Apple & Pear

Strategic Agrichemical Review Process
(SARP)

December 2022

Hort Innovation
Project – MT21005

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MT21005 –Strategic Agrichemical Review Process (SARP) Updates

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

Date of report:
December 2022

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1. Summary

A Strategic Agrichemical Review Process (SARP), through the process of a desktop audit and industry liaison;

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

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

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

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

Alternative pesticides should ideally be selected for benefits of:

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

The results of this process will provide the apple & pear 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
Alternaria Leaf Blotch & Fruit Spot / Rot	*Alternaria* spp.
Black Spot / Scab	*Venturia inaequalis*
Powdery Mildew	*Podosphaera leucotricha*

1.2 Insects and mites

The high priority insect and mite pests are:

Common Name	Scientific Name
Codling Moth	*Cydia pomonella*
Woolly Apple Aphid	*Eriosoma lanigerum*

1.3 Weeds

The high priority weeds are:

Common name	Scientific name
Marshmallow	*Malva parviflora*

1.4 Plant Growth Regulators

The high priority Plant Growth Regulator issues are:

Issue
Fruit Thinning
Reduced Vegetative Growth
Improve Shelf Life

2. The Australian Apple & Pear Industry

Apple and pear production occurs across all Australian states, although the majority of production is focussed in the Goulburn Valley in Victoria. Harvest occurs between February and May, although controlled atmosphere technology enables year-round availability to consumers.

Total production of apples for the year ending June 2021 was 280,273 tonnes[1]. Wholesale value of fresh supply was $720 m, with $632 m distributed into retail and $88.4 m into food service.

Total production of pears for the year ending June 2021 was 124,338 tonnes[1]. Wholesale value of fresh supply was $141 m, with $127 m distributed into retail and $14.0 m into food service.

Apples
Apple production for the fresh market is dominated by three main varieties. Pink Lady accounts for 41% of production, Gala is 23% and Granny Smith is 18%.

Fresh Apple Seasonality by State

State	20/21 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales	38,283												
Victoria	127,939												
Queensland	29,558												
Western Australia	28,691												
South Australia	26,788												
Tasmania	29,015												
Imports	1,727												
Availability legend			High			Medium			Low			None	

Pears
Pear production for the fresh market is dominated by three main varieties. Packham accounts for 63% of production, Williams is 20% and Beurre Bosc is 10%.

Fresh Pear Seasonality by State

State	20/21 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales	248												
Victoria	112,507												
Queensland	339												
Western Australia	4,396												
South Australia	5,677												
Tasmania	1,171												
Availability legend			High			Medium			Low			None	

[1] Hort Innovation (2021). Australian Horticulture Statistics Handbook 2020/21. [online] Available at: https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/grower-resources/ha18002-assets/australian-horticulture-statistics-handbook/

Australia is a net exporter of apples, although this is declining in recent years. Exports represented <1% of total production in 2020/21. Papua New Guinea is the largest customer for Australian apple exports, accounting for 27% of total export volume. Other countries importing Australian apples are Italy, Hong Kong, Thailand and India.

Australia exports 7% of total pear production. The majority of these exports goes to New Zealand with 36% of the total volume. Other countries importing Australian pears are Canada, Singapore, Indonesia and USA.

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 apple & pear 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 apple & pear industry regarding pesticide access, Hort Innovation undertook a review of the pesticide requirements via a Strategic Agrichemical Review Process (SARP) in 2017. The current project is to update the SARP with the latest information and progress.

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

The results will provide the apple & pear 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 apple & pear but attempts to prioritise the major problems.

Exotic plant pests, not present in Australia, are not addressed in this document.

3.2 Minor use permits and registration

From a pesticide access perspective, the APVMA classifies apples and pears as major crops, that fit within the APVMA crop group 002: Pome Fruits. Access to minor use permits can be relatively difficult unless a reasonable justification is provided in accordance with the APVMA's minor use guidance[2].

Possible justification for future permit applications could be based on:

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

With each of these options, sound, scientific argument is required to justify any new permit applications. Another option for the apple & pear 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 Apple & Pear Strategic Agrichemical Review Process (SARP), which was last updated in 2017, was conducted by desktop audit using industry information gathered during 2021-2022. The process included gathering, collating and confirming information:

Process of Review	Activity
Industry survey	Preparation and circulation of online industry survey to update priority pests and identify priority control gaps. Survey released: 17 November 2021 Survey closed: 28 February 2022
SARP data updated via a desktop audit	Updated registrations and permits Updated MRL tables Updated available and potential pesticides against low, moderate and high priority pests, including an assessment of their suitability Included information on regulatory risks from MT20007
Captured industry input	Collated and analysed survey results Consolidated and incorporated industry needs and insights

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 apple & pear
Appendix 2. Products available for control of insects and mites in apple & pear
Appendix 3. Products available for weed control in apple & pear
Appendix 4. Plant growth regulators available in apple & pear
Appendix 5. Current permits for use in apple & pear
Appendix 6. Apple & Pear Maximum Residue Limits (MRLs)
Appendix 7. Apple & Pear Agrichemical Regulatory Risk Assessment

4. Diseases, Pests and Weeds of Apple & Pear

Resistance management: To manage the risk of resistance development, integrated disease/pest/weed management (IDM/IPM/IWM) strategies should be adopted. The general principle is to integrate diverse chemical and non-chemical strategies; maximise efficacy; not rely on singular tools and rotate between different modes of action. It is always essential to follow all the label instructions. Specific resistance management strategies may apply. These can be found, along with other useful information, on the CropLife Australia website[3].

In Chapter 4 information on regulatory risk derived from project MT20007 (Regulatory support and coordination) has been incorporated.

Some of the suggested options have no overseas MRLs (see Appendix 6).

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

[3] https://www.croplife.org.au/resources/programs/resistance-management/ https://www.croplife.org.au/resources/programs/resistance-management/apples-pears-apple-and-pear-scab-2-draft/

4.1 Diseases of apple & pear

4.1.1 Disease priorities

Common name	Scientific name
High	
Alternaria Leaf Blotch & Fruit Spot / Rot	*Alternaria* spp.
Black Spot / Apple Scab and Pear Scab	*Venturia inaequalis*
Powdery Mildew	*Podosphaera leucotricha*
Moderate	
Blue Mould / Post-Harvest	*Penicillium expansum, Penicillium solitum*
Bitter Rot / Post-Harvest	*Glomerella cingulata*
Grey Mould / Storage Rot / Post-Harvest	*Botrytis cinerea*
Ripe Fruit Rot / Target Spot / Post-Harvest	*Pezicula alba*
Mouldy Core	*Alternaria* spp.
Phytophthora Trunk/Collar Rot	*Phytophthora cactorum*
Low	
Fruit Rot / Post-Harvest	*Gloeosporium album*
Storage Scab / Post-Harvest	*Venturia* spp.
Sooty Blotch	*Gloeodes pomigena*
White / Rosellinia Root Rot	*Dermatophora necatrix*
Bacterial Canker / Pear Blossom Blast	*Pseudomonas syringii*
Fly Speck	*Schizothyrium pomi*
Sclerotium Collar Rot	*Sclerotium rolfsii*
Silverleaf	*Chondrostereum purpureum*

The high priority diseases identified were Alternaria Leaf Blotch & Fruit Spot / Rot, Black Spot / Scab, Powdery Mildew and Internal Browning. Available and potential products for control of diseases are listed in Section 4.1.2.

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

Resistance Management

Resistance by fungal pathogens to fungicides usually evolves following the intensive use of fungicides for disease control. In any fungal population there are likely to be individuals that have some degree of natural resistance, and which are less susceptible to fungicides, even before the chemicals are used. Resistance arises mainly through the incorrect use of fungicides, which selects for the resistant individuals. Continued use of a fungicide or fungicide chemical group can result in a significant build-up of resistant individuals in the fungal population – to the point where that product, or other products from the same chemical group, is no longer effective. In some cases, removal of the selection pressure can result in the fungal population regaining its sensitivity to the fungicide group, but this is not always the case. The risk of fungicide resistance developing varies between different chemical groups and different fungal pathogens, such that specific strategies are recommended for those situations considered to carry the highest risk[4]. There is a resistance strategy for Apple & Pear Scab[5] available from CropLife. This strategy recommends not more than four Group 3 fungicides alone per season, no more than four Group 9 fungicides, and three applications of Group 7, Group 11 and Group U12 fungicides.

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

[5] www.croplife.org.au/resources/programs/resistance-management/apples-pears-apple-and-pear-scab-2-draft/

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 7)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required

Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Alternaria Leaf Blotch & Fruit Spot / Rot (*Alternaria* spp.) **Priority: High**							
Rated as a high priority in NSW, QLD, VIC and WA, a moderate priority in SA, and as a low priority in TAS. Alternaria is a serious disease of high value apples, especially during wet seasons. The disease does not impact pears. Orchard hygiene is critical for managing infections. Winter prunings must be mulched and completely broken down or removed before leaves begin to emerge in spring. Early and late fruit development are the critical period for application of fungicides, if required.							
Boscalid + Pyraclostrobin (Pristine) BASF	7+11	Protectant & Curative	14 NG	A	ALL	Registered in apple for control of Black Spot / Scab, Powdery Mildew and **Alternaria Leaf Blotch and Fruit Spot**. Commence application after blossom and during fruit development. Maximum of 3 applications per season, with a retreatment interval of 10-14 days.	-
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protectant & Curative	14 NG	A	ALL	Registered in apples for suppression of **Alternaria Leaf and Fruit Blotch** (outcome of Hort Innovation grant funded project ST17000). Apply prior to onset of disease and repeat applications at 7-14 day intervals if conditions remain favourable for disease. Maximum of 3 applications per season. Do not use post-harvest treatments containing fludioxonil.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative	14 NG	A	ALL	Registered in apple for control of Black Spot / Scab, Powdery Mildew and suppression of **Alternaria Leaf Blotch** and in pears for control of Black Spot. Commence applications following blossom and extending through early fruit development, using retreatment interval of 14 days. Maximum of 3 applications per season.	-
Fluxapyroxad (Sercadis) BASF	7	Protectant	NR NG	A	ALL	Registered in apple for control of Black Spot / Scab, Powdery Mildew and **Alternaria Leaf Blotch**. Commence applications post-flowering / early fruit development stage. Maximum of 3 applications per season, with a retreatment interval of 10-14 days. Registration pending for control of Black Spot / Scab in pears.	-
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative	7 NG	A	ALL	Registered in apples for control of Black Spot / Scab, Powdery Mildew and suppression of **Alternaria**. Application may commence at spurburst and use a 7-10 day interval prior to petal fall and during periods of rapid growth. Later applications should be 10-14 day intervals. Maximum of 3 applications per season, and no more than 2 consecutive applications.	-
Metiram	M3	Apples	14	A	ALL	Registered in apples for control of **Alternaria Leaf Blotch and Alternaria Fruit Spot**. Application should begin after blossom and during early fruit development. Apply every 7-14 days. Maximum number of applications not specified.	R2
Metiram (Polyram) PER12864	M3	Protectant	14	A	ALL (excl. VIC)	Permitted in pome fruit for control of **Alternaria Leaf Blotch / Leaf Spot**. Apply after blossom abd during early fruit development to prevent establishment of infections on the leaves. Use a retreatment interval of 7-14 days. Maximum number of applications not specified.	R2
Penthiopyrad (Fontelis) Corteva	7	Protectant	28 NG	A	ALL	Registered in pome fruit for control of Apple Black Spot, Apple Powdery Mildew, Pear Scab and **Alternaria Leaf Blotch / Fruit Spot**. Commence applications after blossom and during early fruit development. Use a retreatment interval of 10-14 days. Maximum of 3 applications per season, and no more than 2 consecutive applications.	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant	NR	A	ALL	Registered in apples for control of Powdery Mildew and **Alternaria Leaf & Fruit Spot**. Commence applications from flowering onwards. Use a retreatment interval of 10-14 days, but reduce to 7 days if rainfall occurs between treatments. Maximum of 6 applications per season.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Copper	M1	Protectant	1	P-A	ALL	Registered in apples and pears for control of Black Spot. Registered for control of ***Alternaria* spp.** in carrots and potatoes.	-
Fluazinam (Shirlan)	29	Protectant	NR NG	P-A	QLD, NSW, WA & TAS	Registered in apples for control of White Root Rot. US registration for suppression of **Alternaria Blotch** in apples.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered in grapes and strawberries for control of Botrytis, in tomatoes, capsicums and chillies for suppression of Bacterial Spot and in avocado, other tropical fruit crops (excluding banana) and mango for control of Anthracnose and suppression of Stem End Rot. US registration for control of ***Alternaria*** in berries, brassica vegetables, citrus, bulb vegetables, herbs/spices, root/tuber and corm vegetables, stone fruit and tree nuts.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapevines and strawberries. US registration for control of **Alternaria Blotch** in pome fruit.	-
Dimethomorph (Acrobat)	40	Protectant		P		Registered for control of ***Alternaria* spp.** in cucurbits, onions and potatoes.	-
Florylpicoxamid (Adavelt) Corteva	21	Protectant & Curative		P		Registered for control of Septoria in wheat. New active from Corteva with activity on Septoria, Powdery Mildew, Botrytis, Anthracnose, ***Alternaria***, Scab, Monilinia, Rust and *Mycosphaerella* spp.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Registered for control of ***Alternaria* spp.** in citrus and passionfruit.	R3

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 various diseases in grapes, berries, leafy vegetables, lettuce and potato. US registration for control of ***Alternaria* spp.** in almonds, berries, brassica leafy greens, brassica vegetables, bulb vegetables, carrots, cucurbits, beans, fruiting vegetables, grape and small fruit vine climbing subgroup (except fuzzy Kiwifruit), leaf petiole vegetables, leafy greens, root & tuber vegetables, lemons, limes, pistachios, potatoes, specific tree nuts and tuberous and corm vegetables.	R3
Black Spot / Apple Scab / Pear Scab (*Venturia inaequalis*) **Priority: High**							
Rated as a high priority in NSW, SA and VIC, a moderate priority in QLD and TAS, and as a low priority in WA. If poorly managed, this disease will cause serious losses in terms of cost of control, reduced pack out and reduced tree vigour. Maintaining an open canopy, and destruction or removal of leaf litter will assist in reducing the risk of infection. Predictive models can be used to support monitoring programs and to inform the need for fungicide applications during the season.							
Boscalid + Pyraclostrobin (Pristine) BASF	7+11	Protectant & Curative	14 NG	A	ALL	Registered in apple for control of **Black Spot / Scab**, Powdery Mildew and Alternaria Leaf Blotch and Fruit Spot and in pears for control of **Black Spot / Scab**. Commence application at spurburst. Apply at 7-10 day intervals prior to petal fall and during periods of rapid growth. Maximum of 3 applications per season.	-
Captan	M4	Protectant	7 NG	A	ALL	Registered in apples and pears for control of **Black Spot**. Apply from pink stage onwards following a copper spray at green tip. Use a retreatment interval of 7 days until petal fall, and an interval of 10-14 days thereafter. Maximum of 5 applications per season.	R3
Copper	M1	Protectant	1	A	ALL	Registered in apples and pears for control of **Black Spot**. Apply at green tip. Discontinue use when green tip on the earliest developing buds reaches 1 cm. Use 1 application per season only.	-
Cyprodinil (Chorus)	9	Protectant & Curative	NR	A	ALL	Registered in apples and pears for control of **Apple Scab** & **Pear Scab**. Apply between spurburst and petal fall. Use a retreatment interval of 7-10 days. Maximum of 4 applications per season.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Difenoconazole	3	Protectant & Curative	28	A	ALL	Registered in apples and pears for control of **Black Spot** and Powdery Mildew. Apply at 7-10 day intervals as a protective program from spurburst to petal fall. Apply no more than 4 applications alone. For use as a curative, apply within 5 days of the beginning of an infection period. After petal fall, apply only as a tank mix with a protectant Black Spot fungicide, using a 14-21 day retreatment interval.	R3
Dithianon	M9	Protectant	21	A	ALL	Registered in apples for control of **Black Spot / Scab** and Bitter Rot, and in pears for control of **Black Spot / Scab**. For apples, apply at 7-10 days from green tip to petal fall and continue at 10-14 day intervals thereafter while conditions permit infection. For pears, apply every 10-14 days while conditions permit infection. Maximum number of applications not specified.	R3
Dodine	U12	Protectant & Curative	5 NG	A	ALL	Registered in apples and pears for control of **Black Spot**. For a protective program, apply at pink bud (apples) or white bud (pears) followed by 2 covers sprays 10 days apart, a further 2 cover sprays 10-14 days apart and a fifth cover spray after a further 21 days and then at 4-6 week intervals if required. For curative control, apply within 36 hours of the start of an infection period.	-
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative	14 NG	A	ALL	Registered in apple for control of **Black Spot / Scab**, Powdery Mildew and suppression of Alternaria Leaf Blotch and in pears for control of **Black Spot**. Commence applications at green tip or spurburst, using retreatment interval of 7-10 days. Maximum of 3 applications per season.	-
Fluxapyroxad (Sercadis) BASF	7	Protectant	NR NG	A	ALL	Registered in apple for control of **Black Spot / Scab**, Powdery Mildew and Alternaria Leaf Blotch. Commence applications at green tip stage. Maximum of 3 applications per season, with a retreatment interval of 7-10 days. Registration pending for control of **Black Spot / Scab** in pears.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Hexaconazole (Synan)	3	Protectant & Curative	7	A	ALL	Registered in apples for control of Powdery Mildew and **Scab/ Black Spot**. Commence applications at green tip or at 10% blossom after a green tip lime sulphur or copper spray. Use a retreatment interval of 14 days. Maximum of 4 applications per season.	R3
			14			Registered in pears for control of **Scab**. Commence applications at delayed green tip or at 5-7 days after a green tip copper spray. Use a retreatment interval of 14 days. Maximum of 4 applications per season.	
Isopyrazam (Seguris Flexi) Syngenta	7	Protectant	21 NG	A	ALL	Registered in apples for control of **Black Spot / Scab** and Powdery Mildew and in pears for control of **Black Spot / Scab**. Commence applications at green tip and make further applications at 7-10 day intervals. Maximum of 3 applications per season, with no more than 2 consecutive applications.	-
Kresoxim Methyl (Stroby)	11	Protectant & Curative	42 G:14	A	ALL	Registered in apples for control of **Black Spot / Scab** and Powdery Mildew and in pears for control of **Scab**. Commence applications at spurburst, using a retreatment interval of 7-10 days prior to petal fall and during periods of high growth. Later applications should be at 10-14 day intervals. Maximum of 3 applications per season.	-
Mancozeb	M3	Protectant	14	A	ALL	Registered in pome fruit for control of **Pear Scab**, **Apple Scab / Black Spot**, Target Spot, Bitter Rot, Sooty Blotch, Fly Speck and Ripe Fruit Spot. Apply at 7-14 day intervals following a copper spray at green tip. Maximum number of applications not specified.	R2
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative	7 NG	A	ALL	Registered in apples for control of **Black Spot / Scab**, Powdery Mildew and suppression of Alternaria. Application may commence at spurburst and use a 7-10 day interval prior to petal fall and during periods of rapid growth. Later applications should be 10-14 day intervals. Maximum of 3 applications per season, and no more than 2 consecutive applications.	-
Metiram (Polyram)	M3	Protectant	14	A	ALL	Registered in pome fruit for control of **Apple Scab / Black Spot**, Bitter Rot, Fly Speck, **Pear Scab**, Ripe Fruit Spot, Sooty Blotch and Target Spot. Apply after early copper spray and repeat every 7-14 days. Maximum number of applications not specified.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Myclobutanil (Systhane)	3	Protectant & Curative	21	A	ALL	Registered in apples for control of **Black Spot** and Powdery Mildew and in pears for control of **Black Spot**. For protective treatment, apply at green tip or at spurburst following a recommended green tip fungicide. Repeat at 7-10 day intervals. After petal fall, and whenever spray intervals may exceed 10 days, add a protectant fungicide. For curative treatment, apply within 5 days after the commencement of an infection period. Maximum number of applications not specified.	R3
Penconazole (Topas)	3	Protectant & Curative	14	A	ALL	Registered in apples and pears for control of **Apple Scab / Black Spot** and **Pear Scab**. Commence applications at spurburst, following application of an approved fungicide at green tip. Repeat applications at 7-10 day intervals until the end of October, then apply at 14-21 day intervals as required. For curative treatment, apply within 4 days of an infection event. Maximum of 8 applications per season.	R3
Penthiopyrad (Fontelis) Corteva	7	Protectant	28 NG	A	ALL	Registered in pome fruit for control of **Apple Black Spot**, Apple Powdery Mildew, **Pear Scab** and Alternaria Leaf Blotch / Fruit Spot. Commence applications prior to disease development. Use a retreatment interval of 7-10 days. Maximum of 3 applications per season, and no more than 2 consecutive applications.	-
Potassium Bicarbonate (Ecocarb Plus)	M2	Protectant	NR	A	ALL	Registered in apples for control of **Black Spot / Scab** and Powdery Mildew. Commence applications at first sign of disease and repeat applications at 7 days. Maximum number of applications not specified.	-
Sulphur	M2	Protectant	NR	A	VIC, TAS, SA & QLD	Registered in pome fruit for control of **Black Spot / Scab**. Apply at pink bud, petal fall and then at 2-3 week intervals. Maximum number of applications not specified.	-
Thiram	M3	Protectant	7	A	ALL	Registered in apples for control of **Black Spot** and Target Spot & Ripe Spot and in pears for control of **Black Spot**. For apples, apply at pink bud and calyx stages, following early green tip sprays. Follow with 4 cover sprays at 10-14 day intervals and then every 14-21 days if required. For pears, apply at spurburst and again at white bud, followed by 4 cover sprays at 10-14 day intervals, and thereafter at 2-3 week intervals if required. Maximum number of applications not specified.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Trifloxystrobin (Flint)	11	Protectant & Curative	35	A	ALL	Registered in apples for control of Powdery Mildew and **Apple Scab**, and in pears for control of **Pear Scab**. Apply during flowering and early fruit development using 7-10 day retreatment intervals. Maximum of 3 applications per season.	-
Triforine (Saprol)	3	Protectant & Curative	1	A	ALL	Registered in apples (not Golden Delicious or Cox's Orange Pippin) for control of Powdery Mildew and **Black Spot**. Apply as a curative treatment within 72 hours of the start of an infection period. Maximum number of applications not specified.	R3
Zineb	M3	Protectant	14	A	ALL	Registered in pome fruit for control of Bitter Rot, Sooty Blotch, **Black Spot of Pears** and **Black Spot of Apples** (excl. WA). Apply at pink bud, calyx stage and thereafter as cover sprays. Maximum number of applications and retreatment interval not specified.	R2
Ziram	M3	Protectant	7	A	ALL	Registered in apples for control of **Black Spot** and Bitter Rot and in pears for control of **Black Spot**. In apples, apply at spur burst, pink bud stage and then every 14 days or as required in cover sprays. In pears, apply at spurburst, white bud stage, calyx stage and then every 14 days or as required in cover sprays. Maximum number of applications not specified.	R2
Fluazinam (Shirlan)	29	Protectant	NR NG	P-A	QLD, NSW, WA & TAS	Registered in apples for control of White Root Rot. US registration for control of **Apple Scab** in apples.	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant	NR	P-A	ALL	Registered in apples for control of Powdery Mildew and Alternaria Leaf & Fruit Spot. US registration for suppression of **Scab** in pome fruit.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapevines and strawberries. US registration for control of **Scab** in pome fruit.	-
Florylpicoxamid (Adavelt) Corteva	21	Protectant & Curative		P		Registered for control of Septoria in wheat. New active from Corteva with activity on Septoria, Powdery Mildew, Botrytis, Anthracnose, Alternaria, **Scab**, Monilinia, Rust and *Mycosphaerella* spp.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Thiophanate Methyl (Topsin-M)	1	Protectant		P		US registration for control of **Scab** in apples and pears.	
Powdery Mildew (*Podosphaera leucotricha*) **Priority: High**							
Rated as a high priority in NSW, QLD, SA, TAS and VIC, and as a moderate priority in WA. Most apple varieties are susceptible to Powdery Mildew, and incidence is rare on pears. Much of the damage caused by Powdery Mildew is not directly to the fruit, but heavy infections will reduce significantly reduce yield through distortion of leaf and shoot growth. Severe infections during flowering can result in failure to set fruit, or russeting of fruit. Management options include the removal of infected terminal buds during dormant pruning, maintaining an open canopy and the use of fungicides during the growing season. Most Black Spot fungicides also have activity on Powdery Mildew so may provide incidental control, although specific Powdery Mildew controls may be required between the cluster and pink stages.							
Boscalid + Pyraclostrobin (Pristine) BASF	7+11	Protectant & Curative	14 NG	A	ALL	Registered in apple for control of Black Spot / Scab, **Powdery Mildew** and Alternaria Leaf Blotch and Fruit Spot. Commence application at early pink stage. Apply at 7-10 day intervals prior to petal fall and during periods of rapid growth. Maximum of 3 applications per season.	-
Bupirimate (Nimrod)	8	Protectant	7	A	ALL	Registered in apples for control of **Powdery Mildew**. Commence applications at the pink stage and retreat at 10-14 day intervals or as required. Maximum number of applications not specified.	-
Difenoconazole	3	Protectant & Curative	28	A	ALL	Registered in apples and pears for control of Black Spot and **Powdery Mildew**. Apply 10 days after spurburst at approximately the pink stage. Use 4-5 applications at a retreatment interval of 10-14 days.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative	14 NG	A	ALL	Registered in apple for control of Black Spot / Scab, **Powdery Mildew** and suppression of Alternaria Leaf Blotch and in pears for control of Black Spot. Commence applications at early pink stage, using retreatment interval of 14 days. Maximum of 3 applications per season.	-
Fluxapyroxad (Sercadis) BASF	7	Protectant	NR NG	A	ALL	Registered in apple for control of Black Spot / Scab, **Powdery Mildew** and Alternaria Leaf Blotch. Commence applications at pink bud stage. Apply at 7-10 day intervals prior to petal fall and during periods of rapid growth. Later applications should be at 10-14 day interval. Maximum of 3 applications per season. Registration pending for control of Black Spot / Scab in pears.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Hexaconazole (Synan)	3	Protectant & Curative	7	A	ALL	Registered in apples for control of **Powdery Mildew** and Scab/ Black Spot. Commence applications at green tip or at 10% blossom after a green tip lime sulphur or copper spray. Use a retreatment interval of 14 days. Maximum of 4 applications per season.	R3
Isopyrazam (Seguris Flexi) Syngenta	7	Protectant	21 NG	A	ALL	Registered in apples for control of Black Spot / Scab and **Powdery Mildew**. Commence applications at green tip and make further applications at 7-10 day intervals. Maximum of 3 applications per season, with no more than 2 consecutive applications.	-
Kresoxim Methyl (Stroby)	11	Protectant & Curative	42 G:14	A	ALL	Registered in apples for control of Black Spot / Scab and **Powdery Mildew** and in pears for control of Scab. Commence applications at early pink stage, using a retreatment interval of 7-10 days prior to petal fall and during periods of high growth. Later applications should be at 10-14 day intervals. Maximum of 3 applications per season.	-
Mefentrifluconazole (Belanty) BASF	3	Protectant & Curative	7 NG	A	ALL	Registered in apples for control of Black Spot / Scab, **Powdery Mildew** and suppression of Alternaria. Application may commence at spurburst and use a 7-10 day interval prior to petal fall and during periods of rapid growth. Later applications should be 10-14 day intervals. Maximum of 3 applications per season, and no more than 2 consecutive applications.	-
Myclobutanil (Systhane)	3	Protectant & Curative	21	A	ALL	Registered in apples for control of Black Spot and **Powdery Mildew**. Apply at early pink stage and repeat at 10-14 day intervals until December or as indicated in district spray schedules. Maximum number of applications not specified.	R3
Penthiopyrad (Fontelis) Corteva	7	Protectant	28 NG	A	ALL	Registered in pome fruit for control of Apple Black Spot, **Apple Powdery Mildew**, Pear Scab and Alternaria Leaf Blotch / Fruit Spot. Commence applications prior to disease development. Use a retreatment interval of 14-21 days. Maximum of 3 applications per season, and no more than 2 consecutive applications.	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant	NR	A	ALL	Registered in apples for control of **Powdery Mildew** and Alternaria Leaf & Fruit Spot. Commence applications from flowering onwards. Use a retreatment interval of 10-14 days, but reduce to 7 days if rainfall occurs between treatments. Maximum of 6 applications per season.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Potassium Bicarbonate (Ecocarb Plus)	M2	Protectant	NR	A	ALL	Registered in apples for control of Black Spot / Scab and **Powdery Mildew**. Commence applications at first sign of disease and repeat applications at 7 days. Maximum number of applications not specified.	-
Proquinazid (Talendo) Corteva	13	Protectant	28 NG	A	ALL	Registered in pome fruit for control of **Powdery Mildew**. Commence applications from open cluster stage, using a minimum retreatment interval of 14 days. Maximum of 3 applications per season, with no more than 2 consecutive applications.	-
Sulphur	M2	Protectant	NR	A	ALL	Registered in pome fruit for control of **Powdery Mildew**. Apply at least 2 sprays prior to blossom and then at 2 week intervals. Maximum number of applications not specified.	-
Trifloxystrobin (Flint)	11	Protectant & Curative	35	A	ALL	Registered in apples for control of **Powdery Mildew** and Apple Scab. Apply during flowering and early fruit development using 7-10 day retreatment intervals. Maximum of 3 applications per season.	-
Triforine (Saprol)	3	Protectant & Curative	1	A	ALL	Registered in apples (not Golden Delicious or Cox's Orange Pippin) for control of **Powdery Mildew** and Black Spot. Apply in a control program at 10-14 day retreatment intervals. Maximum number of applications not specified.	R3
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant		P		US registration for suppression of **Powdery Mildew** in cucurbits.	-
Bacillus amyloquefaciens strain QST 713 (Serenade Opti) Bayer	BM01	Biological		P		Registered for control of Botrytis in grapes and strawberries, suppression of Bacterial Spot in tomatoes, capsicums and chillis, and control of Anthracnose and suppression of Stem End Rot in tropical fruit crops (excluding banana). US registration for control of **Powdery Mildew** in pome fruit.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapevines and strawberries. US registration for control of **Powdery Mildew** in pome fruit.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Benzovindiflupyr (Aprovia) Syngenta	7	Protectant & Curative		P		US registration for control of **Powdery Mildew** in pome fruit.	-
Cyflufenamid (Flute) AgNova	U6	Protectant & Curative		P		Registered for control of **Powdery Mildew** in grapevines, cucurbits and strawberries.	-
Florylpicoxamid (Adavelt) Corteva	21	Protectant & Curative		P		Registered for control of Septoria in wheat. New active from Corteva with activity on Septoria, **Powdery Mildew**, Botrytis, Anthracnose, Alternaria, Scab, Monilinia, Rust and *Mycosphaerella* spp.	-
Inpyrfluxam (Excalia)	7					US registration for control of Apple Scab, Powdery Mildew and Juniper Rusts in apples.	
Pydiflumetofen + Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Registered for control of **Powdery Mildew** in fruiting vegetables, cucurbits and root vegetables.	R3
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of various diseases in grapes, berries, leafy vegetables, lettuce and potato. US registration for control of **Powdery Mildew** in almonds, brassica leafy greens, brassica vegetables, carrots, cucurbits, beans, fruiting vegetables, grape and small fruit vine climbing subgroup (except fuzzy Kiwifruit), leaf petiole vegetables, leafy greens, root & tuber vegetables, pecans, potatoes, strawberries and tuberous and corm vegetables.	R3
Thiophanate Methyl (Topsin-M)	1	Protectant		P		US registration for control of **Powdery Mildew** in apples and pears.	

