as a low priority. Foliar disease which rarely affects fennel bulb production. Control measures for other foliar pathogens should ensure rust does not cause significant impacts.							
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. Retreatment interval and 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

4.2 Insect and mite pests of fennel bulb

4.2.1 Insect and mite pest priorities

Common name	Scientific name
High	
Melon Thrips	<i>Thrips palmi</i>
Plague Thrips	<i>Thrips imaginis</i>
Western Flower Thrips	<i>Frankliniella occidentalis</i>
Green Peach Aphid	<i>Myzus persicae</i>
Moderate	
Cotton Bollworm	<i>Helicoverpa armigera</i>
Native Budworm	<i>Helicoverpa punctigera</i>
Loopers	<i>Chrysodeixis</i> spp.
Snails & Slugs	<i>Helix</i> spp.
Vegetable Weevil	<i>Listroderes difficilis</i>
Vegetable Leafminer	<i>Liriomyza sativae</i>
Serpentine Leafminer	<i>Liriomyza huidobrensis</i>
American Serpentine Leafminer	<i>Liriomyza trifolii</i>
Low	
Rutherglen Bug	<i>Nysius vinitor</i>
Jassids / Leafhoppers	Cicadellidae
Green Mirid	<i>Creontiades</i> spp.

The high priority insect pests of fennel bulb are Melon Thrips, Plague Thrips, Western Flower Thrips and Green Peach Aphid. 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. Growers should not exceed the maximum number of applications permitted on the insecticide label.

Resistance management strategies⁵ are available on the Croplife Australia website.

⁵ <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
Melon Thrips (<i>Thrips palmi</i>) Plague Thrips (<i>Thrips imaginis</i>) Western Flower Thrips (<i>Frankliniella occidentalis</i>) Priority: High Melon Thrips, Plague Thrips and Western Flower Thrips are rated as a high 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.								
<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
Flonicamid (Mainman) UPL PER89185	29	Ingestion	7	A	ALL (excl. VIC)	Permitted in bulb vegetables, including fennel (bulb), for suppression of Onion Thrips (<i>Thrips tabaci</i>) and Western Flower Thrips (<i>Frankliniella occidentalis</i>). Apply as a foliar spray at first signs of infestation. Use a minimum retreatment interval of 14 days. Maximum of 3 applications per crop.	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
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in alliums, including fennel bulb, 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 numbers are at a low level. 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
Cyantraniliprole (Benevia) FMC	28	Ingestion	7 NG	P-A	ALL	Registered in bulb vegetables, including fennel bulb, for suppression of Onion Thrips (<i>Thrips tabaci</i>).	M Bee:VH	R4
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables for control of <i>Helicoverpa</i> spp. Registered for control of Western Flower Thrips in brassica vegetables, bulb vegetables, cucurbits, fruiting vegetables, leafy vegetables, legume vegetables, ornamentals and berryfruit.	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	P-A	ALL	Registered in stalk & stem vegetables for control of Heliothis. Registered for control of Western Flower Thrips in brassica vegetables, cucurbits, fruiting vegetables, leafy vegetables, legume vegetables, ornamentals, berryfruit, pome fruit and stone fruit.	L Bee:L	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 Onion Thrips (<i>Thrips tabaci</i>), Western Flower Thrips (<i>Frankliniella occidentalis</i>), Green Peach Aphid (<i>Myzus persicae</i>), Cabbage Aphid (<i>Brevicoryne brassicae</i>) and Serpentine Leafminer (<i>Liriomyza brassicae</i>).	VL Bee:VL	R4
Spirotetramat (Movento) Bayer	23	Ingestion		P		Registered for control of Western Flower Thrips (<i>Frankliniella occidentalis</i>) in green beans, celery, rhubarb, herbs, lettuce and bulb vegetables.	M Bee:VL	R4
Green Peach Aphid (<i>Myzus persicae</i>) Priority: High Green Peach Aphid is rated as a high priority. Aphids are a sap-feeding insect that cause stunted growth and can spread plant viruses. Honeydew secreted by the insects can cause sooty mould to develop on leaves. An integrated pest management approach should be used to manage aphids, including the preservation of beneficial species, farm hygiene and strategic use of insecticides.								
<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
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
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in alliums, including fennel bulb, 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 numbers are at a low level. 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
Cyantraniliprole (Benevia) FMC	28	Ingestion	7 NG	P-A	ALL	Registered in bulb vegetables, including fennel bulb, for suppression of Onion Thrips (<i>Thrips tabaci</i>). Registered for suppression of Green Peach Aphid in fruiting vegetables and potatoes, control of Melon Aphid in fruiting vegetables, and suppression of Green Peach Aphid , Melon Aphid and Strawberry Aphid in strawberries.	M Bee:VH	R4
Flonicamid (Mainman) UPL PER89185	29	Ingestion	7	P-A	ALL	Permitted in bulb vegetables, including fennel (bulb), for suppression of Onion Thrips (<i>Thrips tabaci</i>) and Western Flower Thrips (<i>Frankliniella occidentalis</i>). Registered for control of Green Peach Aphid (<i>Myzus persicae</i>) in cucurbits, potatoes and strawberries.	M Bee:L	R4
Afidopyropen (Versys) BASF	9D	Ingestion		P		Registered for control of Green Peach Aphid (<i>Myzus persicae</i>) in sweet corn, rhubarb, artichokes, brassica vegetables, celery, cucurbits, fruiting vegetables, strawberry, leafy vegetables, brassica leafy vegetables, parsley, potato, sweet potato, ginger and ornamentals.	L 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, 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
Pymetrozine (Chess) Syngenta	9B	Contact & Ingestion		P		Registered for control of Green Peach Aphid (<i>Myzus persicae</i>) in brassica vegetables, tomatoes, eggplant, capsicum, lettuce, leafy vegetables, cucurbits, potatoes, stone fruit, almonds, pistachios, beetroot, cut flowers and nursery stock.	L Bee:VL	R3
Spirotetramat (Movento) Bayer	23	Ingestion		P		Registered for control of Green Peach Aphid (<i>Myzus persicae</i>) in beans, peas, brassica vegetables, brassica leafy vegetables, celery, rhubarb, cucurbits, eggplant, peppers, tomatoes, herbs, leafy vegetables, lettuce, chicory, endive, radicchio, potatoes and sweet potatoes.	M Bee:VL	R4
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of Green Peach Aphid in cucurbits, fruiting vegetables, sweet corn, leafy vegetables, root & tuber vegetables, brassica vegetables, cane berries, strawberries, stone fruit and tree nuts.	M Bee:VH	R4
Cotton Bollworm (<i>Helicoverpa armigera</i>) Native Budworm (<i>Helicoverpa punctigera</i>) Priority: Moderate Cotton Bollworm and Native Budworm are rated as a moderate priority. Larvae feed on the foliage but also bore into the tender flesh of the bulb, affecting yield and quality as well as allowing an entry point for fungal infections.								
<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
Flubendiamide (Belt) Bayer	28	Ingestion	1	A	ALL	Registered in stalk & stem vegetables 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