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Blue Mould / Post-Harvest (*Penicillium expansum, Penicillium solitum*) **Bitter Rot / Post-Harvest** (*Glomerella cingulata*) **Grey Mould / Storage Rot / Post-Harvest** (*Botrytis cinerea*) **Ripe Fruit Rot / Target Spot / Post-Harvest** (*Pezicula alba*) **Mouldy Core** (*Alternaria* spp.) **Priority: Moderate**							
Rated as a high priority in TAS, a moderate priority in NSW, QLD, SA and VIC, and as a low priority in WA. Post-harvest disease management starts with good orchard hygiene and appropriate control of in-crop infections with fungicides if required. Post-harvest sanitation and handling are also critical aspects of management.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest	NR	A	ALL	Registered for general disinfection of cool rooms, bulk bins, floors, graders, packing lines and protective clothing.	-
Chlorine	-	Sanitiser / Post-Harvest	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of bacteria and fungi. Post-harvest spray. Must make contact with the fruit for at least 30 seconds. Can also be used as a general disinfectant for equipment.	-
Fludioxonil (Scholar)	12	Protectant / Post Harvest	NR	A	ALL	Registered in pome fruit as a post-harvest treatment for control of **Blue Mould** and **Grey Mould**. Apply as a dip or drench, ensuring contact with the fruit for 1 minute.	R3
Imazalil (Magnate)	3	Protectant / Post Harvest	NR	A	ALL	Registered in apples and pears as a post-harvest treatment for control of **Blue Mould**. Apply as a bulk dip, flood or drench for a maximum of 30 seconds.	R3
Iodine	-	Pome Fruit / Sanitiser	NR	A	ALL	Registered in pome fruit as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Peroxyacetic Acid	M	Sanitiser / Post-Harvest	NR	A	ALL	Registered in fruit as a post-harvest treatment for bacteria. Post-harvest spray or dip. Ensure a minimum of 45 seconds contact time.	-
Thiabendazole (Tecto)	3	Protectant / Post Harvest	NR	A	ALL	Registered in apples and pears as a post-harvest treatment for control of **Blue Mould**, **Grey Mould** and **Fruit Rot**. Immerse fruit for 30 seconds within 24 hours of harvesting.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Fluazinam (Shirlan)	29	Protectant	NR NG	P-A	QLD, NSW, WA & TAS	Registered in apples for control of White Root Rot. US registration for control of **Bitter Rot** in apples.	-
Thiophanate Methyl (Topsin-M)	1	Protectant		P		US registration for control of various post-harvest rots, including Storage Rot, **Blue Mould** and **Grey Mould** in apples and pears.	
Blue Mould (*Penicillium expansum, Penicillium solitum*) **Bitter Rot** (*Glomerella cingulata*) **Grey Mould / Storage Rot** (*Botrytis cinerea*) **Ripe Fruit Rot / Target Spot** (*Pezicula alba*) **Priority: Moderate**							
Rated as a high priority in TAS, a moderate priority in NSW, QLD, SA and VIC, and as a low priority in WA. Post-harvest disease management starts with good orchard hygiene and appropriate control of in-crop infections with fungicides if required. Post-harvest sanitation and handling are also critical aspects of management.							
Dithianon	M9	Protectant	21	A	ALL	Registered in apples for control of Black Spot / Scab and **Bitter Rot**. Apply at 14-21 day intervals from petal fall onwards. Maximum number of applications not specified.	R3
Mancozeb	M3	Protectant	14	A	ALL	Registered in pome fruit for control of Pear Scab, Apple Scab / Black Spot, Target Spot, Bitter Rot, Sooty Blotch, Fly Speck and **Ripe Fruit Spot**. Apply at 7-14 day intervals following a copper spray at green tip. Maximum number of applications not specified.	R2
Metiram (Polyram)	M3	Protectant	14	A	ALL	Registered in pome fruit for control of Apple Scab / Black Spot, **Bitter Rot**, Fly Speck, Pear Scab, **Ripe Fruit Spot**, Sooty Blotch and **Target Spot**. Apply after early copper spray and repeat every 7-14 days. Maximum number of applications not specified.	R2
Thiram	M3	Protectant	7	A	ALL	Registered in apples for control of Black Spot and **Target Spot & Ripe Spot**. Apply at pink bud and calyx stages, following early green tip sprays. Follow with 4 cover sprays at 10-14 day intervals and then every 14-21 days if required. Maximum number of applications not specified.	R2
Zineb	M3	Protectant	14	A	ALL	Registered in pome fruit for control of **Bitter Rot**, Sooty Blotch, Black Spot of Pears and Black Spot of Apples (excl. WA). Apply at pink bud, calyx stage and thereafter as cover sprays. Maximum number of applications and retreatment interval not specified.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Ziram	M3	Protectant	7	A	ALL	Registered in apples for control of Black Spot and **Bitter Rot**. Apply at spur burst, pink bud stage and then every 14 days or as required in cover sprays. Maximum number of applications not specified.	R2
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant	NR	P-A	ALL	Registered in apples for control of Powdery Mildew and Alternaria Leaf & Fruit Spot. US registration for suppression of **Bitter Rot** in pome fruit.	-
Aureobasidium pullulans (Botector) Nufarm	BM 02	Biological	NR	P		Registered for control of Botrytis and suppression of Anthracnose, Phomopsis and Rhizopus in berries, control of Botrytis and suppression of Sclerotinia in fruiting vegetables and cucurbits, and control of Botrytis in grapes. US registration for control of storage diseases: ***Botrytis cinerea***, ***Penicillium* spp.**, *Monilinia* spp., *Nectria galligena* and ***Pezicula* spp.** in pome fruit.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapevines and strawberries. US registration for control of **Bitter Rot**, **Blue Mould** and **Botrytis Grey Mould** in pome fruit.	-
Benzovindiflupyr (Aprovia) Syngenta	7	Protectant & Curative		P		US registration for suppression of **Bitter Rot** in pome fruit.	-
Phytophthora Trunk/Collar Rot (*Phytophthora cactorum*) **Priority: Moderate**							
Rated as a moderate priority in QLD, SA and VIC, and as a low priority in NSW, TAS and WA. Phytophthora impacts both apples and pears. It presents the greatest risk to young trees. The key for avoiding loss of trees is to avoid planting new orchards into infected soil, and to improve soil drainage and organic matter where possible. Avoid planting orchards into areas that are prone to waterlogging.							
Fosetyl Aluminium	33	Protectant & Curative	14	A	ALL (excl. QLD)	Registered in apples for control of **Collar Rot**. Apply 2 foliar sprays per season, the first in early spring when trees are in full leaf, and the second 12 weeks later when the spring growth flush has matured. For severely diseased trees, apply as a soil drench.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime) Bayer	BM 02	Biological Soil Ameliorant	NR	P-A	ALL	Available in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Registered for suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.	-
Copper	M1	Protectant	1	P-A	ALL	Registered in apples and pears for control of Black Spot. Registered for control of **Phytophthora** in citrus, durian, passionfruit, potatoes and tomatoes.	-
Oxathiapiprolin + Mandipropamid (Orondis Ultra) Syngenta	49 + 40	Protectant		P		US registration for control of **Phytophthora** in citrus, cucurbits, ginseng, fruiting vegetables and tuberous & corm vegetables.	-
Oxathiapiprolin + Mefenoxam (Orondis Gold) Syngenta	49 + 4	Protectant		P		US registration for control of **Phytophthora** in asparagus, berries, cucurbits, fruiting vegetables, ginseng, hops, potato and other tuberous & corm vegetables and tobacco.	-
Mandipropamid (Revus) Syngenta	40	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.	-
Metalaxyl M (Ridomil Gold 25G) Syngenta	4	Protectant & Curative		P		Registered for control of **Phytophthora Trunk & Stem Canker** in macadamia and peaches.	-
Fruit Rot / Post-Harvest (*Gloeosporium album*) **Storage Scab / Post-Harvest** (*Venturia* spp.) **Priority: Low**							
Rated as a moderate priority in QLD, and as a low priority in NSW, SA, TAS, VIC and WA. These post-harvest conditions are more evident in cooler, humid seasons, particularly in the late fruit ripening stage. In crop management of infections should be combined with regular post-harvest techniques.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest	NR	A	ALL	Registered for general disinfection of cool rooms, bulk bins, floors, graders, packing lines and protective clothing.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Chlorine	-	Sanitiser / Post-Harvest	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of bacteria and fungi. Post-harvest spray. Must make contact with the fruit for at least 30 seconds. Can also be used as a general disinfectant for equipment.	-
Iodine	-	Pome Fruit / Sanitiser	NR	A	ALL	Registered in pome fruit as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Peroxyacetic Acid	M	Sanitiser / Post-Harvest	NR	A	ALL	Registered in fruit as a post-harvest treatment for bacteria. Post-harvest spray or dip. Ensure a minimum of 45 seconds contact time.	-
Thiabendazole (Tecto)	3	Protectant / Post Harvest	NR	A	ALL	Registered in apples and pears as a post-harvest treatment for control of Blue Mould, Grey Mould and **Fruit Rot**. Immerse fruit for 30 seconds within 24 hours of harvesting.	-
Sooty Blotch (*Gloeodes pomigena*) **Priority: Low**							
Rated as a moderate priority in NSW and QLD, and as a low priority in SA, TAS, VIC and WA.							
Mancozeb	M3	Protectant	14	A	ALL	Registered in pome fruit for control of Pear Scab, Apple Scab / Black Spot, Target Spot, Bitter Rot, **Sooty Blotch**, Fly Speck and Ripe Fruit Spot. Apply at 7-14 day intervals following a copper spray at green tip. Maximum number of applications not specified.	R2
Metiram (Polyram)	M3	Protectant	14	A	ALL	Registered in pome fruit for control of Apple Scab / Black Spot, Bitter Rot, Fly Speck, Pear Scab, Ripe Fruit Spot, **Sooty Blotch** and Target Spot. Apply after early copper spray and repeat every 7-14 days. Maximum number of applications not specified.	R2
Zineb	M3	Protectant	14	A	ALL	Registered in pome fruit for control of Bitter Rot, **Sooty Blotch**, Black Spot of Pears and Black Spot of Apples (excl. WA). Apply at pink bud, calyx stage and thereafter as cover sprays. Maximum number of applications and retreatment interval not specified.	R2
Fluazinam (Shirlan)	29	Protectant	NR NG	P-A	QLD, NSW, WA & TAS	Registered in apples for control of White Root Rot. US registration for suppression of **Sooty Blotch** in apples.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant	NR	P-A	ALL	Registered in apples for control of Powdery Mildew and Alternaria Leaf & Fruit Spot. US registration for suppression of **Sooty Blotch** in pome fruit.	-
Bacillus amyloquefaciens strain QST 713 (Serenade Opti) Bayer	BM01	Biological		P		Registered for control of Botrytis in grapes and strawberries, suppression of Bacterial Spot in tomatoes, capsicums and chillis, and control of Anthracnose and suppression of Stem End Rot in tropical fruit crops (excluding banana). US registration for control of **Sooty Blotch** in pome fruit.	-
Benzovindiflupyr (Aprovia) Syngenta	7	Protectant & Curative		P		US registration for control of **Sooty Blotch** in pome fruit.	-
Thiophanate Methyl (Topsin-M)	1	Protectant		P		US registration for control of **Sooty Blotch** in apples and pears.	
White / Rosellinia Root Rot (*Dermatophora necatrix*) **Priority: Low**							
Rated as a moderate priority in QLD, and as a low priority in NSW, SA, TAS, VIC and WA. This disease is only recorded from the Granite Belt and Northern NSW Tablelands and causes poor plant health and vigour in newly planted trees. It will affect both apples and pears. Affected trees should be removed from orchards immediately.							
Fluazinam (Shirlan)	29	Protectant	NR NG	A	QLD, NSW, WA & TAS	Registered in apples for control of **White Root Rot**. Pre-planting: Apply to the planting hole prior to planting. For established trees, treat as a soil injection following the winter dormant period each year.	-
Bacterial Canker / Pear Blossom Blast (*Pseudomonas syringii*) **Priority: Low**							
Rated as a moderate priority in VIC, and as a low priority in NSW, QLD, SA, TAS and WA. Blossom Blast is a disease that affects pears and can become a problem in regions which commonly have cool, wet weather that persists during extended bloom periods. It causes blossom death and reduced fruit set. The use of copper products at green tip stage may help to manage the disease.							
Copper	M1	Protectant	1	P-A	ALL	Registered in apples and pears for control of **Black Spot**.	-
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant		P		US registration for suppression of ***Pseudomonas* spp.** in cucurbits and tomatoes.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Bacillus amyloquefaciens strain QST 713 (Serenade Opti) Bayer	BM01	Biological		P		Registered for control of Botrytis in grapes and strawberries, suppression of **Bacterial Spot** in tomatoes, capsicums and chillis, and control of Anthracnose and suppression of Stem End Rot in tropical fruit crops (excluding banana). US registration for suppression of Fire Blight and control of Brooks Spot, Cedar Apple Rust, Fly Speck, Sooty Blotch, Bot Rot, Bitter Rot, Bulls Eye Rot and Powdery Mildew in pome fruit.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapevines and strawberries. US registration for control of Alternaria Blotch, Bitter Rot, Blue Mould, Bot Rot, Botrytis, Brooks Spot, Bulls Eye Rot, Cedar Apple Rust, Fire Blight, Flyspeck, Powdery Mildew and Scab in pome fruit, and for control of ***Pseudomonas* spp.** in berries, fruiting vegetables, leafy vegetables, stone fruit, tobacco and tree nuts.	-
Fly Speck (*Schizothyrium pomi*) **Priority: Low**							
Rated as a low priority in all states.							
Mancozeb	M3	Protectant	14	A	ALL	Registered in pome fruit for control of Pear Scab, Apple Scab / Black Spot, Target Spot, Bitter Rot, Sooty Blotch, **Fly Speck** and Ripe Fruit Spot. Apply at 7-14 day intervals following a copper spray at green tip. Maximum number of applications not specified.	R2
Metiram (Polyram)	M3	Protectant	14	A	ALL	Registered in pome fruit for control of Apple Scab / Black Spot, Bitter Rot, **Fly Speck**, Pear Scab, Ripe Fruit Spot, Sooty Blotch and Target Spot. Apply after early copper spray and repeat every 7-14 days. Maximum number of applications not specified.	R2
Fluazinam (Shirlan)	29	Protectant	NR NG	P-A	QLD, NSW, WA & TAS	Registered in apples for control of White Root Rot. US registration for suppression of **Fly Speck** in apples.	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant	NR	P-A	ALL	Registered in apples for control of Powdery Mildew and Alternaria Leaf & Fruit Spot. US registration for suppression of **Fly Speck** in pome fruit.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Bacillus amyloquefaciens strain QST 713 (Serenade Opti) Bayer	BM01	Biological		P		Registered for control of Botrytis in grapes and strawberries, suppression of Bacterial Spot in tomatoes, capsicums and chillis, and control of Anthracnose and suppression of Stem End Rot in tropical fruit crops (excluding banana). US registration for control of **Fly Speck** in pome fruit.	-
Bacillus amyloliquefaciens strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of Botrytis in grapevines and strawberries. US registration for control of **Fly Speck** in pome fruit.	-
Benzovindiflupyr (Aprovia) Syngenta	7	Protectant & Curative		P		US registration for control of **Fly Speck** in pome fruit.	-
Thiophanate Methyl (Topsin-M)	1	Protectant		P		US registration for control of **Fly Speck** in apples and pears.	
Sclerotium Collar Rot (*Sclerotium rolfsii*) **Priority: Low**							
Rated as a moderate priority in QLD, and as a low priority in NSW, SA, TAS, VIC and WA.							
Quintozene (Terraclor Soil Fungicide)	14	Protectant	NR NG	A	QLD, SA, WA & TAS	Registered in apple seedlings for control of **Collar Rot (*Sclerotium rolfsii*)**. Drench seedling butt and planting site.	-
Silverleaf (*Chondrostereum purpureum*) **Priority: Low**							
Rated as a moderate priority in SA, and as a low priority in NSW, QLD, SA, TAS, VIC and WA. Silverleaf affects both apples and pears and is more common in cooler growing regions. Diseased woods should be removed from the orchard and destroyed. Fresh pruning cuts should be sealed immediately to prevent infection.							
Iodicarb + Cyproconazole (Rapid Pruning Wound Dressing)	28+3	Protectant & Curative	NR	A	ALL (excl. WA)	Registered in apples for control of **Silverleaf**. Apply undiluted product thickly to dry wound surface with a paintbrush. Do not apply during the growing season. Apply on the same day as the pruning cut is made. Large wounds on a main trunk will benefit from a second application.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Tebuconazole (Greenseal Pruning Wound Dressing)	3	Protectant & Curative	NR	A	ALL	Registered in apples for control of **Silverleaf**. Apply only during the winter dormant period on fresh pruning cuts. Apply thickly to wound surface with a paintbrush on the same day the pruning cut is made.	R3

4.2 Insect and mite pests of apple & pear

4.2.1 Insect and mite pest priorities

Common name	Scientific name
High	
Codling Moth	*Cydia pomonella*
Woolly Apple Aphid	*Eriosoma lanigerum*
Moderate	
Apple Dimpling Bug / Yellow Mirid	*Campylomma liebknechti*
Harlequin Bug	*Dindymus versicolor*
Light Brown Apple Moth	*Epiphyas postvittana*
Heliothis	*Helicoverpa* spp.
Two Spotted Mite	*Tetranychus urticae*
European Red Mite	*Panonychus ulmi*
Bryobia Mite	*Bryobia rubrioculus*
Queensland Fruit Fly	*Bactrocera tryoni*
Low	
Lesser Queensland Fruit Fly	*Bactrocera neohumeralis*
Mediterranean Fruit Fly	*Ceratitis capitata*
Western Flower Thrips	*Frankliniella occidentalis*
Plague Thrips	*Thrips imaginis*
San Jose Scale	*Diaspidiotus perniciosus*
Snails & Slugs	Gastropoda
Rutherglen Bug	*Nysius vinitor*
Apple Leafhopper / Canary Fly	*Edwardsiana australis*
Oriental Fruit Moth	*Grapholita molesta*
Pear & Cherry Slug	*Caliroa cerasi*
Twig (Pear) Looper	*Ectropis excursaria*
Painted Apple Moth	*Teia anartoides*
Painted Vine Moth	*Agarista agricola*
Long-tailed Mealybug	*Pseudococcus longispinus*
Tuber Mealybug	*Pseudococcus viburni*

Common name	Scientific name
Apple Rust Mite	*Aculus schlechtendali*
Pearleaf Blister Mite	*Eriophyes pyri*
Black Peach Aphid	*Brachycaudus persicae*
Cherry Aphid	*Myzus cerasi*
Green Peach Aphid	*Myzus persicae*
Fuller's Rose Weevil	*Asynonychus cervinus*
Apple Weevil	*Otiorhynchus cribricollis*
Garden Weevil	*Phlyctinus callosus*

The high priority insect pests identified by the survey were Codling Moth and Woolly Apple Aphid. Available and potential products for insect, mite and other pests are listed in Section 4.2.2.

The broad range of insect and mite pests in apples and pears increases the importance of adopting an Integrated Pest Management approach. Pest management strategies should aim to use multiple methods of control, including cultural, biological and chemical measures.

Resistance Management

Insecticide resistance is a risk to effective control for some insect groups, particularly if there is an over-reliance on a limited number of insecticides. Growers should adhere to the resistance management strategies outlined on the CropLife website[6]. Growers should not exceed the maximum number of applications permitted on the insecticide label.

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

4.2.2 Available and potential products for priority insects and mites

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

Availability		Regulatory risk (refer to Appendix 7)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG
IPM – indicative overall impact on beneficials (based on the Cotton Pest Management Guide 2018-19 and cotton use patterns)			
VL – Very low; L – Low; M – Moderate; H – High; VH – Very High; - not specified			

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Codling Moth (*Cydia pomonella*) **Priority: High**								
Rated as a high priority in NSW, QLD, SA and VIC, a moderate priority in TAS, and as a low priority in WA. Orchard hygiene and pest monitoring are critical aspects of managing Codling Moth. The larvae will cause direct feeding damage to the ripening fruit and present a major threat to fruit quality if left uncontrolled.								
(E,E) 8,10 Dodecadien-1-OL (Isomate-C)	-	Insect Confusion Agent	NR	A	ALL (excl. WA)	Registered in apples and pears as a mating disruption agent for control of **Codling Moth**. Apply before the first moth emergence in spring. Loop dispensers over spurs and branches within 1 m of the top of the tree. Use in conjunction with insecticides where moth populations are moderate to high.	VL Bee:VL	-
E,E) 8,10 Dodecadien-1-OL + Tetradecanol (Isomate-C/OFM)	-	Insect Confusion Agent	NR	A	ALL (excl. WA)	Registered in apples and pears as a mating disruption agent for control of **Codling Moth** and Oriental Fruit Moth. Apply before the first moth emergence in spring. Loop dispensers over spurs and branches within 1 m of the top of the tree. Use in conjunction with insecticides where moth populations are moderate to high.	VL Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Abamectin + Chlorantraniliprole (Voliam Targo) Syngenta	6+28	Ingestion	7 G:28	A	ALL	Registered in pome fruit for control of **Codling Moth**, Light Brown Apple Moth, Native Budworm, Cotton Bollworm, Oriental Fruit Moth, Two Spotted Mite and European Red Mite. Maximum of 1 application per season.	M Bee:H	-
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	A	ALL	Registered in apples for control of Apple Dimpling Bug, **Codling Moth**, Light Brown Apple Moth, Longtailed Mealybug, Plague Thrips, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid. Apply 1 application per season only.	M Bee:M	R2
			35 NG			Registered in pears for control of **Codling Moth**, Light Brown Apple Moth, Longtailed Mealybug, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid. Maximum of 2 applications per season, with a retreatment interval of 14 days.		
Carbaryl	1A	Contact	77	A	ALL	Registered in pome fruit for control of **Codling Moth**, Light Brown Apple Moth and Pear Leaf Blister Mite. Do not apply less than 4 weeks following full bloom if fruit set reduction is not desired. Use a retreatment interval of 21 days. Maximum number of treatments not specified.	H Bee:H	R2
Chlorantraniliprole (Altacor) FMC	28	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of **Codling Moth**, Budworms, Oriental Fruit Moth and Light Brown Apple Moth. Use a retreatment interval of 14-21 days from petal fall until late December, and an interval of 14-21 days after the end of December. Maximum of 3 applications per season.	L Bee:VL	-
Clothianidin (Samurai)	4A	Contact & Ingestion	7 NG	A	ALL	Registered in apples and pears for control of Longtailed Mealybug, Tuber Mealybug and **Codling Moth**. Apply 2 consecutive sprays at a 14 day interval.	M Bee:VH	R2
Cyclaniliprole (Teppan) ISK	28	Ingestion	28 NG	A	ALL	Registered in apples for control of **Codling Moth**. Maximum of 2 applications per season with a minimum retreatment interval of 10 days.	L-M Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Cydia pomonella Granulosis Virus V22 (Grandex Biological Insecticide)	-	Biological	NR	A	ALL	Registered in pome fruit for control of **Codling Moth** and Oriental Fruit Moth. Apply as a cover spray when newly hatched larvae are present in the orchard. Apply at 7-14 day intervals while larvae are present. Treatments per season not limited.	VL Bee:VL	-
Fenoxycarb (Insegar) Syngenta	7B	Ingestion	14	A	ALL	Registered in apples and pears for control of **Codling Moth** and Light Brown Apple Moth. Commence application 7-10 days after full petal fall. Make 4 applications at 7 days intervals, followed by further applications at 4-6 week intervals if required. Maximum number of treatments not specified.	L Bee:L	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, Aphids, **Caterpillars**, Earwigs, Whitefly, Thrips and Leafhopper. Use a retreatment interval of 2-3 weeks. Maximum number of applications not specified.	VH Bee:H	-
Indoxacarb (Avatar) FMC	22A	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of **Codling Moth**, Budworms, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil, Garden Weevil and Wingless Grasshopper. Maximum of 6 applications per season, with a retreatment interval of 10 days.	M Bee:H	R3
Malathion	1B	Contact	3	A	NSW, ACT, VIC, SA & WA	Registered in apples and pears for control of Apple Leaf Hopper, **Codling Moth**, Red Spider Mite, Thrips and Woolly Aphid. Maximum number of applications and retreatment interval not specified.	H Bee:H	R3
					TAS & WA	Registered in apples and pears for control of Apple Leaf Hopper, **Codling Moth**, European Red Mite and Woolly Aphid. Maximum number of applications and retreatment interval not specified.		
Methomyl (Lannate)	1A	Contact	1	A	NSW, VIC & WA	Registered in apples for control of **Codling Moth**. Use a retreatment interval of 14 days for late season control of light infestations only. Maximum number of applications not specified.	H Bee:H	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spinetoram (Delegate) Corteva	5	Ingestion	7 NG	A	ALL	Registered in pome fruit for control of **Codling Moth**, Light Brown Apple Moth, Oriental Fruit Moth, Loopers, Pear & Cherry Slug, Helicoverpa and Western Flower Thrips. Use a retreatment interval of 14 days. Maximum of 4 applications per season.	M Bee:VH	-
Tebufenozide (Mimic)	18	Ingestion	21	A	ALL	Registered in apples and pears for control of Light Brown Apple Moth and **Codling Moth**. Apply a minimum of 2 sprays with a 21 day interval. Maximum of 6 applications per season.	L Bee:L	-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion	7 NG	A	ALL	Registered in pome fruit for control of **Codling Moth**, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil. Use a 14-21 day retreatment interval. Maximum of 3 applications per season.	L-M Bee:VH	-
Thiacloprid (Calypso)	4A	Contact & Ingestion	21 NG	A	ALL	Registered in pome fruit for control of **Codling Moth** and Oriental Fruit Moth. Use a 14 day retreatment interval. Maximum of 4 applications per season.	M Bee:L	R2
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Woolly Apple Aphid (*Eriosoma lanigerum*) **Priority: High**								
Rated as a high priority in NSW, QLD, SA and WA, a moderate priority in VIC, and as a low priority in TAS. This pest infests apple trees and very occasionally pears. Wolly Apple Aphid can affect the roots as well as the above-ground parts of the tree. The used of non-disruptive insecticides for controlling other pests will assist management of Woolly Apple Aphid by preserving natural predators and parasitoids.								
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	A	ALL	Registered in apples for control of Apple Dimpling Bug, Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, Plague Thrips, San Jose Scale, Tuber Mealybug and **Woolly Apple Aphid**. Apply 1 application per season only.	M Bee:M	R2
			35 NG			Registered in pears for control of Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, San Jose Scale, Tuber Mealybug and **Woolly Apple Aphid**. Maximum of 2 applications per season, with a retreatment interval of 14 days.		
Chlorpyrifos	1B	Contact	14	A	ALL (excl. VIC)	Registered in apples and pears for control of San Jose Scale and **Woolly Aphid**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R1
Clothianidin (Samurai)	4A	Contact & Ingestion	7 NG	A	ALL	Registered in apples for control of **Woolly Apple Aphid**. Can be applied as a foliar spray, through micro-irrigation or as a soil drench to individual trees. Soil applications should be made between green tip and pink bud stage.	M Bee:VH	R2
Diazinon	1B	Contact	14 G:14	A	SA, NSW, ACT & WA	Registered in apples for control of San Jose Scale and **Woolly Aphid**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R2
Flonicamid (Mainman) UPL	29	Ingestion	21 NG	A	ALL	Registered in apples for control of **Woolly Apple Aphid** and Tuber Mealybug. Minimum retreatment interval of 14 days. Maximum of 3 applications per season.	M Bee:VL	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, **Aphids**, Caterpillars, Earwigs, Whitefly, Thrips and Leafhopper. Use a retreatment interval of 2-3 weeks. Maximum number of applications not specified.	VH Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Imidacloprid	4A	Contact & Ingestion	NR	A	ALL	Registered in apples for control of **Woolly Apple Aphid**. For trees up to 7 years old. Apply as a soil drench to the base of the tree between green tip and petal fall. Do not treat more than once in any 2 year period.	M Bee:M	R2
Malathion	1B	Contact	3	A	NSW, ACT, VIC, SA & WA	Registered in apples and pears for control of Apple Leaf Hopper, Codling Moth, Red Spider Mite, Thrips and **Woolly Aphid**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R3
					TAS & WA	Registered in apples and pears for control of Apple Leaf Hopper, Codling Moth, European Red Mite and **Woolly Aphid**. Maximum number of applications and retreatment interval not specified.		
Omethoate (Folimat)	1B	Contact	7	A	WA	Registered in apples and pears for control of **Woolly Aphid**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R2
Pirimicarb (Pirimor)	1A	Contact	2	A	ALL (excl. QLD)	Registered in apples for control of **Woolly Aphid**. Retreatment interval not specified. Maximum of 2 non-consecutive sprays may be used per season.	VL Bee:VL	R3
Potassium Salts of Fatty Acid (Natrasoap)	-	Contact	NR	A	ALL	Registered in fruit trees for control of **Aphids**, Thrips, Mealybug, Two Spotted Mite, Spider Mite and Whitefly. Maximum number of applications and retreatment interval not specified.	L Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	21	A	ALL	Registered in pome fruit for control of Longtailed Mealybug, Tuber Mealybug and San Jose Scale, and suppression of **Woolly Apple Aphid**. Commence applications at the onset of crawler emergence. For apples, do not apply prior to petal fall and for pears, not prior to fruitlets reaching 10mm in diameter. Apply a second application 14-28 days after the first application. Maximum of 3 applications per season.	M Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	7	A	ALL	Registered in pome fruit for control of Apple Dimpling Bug, Longtailed Mealybug, Tuber Mealybug, **Woolly Apple Aphid** and San Jose Scale. Maximum of 2 applications per season with a minimum 14 day retreatment interval.	M Bee:VH	R3
Petroleum Oil	-	Contact	1	P-A	ALL	Registered in apples for control of Mites (eggs) including European Red Mite and Scales, and in pears for control of European Red Mite, Scales, Two Spotted Mite, Brown Mite, Pear Rust Mite and Pear Leaf Blister Mite. Registered for control of **Aphids** in cotton, stone fruit, pecans, strawberries and various vegetables and ornamental plants.	L Bee:L	-
Afidopyropen (Versys) BASF	9D	Ingestion		P		Registered for control of **Aphids** in various vegetable crops. US registration for control of Aphids in stone fruit.	L Bee:L	-
Beauveria bassiana (Velifer) BASF	UNF	Biological	NR	P		Registered for suppression of Green Peach Aphid, Rose Aphid and Chrysanthemum Aphid in protected vegetables and ornamentals.	L Bee:L	-
Dimpropyridaz (Efficon) BASF	UN			P		BASF has applied for registration to control Whitefly and **Aphids** in leafy vegetables, brassica vegetables, brassica leafy vegetables, fruiting vegetables, cucurbits and cotton. Pending regulatory approvals, first market introduction in Australia is expected early 2023.	-	-
Apple Dimpling Bug / Yellow Mirid (*Campylomma liebknechti*) **Priority: Moderate**								
Rated as a high priority in QLD and WA, a moderate priority in NSW, SA and VIC, and as a low priority in TAS. Pome fruit is most susceptible to damage to dimpling bugs between the pink bud and full bloom stages. Varietal susceptibility to damage varies with light coloured varieties like Granny Smith and Golden Delicious frequently damaged. Damage frequently appears as distortion or dimpling of the fruit, although severe damage can result in shedding of the fruit.								
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	A	ALL	Registered in apples for control of **Apple Dimpling Bug**, Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, Plague Thrips, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid. Apply 1 application per season only.	M Bee:M	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Methomyl (Lannate)	1A	Contact	1	A	QLD & WA	Registered in apples for control of Thrips and **Dimpling Bug**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R2
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	7	A	ALL	Registered in pome fruit for control of **Apple Dimpling Bug**, Longtailed Mealybug, Tuber Mealybug, Woolly Apple Aphid and San Jose Scale. Maximum of 2 applications per season with a minimum 14 day retreatment interval.	M Bee:VH	R3
Tau-Fluvalinate (Mavrik)	3A	Contact	NR	A	ALL (excl. NT & TAS)	Registered in apples for control of **Apple Dimpling Bug** and Plague Thrips. Apply 1 spray only per season, during early blossom from pink stage to 20% bloom.	VH Bee:H	-
Thiacloprid (Calypso)	4A	Contact & Ingestion	21 NG	A	ALL	Registered in apples for control of **Apple Dimpling Bug**. Commence application between pink stage and petal fall according to pest incidence. Maximum of 2 applications during flowering per season.	M Bee:L	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of Aphids (except Woolly Apple Aphid), Leafhoppers and Scale in pome fruit.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-
Harlequin Bug (*Dindymus versicolor*) **Priority: Moderate**								
Rated as a high priority in NSW, a moderate priority in QLD and VIC, and as a low priority in SA, TAS and WA. Cause damage to fruit which is similar to that caused by Apple Dimpling Bugs. Control of weeds in the orchard and removal of sheltering sites such as timber stacks are important cultural control methods.								
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	P-A	ALL	Registered in apples for control of Apple Dimpling Bug, Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, Plague Thrips, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid.	M Bee:M	R2
Flonicamid (Mainman) UPL	29	Ingestion	21 NG	P-A	ALL	Registered in apples for control of Woolly Apple Aphid and Tuber Mealybug. US registration for control of Aphids and **Plant Bugs** in pome fruit.	M Bee:VL	-
Methomyl (Lannate)	1A	Contact	1	P-A	QLD & WA	Registered in apples for control of Thrips and Dimpling Bug.	H Bee:H	R2
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	7	P-A	ALL	Registered in pome fruit for control of Apple Dimpling Bug, Longtailed Mealybug, Tuber Mealybug, Woolly Apple Aphid and San Jose Scale.	M Bee:VH	R3
Tau-Fluvalinate (Mavrik)	3A	Contact	NR	P-A	ALL (excl. NT & TAS)	Registered in apples for control of Apple Dimpling Bug and Plague Thrips.	VH Bee:H	-
Thiacloprid (Calypso)	4A	Contact & Ingestion	21 NG	P-A	ALL	Registered in apples for control of Apple Dimpling Bug.	M Bee:L	R2