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars , Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH Bee:H	R4
Nuclear Polyhedrosis Virus (Gemstar) Sipcam	31	Ingestion	NR	A	ALL	Registered in stalk vegetables for control of Helicoverpa spp. Apply as a foliar spray when larvae are newly hatched. Retreatment may be required at 2-3 day intervals. Treatments per season not limited.	VL Bee:VL	R4
Spinetoram (Success Neo) Corteva	5	Ingestion	1	A	ALL	Registered in stalk & stem vegetables for control of Helicoverpa spp. Apply as a foliar spray when monitoring indicates pest thresholds have been reached. 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 stalk & stem vegetables for control of Heliothis . Apply as a foliar spray when monitoring indicates pest thresholds have been reached. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	L Bee:L	R4
Chlorantraniliprole (Coragen) FMC	28	Ingestion		P		Registered for control of Cotton Bollworm (<i>Helicoverpa armigera</i>) and Native Budworm (<i>Helicoverpa punctigera</i>) in	L Bee:VL	R4
<i>Clitoria ternatea</i> Extract (Sero-X) Growth Agriculture	-	Biological	NR	P		Registered for control of Helicoverpa spp. in cotton, lucerne and tomato.	L Bee:VL	R4
Emamectin (Proclaim Opti) Syngenta	6	Ingestion		P		Registered for control of Helicoverpa spp. in brassica vegetables, root & tuber vegetables, leafy vegetables, brassica leafy vegetables, sweet corn, strawberries, lettuce, cucurbits, legume vegetables and fruiting vegetables.	M Bee:H	R3
Indoxacarb (Avatar Evo) FMC	22A	Ingestion		P		Registered for control of Cotton Bollworm (<i>Helicoverpa armigera</i>) and Native Budworm (<i>Helicoverpa punctigera</i>) in brassica vegetables, leafy vegetables, fruiting vegetables, celery, cucurbits, sweet corn, pome fruit and stone fruit.	L 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
Loopers (<i>Chrysodeixis</i> spp.) Priority: Moderate								
Loopers are rated as a moderate priority. The larvae are voracious leaf feeders, but they do not usually inflict serious damage in fennel bulb. 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
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
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables for control of Heliothis (<i>Helicoverpa</i> spp.) Registered for control of Loopers in brassica vegetables and brassica leafy vegetables.	L-M Bee:L	R4
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables for control of <i>Helicoverpa</i> spp. Registered for control of Loopers in pulses, soybean, forage brassicas, brassica vegetables, culinary herbs, leafy vegetables, legume vegetables, root & tuber vegetables, avocados, berryfruit, cacao and tropical & sub-tropical fruit (inedible peel).	M Bee:H	R4
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables for control of Heliothis. Registered for control of Loopers in brassica vegetables, culinary herbs, leafy vegetables, legume vegetables, root & tuber vegetables, avocado, berryfruit, pome fruit and tropical & sub-tropical fruit (inedible peel).	L Bee:L	R4
Chlorantraniliprole (Coragen) FMC	28	Ingestion		P		Registered for control of Loopers in brassica vegetables and brassica leafy vegetables.	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		P		Registered for control of Loopers in brassica vegetables, root & tuber vegetables, leafy vegetables, brassica leafy vegetables, strawberries and legume vegetables.	M Bee:H	R3
Indoxacarb (Avatar Evo) FMC	22A	Ingestion		P		Registered for control of Loopers in fruiting vegetables.	L Bee:H	R4
Methoxyfenozide (Prodigy) Corteva	18	Insect Growth Regulator		P		Registered for control of Loopers in apples and pears.	VL Bee:VL	R4
Snails & Slugs (<i>Helix</i> spp.) Priority: Moderate								
Snails and Slugs are rated as a moderate priority. Snails cause direct feeding damage to bulbs 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
Vegetable Weevil (<i>Listroderes difficilis</i>) Priority: Moderate								
Vegetable Weevil is rated as a moderate priority. Weevils are soil-borne pests that primarily attack the foliage of fennel plants and do not usually feed on the bulb itself. Control options are limited.								
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of Weevils in pome fruit and stone fruit.	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
Vegetable Leafminer (<i>Liriomyza sativae</i>) Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) American Serpentine Leafminer (<i>Liriomyza trifolii</i>) Priority: Moderate Leafminers are rated as a moderate 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 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.								
Cyromazine (Diptex 150WP) PER81867	17	IGR	7 NG	A	ALL	Permitted in stalk & stem vegetables for control 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 minimum retreatment interval of 7 days. Maximum of 6 applications per crop.	-	R4
Spinetoram (Success Neo) Corteva PER94451	5	Ingestion	1	A	ALL (excl. VIC)	Permitted in stalk & stem vegetables for control of Liriomyza Leafminers , including Vegetable Leafminer (<i>Liriomyza sativa</i>), Pea Leafminer / Serpentine Leafminer (<i>Liriomyza huidobrensis</i>) & American Serpentine Leafminer (<i>Liriomyza trifolii</i>). Apply as a foliar spray, commencing when leafminers first appear. Use a retreatment interval of 7-14 days. Maximum of 4 applications per crop.	M Bee:H	R4
Cyantraniliprole (Benevia) FMC	28	Ingestion	7 NG	P-A	ALL	Registered in bulb vegetables, including fennel bulb, for suppression of Onion Thrips (<i>Thrips tabaci</i>). Permitted for control of Liriomyza 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