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 in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of Aphids (except Woolly Apple Aphid), Leafhoppers and Scale in pome fruit.	L Bee:L	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-
Light Brown Apple Moth (*Epiphyas postvittana*) **Priority: Moderate**								
Rated as a high priority in TAS and WA, and as a moderate priority in NSW, QLD, SA, TAS and VIC. Light Brown Apple Moth is a serious pest of both apples and pears. Larvae cause feeding damage to the surface of fruit. This causes a layer of corky tissue to form as the fruit matures, making it unmarketable.								
Abamectin + Chlorantraniliprole (Voliam Targo) Syngenta	6+28	Ingestion	7 G:28	A	ALL	Registered in pome fruit for control of Codling Moth, **Light Brown Apple Moth**, Native Budworm, Cotton Bollworm, Oriental Fruit Moth, Two Spotted Mite and European Red Mite. Maximum of 1 application per season.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	A	ALL	Registered in apples for control of Apple Dimpling Bug, Codling Moth, **Light Brown Apple Moth**, Longtailed Mealybug, Plague Thrips, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid. Apply 1 application per season only.	M Bee:M	R2
			35 NG			Registered in pears for control of Codling Moth, **Light Brown Apple Moth**, Longtailed Mealybug, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid. Maximum of 2 applications per season, with a retreatment interval of 14 days.		
Bacillus thuringiensis subsp Kurstaki Strain HD-1	11	Biological	NR	A	ALL	Registered in fruit for control of Armyworm, Cotton Bollworm, Native Budworm, Cabbage Moth, Cabbage White Butterfly, Loopers, **Light Brown Apple Moth** and Vine Moth. Apply to newly hatched larvae, late in the afternoon or early evening. Apply a minimum of 2 sprays separated by no more than 3 days initially, and then reapply at 3-5 day intervals. Maximum number of applications not specified.	VL Bee:L	-
Carbaryl	1A	Contact	77	A	ALL	Registered in pome fruit for control of Codling Moth, **Light Brown Apple Moth** and Pear Leaf Blister Mite. Do not apply less than 4 weeks following full bloom if fruit set reduction is not desired. Use a retreatment interval of 21 days. Maximum number of treatments not specified.	H Bee:H	R2
Chlorantraniliprole (Altacor) FMC	28	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of Codling Moth, Budworms, Oriental Fruit Moth and **Light Brown Apple Moth**. Use a retreatment interval of 14-21 days from petal fall until late December, and an interval of 14-21 days after the end of December. Maximum of 3 applications per season.	L Bee:VL	-
E-11-tetradecen-1-yl acetate + E-9-E-11-tetradecadien-1yl acetate (LBAM Isomate)	-	Insect Confusion Agent	NR	A	ALL	Registered in apples as an insect confusion agent for control of Light Brown Apple Moth. Twist dispensers around branches in the upper third of the canopy. Use immediately prior to the first moth emergence in spring.	VL Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Fenoxycarb (Insegar) Syngenta	7B	Ingestion	14	A	ALL	Registered in apples and pears for control of Codling Moth and **Light Brown Apple Moth**. Commence application 7-10 days after full petal fall. Make 4 applications at 7 days intervals, followed by further applications at 4-6 week intervals if required. Maximum number of treatments not specified.	L Bee:L	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, Aphids, **Caterpillars**, Earwigs, Whitefly, Thrips and Leafhopper. Use a retreatment interval of 2-3 weeks. Maximum number of applications not specified.	VH Bee:H	-
Indoxacarb (Avatar) FMC	22A	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of Codling Moth, Budworms, **Light Brown Apple Moth**, Apple Weevil, Fuller's Rose Weevil, Garden Weevil and Wingless Grasshopper. Maximum of 6 applications per season, with a retreatment interval of 14 days.	M Bee:H	R3
Methomyl (Lannate)	1A	Contact	1	A	ALL	Registered in apples for control of **Light Brown Apple Moth**. Apply at calyx stage and use a retreatment interval of 14 days, or as required. Maximum number of applications not specified.	H Bee:H	R2
					VIC & WA	Registered in pears for control of **Light Brown Apple Moth**. Apply at calyx stage and use a retreatment interval of 14 days, or as required. Maximum number of applications not specified.		
Methoxyfenozide (Prodigy)	16	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of **Light Brown Apple Moth** and Loopers. For control of the spring generation, commence applications at petal fall and apply a series of 3 applications at 14 day intervals. To control a later summer generation, apply a minimum of 2 sprays with a 21 day interval, according to pest incidence.	VL Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spinetoram (Delegate) Corteva	5	Ingestion	7 NG	A	ALL	Registered in pome fruit for control of Codling Moth, **Light Brown Apple Moth**, Oriental Fruit Moth, Loopers, Pear & Cherry Slug, Helicoverpa and Western Flower Thrips. Use a retreatment interval of 14 days. Maximum of 4 applications per season.	M Bee:VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in pome fruit for control of **Light Brown Apple Moth**, Loopers, Pear Slug, Heliothis and Western Flower Thrips. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	L Bee:L	-
Tebufenozide (Mimic)	18	Ingestion	21	A	ALL	Registered in apples and pears for control of **Light Brown Apple Moth** and Codling Moth. Apply a minimum of 2 sprays with a 21 day interval. Maximum of 6 applications per season.	L Bee:L	-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion	7 NG	A	ALL	Registered in pome fruit for control of Codling Moth, **Light Brown Apple Moth**, Apple Weevil, Fuller's Rose Weevil and Garden Weevil. Use a 14-21 day retreatment interval. Maximum of 3 applications per season.	L-M Bee:VH	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Heliothis (*Helicoverpa* spp.) **Priority: Moderate**								
Rated as a high priority in WA, and as a low priority in NSW, QLD, SA, TAS and VIC. Heliothis will infest both apples and pears and the larvae will feed on all leaves, shoots and fruit. Orchard monitoring is critical to determine when control measures are required in crop.								
Abamectin + Chlorantraniliprole (Voliam Targo) Syngenta	6+28	Ingestion	7 G:28	A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, **Native Budworm**, **Cotton Bollworm**, Oriental Fruit Moth, Two Spotted Mite and European Red Mite. Maximum of 1 application per season.	M Bee:H	-
Bacillus thuringiensis subsp Kurstaki Strain HD-1	11	Biological	NR	A	ALL	Registered in fruit for control of Armyworm, **Cotton Bollworm**, **Native Budworm**, Cabbage Moth, Cabbage White Butterfly, Loopers, Light Brown Apple Moth and Vine Moth. Apply to newly hatched larvae, late in the afternoon or early evening. Apply a minimum of 2 sprays separated by no more than 3 days initially, and then reapply at 3-5 day intervals. Maximum number of applications not specified.	VL Bee:L	-
Chlorantraniliprole (Altacor) FMC	28	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of Codling Moth, **Budworms**, Oriental Fruit Moth and Light Brown Apple Moth. Use a retreatment interval of 14-21 days from petal fall until late December, and an interval of 14-21 days after the end of December. Maximum of 3 applications per season.	L Bee:VL	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, Aphids, **Caterpillars**, Earwigs, Whitefly, Thrips and Leafhopper. Use a retreatment interval of 2-3 weeks. Maximum number of applications not specified.	VH Bee:H	-
Indoxacarb (Avatar) FMC	22A	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of Codling Moth, **Budworms**, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil, Garden Weevil and Wingless Grasshopper. Maximum of 6 applications per season, with a minimum retreatment interval of 10 days.	M Bee:H	R3
Methomyl (Lannate)	1A	Contact	1	A	TAS & WA	Registered in apples for control of **Heliothis**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Nuclear Polyhedrosis Virus of Helicoverpa (Vivus)	31	Biological	NR	A	ALL	Registered in pome fruit for control of **Corn Earworm** and **Native Budworm**. Apply to small larvae (<7mm) and use a retreatment interval of 2-3 days under heavy insect pressure. Maximum number of applications not specified.	VL Bee:L	-
Spinetoram (Delegate) Corteva	5	Ingestion	7 NG	A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Oriental Fruit Moth, Loopers, Pear & Cherry Slug, **Helicoverpa** and Western Flower Thrips. Use a retreatment interval of 14 days. Maximum of 4 applications per season.	M Bee:VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in pome fruit for control of Light Brown Apple Moth, Loopers, Pear Slug, **Heliothis** and Western Flower Thrips. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	L Bee:L	-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion	7 NG	P-A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.	L-M Bee:VH	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Two Spotted Mite (*Tetranychus urticae*) **European Red Mite** (*Panonychus ulmi*) **Bryobia Mite** (*Bryobia rubrioculus*) **Priority: Moderate**								
Rated as a high priority in QLD and WA, a moderate priority in NSW and SA, and as a low priority in TAS and VIC. Mites will infest both apples and pears and should be managed using an IPM approach, including the reduction of dust in orchards, the use of biological control agents, and selection of non-disruptive insecticides where possible to help preserve natural predators and parasitoids in the orchard.								
Abamectin	6	Ingestion	14 G:14	A	ALL	Registered in apples and pears for control of **Two Spotted Mite** and **European Red Mite**. Maximum of 1 application per season.	M Bee:H	-
Abamectin + Chlorantraniliprole (Voliam Targo) Syngenta	6+28	Ingestion	7 G:28	A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Native Budworm, Cotton Bollworm, Oriental Fruit Moth, **Two Spotted Mite** and **European Red Mite**. Maximum of 1 application per season.	M Bee:H	-
Acequinocyl (Kanemite) UPL	20B	Contact & Ingestion	14 NG	A	ALL	Registered in pome fruit for control of **Two Spotted Mite**. Maximum of 1 application per season.	L Bee:L	-
Bifenazate (Acramite)	20D	Contact & Ingestion	7 G:28	A	ALL	Registered in apples and pears for control of **Two Spotted Mite**, **European Red Mite** and **Bryobia Mite**. Maximum of 1 application per season.	L Bee:H	-
Chlorfenapyr (Secure) BASF	13A	Contact & Ingestion	14 NG	A	ALL	Registered in apples and pears for control of **Two Spotted Mite**. Maximum of 1 application per season.	M Bee:H	-
Clofentozine (Apollo)	10A	Contact	21	A	ALL	Registered in apples for control of **Two Spotted Mite** and **European Red Mite**, and in pears for control of **Two Spotted Mite**. Maximum of 1 application per season.	L Bee:L	-
Cyflumetofen (Danisaraba) BASF	25A	Contact	14 NG	A	ALL	Registered in pome fruit for control of **Two Spotted Mite**, **European Red Mite** and **Bryobia Mite**. Maximum of 2 applications per season, with a minimum retreatment interval of 14 days.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Etoxazole (Paramite) Sumitomo	10B	Contact	7 NG	A	ALL	Registered in pome fruit for control of **Two Spotted Mite**, **European Red Mite** and **Bryobia Mite**. Maximum of 1 application per season.	L Bee:VL	R3
Fenbutatin Oxide (Torque)	12B	Contact	2	A	ALL	Registered in apples and pears for control of **Two Spotted Mite**, **European Red Mite** and **Bryobia Mite**. Maximum number of applications and retreatment interval not specified.	L Bee:L	R2
Fenpyroximate (Acaban)	21A	Contact & Ingestion	14 NG	A	ALL	Registered in apples and pears for control of **Two Spotted Mite** and **European Red Mite** (except WA). Maximum of 1 application per season.	M Bee:H	-
Hexythiazox (Calibre)	10A	Contact	3	A	ALL	Registered in apples and pears for control of **Two Spotted Mite** and **European Red Mite**. Maximum of 1 application per season.	L Bee:L	-
Malathion	1B	Contact	3	A	TAS & WA	Registered in apples and pears for control of Apple Leaf Hopper, Codling Moth, **European Red Mite** and Woolly Aphid. Maximum number of applications and retreatment interval not specified.	H Bee:H	R3
Milbemectin (Milbeknock)	6	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of **European Red Mite** and **Two Spotted Mite**. Maximum of 1 application per season.	M Bee:VH	-
Omethoate (Folimat)	1B	Contact	7	A	ALL (excl. QLD)	Registered in apples and pears for control of **Two Spotted Mite** (not in MIA or Goulburn Valley) and **European Red Mite**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R2
Petroleum Oil	-	Contact	1	A	ALL	Registered in apples for control of Mites (eggs) including **European Red Mite** and Scales, and in pears for control of **European Red Mite**, Scales, **Two Spotted Mite**, Brown Mite, Pear Rust Mite and Pear Leaf Blister Mite. Maximum number of applications and retreatment interval not specified.	L Bee:L	-
Potassium Salts of Fatty Acid (Natrasoap)	-	Contact	NR	A	ALL	Registered in fruit trees for control of Aphids, Thrips, Mealybug, **Two Spotted Mite**, Spider Mite and Whitefly. Maximum number of applications and retreatment interval not specified.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Propargite (Omite)	12C	Contact	7	A	ALL	Registered in apples for control of **Two Spotted Mite** and **European Red Mite**, and in pears for control of **Two Spotted Mite**. Maximum of 2 applications per season. Retreatment interval not specified.	M Bee:L	R3
Pyridaben (Sanmite)	10A	Contact	1	A	ALL	Registered in apples for control of **Two Spotted Mite** and **European Red Mite**, and in pears for control of **Two Spotted Mite**. Maximum of 1 application per season.	L Bee:L	-
Tebufenpyrad (Pyranica)	21A	Contact & Ingestion	14 NG	A	ALL	Registered in apples and pears for control of **Two Spotted Mite** and **European Red Mite**. Maximum of 1 application per season.	M Bee:H	-
Spiromesifen (Oberon) Bayer	23	Ingestion		P		Submitted in July 2022 for registration to control **Mites** in pome and stone fruit. US registrations for **Mites** in various crops.	M Bee:VL	-
Beauveria bassiana (Velifer) BASF	UNF	Biological	NR	P		Registered for suppression of **Two Spotted Mite** in protected vegetables and ornamentals.	L Bee:L	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of **Two Spotted Mite** and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of **Two Spotted Mite** and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Queensland Fruit Fly (*Bactrocera tryoni*) **Lesser Queensland Fruit Fly** (*Bactrocera neohumeralis*) **Mediterranean Fruit Fly** (*Ceratitis capitata*) **Priority: Moderate**								
Queensland Fruit Fly is rated as a high priority in NSW and QLD, a moderate priority in VIC, and as a low priority in SA, TAS and WA. Lesser Queensland Fruit Fly is rated as a high priority in QLD, and as a low priority in other states. Mediterranean Fruit Fly is rated as a moderate priority in QLD, and as a low priority in other states. Fruit Fly infest both apples and pears. Quarantine and orchard hygiene are critical to good fly control. Monitoring by using pheromone-based traps is recommended to assist with timing of control measures. Consider bait sprays for light to moderate infestations.								
4-(P-Acetoxyphenyl) - 2-Butanone + Maldison	1B	Contact	NR	A	ALL	Registered in fruit trees for use as a trap for **Queensland Fruit Fly**. Used to detect the presence of Fruit Fly in the orchard to assist with making decisions about control.	H Bee:H	R3
4-(P-Acetoxyphenyl) - 2-Butanone + Fipronil	2B	Contact	NR	A	ALL	Registered in fruit crops for population reduction and population monitoring of **Queensland Fruit Fly** and **Lesser Queensland Fruit Fly**. Single stations can be used for population monitoring. Control of fruit fly required placement of 16 stations per hectare and should be used in conjunction with regular insecticide cover sprays.	M Bee:VH	R3
Clothianidin (Samurai)	4A	Contact & Ingestion	7 NG	A	ALL	Registered in pome fruit for control of **Queensland Fruit Fly** and **Mediterranean Fruit Fly**. Apply 3 consecutive foliar sprays 7 days apart when monitoring indicates fruit fly activity.	M Bee:VH	R2
Deltamethrin (Magmed) PER92548	3A	Contact	NR	A	WA	Permitted in pome fruit as a fruit fly trap for attract and kill of **Mediterranean Fruit Fly**. Hang devices high and on the sunny side of trees prior to fruit becoming susceptible to attack.	VH Bee:H	-
Dimethoate PER13859	1B	Contact / Post-harvest only	NR	A	ALL	Permitted in fruit fly host crops following the completion of harvest for control of **Fruit Fly**. Do not apply more than 2 applications per crop following harvest. Apply as a foliar spray to both fallen and retained fruit. Produce treated must not be harvested, collected or supplied for human or animal consumption.	H Bee:H	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Malathion	1B	Contact	3	A	ALL	Registered in apples and pears for control of **Fruit Fly**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R3
Pyrethrins (Pyganic)	3A	Contact	1	A	ALL	Registered in pome fruit for control of **Fruit Fly**, Rutherglen Bug and Spiders. Use as a clean-up spray ton remove insects just prior to harvest. Apply a maximum of 3 sprays at 3 day intervals.	VH Bee:H	-
Spinetoram (Delegate) Corteva PER12590	5	Ingestion	7	A	ACT, NSW, QLD & NT	Permitted in pome fruit for suppression of **Queensland Fruit Fly** and Lesser Queensland Fruit Fly. Maximum of 4 applications per season, with a minimum retreatment interval of 14 days.	M Bee:VH	-
					WA	Permitted in pome fruit for control of **Mediterranean Fruit Fly**. Maximum of 4 applications per season, with a minimum retreatment interval of 14 days.		
					ALL (excl. VIC)	Permitted in pome fruit for control of **Fruit Fly** (where an incursion occurs for a fruit fly species not recorded as endemic within a state/territory). Maximum of 4 applications per season, with a minimum retreatment interval of 14 days.		
Spinosad (Naturalure) Corteva	5	Bait / Ingestion	NR	A	ALL	Registered in tree crops as a bait for **Queensland Fruit Fly** and **Mediterranean Fruit Fly**. Apply as either a band or a spot spray to the lower canopy of fruiting plants. Begin applications as soon as monitoring traps indicate flies are present and fruit is at a susceptible stage. Repeat applications every 7 days, re-applying sooner if rain washes off the deposit. Avoid spraying the fruit as phytotoxicity may occur.	L Bee:H	-
Thiacloprid (Calypso) PER14562	4A	Contact & Ingestion	21 NG	A	WA	Permitted in pome fruit for control of **Mediterranean Fruit Fly**. Apply as a foliar spray when monitoring indicates fruit fly activity. Apply a maximum of 3 applications per season, with a minimum 14 days between consecutive applications.	M Bee:L	R2
Trichlorfon	1B	Contact	2 G:2	A	ALL (excl. SA & TAS)	Registered in pome fruit for control of **Fruit Fly**. Apply at start of stinging. Repeat at half concentration every 7-10 days. Number of treatments not specified.	H Bee:H	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	P-A	ALL	Registered in apples for control of Apple Dimpling Bug, Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, Plague Thrips, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid. Registered for suppression of **Queensland Fruit Fly** and **Mediterranean Fruit Fly** in stone fruit.	M Bee:M	R2
			35 NG			Registered in pears for control of Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid. Registered for suppression of **Queensland Fruit Fly** and **Mediterranean Fruit Fly** in stone fruit.		
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion	7 NG	P-A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil. Registered for control of **Mediterranean Fruit Fly** in stone fruit.	L-M Bee:VH	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Hort Innovation 2021/22 AgVet Grant to undertake studies to support a label registration in stone fruit for the control of **Fruit Fly**. Registered in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of Aphids (except Woolly Apple Aphid), Leafhoppers and Scale in pome fruit.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Western Flower Thrips (*Frankliniella occidentalis*) **Plague Thrips** (*Thrips imaginis*) **Priority: Moderate**								
Western Flower Thrips are rated as a high priority in QLD, a moderate priority in WA, and as a low priority in NSW, SA, TAS and VIC. Plague Thrips are rated as a moderate priority in NSW, QLD, SA, VIC and WA, and as a low priority in TAS. Thrips cause direct fruit damage to apples and pears as a result of surface feeding. Management of broadleaf weeds is critical, particularly for Western Flower Thrips management. Insecticide applications should be used if monitoring indicates that damage is likely during blossom.								
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	A	ALL	Registered in apples for control of Apple Dimpling Bug, Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, **Plague Thrips**, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid. Apply 1 application per season only.	M Bee:M	R2
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, **Thrips** and Leafhopper. Use a retreatment interval of 2-3 weeks. Maximum number of applications not specified.	VH Bee:H	-
Malathion	1B	Contact	3	A	NSW, ACT, VIC, SA & WA	Registered in apples and pears for control of Apple Leaf Hopper, Codling Moth, Red Spider Mite, **Thrips** and Woolly Aphid. Maximum number of applications and retreatment interval not specified.	H Bee:H	R3
Methomyl (Lannate)	1A	Contact	1	A	QLD & WA	Registered in apples for control of **Thrips** and Dimpling Bug. Maximum number of applications and retreatment interval not specified.	H Bee:H	R2
Potassium Salts of Fatty Acid (Natrasoap)	-	Contact	NR	A	ALL	Registered in fruit trees for control of Aphids, **Thrips**, Mealybug, Two Spotted Mite, Spider Mite and Whitefly. Maximum number of applications and retreatment interval not specified.	L Bee:L	-
Spinetoram (Delegate) Corteva	5	Ingestion	7 NG	A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Oriental Fruit Moth, Loopers, Pear & Cherry Slug, Helicoverpa and **Western Flower Thrips**. Use a retreatment interval of 14 days. Maximum of 4 applications per season.	M Bee:VH	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in pome fruit for control of Light Brown Apple Moth, Loopers, Pear Slug, Heliothis and **Western Flower Thrips**. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	L Bee:L	-
Tau-Fluvalinate (Mavrik)	3A	Contact	NR	A	ALL (excl. NT & TAS)	Registered in apples for control of Apple Dimpling Bug and **Plague Thrips**. Apply 1 spray only per season, during early blossom from pink stage to 20% bloom.	VH Bee:H	-
Spirotetramat (Movento) Bayer	23	Ingestion	21	P-A	ALL	Registered in pome fruit for control of Longtailed Mealybug, Tuber Mealybug and San Jose Scale, and suppression of Woolly Apple Aphid. Registered for control of various **Thrips** in green beans, celery, rhubarb, eggplant, peppers, tomatoes, herbs, lettuce, bulb vegetables, citrus and grapes.	M Bee:L	-
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	P		Registered for suppression of **Western Flower Thrips** in protected vegetables.	L Bee:L	-
Diafenthiuron + Cyantraniliprole (Minecto Forte) Syngenta	12A+28	Contact & Ingestion		P		Registered for suppression of **Western Flower Thrips**. **Tomato Thrips** and **Plague Thrips** in cucurbits and fruiting vegetables.	M Bee:VH	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of Aphids (except Woolly Apple Aphid), Leafhoppers and Scale in pome fruit.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and **Plague Thrips** in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, **Western Flower Thrips**, Tomato Thrips, Melon Thrips, **Plague Thrips** and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, **Western Flower Thrips**, Tomato Thrips, Melon Thrips, **Plague Thrips** and Heliothis in fruiting vegetables.	-	-
San Jose Scale (*Diaspidiotus perniciosus*) **Priority: Moderate**								
Rated as a high priority in VIC, a moderate priority in NSW, and as a low priority in QLD, SA, TAS and WA. San Jose Scale causes feeding damage to fruit of apples and pears which causes it to become distorted and stunted. Feeding on twigs and limbs can cause their death and over time can lead to reduced tree vigour and productivity. Reliance on pesticides alone is unlikely to provide successful control of scale. Preservation of natural predators through use of non-disruptive chemistry along with oil sprays during the dormant phase will usually be necessary in orchards with scale infestation.								
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	A	ALL	Registered in apples for control of Apple Dimpling Bug, Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, Plague Thrips, **San Jose Scale**, Tuber Mealybug and Woolly Apple Aphid. Apply 1 application per season only.	M Bee:M	R2
			35 NG			Registered in pears for control of Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, **San Jose Scale**, Tuber Mealybug and Woolly Apple Aphid. Maximum of 2 applications per season, with a retreatment interval of 14 days.		
Chlorpyrifos	1B	Contact	14	A	ALL (excl. VIC)	Registered in apples and pears for control of **San Jose Scale** and Woolly Aphid. Maximum number of applications and retreatment interval not specified.	H Bee:H	R1
Diazinon	1B	Contact	14 G:14	A	SA, NSW, ACT & WA	Registered in apples for control of **San Jose Scale** and Woolly Aphid. Maximum number of applications and retreatment interval not specified.	H Bee:H	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Fenoxycarb (Insegar) Syngenta	7B	Ingestion	14	A	QLD, NSW, SA, WA & ACT	Registered in apples and pears for control of **San Jose Scale**. Commence application 7-10 days after full petal fall. Make 4 applications at 7 days intervals, followed by further applications at 4-6 week intervals if required. Maximum number of treatments not specified.	L Bee:L	-
Petroleum Oil	-	Contact	1	A	ALL	Registered in apples for control of Mites (eggs) including European Red Mite and **Scales**, and in pears for control of European Red Mite, **Scales**, Two Spotted Mite, Brown Mite, Pear Rust Mite and Pear Leaf Blister Mite. Maximum number of applications and retreatment interval not specified.	L Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	21	A	ALL	Registered in pome fruit for control of Longtailed Mealybug, Tuber Mealybug and **San Jose Scale**, and suppression of Woolly Apple Aphid. Commence applications at the onset of crawler emergence. For apples, do not apply prior to petal fall and for pears, not prior to fruitlets reaching 10mm in diameter. Apply a second application 14-28 days after the first application. Maximum of 3 applications per season.	M Bee:L	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	7	A	ALL	Registered in pome fruit for control of Apple Dimpling Bug, Longtailed Mealybug, Tuber Mealybug, Woolly Apple Aphid and **San Jose Scale**. Maximum of 2 applications per season with a minimum 14 day retreatment interval.	M Bee:VH	R3
Buprofezin (Applaud)	16	Ingestion	56	P-A	ALL	Registered in pears for control of Longtailed Mealybug. Registered for control of **Scale** in various tree crops including citrus, custard apple, mango, passionfruit and persimmon.	M Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of Aphids (except Woolly Apple Aphid), Leafhoppers and **Scale** in pome fruit.	L Bee:L	-
Snails (Gastropoda) **Priority: Moderate**								
Rated as a high priority in SA, a moderate priority in QLD, TAS, VIC and WA, and as a low priority in NSW. Snails are voracious feeders in orchards and can damage leaves and young fruit. Cultural controls are an effective part of managing snails, including keeping the orchard floor clean and free of weeds and the use of tree guards as physical barriers.								
Iron EDTA Complex	-	Contact & Ingestion	NR	A	ALL	Registered in all plants for the control of **Snails** & **Slugs**. Spread pellets evenly on ground. Number of treatments not specified.	-	-
Metaldehyde	-	Contact & Ingestion	7 G:35	A	ALL	Registered in fruit for control of **Snails** & **Slugs**.	-	-
Rutherglen Bug (*Nysius vinitor*) **Priority: Low**								
Rated as a moderate priority in NSW, and as a low priority in QLD, SA, TAS, VIC and WA. Rutherglen Bug are a sporadic pest that rarely cause damage to apples and pears. In large numbers they will suck sap from fruit causing pitting and a gummy ooze from the feeding site. Numbers tend to build up in weeds that are adjacent to orchards. Control of these weed hosts will help to reduce the risk of outbreaks.								
Pyrethrins (Pyganic)	3A	Contact	1	A	ALL	Registered in pome fruit for control of Fruit Fly, **Rutherglen Bug** and Spiders. Use as a clean-up spray ton remove insects just prior to harvest. Apply a maximum of 3 sprays at 3 day intervals.	VH Bee:H	-
Trichlorfon	1B	Contact	2 G:2	A	ALL (excl. QLD)	Registered in pome fruit for control of **Rutherglen Bug**. Maximum number of applications and retreatment interval not specified.	H Bee:H	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	P-A	ALL	Registered in apples for control of Apple Dimpling Bug, Codling Moth, Light Brown Apple Moth, Longtailed Mealybug, Plague Thrips, San Jose Scale, Tuber Mealybug and Woolly Apple Aphid.	M Bee:M	R2
Flonicamid (Mainman) UPL	29	Ingestion	21 NG	P-A	ALL	Registered in apples for control of Woolly Apple Aphid and Tuber Mealybug. US registration for control of Aphids and **Plant Bugs** in pome fruit.	M Bee:VL	-
Methomyl (Lannate)	1A	Contact	1	P-A	QLD & WA	Registered in apples for control of Thrips and Dimpling Bug.	H Bee:H	R2
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	7	P-A	ALL	Registered in pome fruit for control of Apple Dimpling Bug, Longtailed Mealybug, Tuber Mealybug, Woolly Apple Aphid and San Jose Scale.	M Bee:VH	R3
Tau-Fluvalinate (Mavrik)	3A	Contact	NR	P-A	ALL (excl. NT & TAS)	Registered in apples for control of Apple Dimpling Bug and Plague Thrips.	VH Bee:H	-
Thiacloprid (Calypso)	4A	Contact & Ingestion	21 NG	P-A	ALL	Registered in apples for control of Apple Dimpling Bug.	M Bee:L	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of Aphids (except Woolly Apple Aphid), Leafhoppers and Scale in pome fruit.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-
Apple Leafhopper / Canary Fly (*Edwardsiana australis*) **Priority: Low**								
Rated as a moderate priority in NSW and TAS, and as a low priority in QLD, SA, VIC and WA. Apple Leafhoppers are a pest of apples but not pears. They feed on leaves causing mottling and reducing photosynthetic capacity. In high densities they can cause significant irritation to orchard workers.								
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, Thrips and **Leafhopper**. Use a retreatment interval of 2-3 weeks. Maximum number of applications not specified.	VH Bee:H	-
Malathion	1B	Contact	3	A	NSW, ACT, VIC, SA & WA	Registered in apples and pears for control of **Apple Leaf Hopper**, Codling Moth, Red Spider Mite, Thrips and Woolly Aphid. Maximum number of applications and retreatment interval not specified.	H Bee:H	R3
					TAS & WA	Registered in apples and pears for control of **Apple Leaf Hopper**, Codling Moth, European Red Mite and Woolly Aphid. Maximum number of applications and retreatment interval not specified.		
Flonicamid (Mainman) UPL	29	Ingestion	21 NG	P-A	ALL	Registered in apples for control of Woolly Apple Aphid and Tuber Mealybug. US registration for control of Aphids and Plant Bugs in pome fruit.	M Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion	7 NG	P-A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.	L-M Bee:VH	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of Aphids (except Woolly Apple Aphid), **Leafhoppers** and Scale in pome fruit.	L Bee:L	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Oriental Fruit Moth (*Grapholita molesta*) **Pear & Cherry Slug** (*Caliroa cerasi*) **Twig (Pear) Looper** (*Ectropis excursaria*) **Painted Apple Moth** (*Teia anartoides*) **Painted Vine Moth** (*Agarista agricola*) **Priority: Low**								
Oriental Fruit Moth is rated as a high priority in WA, and as a low priority in other states. Pear & Cherry Slug is rated as a moderate priority in NSW, SA and TAS, and as a low priority in QLD, VIC and WA. Twig (Pear) Looper and Painted Vine Moth are rated as a low priority in all states. Painted Apple Moth is rated as a moderate priority in TAS and WA, and as a low priority in NSW, QLD, SA and VIC. These are secondary Lepidoptera pests that have the potential to cause damage, but they are sporadic in nature and rarely cause a problem in well managed orchards.								
E,E) 8,10 Dodecadien-1-OL + Tetradecanol (Isomate-C/OFM)	-	Insect Confusion Agent	NR	A	ALL (excl. WA)	Registered in apples and pears as a mating disruption agent for control of Codling Moth and **Oriental Fruit Moth**. Apply before the first moth emergence in spring. Loop dispensers over spurs and branches within 1 m of the top of the tree. Use in conjunction with insecticides where moth populations are moderate to high.	VL Bee:VL	-
Abamectin + Chlorantraniliprole (Voliam Targo) Syngenta	6+28	Ingestion	7 G:28	A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Native Budworm, Cotton Bollworm, **Oriental Fruit Moth**, Two Spotted Mite and European Red Mite. Maximum of 1 application per season.	M Bee:H	-
Bacillus thuringiensis subsp Kurstaki Strain HD-1	11	Biological	NR	A	ALL	Registered in fruit for control of Armyworm, Cotton Bollworm, Native Budworm, Cabbage Moth, Cabbage White Butterfly, **Loopers**, Light Brown Apple Moth and Vine Moth. Apply to newly hatched larvae, late in the afternoon or early evening. Apply a minimum of 2 sprays separated by no more than 3 days initially, and then reapply at 3-5 day intervals. Maximum number of applications not specified.	VL Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Chlorantraniliprole (Altacor) FMC	28	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of Codling Moth, Budworms, **Oriental Fruit Moth** and Light Brown Apple Moth. Use a retreatment interval of 14-21 days from petal fall until late December, and an interval of 14-21 days after the end of December. Maximum of 3 applications per season.	L Bee:VL	-
Cydia pomonella Granulosis Virus V22 (Grandex Biological Insecticide)	-	Biological	NR	A	ALL	Registered in pome fruit for control of Codling Moth and **Oriental Fruit Moth**. Apply as a cover spray when newly hatched larvae are present in the orchard. Apply at 7-14 day intervals while larvae are present. Treatments per season not limited.	VL Bee:VL	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, Aphids, **Caterpillars**, Earwigs, Whitefly, Thrips and Leafhopper. Use a retreatment interval of 2-3 weeks. Maximum number of applications not specified.	VH Bee:H	-
Methoxyfenozide (Prodigy)	16	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of Light Brown Apple Moth and **Loopers**. Commence applications at petal fall and apply a series of 3 applications at 14 day intervals.	VL Bee:VL	-
Spinetoram (Delegate) Corteva	5	Ingestion	7 NG	A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, **Oriental Fruit Moth**, **Loopers**, **Pear & Cherry Slug**, Helicoverpa and Western Flower Thrips. Use a retreatment interval of 14 days. Maximum of 4 applications per season.	M Bee:VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	3 G:14	A	ALL	Registered in pome fruit for control of Light Brown Apple Moth, **Loopers**, **Pear Slug**, Heliothis and Western Flower Thrips. Use a retreatment interval of 7-14 days. Maximum of 4 applications per season.	L Bee:L	-
Thiacloprid (Calypso)	4A	Contact & Ingestion	21 NG	A	ALL	Registered in pome fruit for control of Codling Moth and **Oriental Fruit Moth**. Use a 14 day retreatment interval. Maximum of 4 applications per season.	M Bee:L	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-
Long-Tailed Mealybug (*Pseudococcus longispinus*) **Tuber Mealybug** (*Pseudococcus viburni*) **Priority: Low**								
Rated as a high priority in QLD and WA, and as a low priority in NSW, SA, TAS and VIC. Mealybugs will infest both apples and pears. Severe infestations may reduce the vigour and growth of foliage and weaken trees, but it is unusual for populations in commercial orchards to get large enough for this to happen. The production of honeydew that drips onto leaves allows sooty mould to develop and can reduce photosynthetic activity of leaves. Several natural predators and parasitoids provide useful biological control of mealybug.								
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion	70 NG	A	ALL	Registered in apples for control of Apple Dimpling Bug, Codling Moth, Light Brown Apple Moth, **Longtailed Mealybug**, Plague Thrips, San Jose Scale, **Tuber Mealybug** and Woolly Apple Aphid. Apply 1 application per season only.	M Bee:M	R2
			35 NG			Registered in pears for control of Codling Moth, Light Brown Apple Moth, **Longtailed Mealybug**, San Jose Scale, **Tuber Mealybug** and Woolly Apple Aphid. Maximum of 2 applications per season, with a retreatment interval of 14 days.		

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Bifenthrin (Talstar)	3A	Contact	14	A	VIC & WA	Registered in pears for control of **Longtailed Mealybug**. Commence applications when large numbers of nymphs emerge in spring. Apply to the point of runoff to all above ground tree parts from green tip to commencement of flowering. Retreatment interval and maximum number of applications not specified.	VH Bee:H	R3
Buprofezin (Applaud)	16	Ingestion	56	A	ALL	Registered in pears for control of **Longtailed Mealybug**. Apply twice, 10-14 days apart between swollen bud and the end of flowering.	M Bee:L	-
Clothianidin (Samurai)	4A	Contact & Ingestion	7 NG	A	ALL	Registered in apples and pears for control of **Longtailed Mealybug**, **Tuber Mealybug** and Codling Moth. Apply 2 consecutive sprays at a 14 day interval.	M Bee:VH	R2
Flonicamid (Mainman) UPL	29	Ingestion	21 NG	A	ALL	Registered in apples for control of Woolly Apple Aphid and **Tuber Mealybug** and in pears for control of **Longtailed Mealybug**. Minimum retreatment interval of 14 days. Maximum of 3 applications per season.	M Bee:VL	-
Potassium Salts of Fatty Acid (Natrasoap)	-	Contact	NR	A	ALL	Registered in fruit trees for control of Aphids, Thrips, **Mealybug**, Two Spotted Mite, Spider Mite and Whitefly. Maximum number of applications and retreatment interval not specified.	L Bee:L	-
Prothiofos (Tokuthion)	1B	Contact	56	A	VIC & SA	Registered in pears for control of **Longtailed Mealybug**. Apply 1 application at or around green tip when crawlers become active under bark scales.	H Bee:H	R3
					QLD, NSW, ACT & WA	Registered in pears for control of **Mealybug**. Apply 1 application at or around green tip when crawlers become active under bark scales.		

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spirotetramat (Movento) Bayer	23	Ingestion	21	A	ALL	Registered in pome fruit for control of **Longtailed Mealybug**, **Tuber Mealybug** and San Jose Scale, and suppression of Woolly Apple Aphid. Commence applications at the onset of crawler emergence. For apples, do not apply prior to petal fall and for pears, not prior to fruitlets reaching 10mm in diameter. Apply a second application 14-28 days after the first application. Maximum of 3 applications per season.	M Bee:L	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	7	A	ALL	Registered in pome fruit for control of Apple Dimpling Bug, **Longtailed Mealybug**, **Tuber Mealybug**, Woolly Apple Aphid and San Jose Scale. Maximum of 2 applications per season with a minimum 14 day retreatment interval.	M Bee:VH	R3
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of Aphids (except Woolly Apple Aphid), Leafhoppers and Scale in pome fruit and control of **Mealybug** in citrus, pineapple and small fruit vine climbing (except fuzzy Kiwifruit).	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-
Apple Rust Mite (*Aculus schlechtendali*) **Pearleaf Blister Mite** (*Eriophyes pyri*) **Priority: Low**								
Rated as a low priority in all states. Mites should be managed using an IPM approach, including the reduction of dust in orchards, the use of biological control agents, and selection of non-disruptive insecticides where possible to help preserve natural predators and parasitoids in the orchard.								
Carbaryl	1A	Contact	77	A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth and **Pear Leaf Blister Mite**. Do not apply less than 4 weeks following full bloom if fruit set reduction is not desired. Use a retreatment interval of 21 days. Maximum number of treatments not specified.	H Bee:H	R2
Petroleum Oil	-	Contact	1	A	ALL	Registered in apples for control of Mites (eggs) including European Red Mite and Scales, and in pears for control of European Red Mite, Scales, Two Spotted Mite, Brown Mite, Pear Rust Mite and **Pear Leaf Blister Mite**. Maximum number of applications and retreatment interval not specified.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	-	-
Spiromesifen (Oberon) Bayer	23	Ingestion		P		Submitted in July 2022 for registration to control **Mites** in pome and stone fruit. US registrations for **Mites** in various crops.	M Bee:VL	-
Black Peach Aphid (*Brachycaudus persicae*) **Cherry Aphid** (*Myzus cerasi*) **Green Peach Aphid** (*Myzus persicae*) **Priority: Low**								
Rated as a low priority in all states. Rarely cause damage in apples and pears. Large numbers can cause sooty mould outbreaks as a result of honeydew production.								
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, **Aphids**, Caterpillars, Earwigs, Whitefly, Thrips and Leafhopper. Use a retreatment interval of 2-3 weeks. Maximum number of applications not specified.	VH Bee:H	-
Potassium Salts of Fatty Acid (Natrasoap)	-	Contact	NR	A	ALL	Registered in fruit trees for control of **Aphids**, Thrips, Mealybug, Two Spotted Mite, Spider Mite and Whitefly. Maximum number of applications and retreatment interval not specified.	L Bee:L	-
Flonicamid (Mainman) UPL	29	Ingestion	21 NG	P-A	ALL	Registered in apples for control of Woolly Apple Aphid and Tuber Mealybug. US registration for control of **Aphids** and Plant Bugs in pome fruit.	M Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Petroleum Oil	-	Contact	1	P-A	ALL	Registered in apples for control of Mites (eggs) including European Red Mite and Scales, and in pears for control of European Red Mite, Scales, Two Spotted Mite, Brown Mite, Pear Rust Mite and Pear Leaf Blister Mite. Registered for control of **Aphids** in cotton, stone fruit, pecans, strawberries and various vegetables and ornamental plants.	L Bee:L	-
Afidopyropen (Versys) BASF	9D	Ingestion		P		Registered for control of **Aphids** in various vegetable crops. US registration for control of Aphids in stone fruit.	L Bee:L	-
Beauveria bassiana (Velifer) BASF	UNF	Biological	NR	P		Registered for suppression of Green Peach Aphid, Rose Aphid and Chrysanthemum Aphid in protected vegetables and ornamentals.	L Bee:L	-
Diafenthiuron + Cyantraniliprole (Minecto Forte) Syngenta	12A+28	Contact & Ingestion		P		Registered for control of Green Peach Aphid in cucurbits and fruiting vegetables, and Melon Aphid in cucurbits.	M Bee:VH	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered in macadamias for control of Fruit Spotting Bugs, Macadamia Lace Bug and suppression of Scirtothrips, control of Fruit Spotting Bugs and Planthoppers in avocados, mangoes and papaya, control of Whitefly, Green Peach Aphid and Cotton Aphid in cucurbits and fruiting vegetables, and control of Silverleaf Whitefly and Green Peach Aphid in green beans, potatoes and sweet potatoes. US registration for control of **Aphids** (except Woolly Apple Aphid), Leafhoppers and Scale in pome fruit.	L Bee:L	-
Pymetrozine (Chess) Syngenta	9B	Contact & Ingestion		P		Registered for control of **Aphids** in cotton, brassica vegetables, potatoes and stone fruit.	L Bee:VL	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Fuller's Rose Weevil (*Asynonychus cervinus*) **Apple Weevil** (*Otiorhynchus cribricollis*) **Garden Weevil** (*Phlyctinus callosus*) **Priority: Low**								
Rated as a low priority in all states, except for Fuller's Rose Weevil which is rated as a moderate priority in WA, and Apple Weevil and Garden Weevil which are rated as a high priority in WA. Weevils are difficult to control once they establish in an orchard. Good orchard hygiene is important to prevent weevil infestations. Weevils cause damage to fruit either through direct feeding (Garden Weevil) or by damage caused to fruit stalks by Fuller's Rose Weevil and Apple Weevil.								
Alpha-Cypermethrin	3A	Contact	14	A	NSW, VIC, SA & WA	Registered in pome fruit for control of **Apple Weevil** and **Garden Weevil**. Apply to the crotch, trunk and soil at the base of each tree at peak weevil emergence, usually late October to late November for Garden Weevil and late November to mid December for Apple Weevil. A second application may be required 3-4 weeks later, depending on Weevil numbers.	VH Bee:H	-
Indoxacarb (Avatar) FMC	22A	Ingestion	14 NG	A	ALL	Registered in pome fruit for control of Codling Moth, Budworms, Light Brown Apple Moth, **Apple Weevil**, **Fuller's Rose Weevil**, **Garden Weevil** and Wingless Grasshopper. Maximum of 6 applications per season, with a retreatment interval of 10 days.	M Bee:H	R3
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion	7 NG	A	ALL	Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, **Apple Weevil**, **Fuller's Rose Weevil** and **Garden Weevil**. Use a 14-21 day retreatment interval. Maximum of 3 applications per season.	L-M Bee:VH	-

4.3 Weeds in apple & pear

4.3.1 Weed priorities

Common Name	Scientific Name
High	
Marshmallow	*Malva parviflora*
Moderate	
Annual Ryegrass	*Lolium rigidum*
Blackberry	*Rubus* spp.
Couch Grass	*Cynodon dactylon*
Dock	*Rumex* spp.
Flaxleaf Fleabane	*Conyza bonariensis*
Low	
Johnson Grass	*Sorghum halepense*
Bathurst Burr	*Xanthium spinosum*
Bridal Creeper	*Myrsiphllum asparagoides*
Capeweed	*Arctotheca calendula*
English Ivy	*Hedera helix*
Paterson's Curse	*Echium plantagineum*
Silverleaf Nightshade	*Solanum elaeagnifolium*
Three-Corner Jack / Caltrop	*Tribulus terrestris*
Willow Herb	*Epilobium* spp.
Sowthistle	*Sonchus oleraceus*
Fat Hen	*Chenopodium album*
Nut Sedge	*Cyperus* spp.