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Isocycloseram (Simodis Plinazolin) Syngenta	30	Ingestion		P		Permitted for control of Liriomyza Leafminers in celery, babay leaf spinach, baby leaf lettuce, kale, open leaf lettuce, parsley, coriander, shallots, leek, tomato and capsicum.	H Bee:H	R4
Spirotetramat (Movento) Bayer	23	Ingestion		P		Permitted for control of Liriomyza Leafminers in snow peas, sugar snap peas, lettuce, parsley, eggplant, capsicums, chilies, tomatoes, green beans, celery and rhubarb.	M Bee:VL	R4
Rutherglen Bug (<i>Nysius vinitor</i>) Priority: Low Rutherglen Bug is rated as a low priority. They breed up on weeds 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.								
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in alliums, including fennel bulb, 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 numbers are at a low level. 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
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for suppression of Rutherglen Bug in cucurbits, fruiting vegetables, leafy vegetables, root & tuber vegetables, brassica vegetables, cane berries and strawberries.	M Bee:VH	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 / Leafhoppers are rated as a low priority. 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.								
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
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in alliums, including fennel bulb, 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 numbers are at a low level. Retreatment interval and maximum number of applications per crop not specified.	VL Bee:L	R4
Buprofezin (Applaud) Corteva	16	Ingestion		P		Registered for control of Jassids in citrus.	L Bee:VL	R4
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Leafhoppers in tropical & subtropical fruit (inedible peel).	L Bee:VL	R4
Green Mirid (<i>Creontiades</i> spp.)								
Priority: Low								
Green Mirid is rated as a low priority. Adults and nymphs feed predominantly on the foliage and their impact on bulb production is minimal. Control in fennel bulb is usually not warranted.								
Petroleum Oil PER12221	-	Contact	1	A	ALL (excl. VIC)	Permitted in alliums, including fennel bulb, 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 numbers are at a low level. 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
Flonicamid (Mainman) UPL PER89185	29	Ingestion	7	P-A	ALL	Permitted in bulb vegetables, including fennel (bulb), for suppression of Onion Thrips (<i>Thrips tabaci</i>) and Western Flower Thrips (<i>Frankliniella occidentalis</i>). Registered for control of Green Mirid (<i>Creontiades dilutes</i>) in cotton, strawberries and nursery stock.	M Bee:L	R4
<i>Clitoria ternatea</i> Extract (Sero-X) Growth Agriculture	-	Biological	NR	P		Registered for control of Green Mirids in cotton and lucerne.	L Bee:VL	R4
Fipronil (Regent) BASF	2B	Contact		P		Registered for control of Green Mirids (<i>Creontiades dilutes</i>) in cotton.	M Bee:VH	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various bug species in macadamia, avocados, mango, papaya and other tropical & sub-tropical fruit, inedible peel (excluding bananas and pineapple) and olives.	L Bee:L	R4
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of Green Mirid (<i>Creontiades dilutes</i>) in cotton, lucerne, soybean, cane berries and strawberries.	M Bee:VH	R4