Marshmallow was identified as a high priority weed. An integrated weed management program incorporating mulch and inter-row grass cover should be used to reduce reliance on herbicides in orchards.

Resistance management
There are confirmed cases of resistance in Australia for Awnless Barnyard Grass (Group 9 at more than 200 sites), Feather Top Rhodes Grass (Group 9 at 4 sites) and Blackberry Nightshade (Group 22 at 2 sites).

Specific resistance management strategies for high resistance risk (1 and 2) and moderate resistance risk (0, 3, 4, 5, 9, 10, 12, 14, 15, 22, 27 and 34) herbicide modes of action are available on the CropLife Australia webpage[7].

This report uses the new numerical herbicide mode of action classifications. Refer to the CropLife website[8] to compare these to the previous alphabetical classifications.

[7] https://www.croplife.org.au/resources/programs/resistance-management/herbicide-resistance-management-strategies-2/
[8] https://www.croplife.org.au/wp-content/uploads/2021/07/A2-poster_03_FINAL.pdf

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 7)	
		R1	Short-term: Critical concern over retaining access
**	Moderate resistance risk	R2	Medium-term: Maintaining access of significant concern
***	High resistance risk	R3	Long-term: Potential issues associated with use - Monitoring required

Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Marshmallow (*Malva parviflora*) **Priority: High**							
Rated as a high priority in NSW, SA and TAS, and as a moderate priority in QLD and VIC. Adapted to a wide variety of environments and highly competitive weed. Control with knockdown herbicides can be unreliable.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Carfentrazone (Hammer)	14**	Pome Fruit / Directed Spray or Spot Spray	Registered in pome fruit for control of various broadleaf weeds, including **Marshmallow**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR G:14	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Flumioxazin (Chateau)	14**	Pome Fruit / Residual Weed Control	Registered in pome fruit for control of grass and broadleaf weeds, including **Marshmallow**. Apply to bare soil using a directed spray at the base of trees.	98 G:28	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Isoxaben (Gallery) Corteva	29**	Bearing & Non-Bearing Fruit Trees / Residual Weed Control	Registered in bearing and non-bearing fruit trees for control of broadleaf weeds, including **Marshmallow**. Apply as a directed spray to weed-free, well-prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application.	NR	A	ALL	-
Oxyfluorfen (Goal)	14**	Apples, Pears / Not Less Than 3 Years Old / Dormant Application	Registered in apples and pears for control of various grass and broadleaf weeds, including **Small Flowered Mallow**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR NG	A	ALL	-
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds, including **Marshmallow**. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds, including **Marshmallow**. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds, including **Marshmallow**. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Saflufenacil (Sharpen) BASF	14**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Marshmallow**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Marshmallow**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-
Flumetsulam (Broadstrike)	2***		Registered for control of several broadleaf weeds, including **Marshmallow** in chickpeas.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Chloridazon (Pyramin) BASF	5**		Registered for control of a range of grass and broadleaf weeds, including **Marshmallow** in fodder beet, red beet, silverbeet, baby leaf spinach and baby leaf beet.		P		-
Annual Ryegrass (*Lolium rigidum*) **Priority: Moderate**							
Rated as a high priority in SA and WA, a moderate priority in QLD, and as a low priority in NSW, SA and VIC. 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.							
2,2-DPA	0**	Apples, Pears	Registered in apples and pears for control of Annual and Perennial Grasses. Best results are achieved with high-volume handgun application.	7 G:2	A	ALL	-
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Clethodim (Select)	1***	Non-Bearing Fruit Trees	Registered in non-bearing fruit trees for control of annual and perennial grass weeds, including **Ryegrass**. Apply after trees have recovered from transplant shock and are showing signs of active growth. Do not apply to bearing trees.	NR	A	ALL	R3
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Fluazifop-P (Fusilade)	1***	Apples, Pears / Directed Spray	Registered in apples and pears as a directed spray for the control of grass weeds, including **Ryegrass**.	NR	A	ALL	-
Flumioxazin (Chateau)	14**	Pome Fruit / Residual Weed Control	Registered in pome fruit for control of grass and broadleaf weeds, including **Annual Ryegrass**. Apply to bare soil using a directed spray at the base of trees.	98 G:28	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Ryegrass**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Annual Ryegrass**. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Haloxyfop (Verdict)	1***	Apple, Pear / Directed Spray or Spot Spray	Registered in apples and pears for control of grass weeds, including **Annual Ryegrass**. Apply as a directed spray.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Annual Ryegrass**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Oxyfluorfen (Goal)	14**	Apples, Pears / Not Less Than 3 Years Old / Dormant Application	Registered in apples and pears for control of various grass and broadleaf weeds, including **Annual Ryegrass**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR NG	A	ALL	-
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds, including **Ryegrass**. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds, including **Ryegrass**. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds, including **Ryegrass**. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Pendimethalin (Stomp)	3**	Deciduous Fruits	Registered in deciduous fruits for control of grass and broadleaf weeds, including **Annual Ryegrass**. Do not allow spray to contact any part of the tree, including the trunk. Incorporate with at least 5mm of rainfall or spray irrigation as soon as possible but no later than 10 days after treatment.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Saflufenacil (Sharpen) BASF	14**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Annual Ryegrass**. Apply as a directed or shielded spray in a tank mix with glyphosate.	NR G:35	A	ALL	-
Simazine	5**	Apples, Pears / Established At Least 12 Months	Registered in apples and pears for control of grass and broadleaf weeds, including **Annual Ryegrass**. Apply to bare, moist soil prior to weed emergence.	NR	A	ALL	R3
Trifluralin	3**	Orchards / Pre-Plant Residual	Registered in orchards as a pre-plant residual for control of grass and broadleaf weeds, including **Ryegrass**. Apple to new planting during pre-plant cultivation, or to established crops in spring after weeds and green manure crop have been incorporated into ground.	NR	A	QLD, SA, WA, VIC & TAS	-
Bromacil (Hyvar X)	5**		Registered for control of annual grass and broadleaf weeds, including **Annual Ryegrass** in asparagus and citrus.		P		-
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Annual Ryegrass**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-
Fluometuron	5**		Registered for control of grass and broadleaf weeds, including **Ryegrass** in cotton.		P		-
Napropamide (Devrinol)	0**		Registered in almonds, grapes, stone fruit and tomatoes for control of various grass and broadleaf weeds, including **Ryegrass**.		P		-
Propachlor (Ramrod)	15**		Registered for control of various grass and broadleaf weeds, including **Annual Ryegrass** in maize, sorghum, sweet corn, onions, brassica vegetables and beetroot.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds, including **Annual Ryegrass** in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
S-Metolachlor+ Prosulfocarb (Boxer Gold) Syngenta	15**		Registered for control of **Ryegrass** in potatoes.		P		-
Blackberry (*Rubus* spp.) **Priority: Moderate**							
Rated as a high priority in SA and TAS, a moderate priority in QLD and VIC, and as a low priority in NSW and WA. Prolific weed that is widely adapted and difficult to eradicate, mainly due to its long-term seed viability.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
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		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Couch Grass (*Cynodon dactylon*) **Priority: Moderate**							
Rated as a high priority in VIC, a moderate priority in QLD, SA and TAS, and as a low priority in NSW and WA. Couch Grass is an aggressive and highly competitive perennial grass that grows year-round in most areas. Herbicide control is effectively provided it is targeted to young, actively growing weeds. Multiple applications are usually required.							
2,2-DPA	0**	Apples, Pears	Registered in apples and pears for control of Annual and Perennial Grasses. Best results are achieved with high-volume handgun application.	7 G:2	A	ALL	-
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Fluazifop-P (Fusilade)	1***	Apples, Pears / Directed Spray	Registered in apples and pears as a directed spray for the control of grass weeds, including **Couch Grass**.	NR	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Couch Grass**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Haloxyfop (Verdict)	1***	Apple, Pear / Directed Spray or Spot Spray	Registered in apples and pears for control of grass weeds, including **Couch Grass**. Apply as a directed spray.	NR	A	ALL	-
Nonanoic Acid (Beloukha)	-	Orchards / Directed Spray	Registered in orchards for control of various grass and broadleaf weeds, including **Couch Grass**. Apply as a directed spray at the early vegetative stage of the weeds.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Couch Grass**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Oryzalin	3**	Fruit Trees / Non-Bearing Fruit / Directed Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Couch Grass**. Apply as a directed spray.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Couch Grass**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-
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		-
Dock (*Rumex* spp.) **Priority: Moderate**							
Rated as a high priority in TAS, a moderate priority in NSW and VIC, and as a low priority in QLD, SA and WA. Widespread species that is prolific and difficult to control when established.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Asulam	18**	Apple Orchards	Registered in apple orchards for control of **Docks**. Apply as a directed spray to actively growing weeds.	NR G:21	A	ALL (excl. QLD)	
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Curled Dock Seedlings**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds, including **Fiddle Dock** in Brassica vegetables, Brassica leafy vegetables, spring onions, shallots, spinach, silverbeet and rhubarb.		P		-
Flaxleaf Fleabane (*Conyza bonariensis*) **Priority: Moderate**							
Rated as a moderate priority in NSW and VIC, and as a low priority in QLD, SA, TAS and WA. Flaxleaf Fleabane seeds prolifically and can germinate year-round. It is difficult to control with herbicides and a continuous program is required to manage it in the orchard.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Flumioxazin (Chateau)	14**	Pome Fruit / Residual Weed Control	Registered in pome fruit for control of grass and broadleaf weeds, including **Flaxleaf Fleabane**. Apply to bare soil using a directed spray at the base of trees.	98 G:28	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Flaxleaf Fleabane**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds, including **Flaxleaf Fleabane**. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds, including **Flaxleaf Fleabane**. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds, including **Flaxleaf Fleabane**. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Saflufenacil (Sharpen) BASF	14**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Flaxleaf Fleabane**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Fleabane**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-
Propachlor (Ramrod)	15**		Registered for control of various grass and broadleaf weeds, including **Fleabane** in maize, sorghum, sweet corn, onions, brassica vegetables and beetroot.		P		-
Johnson Grass (*Sorghum halepense*) **Priority: Low**							
Rated as a moderate priority in QLD, and as a low priority in NSW, SA, TAS, VIC and WA. Johnson Grass is an aggressive perennial weed, which is difficult to eradicate once it becomes established.							
2,2-DPA	0**	Apples, Pears	Registered in apples and pears for control of Annual and Perennial Grasses. Best results are achieved with high-volume handgun application.	7 G:2	A	ALL	-
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Clethodim (Select)	1***	Non-Bearing Fruit Trees	Registered in non-bearing fruit trees for control of annual and perennial grass weeds, including **Johnson Grass**. Apply after trees have recovered from transplant shock and are showing signs of active growth. Do not apply to bearing trees.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Fluazifop-P (Fusilade)	1***	Apples, Pears / Directed Spray	Registered in apples and pears as a directed spray for the control of grass weeds, including **Johnson Grass**.	NR	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Johnson Grass**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Haloxyfop (Verdict)	1***	Apple, Pear / Directed Spray or Spot Spray	Registered in apples and pears for control of grass weeds, including **Johnson Grass**. Apply as a directed spray.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Johnson Grass**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Trifluralin	3**	Orchards / Pre-Plant Residual	Registered in orchards as a pre-plant residual for control of grass and broadleaf weeds, including **Johnson Grass**. Apple to new planting during pre-plant cultivation, or to established crops in spring after weeds and green manure crop have been incorporated into ground.	NR	A	QLD, SA, WA, VIC & TAS	-
Bathurst Burr (*Xanthium spinosum*) **Priority: Low**							
Rated as a low priority in all states. Annual weed which is difficult to control with herbicides.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Terbacil (Sinbar)	5**	Apples / At Least 3 Years Old	Registered in apples for control of grass and broadleaf weeds, including **Bathurst Burr**. Apply to moist soil just before or during active weed growth.	NR	A	ALL (excl. WA)	-
Bromacil (Hyvar X)	5**		Registered for control of annual grass and broadleaf weeds, including **Bathurst Burr** in asparagus and citrus.		P		-
Fluometuron	5**		Registered for control of grass and broadleaf weeds, including **Bathurst Burr** in cotton.		P		-
Bridal Creeper (*Myrsiphllum asparagoides*) **Priority: Low**							
Rated as a moderate priority in VIC, and as a low priority in NSW, QLD, SA, TAS and WA. Bridal Creeper is an aggressive vine-like weed that can cause shading and interfere with orchard operations.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Capeweed (*Arctotheca calendula*) **Priority: Low**							
Rated as a moderate priority in VIC, and as a low priority in NSW, QLD, SA, TAS and WA. Seeds and grows prolifically and is difficult to control with knockdown herbicides. Annual weed that germinates in the cooler months.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Carfentrazone (Hammer)	14**	Pome Fruit / Directed Spray or Spot Spray	Registered in pome fruit for control of various broadleaf weeds, including **Capeweed**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR G:14	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Diquat (Reglone)	22**	Orchards / Directed Spray	Registered in orchards for control of **Capeweed**. Apply as a directed spray.	NR	A	ALL	R3
Flumioxazin (Chateau)	14**	Pome Fruit / Residual Weed Control	Registered in pome fruit for control of grass and broadleaf weeds, including **Capeweed**. Apply to bare soil using a directed spray at the base of trees.	98 G:28	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Capeweed**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Isoxaben (Gallery) Corteva	29**	Bearing & Non-Bearing Fruit Trees / Residual Weed Control	Registered in bearing and non-bearing fruit trees for control of broadleaf weeds, including **Capeweed**. Apply as a directed spray to weed-free, well-prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application.	NR	A	ALL	-
Nonanoic Acid (Beloukha)	-	Orchards / Directed Spray	Registered in orchards for control of various grass and broadleaf weeds, including **Capeweed**. Apply as a directed spray at the early vegetative stage of the weeds.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Capeweed**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Oryzalin	3**	Fruit Trees / Non-Bearing Fruit / Directed Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Capeweed**. Apply as a directed spray.	NR	A	ALL	-
Oxyfluorfen (Goal)	14**	Apples, Pears / Not Less Than 3 Years Old / Dormant Application	Registered in apples and pears for control of various grass and broadleaf weeds, including **Capeweed**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR NG	A	ALL	-
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Saflufenacil (Sharpen) BASF	14**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Capeweed**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Simazine	5**	Apples, Pears / Established At Least 12 Months	Registered in apples and pears for control of grass and broadleaf weeds, including **Capeweed**. Apply to bare, moist soil prior to weed emergence.	NR	A	ALL	R3
Terbacil (Sinbar)	5**	Apples / At Least 3 Years Old	Registered in apples for control of grass and broadleaf weeds, including **Capeweed**. Apply to moist soil just before or during active weed growth.	NR	A	ALL (excl. WA)	-
Bromacil (Hyvar X)	5**		Registered for control of annual grass and broadleaf weeds, including **Capeweed** in asparagus and citrus.		P		-
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Capeweed**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-
Fluometuron	5**		Registered for control of grass and broadleaf weeds, including **Capeweed** in cotton.		P		-
English Ivy (*Hedera helix*) **Priority: Low**							
Rated as a low priority in all states. Aggressive, highly invasive weed that can form a dense mat across the ground.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
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		-
Paterson's Curse (*Echium plantagineum*) **Priority: Low**							
Rated as a low priority in all states. Annual broadleaf weed that is difficult to eradicate once it becomes established.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Carfentrazone (Hammer)	14**	Pome Fruit / Directed Spray or Spot Spray	Registered in pome fruit for control of various broadleaf weeds, including **Paterson's Curse**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR G:14	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Paterson's Curse**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Isoxaben (Gallery) Corteva	29**	Bearing & Non-Bearing Fruit Trees / Residual Weed Control	Registered in bearing and non-bearing fruit trees for control of broadleaf weeds, including **Salvation Jane / Paterson's Curse**. Apply as a directed spray to weed-free, well-prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Salvation Jane / Paterson's Curse**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Saflufenacil (Sharpen) BASF	14**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Paterson's Curse**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Terbacil (Sinbar)	5**	Apples / At Least 3 Years Old	Registered in apples for control of grass and broadleaf weeds, including **Paterson's Curse**. Apply to moist soil just before or during active weed growth.	NR	A	ALL (excl. WA)	-
Bromacil (Hyvar X)	5**		Registered for control of annual grass and broadleaf weeds, including **Paterson's Curse** in asparagus and citrus.		P		-
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Paterson's Curse**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Fluometuron	5**		Registered for control of grass and broadleaf weeds, including **Paterson's Curse** in cotton.		P		-
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		-
Silverleaf Nightshade (*Solanum elaeagnifolium*) **Priority: Low**							
Rated as a moderate priority in TAS, and as a low priority in NSW, QLD, SA, VIC and WA. Silverleaf Nightshade is a widespread weed that can be managed by a combination of strategic herbicide use and maintenance of ground cover in the inter-row.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Oryzalin	3**	Pome Fruit / Directed Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Silverleaf Nightshade**. Apply as a directed spray.	NR	A	ALL	-
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
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		-
Three-Corner Jack / Caltrop (*Tribulus terrestris*) **Priority: Low**							
Rated as a low priority in all states. Fast growing perennial weed that grows as a vine across the ground. Seed pods have sharp spines which present a hazard to orchard workers.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Caltrop**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Isoxaben (Gallery) Corteva	29**	Bearing & Non-Bearing Fruit Trees / Residual Weed Control	Registered in bearing and non-bearing fruit trees for control of broadleaf weeds, including **Caltrop**. Apply as a directed spray to weed-free, well-prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Caltrop**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Oryzalin	3**	Pome Fruit / Directed Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Caltrop**. Apply as a directed spray.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Oxyfluorfen (Goal)	14**	Apples, Pears / Not Less Than 3 Years Old / Dormant Application	Registered in apples and pears for control of various grass and broadleaf weeds, including **Caltrop**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR NG	A	ALL	-
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Saflufenacil (Sharpen) BASF	14**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Caltrop**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Trifluralin	3**	Orchards / Pre-Plant Residual	Registered in orchards as a pre-plant residual for control of grass and broadleaf weeds, including **Caltrop**. Apple to new planting during pre-plant cultivation, or to established crops in spring after weeds and green manure crop have been incorporated into ground.	NR	A	QLD, SA, WA, VIC & TAS	-
Bromacil (Hyvar X)	5**		Registered for control of annual grass and broadleaf weeds, including **Caltrop** in asparagus and citrus.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds, including **Caltrop** in maize, sweet corn, sorghum and sugar cane.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Willow Herb (*Epilobium* spp.) **Priority: Low**							
Rated as a high priority in TAS, a moderate priority in NSW, and as a low priority in QLD, SA, VIC and WA. Aggressive broadleaf perennial which can reproduce from seed dispersal as well as underground rhizomes.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Willow Herb**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Willow Herb**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-
Sowthistle (*Sonchus oleraceus*) **Priority: Low**							
Rated as a moderate priority in TAS, and as a low priority in NSW, QLD, SA, VIC and WA. Annual broadleaf weed that is a prolific seed producer and can grow year-round. Timely herbicide control is required in conjunction with an integrated weed management program.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Flumioxazin (Chateau)	14**	Pome Fruit / Residual Weed Control	Registered in pome fruit for control of grass and broadleaf weeds, including **Sowthistle**. Apply to bare soil using a directed spray at the base of trees.	98 G:28	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Milk Thistle**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Isoxaben (Gallery) Corteva	29**	Bearing & Non-Bearing Fruit Trees / Residual Weed Control	Registered in bearing and non-bearing fruit trees for control of broadleaf weeds, including **Milk Thistle**. Apply as a directed spray to weed-free, well-prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application.	NR	A	ALL	-
Nonanoic Acid (Beloukha)	-	Orchards / Directed Spray	Registered in orchards for control of various grass and broadleaf weeds, including **Sowthistle**. Apply as a directed spray at the early vegetative stage of the weeds.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Common Sowthistle**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Oryzalin	3**	Pome Fruit / Directed Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Sowthistle**. Apply as a directed spray.	NR	A	ALL	-
Oxyfluorfen (Goal)	14**	Apples, Pears / Not Less Than 3 Years Old / Dormant Application	Registered in apples and pears for control of various grass and broadleaf weeds, including **Sowthistle**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR NG	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Pendimethalin (Stomp)	3**	Deciduous Fruits	Registered in deciduous fruits for control of grass and broadleaf weeds, including **Sowthistle**. Do not allow spray to contact any part of the tree, including the trunk. Incorporate with at least 5mm of rainfall or spray irrigation as soon as possible but no later than 10 days after treatment.	NR	A	ALL	-
Saflufenacil (Sharpen) BASF	14**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Sowthistle**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Simazine	5**	Apples, Pears / Established At Least 12 Months	Registered in apples and pears for control of grass and broadleaf weeds, including **Common Sowthistle**. Apply to bare, moist soil prior to weed emergence.	NR	A	ALL	R3
Terbacil (Sinbar)	5**	Apples / At Least 3 Years Old	Registered in apples for control of grass and broadleaf weeds, including **Milk Thistle**. Apply to moist soil just before or during active weed growth.	NR	A	ALL (excl. WA)	-
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Sowthistle**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-
Fluometuron	5**		Registered for control of grass and broadleaf weeds, including **Common Sowthistle** in cotton.		P		-
Propachlor (Ramrod)	15**		Registered for control of various grass and broadleaf weeds, including **Milk Thistle** in maize, sorghum, sweet corn, onions, brassica vegetables and beetroot.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds, including **Sowthistle**, in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Fat Hen (*Chenopodium album*) **Priority: Low**							
Rated as a moderate priority in QLD, TAS and VIC, and as a low priority in NSW, SA and WA. Fat Hen is a fast-growing woody annual weed, which can germinate throughout most of the year. Timely herbicide control id critical for managing this weed.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards for control of grass and broadleaf weeds. Apply as a directed spray to small, actively growing weeds. Repeat application in 6-8 weeks.	56	A	ALL	-
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-
Flumioxazin (Chateau)	14**	Pome Fruit / Residual Weed Control	Registered in pome fruit for control of grass and broadleaf weeds, including **Fat Hen**. Apply to bare soil using a directed spray at the base of trees.	98 G:28	A	ALL	-
Glufosinate (Basta)	10**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Fat Hen**. Apply treatment along the sides of crops and between rows of crops.	21 G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of various grass and broadleaf weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Isoxaben (Gallery) Corteva	29**	Bearing & Non-Bearing Fruit Trees / Residual Weed Control	Registered in bearing and non-bearing fruit trees for control of broadleaf weeds, including **Fat Hen**. Apply as a directed spray to weed-free, well-prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application.	NR	A	ALL	-
Nonanoic Acid (Beloukha)	-	Orchards / Directed Spray	Registered in orchards for control of various grass and broadleaf weeds, including **Fat Hen**. Apply as a directed spray at the early vegetative stage of the weeds.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Fat Hen**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3
Oryzalin	3**	Pome Fruit / Directed Spray	Registered in pome fruit for control of various grass and broadleaf weeds, including **Fat Hen**. Apply as a directed spray.	NR	A	ALL	-
Oxyfluorfen (Goal)	14**	Apples, Pears / Not Less Than 3 Years Old / Dormant Application	Registered in apples and pears for control of various grass and broadleaf weeds, including **Fat Hen**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR NG	A	ALL	-
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds, including **Fat Hen**. Do not allow spray to contact any part of the tree, including the trunk.	H:1 G:7	A	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Registered in orchards for control of annual weeds, including **Fat Hen**. Avoid contact with crop foliage.	H:NR G:1	A	ALL	R3
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of various annual grass and broadleaf weeds, including **Fat Hen**. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Pendimethalin (Stomp)	3**	Deciduous Fruits	Registered in deciduous fruits for control of grass and broadleaf weeds, including **Fat Hen**. Do not allow spray to contact any part of the tree, including the trunk. Incorporate with at least 5mm of rainfall or spray irrigation as soon as possible but no later than 10 days after treatment.	NR	A	ALL	-
Saflufenacil (Sharpen) BASF	14**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Fat Hen**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Simazine	5**	Apples, Pears / Established At Least 12 Months	Registered in apples and pears for control of grass and broadleaf weeds, including **Fat Hen**. Apply to bare, moist soil prior to weed emergence.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Terbacil (Sinbar)	5**	Apples / At Least 3 Years Old	Registered in apples for control of grass and broadleaf weeds, including **Fat Hen**. Apply to moist soil just before or during active weed growth.	NR	A	ALL (excl. WA)	-
Bromacil (Hyvar X)	5**		Registered for control of annual grass and broadleaf weeds, including **Fat Hen** in asparagus and citrus.		P		-
Flazasulfuron (Katana) ISK	2***		Registration pending for control of various grass and broadleaf weeds, including **Fat Hen**, in vineyards, olive groves, citrus orchards and non-crop situations.		P		-
Fluometuron	5**		Registered for control of grass and broadleaf weeds, including **Fat Hen** in cotton.		P		-
Propachlor (Ramrod)	15**		Registered for control of various grass and broadleaf weeds, including **Fat Hen** in maize, sorghum, sweet corn, onions, brassica vegetables and beetroot.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**		Registered for control of grass and broadleaf weeds, including **Fat Hen** in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Nut Sedge (*Cyperus* spp.) **Priority: Low**							
Rated as a low priority in all states. Nut Sedge 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**	Pome Fruit / Directed or Shielded Spray	Registered in pome fruit for control of **Nutgrass**. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Registered in pome fruit for control of grass and broadleaf weeds, including **Nutgrass**. Apply as a directed spray prior to weed emergence.	NR	A	ALL	R3

4.4 Plant Growth Regulators in apple & pear

4.4.1 Plant Growth Regulator priorities

PGR Issue
High
Fruit Thinning
Reduced Vegetative Growth
Improve Shelf Life
Moderate
Delay Maturity
Increased Fruit Set
Low
Advance Maturity

Fruit Thinning, Reduced Vegetative Growth and Improve Shelf Life were identified as high priority Plant Growth Regulator issues for apples and pears.