4.3 Weeds in Fennel Bulb

4.3.1 Weed priorities

Common Name	Scientific Name
Moderate	
Annual Ryegrass	<i>Lolium rigidum</i>
Fat Hen	<i>Chenopodium album</i>
Wireweed	<i>Polygonum aviculare</i>
Shepherd's Purse	<i>Capsella bursa pastoris</i>
Wild Radish	<i>Raphanus raphanistrum</i>
Capeweed	<i>Arctotheca calendula</i>
Awnless Barnyard Grass	<i>Echinochloa colona</i>
Amaranthus	<i>Amaranthus</i> spp.
Blackberry Nightshade	<i>Solanum nigrum</i>
Nutgrass	<i>Cyperus rotundus</i>
Pigweed	<i>Portulaca oleracea</i>

There are no high priority weeds but several moderate priorities as listed above. 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 webpage⁶.

⁶ <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
Annual Ryegrass (<i>Lolium rigidum</i>) Priority: Moderate Annual Ryegrass is rated 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 PER93116	1***	Post-Emergence	Permitted in herbs and spices (field grown only) including fennel for control of grass weeds, including Annual Ryegrass (<i>Lolium rigidum</i>). Apply as an in-crop post-emergence spray to grass weeds that are at the 2 leaf to early-tillered stage and are actively growing. Maximum of 1 application per crop.	28	A	ALL (excl. VIC)	R4
Glyphosate (Roundup)	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
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
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
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		R4
Fat Hen (<i>Chenopodium album</i>) Priority: Moderate Fat Hen is rated as a moderate 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.							
Glyphosate (Roundup)	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**	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
Ethofumesate (Tramat)	15**		Registered for control of grass and broadleaf weeds, including Fat Hen in beet crops, oilseed poppy and onions.		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

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glufosinate- Ammonium (Basta) BASF	10**		Registered for control of grass and broadleaf weeds including Fat Hen in berries, tomatoes, beans and fallow.		P		R3
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
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.		P		R4
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		R4
Wireweed (<i>Polygonum aviculare</i>) Priority: Moderate Wireweed is rated as a moderate 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.							
Glyphosate (Roundup)	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
Ethofumesate (Tramat)	15**		Registered for control of grass and broadleaf weeds, including Wireweed in beet crops, oilseed poppy and onions.		P		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

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 Wireweed in fallow, Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		R4
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		R4
Shepherd's Purse (<i>Capsella bursa pastoris</i>) Priority: Moderate							
Shepherd's Purse is rated as a moderate priority. Erect, annual broadleaf which is adapted to a wide range of environments. Herbicide options can be unreliable and timely application is critical to target young and actively growing weeds.							
Glyphosate (Roundup)	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
Norflurazon (Zoliar) AgNova	12**		Registered for control of grass and broadleaf weeds including Shepherd's Purse in asparagus, citrus, grapes, nuts, stone & pome fruits.		P		R4
Oxyfluorfen (Goal)	14**		Registered for control of grass and broadleaf weeds, including Shepherd's Purse in fallow, Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		R4
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		R4
Wild Radish (<i>Raphanus raphanistrum</i>) Priority: Moderate							
Wild Radish is rated as a moderate priority. Wild Radish 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.							
Glyphosate (Roundup)	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
Flumioxazin (Chateau) Sumitomo	14**		Registered for control of Wild Radish in grapes, pome fruit, stone fruit, citrus, nut trees, olives, avocados and berries.		P		R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of Wild Radish in citrus, grapes, almonds, pome fruit and stone fruit.		P		R4
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		R4
Capeweed (<i>Arctotheca calendula</i>) Priority: Moderate Capeweed is rated as a moderate priority. Annual broadleaf weed that germinates in the cooler months and is widespread in temperate regions. Capeweed seeds and grows prolifically and is difficult to control with knockdown herbicides.							
Glyphosate (Roundup)	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
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Awnless Barnyard Grass (<i>Echinochloa colona</i>) Priority: Moderate							
Awnless Barnyard Grass is rated as a moderate priority. Fast growing annual grass weed that is adapted to a wide variety of conditions and soil types. Has developed resistance to glyphosate in some regions.							
Clethodim PER93116	1***	Post-Emergence	Permitted in herbs and spices (field grown only) including fennel for control of grass weeds, including Barnyard Grass (<i>Echinochloa</i> spp.) Apply as an in-crop post-emergence spray to grass weeds that are at the 2 leaf to early-tillered stage and are actively growing. Maximum of 1 application per crop.	28	A	ALL (excl. VIC)	R4
Glyphosate (Roundup)	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
Napropamide (Devrinol)	0**		Registered for control of Barnyard Grass in almonds, grapevines, stone fruit, tomatoes and canola.		P		R4
Nonanoic Acid (Beloukha)	-		Registered for control of Barnyard Grass in non-crop areas, turf, orchards & vineyards, fallow and forestry.		P		R4
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		R4
Amaranthus (<i>Amaranthus</i> spp.) Priority: Moderate							
Amaranthus is rated as a moderate priority. Short-lived annual broadleaf weed that can pose a problem every year as it is a prolific seed producer. Herbicide control can be effective but application timing is critical to ensure small weeds are targeted.							
Glyphosate (Roundup)	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
Dimethenamid-P (Outlook)	15**		Registered for pre-emergent control of grass and broadleaf weeds in sweet corn, beans, peas, pumpkins and kabocha.		P		R4
Fluroxypyr (Starane)	4**		Registered for control of broadleaf weeds, including Amaranth in sorghum, maize, sweet corn and millet.		P		R4
Ethofumesate (Tramat)	15**		Registered for control of grass and broadleaf weeds, including Amaranth in beet crops, oilseed poppy and onions.		P		R4
Glufosinate- Ammonium (Basta) BASF	10**		Registered for control of grass and broadleaf weeds including Amaranthus in berries, tomatoes, beans and fallow.		P		R3
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
Blackberry Nightshade (<i>Solanum nigrum</i>) Priority: Moderate							
Blackberry Nightshade is rated as a moderate priority. Prolific perennial, broadleaf, weed that is widely adapted and difficult to eradicate, mainly due to its long-term seed viability. Herbicide control is effective but requires timely application and avoidance of seed set over several years to bring the soil seed bank down.							
Glyphosate (Roundup)	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**	Pre-Emergence	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals. Blackberry Nightshade is listed as moderately susceptible at a high rate.		P		R4
Dimethenamid-P (Outlook) BASF	15**		Registered for control of grass and broadleaf weeds, including Blackberry Nightshade in sweet corn, beans, peas, pumpkins and kabocha.		P		R4

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Ethyl Dipropylthiocarbamate (Eptam)	15**		Registered for control of grass and broadleaf weeds, including Blackberry Nightshade , in beans, potatoes, maize and sweet corn.		P		R4
Fluroxypyr (Starane) Corteva	4**		Registered for control of Blackberry Nightshade in non-crop areas and pastures.		P		R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of various grass and broadleaf weeds, including Blackberry Nightshade in citrus, grapes, almonds, pome fruit and stone fruit.		P		R4
Oxyfluorfen (Goal)	14**		Registered for control of various grass and broadleaf weeds, including Blackberry Nightshade , in fruit and nut trees, vines, brassica vegetables, coffee, duboisia, pyrethrum, tobacco and tropical & subtropical fruit.		P		R4
S-Metolachlor (Dual Gold)	15**		Registered for control of grass and broadleaf weeds in brassica vegetables, brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		R4
Nutgrass (<i>Cyperus rotundus</i>) Priority: Moderate							
Nutgrass is rated as a moderate priority. It is not a problem in Victorian crops. Nutgrass prefers damp, water-logged soils but can survive for years underground during dry times. Herbicide options are limited and unreliable. Improve soil drainage if possible.							
Glyphosate (Roundup)	9**	General Pre-Crop Spray	Registered for control of grass and broadleaf weeds, and Nutgrass , as a pre-crop spray or fallow spray.	NR	A	ALL	R3
Ethyl Dipropylthiocarbamate (Eptam)	15**		Registered for control of Nutgrass in non-crop situations.		P		R4
Norflurazon (Zoliar) AgNova	12**		Registered for control of Nutgrass 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
Pigweed (<i>Portulaca oleracea</i>) Priority: Moderate Pigweed is rated as a moderate priority. Summer growing broadleaf weed that competes aggressively in-crop and can be difficult to control with herbicides.							
Glyphosate (Roundup)	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
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 (Soletto) 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