4.3.2 Available and potential plant growth regulators

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		
Regulatory risk (refer to Appendix 7)			
R1	Short-term: Critical concern over retaining access		
R2	Medium-term: Maintaining access of significant concern		
R3	Long-term: Potential issues associated with use - Monitoring required		
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	WHP (days)	Availability	States	Regulatory Risk
Fruit Thinning **Priority: High**							
Rated as a high priority in all states.							
6-Benzyladenine + Gibberellins (Cytolin)	PGR	Apples / Red Delicious & Gala	Registered in apples (Red Delicious & Gala) for **flower thinning**. Apply as a split application with first spray at 50% king bloom and second spray at 90% king bloom. Follow with NAA application at full bloom.	NR	A	ALL	-
Carbaryl	1A	Pome Fruit	Registered in pome fruit for **fruit thinning**. Apply between 7 and 28 days following full bloom.	77	A	ALL	R2
Ethephon	PGR	Apples / Gravenstein, Golden Delicious, Johnathon & Red Delicious	Registered in apples for **thinning**. Apply at full bloom or up to 1 week following full bloom. A second thinning spray 10-14 days after the first application may be necessary.	7	A	VIC & SA	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use	WHP (days)	Availability	States	Regulatory Risk
		Apples / Golden Delicious, Stark Crimson & Legana	Registered in apples for **thinning**. Apply at the balloon blossom stage. Do not use in sequence or in mixtures with NAA.			TAS	
		Apples / Golden Delicious, Red Delicious, Johnathon, Granny Smith & Lady William	Registered in apples for **thinning**. Only use high concentration when heavy set expected.			WA	
Metamitron	PGR	Apples (except Sundowner) / Pears	Registered in apples (except Sundowner) and pears for **fruit thinning**. Apply when the diameter of central fruitlets is 8-16mm. Do not apply later than the 16mm stage. A second application may be required where there is high fruit set, with a minimum retreatment interval of 5 days.	NR NG	A	ALL	-
Naphthylacetic Acid (NAA Stop Drop)	PGR	Apples	Registered in apples for **fruit thinning**. Apply 10-14 days after full bloom to the top two-thirds of the tree.	1	A	ALL	-
Triclopyr (Tops PGR)	4**		Registered for **thinning** and increasing fruit size in oranges and mandarins, and for reducing fruit drop in lychees.		P		-
Gibberellic Acid	PGR		Registered for **fruit thinning** in grapes.		P		-
Reduced Vegetative Growth Priority: High							
Rated as a high priority in all states.							
Ethephon	PGR	Apples / All Varieties	Registered in apples to aid complete removal of fruit and encourage biennial bearing habit, and to **retard vegetative growth** and stimulate flowering in young trees. Apply from to full bloom to 6 weeks after full bloom.	7	A	NSW, SA & WA	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use	WHP (days)	Availability	States	Regulatory Risk
Paclobutrazol	PGR	Apples / Red Delicious & Granny Smith	Registered in apples (Red Delicious & Granny Smith) to **reduce vegetative growth**. Apply ina sequential spray program commencing 28 days after full bloom. Apply subsequent applications at intervals of 21 days for as long as growth control is required.	21	A	ALL	-
Prohexadione-Calcium (Regalis)	PGR	Apples	Registered in apples for **shoot growth reduction**. Apply in a 2 or 3 spray program commencing when terminal shoots are 3-5 cm in length. Repeat applications at 3-5 week intervals.	56 G:56	A	ALL	-
Cyanamide (Dormex)	PGR		Registered for regulation of bud dormancy in apples, grapes, kiwi fruit, plums, almonds and walnuts. Early budbreak may not translate to earlier flowering.		P		-
Methyl Esters of Fatty Acids (Waiken)	PGR		Registered to advance budbreak in cherries. Early budbreak may not translate to earlier flowering.		P		-
Improve Shelf Life **Priority: High**							
Rated as a high priority in QLD, SA, TAS and VIC, and as a moderate priority in NSW and WA.							
1-Methylcyclopropene (Smartfresh)	-	Apples / Pears	Registered in apples and pears as a post-harvest treatment for **improved fruit quality** after shipping, handling and storage. Add to the treatment area containing fruit immediately after harvest, upon entering storage or in transit.	NR	A	ALL	-
Aminoethoxyvinylglycine (Retain)	PGR	Apples	Registered in apples to improve harvest management, fruit quality and **enhance storage potential**. Apply 7 days before the average starch pattern index of the block is 1.5. This is when the average SPI of the block is 0.5 and occurs about 7 days before the earliest possible time fruit can be harvested for long-term storage.	7 G:14	A	ALL	-
Gibberellic Acid	PGR		Registered to promote desirable harvest effects in citrus.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use	WHP (days)	Availability	States	Regulatory Risk
Delay Maturity **Priority: Moderate**							
Rated as a high priority in NSW and QLD, a moderate priority in SA, VIC and WA, and as a low priority in TAS.							
Methyl Esters of Fatty Acids (Waiken)	PGR	Apples	Registered in apples to **set back bud break**. Apply from 20 days before bud break would normally occur, up to the time of green tip.	NR	A	ALL	-
Gibberellic Acid	PGR		Registered to delay maturity in prunes.		P		-
Increased Fruit Set **Priority: Moderate**							
Rated as a high priority in QLD, a moderate priority in NSW, SA, VIC and WA, and as a low priority in TAS.							
2,4-D as Sodium Salt (William Pear Stop Drop)	4	Williams Pears	Registered in Williams pears (canning only) to **reduce premature fruit drop**. Apply one application only at 4-6 weeks prior to first pick.	28	A	ALL (excl. TAS)	-
Naphthylacetic Acid (NAA Stop Drop)	PGR	Apples, Pears	Registered in apples and pears to assist the **prevention of pre-harvest fruit drop**. Apply at 12-14 days before harvest. A second (half-strength) spray may be necessary if conditions favour excessive fruit drop.	1	A	ALL	-
Triclopyr (Tops PGR)	4**		Registered for thinning and increasing fruit size in oranges and mandarins, and for **reducing fruit drop** in lychees.		P		-
Advance Maturity **Priority: Low**							
Rated as a moderate priority in QLD, VIC and WA, and as a low priority in NSW, SA and TAS.							
Cyanamide (Dormex)	PGR	Apples	Registered in apples for **regulation of bud dormancy**. Apply at 30-45 days before expected bud burst (50% green tip on spurs). Do not apply later than 25 days before expected bud burst.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use	WHP (days)	Availability	States	Regulatory Risk
Ethephon	PGR	Apples / Johnathon, Delicious	Registered in apples (Johnathon, Delicious) for **advancement of maturity** and improvement of red colour. Apply 2-3 weeks before normal harvest period and 7-14 days before desired harvest date. Apply only to fruit for the fresh market or short-term storage.	7	A	ALL (excl. TAS)	-
Methyl Esters of Fatty Acids (Waiken)	PGR	Apples	Regsitered in apples to **advance bud break**. Apply 35-50 days before bud break would normally occur.	NR	A	ALL	-

5. References

5.1 Information:

AgChem Access Priority Access Forum	https://www.agrifutures.com.au/national-rural-issues/agvet-chemicals/
Australian Pesticide and Veterinary Medicines Authority	www.apvma.gov.au
APVMA Chemical review	https://apvma.gov.au/chemicals-and-products/chemical-review/listing
APVMA MRLs	https://www.legislation.gov.au/Details/F2022C00400
APVMA Permit search	https://productsearch.apvma.gov.au/permits
APVMA Product search	https://productsearch.apvma.gov.au/products
Codex MRL database	http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/
Cotton Pest Management Guide 2022-23	https://www.cottoninfo.com.au/publications/cotton-pest-management-guide
CropLife Australia (Resistance Management)	https://www.croplife.org.au/resources/programs/resistance-management/
Growcom – Infopest Database	www.infopest.com.au
Hort Innovation	www.horticulture.com.au
Integrated Pest Disease and Weed Management manual for Australian Apple and Pears	www.horticulture.com.au/globalassets/hort-innovation/resource-assets/2020-21-australian-apple-and-pear-ipdm-manual.pdf

5.2 Abbreviations and Definitions:

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

5.3 Acknowledgements:

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

6. Appendices:

Appendix 1. Products available for disease control in apple & pear
Appendix 2. Products available for control of insects and mites in apple & pear
Appendix 3. Products available for weed control in apple & pear
Appendix 4. Plant growth regulators available in apple & pear
Appendix 5. Current permits for use in apple & pear
Appendix 6. Apple & Pear Maximum Residue Limits (MRLs)
Appendix 7. Apple & Pear Agrichemical Regulatory Risk Assessment

Appendix 1. Products available for disease control in apple & pear

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Boscalid + Pyraclostrobin (Pristine) BASF	7+11	Apple	Black Spot / Scab Powdery Mildew Alternaria Leaf Blotch & Fruit Spot	ALL	14 NG	-
		Pears	Black Spot / Scab			
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	External Rot Causing Organisms	ALL	NR	-
Bupirimate (Nimrod)	8	Apples	Powdery Mildew	ALL	7	-
Captan	M4	Apples & Pears	Black Spot	ALL	7 NG	R3
Chlorine	-	Sanitiser / Post-Harvest Treatment	Bacteria and Fungi	ALL	NR	-
Copper	M1	Apples & Pears	Black Spot	ALL	1	-
Cyprodinil (Chorus)	9	Apples & Pears	Apple Scab Pear Scab	ALL	NR	R3
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Apples	Suppression of Alternaria Leaf and Fruit Blotch	ALL	14 NG	R3
Difenoconazole	3	Apples & Pears	Black Spot Powdery Mildew	ALL	28	R3
Dithianon	M9	Apples	Black Spot / Scab Bitter Rot	ALL	21	R3
		Pears	Black Spot / Scab			
Dodine	U12	Apples / Pears	Black Spot	ALL	5 NG	-

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Fluazinam (Shirlan)	29	Apples	White Root Rot	QLD, NSW, WA & TAS	NR NG	-
Fludioxonil (Scholar)	12	Pome Fruit / Post-Harvest	Blue Mould Grey Mould	ALL	NR	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Apples	Black Spot / Apple Scab Powdery Mildew Suppression of Alternaria Leaf Blotch	ALL	14 NG	-
		Pears	Black Spot / Pear Scab			
Fluxapyroxad (Sercadis) BASF	7	Apple	Black Spot / Scab Powdery Mildew Alternaria Leaf Blotch	ALL	NR NG	-
Fosetyl Aluminium	33	Apples	Collar Rot (*Phytophthora cactorum*)	ALL (excl. QLD)	14	-
Hexaconazole (Synan)	3	Apples	Powdery Mildew Scab / Black Spot	ALL	7	R3
		Pears	Scab		14	
Imazalil (Magnate)	3	Apples & Pears / Post-Harvest	Blue Mould	ALL	NR	R3
Iodicarb + Cyproconazole (Rapid Pruning Wound Dressing)	28+3	Apples	Silverleaf	ALL (excl. WA)	NR	R3
Iodine	-	Pome Fruit / Sanitiser	Bacteria & Fungi	ALL	NR	-
Iprodione (Rovral)	2	Pome Fruit / Post-Harvest	Storage Rots (*Penicillium* spp., *Botrytis* spp., *Gloeosporium* spp.)	ALL	NR	R2
Isopyrazam (Seguris Flexi) Syngenta	7	Apples	Black Spot / Scab Powdery Mildew	ALL	21 NG	-
		Pears	Black Spot / Scab			

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Kresoxim Methyl (Stroby)	11	Apples	Black Spot / Scab Powdery Mildew	ALL	42 G:14	-
		Pears	Scab			
Mancozeb	M3	Pome Fruit	Pear Scab Apple Scab / Black Spot Target Spot Bitter Rot Sooty Blotch Fly Speck Ripe Fruit Spot	ALL	14	R2
Mefentrifluconazole (Belanty) BASF	3	Apples	Black Spot / Scab Powdery Mildew Suppression of Alternaria	ALL	7 NG	-
Metiram	M3	Apples	Alternaria Leaf Blotch & Alternaria Leaf Spot	ALL	14	R2
		Pome Fruit	Apple Scab / Black Spot Bitter Rot Fly Speck Pear Scab Ripe Fruit Spot Sooty Blotch Target Spot			
Metiram PER12864	M3	Apples	Alternaria Leaf Blotch / Leaf Spot	ALL (excl. VIC)	14	R2
Myclobutanil (Systhane)	3	Apples	Black Spot Powdery Mildew	ALL	21	R3
		Pears	Black Spot			
Penconazole (Topas)	3	Apples / Pears	Apple Scab / Black Spot Pear Scab	ALL	14	R3

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Penthiopyrad (Fontelis) Corteva	7	Pome Fruit	Apple Black Spot Apple Powdery Mildew Pear Scab Alternaria Leaf Blotch / Fruit Spot	ALL	28 NG	-
Peroxyacetic Acid	M	Sanitiser / Post-Harvest Treatment	Bacteria	ALL	NR	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Apples	Powdery Mildew Alternaria Leaf & Fruit Spot	ALL	NR	-
Potassium Bicarbonate (Ecocarb Plus)	M2	Apples	Black Spot / Apple Scab Powdery Mildew	ALL	NR	-
Proquinazid (Talendo) Corteva	13	Pome Fruit	Powdery Mildew	ALL	28 NG	-
Pyrimethanil	9	Apples & Pears / Post-Harvest	Moulds caused by *Penicillium* spp., *Botrytis* spp., *Neofabrea* spp.	ALL	NR	-
Quintozene (Terraclor Soil Fungicide)	14	Apple Seedlings	Collar Rot (*Sclerotium rolfsii*)	QLD, SA, WA & TAS	NR NG	-
Sulphur	M2	Pome Fruit	Black Spot / Scab	VIC, TAS, SA & QLD	NR	-
			Powdery Mildew	ALL		
Tebuconazole (Greenseal Pruning Wound Dressing)	3	Apples	Silverleaf	ALL	NR	R3
Thiabendazole (Tecto)	3	Apples, Pears / Post-Harvest	Blue Mould Grey Mould Fruit Rot	ALL	NR	-
Thiram	M3	Apples	Black Spot Target Spot & Ripe Spot (*Pezicula* spp.)	ALL	7	R2
		Pears	Black Spot			

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Trifloxystrobin (Flint)	11	Apples	Powdery Mildew Apple Scab	ALL	35	-
		Pears	Pear Scab			
Triforine (Saprol)	3	Apples / Not Golden Delicious or Cox's Orange Pippin	Powdery Mildew Black Spot	ALL	1	R3
Zineb	M3	Pome Fruit	Bitter Rot Sooty Blotch Black Spot of Pears	ALL	14	R2
			Black Spot of Apples	ALL (excl. WA)		
Ziram	M3	Apples	Black Spot Bitter Rot	ALL	7	R2
		Pears	Black Spot			

Appendix 2. Products available for control of insects and mites in apple & pear

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
4-(P-Acetoxyphenyl)-2-Butanone + Malathion	1B	Fruit Fly Trap	Queensland Fruit Fly	ALL	NR	R3
4-(P-Acetoxyphenyl) -2-Butanone + Fipronil	2B	Fruit Trees / Fruit Fly Trap	Queensland Fruit Fly (*Bactrocera tryoni*) Lesser Queensland Fruit Fly (*Bactrocera neohumeralis*)	ALL	NR	R3
(E,E) 8,10 Dodecadien-1-OL (Isomate-C)	-	Apples / Pears	Codling Moth	ALL (excl. WA)	NR	-
E,E) 8,10 Dodecadien-1-OL + Tetradecanol (Isomate-C/OFM)	-	Apples / Pears	Codling Moth Oriental Fruit Moth	ALL (excl. WA)	NR	-
Abamectin	6	Apples / Pears	Two Spotted Mite European Red Mite	ALL	14 G:14	-
Abamectin + Chlorantraniliprole (Voliam Targo) Syngenta	6+28	Pome Fruit	Codling Moth Light Brown Apple Moth Native Budworm Cotton Bollworm Oriental Fruit Moth Two Spotted Mite European Red Mite	ALL	7 G:28	-
Acequinocyl (Kanemite) UPL	20B	Pome Fruit	Two Spotted Mite	ALL	14 NG	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Apples	Apple Dimpling Bug Codling Moth Light Brown Apple Moth Longtailed Mealybug Plague Thrips San Jose Scale Tuber Mealybug Woolly Apple Aphid	ALL	70 NG	R2
		Pears	Codling Moth Light Brown Apple Moth Longtailed Mealybug San Jose Scale Tuber Mealybug Woolly Apple Aphid		35 NG	
Alpha-Cypermethrin	3A	Pome Fruit	Apple Weevil Garden Weevil	NSW, VIC, SA & WA	14	-
Bacillus thuringiensis subsp Kurstaki Strain HD-1	11	Fruit	Armyworm (*Spodoptera* spp.) Cotton Bollworm (*Helicoverpa armigera*) Native Budworm (*Helicoverpa punctigera*) Cabbage Moth (*Plutella xylostella*) Cabbage White Butterfly (*Pieris rapae*) Loopers Light Brown Apple Moth (*Epiphyas postvittana*) Vine Moth (*Agarista agricola*)	ALL	NR	-
Bifenazate (Acramite)	20D	Apples / Pears	Two Spotted Mite European Red Mite Bryobia Mite	ALL	7 G:28	-
Bifenthrin (Talstar)	3A	Pears	Longtailed Mealybug	VIC & WA	14	R3
Buprofezin (Applaud)	16	Pears	Longtailed Mealybug	ALL	56	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Carbaryl	1A	Pome Fruit	Codling Moth Light Brown Apple Moth Pear Leaf Blister Mite	ALL	77	R2
Chlorantraniliprole (Altacor) FMC	28	Pome Fruit	Codling Moth Budworms Oriental Fruit Moth Light Brown Apple Moth	ALL	14 NG	-
Chlorantraniliprole (Altacor) FMC PER89259	28	Pome Fruit	Fall Armyworm	ALL (excl. VIC)	14 NG	-
Chlorfenapyr (Secure) BASF	13A	Apple / Pear	Two Spotted Mite	ALL	14 NG	-
Chlorpyrifos	1B	Apple / Pear	San Jose Scale Woolly Aphid	ALL (excl. VIC)	14	R1
			Wingless Grasshopper	NSW & ACT		
		Pome Fruit	Wingless Grasshopper	ALL (excl. QLD)		
Clofentozine (Apollo)	10A	Apples	Two Spotted Mite European Red Mite	ALL	21	-
		Pears	Two Spotted Mite			
Clothianidin (Samurai)	4A	Apples	Woolly Apple Aphid	ALL	7 NG	R2
		Apples / Pears	Longtailed Mealybug Tuber Mealybug Codling Moth			
		Pome Fruit	Queensland Fruit Fly Mediterranean Fruit Fly			

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Cyclaniliprole (Teppan) ISK	28	Apples	Codling Moth	ALL	28 NG	-
Cydia pomonella Granulosis Virus V22 (Grandex Biological Insecticide)	-	Pome Fruit	Codling Moth (*Cydia pomonella*) Oriental Fruit Moth (*Grapholita molesta*)	ALL	NR	-
Cyflumetofen (Danisaraba) BASF	25A	Pome Fruit	Two Spotted Mite European Red Mite Bryobia Mite	ALL	7 NG	-
Deltamethrin (Magmed) PER92548	3A	Pome Fruit / Fruit Fly Traps	Mediterranean Fruit Fly	WA	NR	-
Diazinon	1B	Apples / Pears / Dormant	San Jose Scale	ALL (excl. QLD)	14 G:14	R2
		Apples / Pears		VIC & WA		
		Apples	San Jose Scale Woolly Aphid	SA, NSW, ACT & WA		
			Greedy Scale	WA		
Dimethoate PER13859	1B	Fruit Fly Host Crops / After Harvest Only	Fruit Fly	ALL	NR	R1
E-11-tetradecen-1-yl acetate + E-9-E-11-tetradecadien-1yl acetate (LBAM Isomate)	-	Apples	Light Brown Apple Moth (*Epiphyas postvittana*)	ALL	NR	-
Ethyl Formate	-	Apple / Post-Harvest Fumigant	Eucalyptus Weevil Obscure Mealybug Onion Thrips Latania Scale	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Etoxazole (Paramite) Sumitomo	10B	Pome Fruit	Two Spotted Mite European Red Mite Bryobia Mite	ALL	7 NG	R3
Fenbutatin Oxide (Torque)	12B	Apples / Pears	Two Spotted Mite European Red Mite Bryobia Mite	ALL	2	R2
Fenitrothion	1B	Apples	Spur-Throated Locust Migratory Locust	ALL (excl. TAS)	14	-
			Wingless Grasshopper	NSW, VIC, SA & WA		
Fenoxycarb (Insegar) Syngenta	7B	Apples / Pears	Codling Moth Light Brown Apple Moth	ALL	14	-
			San Jose Scale	QLD, NSW, SA, WA & ACT		
Fenpyroximate (Acaban)	21A	Apples / Pears	Two Spotted Mite	ALL	14 NG	-
			European Red Mite	ALL (excl. WA)		
Flonicamid (Mainman) UPL	29	Apples	Woolly Apple Aphid Tuber Mealybug	ALL	21 NG	-
		Pears	Longtailed Mealybug			
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Fruit Tree	Suitable for organic growers. Broad spectrum activity including ants, aphids, caterpillars, earwigs, whitefly, thrips and leafhopper.	ALL	1	-
Hexythiazox (Calibre)	10A	Apples / Pears	Two Spotted Mite European Red Mite	ALL	3	-
Imidacloprid	4A	Apples	Woolly Aphid	ALL	NR	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Indoxacarb (Avatar) FMC	22A	Pome Fruit	Codling Moth Budworms Light Brown Apple Moth Apple Weevil Fuller's Rose Weevil Garden Weevil Wingless Grasshopper	ALL	14 NG	R3
Indoxacarb (Avatar) FMC PER89278	22A	Apples / Pears	Fall Armyworm	ALL (excl. VIC)	14 NG	R3
Iron EDTA Complex	-	All plants	Snails & Slugs	ALL	NR	-
Malathion	1B	Apples / Pears	Apple Leaf Hopper Codling Moth Red Spider Mite Thrips Woolly Aphid	NSW, ACT, VIC, SA & WA	3	R3
			Apple Leaf Hopper Codling Moth European Red Mite Woolly Aphid	TAS & WA		
			Fruit Fly	ALL		
Metaldehyde	-	Fruit	Snails & Slugs	ALL	7 G:35	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Methomyl (Lannate)	1A	Apples	Light Brown Apple Moth	ALL	1	R2
			Codling Moth	NSW, VIC & WA		
			Heliothis	TAS & WA		
			Thrips Dimpling Bug	QLD & WA		
		Pears	Light Brown Apple Moth	VIC & WA	2	
Methomyl (Lannate) PER89293	1A	Apples	Fall Armyworm	ALL	1	R2
		Pears			2	
Methoxyfenozide (Prodigy)	16	Pome Fruit	Light Brown Apple Moth Loopers	ALL	14 NG	-
Milbemectin (Milbeknock)	6	Pome Fruit	European Red Mite Two Spotted Mite	ALL	14 NG	-
Nuclear Polyhedrosis Virus of Helicoverpa (Vivus)	31	Pome Fruit	Corn Earworm Native Budworm	ALL	NR	-
Omethoate (Folimat)	1B	Apples / Pears	Two Spotted Mite (not in MIA or Goulburn Valley) European Red Mite	ALL (excl. QLD)	7	R2
			Woolly Aphid	WA		

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Petroleum Oil	-	Apples	Mites (eggs) including European Red Mite Scales	ALL	1	-
		Pears	European Red Mite Scales	ALL		
			Two Spotted Mite Brown Mite Pear Rust Mite Pear Leaf Blister Mite	ALL (excl. QLD)		
Pirimicarb (Pirimor)	1A	Apples	Woolly Aphid	ALL (excl. QLD)	2	R3
Potassium Salts of Fatty Acid (Natrasoap)	-	Fruit Trees	Aphids Thrips Mealybug Two-Spotted Mite Spider Mite Whitefly	ALL	NR	-
Propargite (Omite)	12C	Apples	Two Spotted Mite European Red Mite	ALL	7	R3
		Pears	Two Spotted Mite			
Prothiofos (Tokuthion)	1B	Pears	Longtailed Mealybug	VIC & SA	56	R3
			Mealybug	QLD, NSW, ACT & WA		
Pyrethrins (Pyganic)	3A	Pome Fruit	Fruit Fly Rutherglen Bug Spiders	ALL	1	-
Pyridaben (Sanmite)	10A	Apples	Two Spotted Mite European Red Mite	ALL	1	-
		Pears	Two Spotted Mite			

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spinetoram (Delegate) Corteva	5	Pome Fruit	Codling Moth Light Brown Apple Moth Oriental Fruit Moth Loopers Pear & Cherry Slug Helicoverpa Western Flower Thrips	ALL	7 NG	-
Spinetoram (Delegate) Corteva PER12590	5	Pome Fruit	Suppression of Queensland Fruit Fly Lesser Queensland Fruit Fly	ACT, NSW, QLD & NT	7	-
			Mediterranean Fruit Fly	WA		
			Fruit Fly	ALL (excl. VIC)		
Spinetoram (Delegate) Corteva PER89241	5	Pome Fruit	Fall Armyworm	ALL (excl. VIC)	7 NG	-
Spinosad (Entrust Organic) Corteva	5	Pome Fruit	Light Brown Apple Moth Loopers Pear Slug Heliothis Western Flower Thrips	ALL	3 G:14	-
Spinosad (Entrust Organic) Corteva PER89870	5	Pome Fruit	Fall Armyworm	ALL (excl. VIC)	3 G:14	-
Spinosad (Naturalure) Corteva	5	Tree, Fruit, Nut, Vine & Vegetable Crops / Fruit Fly Bait	Queensland Fruit Fly *(Bactrocera tryoni)* Mediterranean Fruit Fly *(Ceratitis capitata)*	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spirotetramat (Movento) Bayer	23	Pome Fruit	Longtailed Mealybug Tuber Mealybug Woolly Apple Aphid (suppression) San Jose Scale	ALL	21	-
Sulfoxaflor (Transform) Corteva	4C	Pome Fruit	Apple Dimpling Bug Longtailed Mealybug Tuber Mealybug Woolly Apple Aphid San Jose Scale	ALL	7	R3
Tau-Fluvalinate (Mavrik)	3A	Apples	Apple Dimpling Bug Plague Thrips	ALL (excl. NT & TAS)	NR	-
Tebufenozide (Mimic)	18	Apples & Pears	Light Brown Apple Moth Codling Moth	ALL	21	-
Tebufenpyrad (Pyranica)	21A	Apples / Pears	Two Spotted Mite European Red Mite	ALL	14 NG	
Tetraniliprole (Vayego 200SC) Bayer	28	Pome Fruit	Codling Moth Light Brown Apple Moth Apple Weevil Fuller's Rose Weevil Garden Weevil	ALL	7 NG	-
Thiacloprid (Calypso)	4A	Apples	Apple Dimpling Bug	ALL	21 NG	R2
		Pome Fruit	Codling Moth Oriental Fruit Moth			
Thiacloprid (Calypso) PER14562	4A	Pome Fruit	Mediterranean fruit Fly	WA	21 NG	R2
Trichlorfon	1B	Pome Fruit	Fruit Fly	ALL (excl. SA & TAS)	2 G:2	R2
			Rutherglen Bug	ALL (Excl. QLD)		