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 fennel bulb

Appendix 2. Products available for control of insects and mites in fennel bulb

Appendix 3. Products available for weed control in fennel bulb

Appendix 4. Current permits for use in fennel bulb

Appendix 5. Fennel bulb Maximum Residue Limits (MRLs)

Appendix 6. Fennel bulb Agrichemical Regulatory Risk Assessment

Appendix 1. Products available for disease control in fennel bulb

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 (Amistar) PER96304	11	Herbs, including Fennel	Downy Mildew (<i>Bremia</i> spp., <i>Peronospora</i> spp., <i>Plasmopara</i> spp., <i>Pseudoperonospora</i> spp.) Powdery Mildew (<i>Erysiphe</i> spp., <i>Leveillula</i> spp., <i>Microsphaera</i> spp., <i>Oidium</i> spp. and <i>Sphaerotheca</i> spp.)	ALL	1 NG	R4
Chlorothalonil (Bravo) PER82895	M5	Fennel	Downy Mildew Purple Blotch (<i>Alternaria porri</i>)	ALL (excl. VIC)	7	R2
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
Iodine	-	Vegetables	Post-Harvest Sanitiser – Bacteria and Fungi	ALL	NR	R4
Mancozeb	M3	Fennel	Leaf Blight (<i>Cercosporidium</i> spp.)	TAS	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	Bulb Vegetables, including Fennel Bulb	Downy Mildew (<i>Peronospora destructor</i>)	ALL	10	R4
Phosphorous Acid PER13698	33	Fennel	Suppression of: Downy Mildew (<i>Peronospora</i> spp.)	ALL (excl. VIC)	1	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

Appendix 2. Products available for control of insects and mites in fennel bulb

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
<i>Bacillus thuringiensis subsp. 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
Cyantraniliprole (Benevia) FMC	28	Bulb Vegetables, including Fennel Bulb	Suppression of: Onion Thrips (<i>Thrips tabaci</i>)	ALL	7 NG	R4
Cyromazine (Diptex 150WP) PER81867	17	Stalk & Stem Vegetables	Liriomyza Leafminers including: Vegetable Leafminer (<i>Liriomyza sativae</i>) Serpentine Leafminer (<i>Liriomyza huidobrensis</i>)	ALL	7 NG	R4
Dazomet (Basamid)	8F	Soil fumigant	Soil fungi, Nematodes, soil insects and weeds.	ALL	NR	R4
Emulsifiable Botanical Oil (Eco-Oil)	-	Vegetables	Greenhouse Whitefly	ALL	NR	R4
Flonicamid (Mainman) UPL PER89185	29	Bulb Vegetables including Fennel (bulb)	Suppression of: Onion Thrips (<i>Thrips tabaci</i>) Western Flower Thrips (<i>Frankliniella occidentalis</i>)	ALL (excl VIC)	7	R4
Flubendiamide (Belt) Bayer	28	Stalk & Stem Vegetables	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

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
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
Methiocarb (Mesuro)	1A	Vegetables	Common Garden Snails Slugs White Italian Snail White Snail	ALL	7 G:7	R4
Nuclear Polyhedrosis Virus (Gemstar) Sipcam	31	Stalk Vegetables	Cotton Bollworm (<i>Helicoverpa armigera</i>) Native Budworm (<i>Helicoverpa punctigera</i>)	ALL	NR	R4
Petroleum Oil PER12221	-	Alliums, including Fennel Bulbs	Aphids Green Mirid Green Vegetable Bug Grey Cluster Bug Leafhoppers Mites Rutherglen Bug Thrips	ALL (excl. VIC)	1	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
Spinetoram (Success Neo) Corteva	5	Stalk & Stem Vegetables	<i>Helicoverpa</i> spp.	ALL	1	R4

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spinetoram (Success Neo) Corteva PER94451	5	Stalk & Stem Vegetables	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)	1	R4
Spinosad (Entrust Organic) Corteva	5	Stalk & Stem Vegetables	Heliothis	ALL	1 G:14	R4
Spinosad (Entrust Organic) Corteva PER89870	5	Stalk & Stem Vegetables	Fall Armyworm (<i>Spodoptera frugiperda</i>)	ALL (excl. VIC)	1 G:14	R4
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 fennel bulb

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
Clethodim PER93116	1***	Herbs & Spices, including Fennel	Grass Weeds	28	ALL (excl. VIC)	R4
Glyphosate (Roundup)	9**	General Pre-Crop Spray	Grass and Broadleaf Weeds	NR	ALL	R3