Appendix 3. Products available for weed control in apple & pear

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
2,2-DPA	0**	Apples / Pears	Annual and Perennial Grasses	7 G:2	ALL	
Amitrole	34**	Orchards / Directed Spray	Grass and Broadleaf Weeds	56	ALL	-
Asulam	18**	Apple Orchards	Docks	NR G:21	ALL (excl. QLD)	
Carfentrazone-Ethyl (Hammer)	14**	Pome Fruit / Directed Spray	Selected Broadleaf Weeds	NR G:14	ALL	-
Clethodim (Select)	1***	Non-Bearing Fruit Tree	Annual Ryegrass (*Lolium rigidum*), Annual Phalaris (*Phalaris minor*), Barley Grass (*Hordeum leporinum*), Barnyard Grass (*Echinochloa* spp.), Blown Grass (*Agrostis avenacea*), Brome Grass (*Bromus diandrus*), Crowsfoot Grass (*Eleusine indica*), Feathertop Rhodes Grass (*Chloris virgata*), Liverseed Grass (*Urochloa panicoides*), Paradoxa Grass (*Phalaris paradoxa*), Red Sprangletop Grass (*Leptochloa filiformis*), Seedling Johnson Grass (*Sorghum halepense*), Summer Grass (*Digitaria* spp.), Volunteer Sorghum (*Sorghum* spp.), Volunteer Wheat (*Triticum aestivum*), Volunteer Oats (*Avena sativa*), Volunteer Barley (*Hordeum vulgare*), Winter Grass (*Poa annua*) Suppression of: Silver Grass (*Vulpia bromoides*) (not QLD, WA)	NR	ALL	R3
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Annual Grass and Broadleaf Weeds	NR	ALL	-
Diquat (Reglone)	22**	Orchards / Directed Spray / Tank Mix with Paraquat	Capeweed	NR	ALL	R3

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
Fluazifop-P (Fusilade)	1***	Apples, Pears / Directed Spray	Grass Weeds	NR	ALL	-
Flumioxazin (Chateau) Sumitomo		Pome Fruit / Residual Weed Control	Grass and Broadleaf Weeds	98 G:28	ALL	-
Glufosinate (Basta)	10**	Citrus / Directed or Shielded Spray	Grass and Broadleaf Weeds	NR G:56	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Over 3 Years Old / Directed Spray, Shielded Spray or Wick Wiper	Do not allow spray to contact any part of the tree, including the trunk. Grass and broadleaf weeds.	NR	ALL	R3
Haloxyfop (Verdict)	1***	Apple, Pear / Directed Spray	Annual and Perennial Grasses	NR	ALL	-
Isoxaben (Gallery) Corteva	29**	Bearing and Non-Bearing Fruit Tree / Residual Weed Control	Broadleaf Weeds	NR	ALL	-
Nonanoic Acid (Beloukha)	-	Orchards / Directed Spray	Grass and Broadleaf Weeds	NR	ALL	-
Norflurazon (Zoliar) AgNova	12**	Pome Fruit / Directed Spray	Grass and Broadleaf Weeds (pre-emergence)	NR	ALL	R3
Oryzalin (Surflan)	3**	Apples, Pears / Soil Application	Grass and Broadleaf Weeds	NR	ALL	-
Oxyfluorfen (Goal)	14**	Apples, Pears / Not Less Than 3 Years Old / Dormant Application	Grass and Broadleaf Weeds. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	NR NG	ALL	-

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Annual Grass and broadleaf weeds	1 G:7	ALL	R3
Paraquat + Amitrole (Guerrilla)	22** + 34**	Orchards / Directed Spray	Annual Weeds Capeweed or *Erodium* spp.	NR G:1	QLD, VIC, SA, WA, TAS and NT	R3
			Annual Weeds Fat Hen Pigweed		NSW	
			Flaxleaf Fleabane		ALL	
Paraquat + Diquat (SpraySeed)	22**	Orchards / Directed Spray	Grass and Broadleaf Weeds	G:1	ALL	R3
Pendimethalin (Stomp)	3**	Deciduous Fruits	Grass and Broadleaf Weeds	NR	ALL	-
Saflefenacil (Sharpen)	14**	Pome Fruit / Directed or Shielded Spray	Grass and Broadleaf Weeds	NR G:35	ALL	-
Simazine	5**	Apples, Pears	Grass and Broadleaf Weeds	NR	ALL	R3
Terbacil (Sinbar)	5**	Apples / At Least 3 Years Old	Grass and Broadleaf Weeds	NR	ALL (excl. WA)	-
Trifluralin	3**	Orchards / Pre-Plant Residual	Grass and Broadleaf Weeds	NR	QLD, SA, WA, VIC & TAS	-

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

Appendix 4. Plant growth regulators available in apple & pear

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use	WHP (days)	States	Regulatory risk
1-Methylcyclopropene (Smartfresh)	-	Apples, Pears	Post-harvest treatment for improved fruit quality after shipping, handling and storage	NR	ALL	-
2,4-D as Sodium Salt (William Pear Stop Drop)	4	Williams Pears	Reduce premature fruit drop	28	ALL (excl. TAS)	-
6-Benzyladenine (Bapsol)	PGR	Apples	Reduce fruit set, increase fruit size and improve firmness of harvested apples	NR	ALL	-
6-Benzyladenine + Gibberellins (Cytolin)	PGR	Apples	Improve fruit shape and size	NR	ALL	-
		Apples / Red Delicious & Gala	Flower thinning			
		Apples / Red Delicious	Stimulation of lateral growth			
Aminoethoxyvinylglycine (Retain)	PGR	Apples	Improve harvest management, fruit quality and enhance storage potential	7 G:14	ALL	-
Ammonium Thiosulphate (Thin-It Blossom Thinner)	PGR	Apples	Desiccation of blossoms and reduction of fruit set	NR	ALL	-
Carbaryl	1A	Pome Fruit	Fruit Thinning	77	ALL	R2
Cyanamide (Dormex)	PGR	Apples	Regulation of bud dormancy	NR	ALL	-

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use	WHP (days)	States	Regulatory risk
Ethephon	PGR	Apples / Johnathon, Delicious	Advancement of maturity, improvement of red colour	7	ALL (excl. TAS)	-
		Apples / Tydeman's Early			TAS	
		Apples / Gravenstein, Golden Delicious, Johnathon & Red Delicious	Thinning		VIC & SA	
		Apples / Golden Delicious, Stark Crimson & Legana			TAS	
		Apples / Golden Delicious, Red Delicious, Johnathon, Granny Smith & Lady William			WA	
		Apples / All Varieties	Aid complete removal of fruit and encourage biennial bearing habit Retard vegetative growth and stimulate flowering of young trees		NSW, SA & WA	
Forchlorfenuron (Ambitious PGR)	PGR	Apples / Royal Gala, Fuji	Increase fruit size	NR NG	ALL	-
Metamitron	PGR	Apples (except Sundowner) / Pears	Fruit Thinning	NR NG	ALL	
Methyl Esters of Fatty Acids (Waiken)	PGR	Apples	Advance bud break Delay bud break	NR	ALL	-

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use	WHP (days)	States	Regulatory risk
Naphthylacetic Acid (NAA Stop Drop)	PGR	Apples, Pears	Assist prevention of pre-harvest fruit drop	1	ALL	-
		Apples	Fruit thinning			
Paclobutrazol	PGR	Apples / Red Delicious & Granny Smith	Reduce vegetative growth	21	ALL	-
Prohexadione-Calcium (Regalis)	PGR	Apples	Shoot growth reduction	56 G:56	ALL	-

Appendix 5. Current permits for use in apple & pear

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER89259 Version 2	Chlorantraniliprole (Altacor) / Pome Fruit / Fall Armyworm	6-Mar-20	31-Mar-23	Hort Innovation
PER92548	Deltamethrin (Magmed) / Pome Fruit / Mediterranean Fruit Fly (WA only)	7-Sep-22	30-Sep-25	Sustainable Ventures Pty Ltd
PER13859 Version 2	Dimethoate / Orchard clean-up - fruit fly host crops following harvest / Fruit Fly	9-Feb-15	31-Jul-24	Hort Innovation
PER89278	Indoxacarb (Avatar) / Apples, Pears / Fall Armyworm	13-Mar-20	31-Mar-23	Hort Innovation
PER12864 Version 3	Metiram (Polyram) / Apples / Alternaria (Now registered via permit to label project, permit to be surrendered)	18-Apr-13	30-Jun-26	Hort Innovation
PER89293	Methomyl (Lannate) / Apples, Pears / Fall Armyworm	10-Apr-20	30-Apr-23	Hort Innovation
PER12590 Version 4	Spinetoram (Delegate) / Pome Fruit / Fruit Fly (suppression only)	6-Oct-11	31-May-24	Hort Innovation
PER89241	Spinetoram (Delegate) / Pome Fruit / Fall Armyworm	6-Mar-20	31-Mar-23	Hort Innovation
PER89870	Spinosad (Entrust Organic) / Pome Fruit / Fall Armyworm	21-Jul-20	31-Jul-23	Hort Innovation
PER14562 Version 2	Thiacloprid (Calypso) / Pome Fruit / Mediterranean Fruit Fly	13-Dec-13	30-Sep-23	Hort Innovation

Appendix 6. Apple & Pear Maximum Residue Limits (MRLs)

CODEX commodity groupings of citrus fruits and subgroups:

FP 0009 Pome fruit
FP 0226 Apple
FP 0230 Pear
Fruit

Note: Australia is a net exporter of apples, although this is declining in recent years. Exports represented <1% of total production in 2020/21. Papua New Guinea is the largest customer for Australian apple exports, accounting for 27% of total export volume. Other countries importing Australian apples are Italy, Hong Kong, Thailand and India. Australia exports 7% of total pear production. The majority of these exports goes to New Zealand with 36% of the total volume. Other countries importing Australian pears are Canada, Singapore, Indonesia and USA. Available information indicates that in the absence specific limits in legislation that most countries defer to Codex, followed by EU MRL standards or apply a 0.01 ppm default value. Food exported to New Zealand from Australia may be legally sold if it complies with Australian requirements. MRLs and legislation are subject to change; the values presented should not be relied on.

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
2,4-D	FP 0009	Pome fruits	-	*0.01
	FP 0230	Pear	*0.05	-
2-Phenylphenol	FP 0230	Pear	-	Po20
Abamectin	FP 0009	Pome fruits	0.01	0.01
Acetamiprid	FP 0009	Pome fruits	-	0.8
	FP 0226	Apple	0.2	-
	FP 0230	Pear	0.3	-
Acequinocyl	FP 0009	Pome fruits	0.7	-
Acibenzolar-S-Methyl	FP 0226	Apple	-	0.3
Afidopyropen	FP 0009	Pome fruits {except persimmons}	-	0.03
Aldrin and Dieldrin	FP 0009	Pome fruits	-	E0.05
Aminoethoxyvinylglycine	FP 0226	Apple	0.1	-
Amitraz	FP 0009	Pome fruits	-	0.5
Amitrole	FP 0009	Pome fruits	*0.01	*0.05
Asulam	FP 0226	Apple	*0.1	-
Azocyclotin	FP 0226	Apple	-	0.2
	FP 0230	Pear	-	0.2
Benzovindiflupyr	FP 0009	Pome fruits	-	0.2
Benzyladenine	FP 0226	Apple	0.2	-
	FP 0230	Pear	*0.005	-
Bifenazate	FP 0009	Pome fruits	2	0.7
Bifenthrin	FP 0226	Apple	*0.05	-
	FP 0230	Pear	0.5	-
Bitertanol	FP 0009	Pome fruits	-	2
Boscalid	FP 0009	Pome fruits	2	2
Bromide Ion		Fruits	-	20
Bupirimate	FP 0226	Apple	1	-
Buprofezin	FP 0226	Apple	-	3
	FP 0230	Pear	0.2	6
Captan	FP 0009	Pome fruits	10	Po15

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Carbaryl	FP 0009	Pome fruits	-	0.2
Carbendazim	FP 0009	Pome fruits	-	3
Carfentrazone-ethyl	FP 0009	Pome fruits	*0.05	-
Chlorantraniliprole	FP 0009	Pome fruits	0.3	0.4
Chlordane	FP 0009	Pome fruits	E0.02	-
		Fruits & Vegetables	-	E0.02
Chlorfenapyr	FP 0009	Pome fruits	0.5	-
Chlorpyrifos	FP 0009	Pome fruits	T0.5	1
Chlorpyrifos-Methyl	FP 0009	Pome fruits	-	1
Clofentezine	FP 0009	Pome fruits	0.1	0.5
Clothianidin	FP 0009	Pome fruits	2	0.4
Cyanamide	FP 0226	Apple	*0.02	-
Cyantraniliprole	FP 0009	Pome fruits	-	0.8
Cyclaniliprole	FP 0009	Pome fruits	-	0.2
	FP 0226	Apple	0.1	-
Cycloxydim	FP 0009	Pome fruits	-	*0.09
Cyflumetofen	FP 0009	Pome fruits	-	0.4
Cyfluthrin / Beta-cyfluthrin	FP 0226	Apple	-	0.1
	FP 0230	Pear	-	0.1
Cyhalothrin	FP 0009	Pome fruits	-	0.2
Cyhexatin	FP 0226	Apple	-	0.2
	FP 0230	Pear	-	0.2
Cypermethrins	FP 0009	Pome fruits	1	0.7
Cyprodinil	FP 0009	Pome fruits	-	2
	FP 0009	Pome fruits {except apple}	0.05	-
	FP 0226	Apple	1	-
DDT		Fruits	E1	-
Deltamethrin	FP 0226	Apple	-	0.2
Diazinon	FP 0009	Pome fruits	-	0.3
Dichlobenil	FP 0009	Pome fruits	0.1	-
Dicofol		Fruits {except Strawberry}	5	-
Difenoconazole	FP 0009	Pome fruits	0.3	Po4
Diflubenzuron	FP 0009	Pome fruits	-	5
Dimethoate	FP 0230	Pear	-	1
Dinocap	FP 0226	Apple	-	0.2
2,2-DPA	FP 0009	Pome fruits	*0.1	-
Diphenylamine	FP 0226	Apple	10	Po10
	FP 0230	Pear	7	Po5
Diquat		Fruits	*0.05	-
	FP 0009	Pome fruits	-	*0.02
Dithianon		Fruits {except Blueberries}	2	-
	FP 0009	Pome fruits	-	1
Dithiocarbamates	FP 0009	Pome fruits	3	5
Dodine	FP 0009	Pome fruits	5	5
Emamectin Benzoate	FP 0009	Pome fruits	-	0.02
Ethephon	FP 0226	Apple	1	0.8
Ethion	FP 0009	Pome fruits	1	-
Ethoxyquin	FP 0230	Pear	-	Po3

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Etofenprox	FP 0226	Apple	-	0.6
	FP 0230	Pear	-	0.6
Etoxazole	FP 0009	Pome fruits	0.2	0.07
Fenamiphos	FP 0226	Apple	-	*0.05
Fenbuconazole	FP 0009	Pome fruits	-	0.5
Fenbutatin Oxide	FP 0009	Pome fruits	3	5
Fenitrothion	FP 0226	Apple	1	0.5
Fenoxycarb	FP 0009	Pome fruits	-	2
Fenpyroximate	FP 0226	Apple	0.3	0.2
	FP 0230	Pear	0.3	0.2
Flonicamid	FP 0009	Pome fruits	0.7	0.8
Fluazifop-p-butyl	FP 0009	Pome fruits	*0.01	*0.01
Fluazinam	FP 0009	Pome fruits	*0.01	-
Flubendiamide	FP 0009	Pome fruits	-	0.8
Fludioxonil	FP 0009	Pome fruits	5	Po5
Flumioxazin	FP 0009	Pome fruits	*0.02	*0.02
Fluopyram	FP 0009	Pome fruits	1	0.5
Flupyradifurone	FP 0009	Pome fruits	-	0.9
Fluquinconazole	FP 0009	Pome fruits	-	0.3
Flusilazole	FP 0009	Pome fruits	-	0.3
Flutriafol	FP 0009	Pome fruits	-	0.4
Fluvalinate	FP 0226	Apple	0.1	-
Fluxapyroxad	FP 0009	Pome fruits	-	0.9
	FP 0226	Apple	0.7	-
Folpet	FP 0226	Apple	-	10
Forchlorfenuron	FP 0226	Apple	*0.01	-
Fosetyl Al	FP 0009	Pome fruits	-	50
	FP 0226	Apple	1	-
Glufosinate	FP 0009	Pome fruits	*0.1	0.1
Glyphosate	FP 0009	Pome fruits	*0.05	-
Haloxyfop	FP 0009	Pome fruits	*0.05	*0.02
Hexaconazole	FP 0226	Apple	0.1	-
	FP 0230	Pear	0.1	-
Hexythiazox	FP 0009	Pome fruits	1	0.4
Imazalil	FP 0009	Pome fruits	5	-
Imidacloprid	FP 0226	Apple	0.3	0.5
	FP 0230	Pear	-	1
Indoxacarb	FP 0226	Apple	-	0.5
	FP 0230	Pear	-	0.2
	FP 0009	Pome fruits	2	
Iprodione	FP 0009	Pome fruits	3	Po5
Isofetamid	FP 0009	Pome fruits	-	0.6
Isopyrazam	FP 0009	Pome fruits	0.7	0.4
Isoxaben	FP 0009	Pome fruits	*0.01	-
Kresoxim-Methyl	FP 0009	Pome fruits {except Japanese persimmons}	-	0.15
	FP 0009	Pome fruits	0.1	-
Lindane	FP 0226	Apple	E2	-

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Lufenuron	FP 0009	Pome fruits	-	1
Maldison	FP 0226	Apple	-	0.5
Mefentrifluconazole	FP 0226	Apple	1	-
Mesotrione	FP 0009	Pome fruits	-	*0.01
Metaflumizone	FP 0226	Apple	-	0.9
Metalaxyl	FP 0009	Pome fruits	0.2	Po1
Metamitron	FP 0009	Pome fruits	0.01	-
Methidathion	FP 0226	Apple	-	0.5
	FP 0230	Pear	-	1
Methomyl	FP 0226	Apple	1	0.3
	FP 0230	Pear	3	0.3
Methoxyfenozide	FP 0009	Pome fruits	0.5	2
Metrafenone	FP 0009	Pome fruits	-	1
Milbemectin	FP 0009	Pome fruits	0.03	-
Myclobutanil	FP 0009	Pome fruits	0.5	0.6
Naphthalene Acetic Acid	FP 0226	Apple	1	-
	FP 0230	Pear	1	-
Norflurazon	FP 0009	Pome fruits	*0.2	-
Novaluron	FP 0009	Pome fruits	-	3
	FP 0226	Apple	0.3	-
	FP 0230	Pear	0.3	-
Oxydemeton-Methyl	FP 0230	Pear	-	0.05
Oxyfluorfen	FP 0009	Pome fruits	0.05	-
Paclobutrazol	FP 0009	Pome fruits	1	-
Parathion-Methyl	FP 0226	Apple	-	0.2
Paraquat		Fruits {except Olives}	*0.05	-
	FP 0009	Pome fruits	-	*0.01
Penconazole	FP 0226	Apple	-	0.1
	FP 0230	Pear	-	0.1
	FP 0009	Pome fruits	0.1	-
Pendimethalin	FP 0009	Pome fruits	*0.05	-
Penthiopyrad	FP 0009	Pome fruits	0.5	0.4
Permethrin	FP 0009	Pome fruits	-	2
Phosmet	FP 0009	Pome fruits	-	10
Piperonyl Butoxide		Fruits	8	-
Pirimicarb		Fruits {except Blackberries}	0.5	-
	FP 0009	Pome fruits	-	1
Prohexadione-Calcium	FP 0226	Apple	*0.02	-
Propargite	FP 0226	Apple	3	3
	FP 0230	Pear	3	-
Proquinazid	FP 0009	Pome fruits	0.3	-
Prothiofos	FP 0230	Pear	0.05	-
Pydiflumetofen	FP 0009	Pome fruits	T0.2	-
Pyraclostrobin	FP 0009	Pome fruits	1	0.7
Pyrethrins		Fruits	1	-
Pyridaben	FP 0009	Pome fruits	0.5	-
Pyrimethanil	FP 0009	Pome fruits	15	Po15

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Saflufenacil	FP 0009	Pome fruits	*0.03	0.01
Simazine		Fruits	*0.1	-
Spinetoram	FP 0009	Pome fruits	0.1	0.05
Spinosad	FP 0226	Apple	-	0.1
	FP 0009	Pome fruits	0.5	-
Spirodiclofen	FP 0009	Pome fruits	-	0.8
Spirotetramat	FP 0009	Pome fruits	0.5	0.7
Sulfoxaflor	FP 0009	Pome fruits	0.5	0.3
Tebuconazole	FP 0226	Apple	-	1
	FP 0230	Pear	-	1
	FP 0009	Pome fruits	*0.01	-
Tebufenozide	FP 0009	Pome fruits	1	1
Tebufenpyrad	FP 0009	Pome fruits	1	-
Teflubenzuron	FP 0226	Apple	-	0.5
Terbacil	FP 0226	Apple	*0.04	-
Tetraniliprole	FP 0009	Pome fruits	0.5	-
Thiabendazole	FP 0009	Pome fruits	-	Po3
	FP 0226	Apple	10	-
	FP 0230	Pear	10	-
Thiacloprid	FP 0009	Pome fruits	1	0.7
Thiamethoxam	FP 0009	Pome fruits	-	0.3
Triadimefon	FP 0226	Apple	-	0.3
Triadimenol	FP 0226	Apple	-	0.3
Trifloxystrobin	FP 0009	Pome fruits	0.7	0.7
Trifluralin		Fruits	*0.05	-
Triforine	FP 0009	Pome fruits	1	-

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

* Indicates that an MRL is at the Limit of Quantitation (LOQ)
T =Temporary MRL
E = The MRL is based on extraneous residues

Sources: APVMA MRLs: Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2019. Compilation 28. Prepared 20 August 2022. CODEX MRLs: CODEX Alimentarius International Food Standards database (August 2022), http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/

Appendix 7. Apple & Pear Agrichemical Regulatory Risk Assessment

Apple & Pear
Agrichemical Regulatory
Risk Assessment

September 2022

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

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

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

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

Apple Agrichemical Regulatory Risk Assessment

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

Active Constituents	Chemical Group	Problem	Comment
INSECT AND OTHER PESTS			
Abamectin	**6**	European red mite	EU: Use restricted to permanent greenhouses
		Two-spotted mites	
		Fruit flies (PER91073 – SA Biosecurity) (Bait spray)	
Abamectin + Chlorantraniliprole	**6 + 28**	Codling moth	Abamectin EU: Use restricted to permanent greenhouses
		European red mite	
		Helicoverpa species	
		Lightbrown apple moth	
		Oriental fruit moth	
		Two-spotted mites	
Acequinocyl	**20B**	Two-spotted mites	
Acetamiprid + Novaluron	**4A + 15**	Apple dimpling bug (Yellow mirid)	Acetamiprid APVMA: Under review EU: Under review Novaluron EU: No authorisation in place
		Codling moth	
		Longtailed mealybug	
		Woolly apple aphid	
		Lightbrown apple moth	
		Plague thrips	
		San Jose scale	
		Tuber mealybug	
Alpha-cypermethrin	**3A**	Apple weevil	EU: Proposed restricted authorisation & Candidate for substitution
		Garden weevil	

Active Constituents	Chemical Group	Problem	Comment
Bacillus thuringiensis	**11A**	Caterpillars	EU: Under review for renewal
		Helicoverpa species	
		Lightbrown apple moth	
		Loopers	
		Pear looper	
Bifenazate	**20D**	Bryobia mite	Canada: Under review EU: Proposed restriction to non-edible crops and to permanent greenhouses
		European red mite	
		Two-spotted mites	
Bifenthrin	**3A**	Apple dimpling bug (Yellow mirid)	Canada: Not authorised EU: Not authorised
		Plague thrips	
Carbaryl	**1A**	Codling moth	Canada: Reviewed, large number of uses deleted Codex: Review scheduled, support uncertain EU: Authorisation not renewed USA: Under review
		Helicoverpa species	
		Lightbrown apple moth	
		Pear and cherry slug	
		Pear leaf blister mite	
		Wingless grasshoppers	
Chlorantraniliprole	**28**	Codling moth	
		Helicoverpa species	
		Lightbrown apple moth	
		Oriental fruit moth	
		Fall armyworm (PER89259)	
Chlorfenapyr	**13**	Two-spotted mites	EU: No authorisation in place

Active Constituents	Chemical Group	Problem	Comment
Chlorpyrifos	**1B**	Apple dimpling bug (Yellow mirid)	APVMA: Under review. Codex: Scheduled for review by JMPR Canada: Cancellation of all uses. EU: No authorisation in place USA: EPA decision to cancel uses
		Lightbrown apple moth	
		Locusts	
		Mealybugs	
		San Jose scale	
		Wingless grasshoppers	
		Woolly apple aphid	
		Queensland fruit fly (Bait spray)	
Clofentezine	**10A**	Bryobia mite	EU: Proposed restriction of use non-edible crops in permanent greenhouses
		European red mite	
		Two-spotted mites	
Clothianidin	**4A**	Codling moth	APVMA: Under review Canada: Field uses cancelled or amended EU: Not authorised USA: Re-registration with new risk mitigation measures
		Fruit flies	
		Longtailed mealybug	
		Woolly apple aphid	
		Tuber mealybug	
Cyclaniliprole	**28**	Codling moth	
Cydia pomonella granulosis virus	**31**	Codling moth	
		Oriental fruit moth	
Cyflumetofen	**25A**	Bryobia mite	
		European red mite	
		Two-spotted mites	
Diazinon	**1B**	Greedy scale	APVMA: Under review EU: No authorisation in place Codex: Withdrawal of Codex MRLs recommended
		San Jose scale	
		Woolly apple aphid	
Dimethoate	**1B**	Fruit flies (PER13859) (After harvest orchard clean-up spray)	Codex: MRL deletion recommended EU: No authorisations
Dodecadienol (pheromone)	**-**	Codling moth	