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

Appendix 4. Current permits for use in fennel bulb

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER81867 Version 3	Cyromazine (Diptex 150 WP) / Stalk & Stem Vegetables / Liriomyza Leafminers	02-Dec-19	30-Sep-26	Hort Innovation
PER89185 Version 3	Flonicamid (Mainman) / Bulb Vegetables / Thrips	06-Aug-20	31-May-27	Hort Innovation
PER94451	Spinetoram (Success Neo) / Stalk & Stem Vegetables / Liriomyza Leafminers	05-Jul-24	31-Jul-27	Hort Innovation
PER12221 Version 5	Petroleum Oil / Alliums / Various Insect Pests	29-Jun-12	30-Sep-27	Hort Innovation
PER96304	Azoxystrobin (Amistar) / Herbs / Downy Mildew & Powdery Mildew	22-Jan-26	31-Jan-29	Botanical Food Co
PER82895 Version3	Chlorothalonil (Bravo) / Fennel / Downy Mildew & Purple Blotch	04-Aug-17	31-May-30	Hort Innovation
PER13698 Version 5	Phosphorous Acid / Fennel / Downy Mildew	01-Oct-12	31-Jul-30	Hort Innovation
PER89870 Version 3	Spinosad (Entrust Organic) / Stalk & Stem Vegetables / Fall Armyworm	21-Jul-20	31-Oct-30	Hort Innovation
PER96806	Spinosad (Entrust Organic) / Herbs / Dipteran Leaf Miners	05-May-26	30-May-31	Hort Innovation
PER93116 Version 2	Clethodim / Fennel / Grass Weeds	11-Jun-23	31-May-31	Botanical Food Co

Appendix 5. Fennel Bulb Maximum Residue Limits (MRLs)

CODEX commodity groupings of root and tuber vegetables and subgroups:

VS 0078	Stalk and stem vegetables
VS 2080	Stems and petioles
VS 0380	Fennel, bulb
VA	Bulb vegetables
VA 0380	Fennel, bulb
	Vegetables

Note: Export statistics are not available, with export volumes negligible for fennel bulb. 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	-
Acibenzolar-S-methyl	VA0380	Fennel, bulb	-	0.2
Afidopyropen	VS2080	Stems and petioles	-	3
Aldrin & Dieldrin	VA0035	Bulb vegetables	-	E0.05
Azoxystrobin	VS0380	Fennel, bulb	T10	-
Boscalid	VS0078	Stalk and stem vegetables	-	30
Chlordane		Vegetables {except fruiting vegetables, cucurbits, sugar beet}	E0.02	-
Chlorothalonil	VS0380	Fennel, bulb	5	-
Clothianidin	VS2080	Stems and petioles	-	0.04
	VS0078	Stalk and stem vegetables {except artichoke, celery}	-	0.04
Cyhalothrin (includes lambda-cyhalothrin)	VA0035	Bulb vegetables	-	0.2
Cyromazine	VS0078	Stalk and stem vegetables	T7	-
DDT		Vegetables	E1	-
Diazinon		Vegetables	0.7	-
Dicofol		Vegetables {except cucumber; gherkin; tomato}	5	-
Diquat		Vegetables {except beans; broad bean; lupin (dry); onion, bulb; peas; potato; soya bean (dry); sugar beet}	*0.05	-
EPTC		Vegetables	*0.04	-
Fluazaindolizine	VS0078	Stalk and stem vegetables	-	0.04
	VA0035	Bulb vegetables	-	0.04
Flubendiamide	VS0078	Stalk and stem vegetables	5	-
Glyphosate	VS0078	Stalk and stem vegetables	*0.01	-
Heptachlor		Vegetables {except carrot; soya bean (dry); tomato}	E0.05	-
Inorganic Bromide		Vegetables {except peppers, sweet [capsicum]}	20	-
Lindane		Vegetables	E2	-

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Mandipropamid	VS0380	Fennel, bulb	T20	
Methomyl	VS0380	Fennel, bulb	T0.2	-
Methyl Bromide		Vegetables {except cucumber; peppers}	T*0.05	-
Myclobutanil	VA0035	Bulb vegetables	-	0.06
Paraquat		Vegetables {except potato, pulses}	*0.05	-
Pendimethalin	VA0380	Fennel, bulb	-	*0.05
Penthiopyrad	VA0380	Fennel, bulb	15	
Piperonyl Butoxide		Vegetables	8	-
Prometryn		Vegetables	*0.1	-
Propargite		Vegetables	3	-
Pydiflumetofen	VS2080	Stems and petioles	-	15
Pyrethrins		Vegetables	1	-
Sethoxydim (Clethodim)	VS0380	Fennel, bulb	T1	-
Spinetoram	VS0078	Stalk and stem vegetables	2	-
Thiamethoxam	VS2080	Stems and petioles	-	0.8
Trifluralin	VS0380	Fennel, bulb	T0.5	-

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. [Agricultural and Veterinary Chemicals \(MRL Standard for Residues of Chemical Products\) Instrument 2023 - Federal Register of Legislation](#)

CODEX MRLs: CODEX Alimentarius International Food Standards database (September 2026), <http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/>

Appendix 6: Fennel Bulb Agrichemical Regulatory Risk Assessment

Fennel Bulb 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 fennel bulb 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
BACILLUS THURINGIENSIS	11A	Armyworm, Helicoverpa, Loopers	Australia: No current concerns. USA: Under Registration Review (scheduled)
CHLORPYRIFOS	1B	Spotted vegetable weevil, Cutworms, Field crickets, Mole crickets, Vegetable weevil	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
CYANTRANILIPROLE	28	Rasping pests; [Suppression only] Onion thrips (Thripstabaci)	Australia: No current concerns.
CYROMAZINE	17	PER81867 for the control of Liriomyza species, including: Vegetable Leafminer (Liriomyza sativae) Serpentine Leafminer (Liriomyza huidobrensis)	Australia: No current concerns. Permit PER81867 Expiry date: 30/09/2026 EU: Not approved
DIAZINON	1B	Caterpillars	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
FLONICAMID	29	PER89185 for the control of Thrips	Australia: No current concerns. Permit PER89185 Expiry date: 31/05/2027
FLUBENDIAMIDE	28	Helicoverpa	Australia: No current concerns. EU: Not approved
HELCOVERPA ARMIGERA NPV	31	Helicoverpa	Australia: No current concerns
INDOXACARB	22A	Cotton bollworm (H. armigera) Native budworm (H. punctigera)	Australia: No current concerns. EU: Not approved
IRON EDTA COMPLEX	--	Common brown(brown) snail White snail Vine snail	Australia: No current concerns

Active Constituent	MoA Group	Pest	Risks and Comments
MALATHION	1B	Loopers	Australia: The final regulatory decision was published in an APVMA Special Gazette on 2 May 2024 . Labels have been varied. Products bearing previously approved labels must not be supplied after 1 May 2026. Canada: In re-evaluation
METALDEHYDE	--	slugs/snails For the control of snails and slugs	Australia: No current concerns Canada: In re-evaluation
METHIOCARB	1A	slugs/snails	Australia: No current concerns Canada: Cancelled
PETROLEUM OIL	UN	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
PROPARGITE	12C	Spider mites	Australia: APVMA reconsideration. Prioritised to be commenced by 2029. EU: Not approved Canada: Cancelled
SPINETORAM	5	Permit PER94451 for the control of Leaf miners	Australia: No current concerns. Permit PER94451 Expiry date: 31/07/2027 EU: Not approved Canada: In re-evaluation
SPINOSAD	5	Cabbage moth, heliothis spp., light brown apple moth, looper. Permit PER94331 for the control of Dipteran leaf miners	Australia: No current concerns. Permit PER94331 Expiry date: 30/05/2031 Canada: In re-evaluation
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
CHLOROTHALONIL	M5	Permit PER82895 for the control of Downy Mildew and Purple Blotch (<i>Alternaria porri</i>)	Australia: APVMA reconsideration. Prioritised to be commenced by 2028. Permit PER82895 Expiry date: 31/05/2030 EU: Not approved Canada: In re-evaluation USA: Under Registration Review (scheduled)
COPPER	M1	Leaf diseases	Australia: No current concerns.
MANCOZEB	M3	Leaf blight	Australia: APVMA reconsideration. Prioritised to be commenced by 2027. EU: Not approved USA: Under Registration Review (scheduled)
OXATHIPIPROLIN	49	Downy Mildew	Australia: No current concerns.
PENTHIOPYRAD	7	Sclerotinia rot (Lettuce drop) (<i>Sclerotinia</i> spp.), Grey mould (<i>Botrytis cinerea</i>), Powdery mildew (<i>Erysiphe cichoracearum</i>)	Australia: No current concerns. EU: Not approved
PHOSPHOROUS (PHOSPHONIC) ACID	P07 (33)	PER13698 for the control of Downy Mildew and Damping Off	Australia: No current concerns. Permit PER13698 Expiry date: 30/07/2030

HERBICIDES – Weed Control

Blue text = new APVMA approved uses

Active Constituent	MoA Group	Risks and Comments
DIQUAT	22	Australia: APVMA: Currently under review . Publication of the final regulatory decision is expected in Mid 2026. EU: Not approved
GLYPHOSATE	9	Australia: Nominated for targeted spray drift reconsideration USA: Under Registration Review (scheduled)
PARAQUAT	22	Australia: APVMA: Currently under review . Publication of the final regulatory decision is expected in Mid 2026. Candidate chemical recommended to be listed to Rotterdam Convention. EU: Not approved Canada: Cancelled USA: Restricted use

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.

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