Active Constituents	Chemical Group	Problem	Comment
Ethyl formate (Po)	**8A**	Eucalyptus weevil	
		Latania scale	
		Obscure mealybug	
		Onion thrips	
Etoxazole	**10B**	Bryobia mite	EU: Only uses on greenhouse ornamentals approved & Candidate for substitution
		European red mite	
		Two-spotted mites	
Fatty acids: K salt	**UN**	Aphids	
		Mealybug	
		Spider mites	
		Thrips	
		Whitefly	
Fenbutatin oxide	**12B**	Bryobia mite	APVMA: nominated for review Codex: To be reviewed by JMPR. No supporting registrant EU: No authorisation in place USA: Under review
		European red mite	
		Two-spotted mites	
Fenitrothion	**1B**	Locusts	EU: No authorisation in place
		Wingless grasshoppers	
Fenoxycarb	**7B**	Codling moth	EU: No authorisation in place
		Lightbrown apple moth	
		San Jose scale	
Fenpyroximate	**21A**	European red mite	
		Two-spotted mites	
Fipronil	**2B**	Ants	APVMA: Under review Codex: Re-evaluation underway EU: No authorisation in place USA: Under review

Active Constituents	Chemical Group	Problem	Comment
Flonicamid	**29**	Tuber mealybug	
		Woolly apple aphid	
Helicoverpa NPV	**31**	Helicoverpa species	
Hexythiazox	**10A**	European red mite	
		Two-spotted mites	
Imidacloprid	**4A**	Woolly apple aphid	APVMA: Under review Canada: Field uses cancelled or amended EU: No authorisation. Grace period expires (June 2022) USA: Re-registration with new risk mitigation measures
Indoxacarb	**22A**	Apple weevil	Canada: No authorisations EU: Authorisation not renewed. Grace period expires 19/9/2022 UK: Proposed non-renewal
		Codling moth	
		Fuller's rose weevil	
		Garden weevil	
		Helicoverpa species	
		Lightbrown apple moth	
		Red imported fire ant	
		Wingless grasshoppers	
		Fall armyworm (PER89278)	
Lambda-cyhalothrin	**3A**	Fruit flies (PER12961 – SA Biosecurity) (Soil drench)	EU: Candidate for substitution

Active Constituents	Chemical Group	Problem	Comment
Maldison/Malathion	**1B**	Apple leafhopper	APVMA: Under review Codex: Re-evaluation scheduled EU: Restricted use to permanent greenhouses
		European red mite	
		Locusts	
		Spider mites	
		Thrips	
		Two-spotted mites	
		Wingless grasshoppers	
		Woolly apple aphid	
		Fruit flies	
		Codling moth	
Methomyl	**1A**	Apple dimpling bug (Yellow mirid)	APVMA: nominated for review Canada: Re-evaluation completed. Majority of uses removed EU: No authorisations in place USA: Under review
		Codling moth	
		Helicoverpa species	
		Lightbrown apple moth	
		Plague thrips	
		Thrips	
		Fall armyworm (PER89293)	
Methoxyfenozide	**18**	Lightbrown apple moth	EU: Proposed restricted authorisation & candidate for substitution
		Loopers	
Milbemectin	**6**	European red mite	
		Two-spotted mites	

Active Constituents	Chemical Group	Problem	Comment
Paraffinic oil/ petroleum oil	**UNM**	Two-spotted mites	
		Mites	
		Spider mites	
		Bryobia mite	
		European red mite	
		Frosted scale	
		Oystershell scale	
		San Jose scale	
		Scale insects	
		Armoured (Hard) scales	
		Pear scale	
Pirimicarb	**1A**	Woolly apple aphid	Codex: JMPR Periodic re-evaluation scheduled EU: Candidate for substitution
Propargite	**12C**	European red mite	APVMA: nominated for review EU: No authorisations
		Mites	
		Two-spotted mites	
Pyrethrins	**3A**	Ants	Canada: Under review
		Aphids	
		Apple leafhopper	
		Caterpillars	
		Codling moth	
		Earwigs	
		Plague thrips	
		Thrips	
Pyridaben	**21A**	European red mite	
		Two-spotted mite	

Active Constituents	Chemical Group	Problem	Comment
Pyriproxyfen	**7C**	Ants	
		Red imported fire ant (PER87728)	
S-methoprene	**7A**	Red imported fire ant (PER81094)	EU: No authorisations
Spinetoram	**5**	Caterpillars	
		Codling moth	
		Helicoverpa species	
		Lightbrown apple moth	
		Loopers	
		Oriental fruit moth	
		Pear and cherry slug	
		Western flower thrips	
		Fruit flies (PER12590)	
		Fall armyworm (PER89241)	
		Fruit flies (PER91070 – SA Biosecurity) (Bait spray)	
Spinosad	**5**	Helicoverpa species	
		Lightbrown apple moth	
		Loopers	
		Pear and cherry slug	
		Western flower thrips	
		Fruit flies (PER80719) (Lures) (Bait spray)	
		Fall armyworm (PER89870)	
		Fruit flies (PER91108 – SA Biosecurity)	
Spirotetramat	**23**	Longtailed mealybug	
		San Jose scale	
		Tuber mealybug	
		Woolly apple aphid	

Active Constituents	Chemical Group	Problem	Comment
Sulfoxaflor	**4C**	Apple dimpling bug (Yellow mirid)	USA: Pollinator concerns EU: Restricted to permanent glasshouses only
		Longtailed mealybug	
		San Jose scale	
		Tuber mealybug	
		Woolly apple aphid	
Sulfur	**UN**	Bryobia mite	
		European red mite	
		Pear leaf blister mite	
		San Jose scale	
Tau-fluvalinate	**3A**	Apple dimpling bug (Yellow mirid)	
		Plague thrips	
Tebufenozide	**18**	Codling moth	
		Lightbrown apple moth	
Tebufenpyrad	**21A**	European red mite	EU: Candidate for substitution
		Two-spotted mite	
Tetraniliprole	**28**	Apple weevil	EU: No authorisation
		Codling moth	
		Fuller's rose weevil	
		Garden weevil	
		Lightbrown apple moth	
Thiacloprid	**4A**	Apple dimpling bug (Yellow mirid)	APVMA: Under review EU: No authorisation in place USA: No authorisation
		Codling moth	
		Oriental fruit moth	
		Woolly apple aphid	
		Mediterranean fruit fly (PER14562)	
Trichlorfon	**1B**	Fruit flies	APVMA: nominated for review Codex: No MRLs EU: No authorisations USA: No MRLs
		Rutherglen bug	

Active Constituents	Chemical Group	Problem	Comment
DISEASES			
BCDMH	-	Surface sterilisation	EU: Under assessment
Boscalid + Pyraclostrobin	**7 + 11**	Alternaria leaf blotch / fruit spot	Boscalid Canada: Under review
		Black spot	
		Powdery mildew	
Bupirimate	**8**	Powdery mildew	
Captan	**M4**	Black spot	EU: Under review proposed restriction to use in permanent greenhouses only USA: Under review
Chlorine (Calcium / Sodium hypochlorite)	**M**	Surface moulds: Post-harvest (PER10822)	EU: No authorisation
Copper	**M1**	Bitter rot	EU: Candidates for substitution
		Black spot	
		Fly speck	
		Ripe fruit rot	
		Sooty blotch	
Cyproconazole + Iodocarb	**3 + 28**	Silver leaf	Cyproconazole APVMA: nominated for review EU: No authorisation in place Iodocarb EU: No authorisation in place
Cyprodinil	**9**	Black spot	Canada: Under review EU: Candidate for substitution
Difenoconazole	**3**	Black spot	APVMA: nominated for review EU: Candidate for substitution USA: Under review
		Powdery mildew	

Active Constituents	Chemical Group	Problem	Comment
Dithianon	**M9**	Alternaria leaf blotch/fruit spot	EU: Use restricted to non-edible crops
		Bitter rot	
		Black spot	
Dodine	**U12**	Black spot	
Fluazinam	**29**	White root rot	Canada: Under review
Fludioxonil	**12**	Blue mould	EU: Under review & candidate for substitution
		Grey mould	
Fluopyram + Trifloxystrobin	**7 + 11**	Black spot	Trifloxystrobin Canada: Under review
		Powdery mildew	
		Alternaria leaf blotch / Fruit spot	
Fluxapyroxad	**7**	Alternaria leaf blotch / Fruit spot	
		Black spot	
		Powdery mildew	
Fosetyl-Al	**33**	Phytophthora trunk / Collar rot	Canada: Under review
Hexaconazole	**3**	Black spot	APVMA: nominated for review EU: No authorisation in place
		Powdery mildew	
Imazalil	**3**	Blue mould	EU: Under review - data gaps identified. Withdrawal of many EU MRLs proposed.
Iodine (Post harvest)	**M**	Bactericide / fungicide	
Iprodione	**2**	Blue & green moulds	Canada: Majority of food crop uses deleted Codex: Review scheduled EU: No authorisation in place USA: Proposed deletion or restriction of uses
		Blue mould	
		Botrytis blight	
		Ripe fruit rot	
		Storage rot	
Isopyrazam	**7**	Black spot	EU: Authorisation not renewed
		Powdery mildew	
Kresoxim-methyl	**11**	Black spot	Canada: Reduced number of applications
		Powdery mildew	

Active Constituents	Chemical Group	Problem	Comment
Mancozeb	**M3**	Bitter rot	APVMA: nominated for review Canada: Many uses cancelled Codex: To be reviewed 2023/24 EU: No authorisation
		Black spot	
		Fly speck	
		Powdery mildew	
		Ripe fruit rot	
		Sooty blotch	
		Target spot (Early blight)	
Mefentrifluconazole	**3**	Alternaria leaf blotch / Fruit spot	
		Black spot	
		Powdery mildew	
Metiram	**M3**	Alternaria leaf blotch / Fruit spot (PER12864)	APVMA: nominated for review Canada: Only use on potato retained Codex: To be reviewed 2023/24 EU: Under review
		Bitter rot	
		Black spot	
		Fly speck	
		Ripe fruit rot	
		Sooty blotch	
Myclobutanil	**3**	Black spot	APVMA: nominated for review EU: No authorisation in place
		Powdery mildew	
Penconazole	**3**	Black spot	APVMA: nominated for review
		Powdery mildew	
Penthiopyrad	**7**	Black spot	
		Powdery mildew	
Petroleum oil	**-**	Powdery mildew	
Polyoxin-D	**19**	Alternaria leaf blotch / Fruit spot	EU: No authorisation in place
		Powdery mildew	
Potassium bicarbonate	**M2**	Powdery mildew	EU: No authorisation in place

Active Constituents	Chemical Group	Problem	Comment
Pyrimethanil	**9**	Blue mould	Canada: Under review
		Grey mould	
		Ripe fruit rot	
Quintozene	**14**	Collar rot	Codex: Re-evaluation EU: No authorisations
Sulfur	**M2**	Black spot	
		Powdery mildew	
Tebuconazole	**3**	Silver leaf	APVMA: nominated for review Canada: Under review EU: Candidate for substitution USA: Under review
Thiabendazole	**1**	Blue mould	
		Grey mould	
		Ripe fruit rot	
Thiram	**M3**	Black spot	APVMA: nominated for review Canada: Not authorised Codex: To be reviewed 2023/24 EU: No authorisation in place
		Ripe fruit rot	
Trifloxystrobin	**11**	Black spot	Canada: Under review
		Powdery mildew	
Triforine	**3**	Black spot	APVMA: nominated for review EU: No authorisation
		Powdery mildew	
Zineb	**M3**	Bitter rot	APVMA: nominated for review Codex: To be reviewed 2022/23 EU: No authorisation in place
		Black spot	
		Sooty blotch	
		Bitter rot	APVMA: nominated for review Canada: Cancelling of all uses Codex: To be reviewed 2022/23 EU: Candidate for substitution
Ziram	**M3**	Black spot	

Active Constituents	Chemical Group	Comment
WEEDS		
2,2-DPA as Na salt	**0**	
Asulam	**18**	EU: Under review, proposed restriction to non-edible crops
Carfentrazone-ethyl	**14**	
Dichlobenil	**29**	EU: No authorisation in place
Diquat	**22**	APVMA: Currently under review EU: No authorisation in place
Fluazifop	**1**	
Flumioxazin	**14**	EU: Candidates for substitution
Glufosinate	**10**	Canada: Review proposed EU: No authorisation in place
Glyphosate	**9**	Ongoing issues internationally EU: Under review
Haloxyfop-P	**1**	EU: No authorisation in place
Isoxaben (Non-bearing trees)	**29**	
Norflurazon	**12**	EU: No authorisation in place
Oryzalin	**3**	EU: No authorisation in place
Oxyfluorfen	**14**	EU: Candidate for substitution USA: Interim review decision Label amendments proposed
Paraquat	**22**	APVMA: Currently under review Canada: Under review EU: No authorisation in place Rotterdam Convention: nominated
Saflufenacil	**14**	EU: No authorisation in place
Simazine	**5**	APVMA: nominated for review EU: No authorisation in place
Terbacil	**5**	EU: No authorisation in place

Active Constituents	Chemical Group	Comment
PLANT GROWTH REGULATORS		
1-methyl-cyclopropene	-	
6-benzyladenine	-	
ammonium thiosulfate	-	EU: No authorisation
AVG	-	EU: No authorisation
Cyanamide	-	EU: No authorisation
DPA	-	EU: No authorisation
Ethephon	-	
Gibberellins	-	
NAA	-	
Paclobutrazol	-	EU: Candidate for substitution
Prohexadione-calcium	-	
Carbaryl	**1A**	Canada: Reviewed, large number of uses deleted Codex: Review scheduled, support uncertain EU: Authorisation not renewed USA: Under review
Metamitron	**C**	

Pear Agrichemical Regulatory Risk Assessment

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

Active Constituents	Chemical Group	Problem	Comment
INSECT AND OTHER PESTS			
Abamectin	**6**	European red mite	EU: Restricted use to permanent greenhouses
		Two-spotted mites	
		Fruit flies (PER91073 – SA Biosecurity Bait spray)	
Abamectin + Chlorantraniliprole	**6 + 28**	European red mite	Abamectin: EU: Restricted use to permanent greenhouses
		Oriental fruit moth	
		Codling moth	
		Helicoverpa species	
		Lightbrown apple moth	
Acequinocyl	**20B**	Two-spotted mites	
Acetamiprid + Novaluron	**4A + 15**	Codling moth	Acetamiprid APVMA: Under review EU: Under review Novaluron EU: No authorisation in place
		Lightbrown apple moth	
		Longtailed mealybug	
		Woolly apple aphid	
		San Jose scale	
		Tuber mealybug	

Active Constituents	Chemical Group	Problem	Comment
Alpha-cypermethrin	**3A**	Apple weevil	EU: Withdrawal of approval, grace period expires December 2022
		Garden weevil	
B thuringiensis	**11A**	Armyworm	EU: Under review for renewal
		Caterpillars	
		Helicoverpa species	
		Lightbrown apple moth	
		Loopers	
		Painted vine moth	
		Vine moths	
Bifenazate	**20D**	Bryobia mite	Canada: Review initiated EU: Proposed restriction to non-edible crops and to permanent greenhouses.
		European red mite	
		Two-spotted mites	
Bifenthrin	**3A**	Caterpillars	Canada: Not authorised EU: Not authorised
		Longtailed mealybug	
		Two-spotted mites	
Buprofezin	**16**	Longtailed mealybug	EU: MRLs set to limit of quantification
Carbaryl	**1A**	Codling moth	Canada: Reviewed, large number of uses deleted Codex: Review scheduled, support uncertain EU: Authorisation not renewed USA: Under review
		Helicoverpa species	
		Lightbrown apple moth	
		Pear and cherry slug	
		Pear leaf blister mite	
		Wingless grasshoppers	
Chlorantraniliprole	**28**	Codling moth	
		Helicoverpa species	
		Lightbrown apple moth	
		Oriental fruit moth	
		Fall Armyworm (PER89259)	

Active Constituents	Chemical Group	Problem	Comment
Chlorfenapyr	**13**	Two-spotted mites	EU: No authorisation in place
Chlorpyrifos	**1B**	Lightbrown apple moth Locusts Mealybugs Queensland fruit fly (Bait spray) San Jose scale Wingless grasshoppers Woolly apple aphid	APVMA: Under review. Codex: Scheduled for review by JMPR Canada: Cancellation of all uses. EU: No authorisation in place USA: EPA decision to cancel use on food crops
Clofentezine	**10A**	Bryobia mite European red mite Two-spotted mites	EU: Proposed restriction of use non-edible crops in permanent greenhouses
Clothianidin	**4A**	Codling moth Fruit flies Longtailed mealybug Tuber mealybug	APVMA: Under review Canada: Field uses cancelled or amended EU: Not authorised USA: Re-registration with new risk mitigation measures
Cydia pomonella granulosis virus	**31**	Codling moth Oriental fruit moth	
Cyflumetofen	**25A**	Bryobia mite European red mite Two-spotted mites	
Diazinon	**1B**	San Jose scale	APVMA: Under review EU: No authorisation in place Codex: Withdrawal of Codex MRLs recommended
Dimethoate	**1B**	Fruit flies (PER13895 Orchard clean-up)	Codex: MRL deletion recommended. EU: Not authorised
Dodecadienol (pheromone)	**-**	Codling moth	

Active Constituents	Chemical Group	Problem	Comment
Etoxazole	**10B**	Bryobia mite	EU: Only uses on greenhouse ornamentals approved & Candidate for substitution
		European red mite	
		Two-spotted mites	
Fenbutatin oxide	**12B**	Bryobia mite	APVMA: nominated for review Codex: To be reviewed by JMPR. No supporting registrant EU: No authorisation in place USA: Under review
		European red mite	
		Two-spotted mites	
Fenoxycarb	**7B**	Codling moth	Codex: No MRLs EU: No authorisation in place
		Lightbrown apple moth	
		San Jose scale	
Fenpyroximate	**21A**	European red mite	
		Two-spotted mites	
Fipronil	**2B**	Ants	APVMA: Under review Codex: Re-evaluation underway EU: No authorisation in place USA: Under review
Flonicamid	**29**	Longtailed mealybug	
Helicoverpa NPV	**31**	Helicoverpa species	
Hexythiazox	**10A**	European red mite	
		Two-spotted mites	
Indoxacarb	**22A**	Codling moth	Canada: No authorisation EU: Authorisation not renewed. Grace period expires 19/9/2022 UK: Proposed non-renewal
		Curculio beetle	
		Fuller's rose weevil	
		Garden weevil	
		Helicoverpa species	
		Lightbrown apple moth	
		Red imported fire ant	
		Wingless grasshoppers	
		Fall armyworm (PER89278)	

Active Constituents	Chemical Group	Problem	Comment
Lambda-cyhalothrin	**3A**	Fruit flies (PER12961 – SA Biosecurity) (Soil drench)	EU: Candidate for substitution
Malathion	**1B**	Apple leafhopper	APVMA: Under review Codex: Re-evaluation scheduled EU: Restricted use to permanent greenhouses
		Caterpillars	
		Codling moth	
		European red mite	
		Locusts	
		Scale insects	
		Spider mites	
		Thrips	
		Wingless grasshoppers	
		Woolly apple aphid	
		Fruit flies (lures)	
Methomyl	**1A**	Lightbrown apple moth	APVMA: nominated for review Canada: Re-evaluation completed. Majority of uses removed EU: No authorisations in place USA: Under review
		Fall Armyworm (PER89293)	
Methoxyfenozide	**18**	Lightbrown apple moth	EU: Proposed restricted authorisation & Candidate for substitution
		Loopers	
Milbemectin	**6**	European red mite	
		Two-spotted mites	

Active Constituents	Chemical Group	Problem	Comment
Paraffinic oil/ petroleum oil	**UNM**	Spider mites	
		Two-spotted mites	
		Bryobia mite	
		European red mite	
		Frosted scale	
		Oyster shell scale	
		Pear leaf blister mite	
		San Jose scale	
		Scale insects	
		Pear rust mite	
Propargite	**12C**	Two-spotted mites	APVMA: nominated for review EU: No authorisations
Prothiofos	**1B**	Longtailed mealybug	Codex: No MRLs EU: No authorisation
		Mealybugs	
Pyrethrins	**3A**	Aphids	Canada: Under review
		Apple leafhopper	
		Caterpillars	
		Thrips	
Pyridaben	**21A**	Two-spotted mites	

Active Constituents	Chemical Group	Problem	Comment
Pyriproxyfen	**7C**	Ants	
		Red imported fire ant (PER87728)	
S-methoprene	**7A**	Red imported fire ant (PER81094)	EU: No authorisations in place
Spinetoram	**5**	Caterpillars	
		Codling moth	
		Helicoverpa species	
		Lightbrown apple moth	
		Loopers	
		Oriental fruit moth	
		Pear and cherry slug	
		Western flower thrips	
		Fruit flies (PER12590)	
		Fall armyworm (PER89241)	
Spinosad	**5**	Helicoverpa species	
		Lightbrown apple moth	
		Loopers	
		Western flower thrips	
		Pear and cherry slug	
		Fruit flies (PER80719) (Lures)	
		Codling moth (PER83085)	
		Fall armyworm (PER89870)	
Spirotetramat	**23**	Longtailed mealybug	
		San Jose scale	
		Tuber mealybug	
		Woolly apple aphid	

Active Constituents	Chemical Group	Problem	Comment
Sulfoxaflor	**4C**	Apple dimpling bug (Yellow mirid)	USA: Pollinator concerns EU: Restricted use to permanent glasshouses only
		Longtailed mealybug	
		San Jose scale	
		Tuber mealybug	
		Woolly apple aphid	
Sulfur	**M2**	European red mite	
		Mites	
		Pear leaf blister mite	
Tebufenozide	**18**	Codling moth	
		Lightbrown apple moth	
		Loopers	
Tebufenpyrad	**21A**	European red mite	EU: Candidate for substitution
		Two-spotted mites	
Tetraniliprole	**28**	Apple weevil	EU: Not authorised
		Fuller's rose weevil	
		Garden weevil	
Thiacloprid	**4A**	Codling moth	APVMA: Under review EU: No authorisation in place USA: No authorisation
		Oriental fruit moth	
		Woolly apple aphid	
		Mediterranean fruit fly (PER14562)	
Trichlorfon	**1B**	Rutherglen bug	APVMA: nominated for review Codex: No MRLs EU: No authorisations USA: No MRLs
		Fruit flies	

Active Constituents	Chemical Group	Problem	Comment
DISEASES			
BCDMH	-	Surface sterilisation	EU: Under assessment
Boscalid + Pyraclostrobin	**7 + 11**	Black spot	Boscalid Canada: Under review Pyraclostrobin Canada: Under review
Captan	**M4**	Black spot	EU: Under review proposed restriction to use in permanent greenhouses only USA: Under review
Chlorine	**M**	Surface moulds	
Copper	**M1**	Bitter rot	EU: Candidates for substitution
		Black spot	
		Fly speck	
		Ripe fruit rot/spot	
		Sooty blotch	
Cyprodinil	**9**	Black spot	Canada: Under review EU: Candidate for substitution
Difenoconazole	**3**	Black spot	APVMA: nominated for review EU: Candidate for substitution USA: Under review
		Powdery mildew	
Dithianon	**M9**	Black spot	EU: Restricted use to non-edible crops
Dodine	**U12**	Black spot	
Fludioxonil	**12**	Blue mould	EU: Under review, & candidate for substitution
		Grey mould	
Fluopyram + Trifloxystrobin	**7 + 11**	Black spot	
Hexaconazole	**3**	Black spot	APVMA: nominated for review EU: No authorisation
Imazalil	**3**	Blue mould	EU: Under review, withdrawal of many EU MRLs proposed.
Iodine (Po)	**M**	Bactericide/fungicide	

Active Constituents	Chemical Group	Problem	Comment
Iprodione	**2**	Blue & green moulds	Canada: Majority of food crop uses deleted Codex: Review scheduled EU: No authorisation in place USA: Proposed deletion or restriction of uses
		Blue mould	
		Botrytis blight	
		Ripe fruit rot/spot	
		Storage rot	
Isopyrazam	**7**	Black spot	EU: Authorisation not renewed
Kresoxim-methyl	**11**	Black spot	Canada: Reduced number of applications
Mancozeb	**M3**	Bitter rot	APVMA: nominated for review Canada: Many uses cancelled Codex: To be reviewed 2023/24 EU: Authorisation not renewed
		Black spot	
		Fly speck	
		Powdery mildew	
		Ripe fruit rot/spot	
		Sooty blotch	
		Target spot (Early blight)	
Metiram	**M3**	Bitter rot	APVMA: nominated for review Canada: All foliar uses, except potato, cancelled Codex: To be reviewed 2023/24 EU: Under review
		Black spot	
		Sooty blotch	
Myclobutanil	**3**	Black spot	APVMA: nominated for review EU: No authorisation in place
Penconazole	**3**	Black spot	APVMA: nominated for review
Penthiopyrad	**7**	Black spot	
		Powdery mildew	
Petroleum oil/paraffinic oil	**-**	Powdery mildew	
Proquinazid	**13**	Powdery mildew	
Pyrimethanil	**9**	Blue mould	Canada: Review initiated
		Grey mould	
		Ripe fruit rot/spot	

Active Constituents	Chemical Group	Problem	Comment
Sulfur	**M2**	Black spot	
		Powdery mildew	
Thiabendazole	**1**	Blue mould	
		Grey mould	
		Ripe fruit rot/spot	
Thiram	**M3**	Black spot	APVMA: nominated for review Canada: All foliar uses cancelled Codex: To be reviewed 2023/24 EU: No authorisation in place
Triadimenol	**3**	Myrtle rust (Non-bearing trees)	APVMA: nominated for review Canada: No authorisation in place EU: No authorisation in place USA: Registration cancelled
Trifloxystrobin	**11**	Black spot	Canada: Under review
		Powdery mildew	
Zineb	**M3**	Bitter rot	APVMA: nominated for review Codex: To be reviewed 2023/24 EU: No authorisation in place
		Black spot	
		Sooty blotch	
		Black spot	

Active Constituents	Chemical Group	Comment
BROADLEAF WEEDS AND GRASSES		
2,2-DPA as Na salt	**0**	
Carfentrazone-ethyl	**14**	
Clethodim	**1**	
Dichlobenil	**29**	EU: No authorisation in place
Diquat	**22**	APVMA: Currently under review EU: No authorisation in place
Fluazifop	**1**	
Flumioxazin	**14**	EU: Candidate for substitution
Glufosinate	**10**	Canada: Review proposed EU: No authorisation in place
Glyphosate	**9**	Ongoing issues internationally EU: Under review
Haloxyfop-P	**1**	EU: No authorisation in place
Isoxaben (non-bearing)	**29**	
Norflurazon	**12**	EU: No authorisation in place
Oryzalin	**3**	EU: No authorisation in place
Oxyfluorfen	**14**	EU: Candidate for substitution
Paraquat	**22**	APVMA: Currently under review Canada: Review initiated EU: No authorisation in place Rotterdam Convention - nomination
Saflufenacil	**14**	EU: No authorisation in place
Simazine	**5**	APVMA: nominated for review EU: No authorisation in place

Active Constituents	Chemical Group	Comment
PLANT GROWTH REGULATORS		
1-methyl-cyclopropene	-	
2,4-D	-	
6-benzyladenine	-	
DPA	-	EU: No authorisation
Gibberellins	-	
NAA	-	

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