Citrus

Strategic Agrichemical Review Process
(SARP)

October 2022

Hort Innovation
Project – MT21005

Hort Innovation Project Number:
MT21005 –Strategic Agrichemical Review Process (SARP) Updates

SARP Service Provider:
AGK Services

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

Date of report:
October 2022

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Table of Contents

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 citrus 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

There were no high priority diseases identified, but the following are moderate priority:

Common Name	Scientific Name
Phytophthora Brown Rot, Trunk Collar Rot & Root Rot	*Phytophthora* spp.
Blue Mould / Post Harvest	*Penicillium italicum*
Green Mould / Post Harvest	*Penicillium digitatum*
Sour Rot / Post Harvest	*Geotrichum candidum var. citri-aurantii*
Stem-End Rot / Post Harvest	*Phomopsis citri* / *Diplodia* spp.
Anthracnose	*Colletotrichum gloeosporioides*
Black Core Rot	*Alternaria alternata*
Greasy Spot	*Mycosphaerella* spp.

1.2 Insects and mites

The high priority insect and mite pests are:

Common Name	Scientific Name
Citrus Gall Wasp	*Bruchophagus fellis*
Queensland Fruit Fly	*Bactrocera tryoni*
Light Brown Apple Moth	*Epiphyas postvittana*
Kelly's Citrus Thrips	*Pezothrips kellyanus*
Citrophilous Mealybug	*Pseudococcus calceolariae*
Longtail Mealybug	*Pseudococcus longispinus*
Red Scale	*Aonidiella aurantii*
Spined Citrus Bug	*Biprorulus bibax*
Kaytdids	*Caedicia simplex*

1.3 Weeds

There were no high priority weeds identified, but the moderate priority weeds are:

Common name	Scientific name
Flaxleaf Fleabane	*Conyza bonariensis*
Feather Top Rhodes Grass	*Chloris virgata*

1.4 Plant Growth Regulators

Plant Growth Regulator issues were not determined, but the following PGR issues are known to impact on citrus:

Issue
Control of Vegetative Growth
Increase Fruit Size
Extend Shelf Life
Reduction of Fruit Drop

2. The Australian Citrus Industry

Citrus is a major fruit group with the four major types being oranges, mandarins, lemons/limes, and grapefruit.

Total production for the year ending June 2021 was 708,827 tonnes[1]. Wholesale value of fresh supply was $668 m, with $571 m distributed into retail and $114 m into food service.

The production areas and harvest times vary for the different citrus groups.

Oranges
Orange production occurs predominantly in the southern states and is dominated by two main varieties. Navel oranges are available in the winter months and Valencia are available during summer.

Fresh Orange Seasonality by State

State	20/21 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales	246,322												
Victoria	87,634												
Queensland	5,684												
Western Australia	13,264												
South Australia	120,793												
Availability legend			High			Medium			Low			None	

Mandarins
Mandarin production occurs across most states in Australia. Production for the fresh market is dominated by 3 main varieties, Murcott, Imperial and Afourer.

Fresh Mandarin Seasonality by State

State	20/21 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales	2,452												
Victoria	27,795												
Queensland	85,837												
Western Australia	6,540												
South Australia	40,875												
Availability legend			High			Medium			Low			None	

Lemons / Limes
Lemons and limes are grown across Australia with the major production in Queensland. Of the group, lemons account for 70% of production and limes the remaining 30%.

[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/

Fresh Lemons / Limes Seasonality by State

State	20/21 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales	5,605												
Victoria	6,440												
Queensland	37,692												
Western Australia	1,976												
South Australia	7,409												
Northern Territory	716												
Imported	6,636												
Availability legend			High			Medium			Low			None	

Grapefruit

Grapefruit production occurs predominantly in the Murray Valley. Imports, as well as production from WA and NT, allow for close to year-round availability.

Fresh Grapefruit Seasonality by State

State	20/21 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales	3,715												
Victoria	2,087												
Queensland	1,769												
Western Australia	590												
South Australia	3,007												
Northern Territory	625												
Availability legend			High			Medium			Low			None	

Australia is a net exporter of citrus, with 34% of total production exported in 2020/21. Of the different citrus groups, 36% of oranges are exported with the major international destinations being Japan, Hong Kong and China. Exports represent 36% of mandarin production with the major destinations being China, Thailand, Japan, New Zealand and Philippines. Exports are less significant for lemons and limes, representing 7% of production with the major destinations being Indonesia, Japan, Canada, China and Philippines. Exports represent 19% of grapefruit production, with the major destinations being Japan, China and Canada.

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 citrus 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 citrus industry regarding pesticide access, Hort Innovation undertook a review of the pesticide requirements via a Strategic Agrichemical Review Process (SARP) in 2013. 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 citrus 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 citrus 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 citrus 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 oranges and mandarin as major crops, and lemons, limes, tangelos, and grapefruit as minor crops. Citrus fit within the APVMA crop group 001: Citrus Fruits which includes Subgroup 001B, Mandarin, Subgroup 001C, Oranges, Sweet, Sour, and Subgroup 001D Pummelos. 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 citrus 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 Citrus 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 citrus
Appendix 2. Products available for control of insects and mites in citrus
Appendix 3. Products available for weed control in citrus
Appendix 4. Plant growth regulators available in citrus
Appendix 5. Current permits for use in citrus
Appendix 6. Citrus Maximum Residue Limits (MRLs)
Appendix 7. Citrus Agrichemical Regulatory Risk Assessment

4. Diseases, Pests and Weeds of Citrus

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/

4.1 Diseases of citrus

4.1.1 Disease priorities

Common name	Scientific name
Moderate	
Phytophthora Brown Rot, Trunk Collar Rot & Root Rot	*Phytophthora* spp.
Blue Mould / Post Harvest	*Penicillium italicum*
Green Mould / Post Harvest	*Penicillium digitatum*
Sour Rot / Post Harvest	*Geotrichum candidum var. citri-aurant*
Stem-End Rot / Post Harvest	*Diaporthe citri* / *Diplodia* spp.
Anthracnose	*Colletotrichum gloeosporiodes*
Black Core Rot	*Alternaria alternata*
Greasy Spot	*Mycosphaerella* spp.
Low	
Citrus Black Spot	*Phyllosticta citricarpa*
Brown Spot / Emperor Brown Spot	*Alternaria alternata*, *A. citri*
Botrytis / Blossom Mould	*Botrytis cinerea*
Melanose	*Phomopsis citri*
Pink Disease	*Erythricium salmonicolor*
Scab	*Elsinoe fawcettii*
Septoria Spot	*Septoria citri*
Black Pit & Citrus Blast	*Pseudomonas syringae*
Diplodia Fruit Rot	*Lasiodiplodia theobromae*
Rhizopus	*Rhizopus* spp.
Sooty Blotch	*Gloeodes pomigena*

There were no high priority diseases identified based on the feedback received, but the following were rated as moderate priority: Phytophthora Brown Rot & Trunk Collar Rot, Blue Mould / Post Harvest, Green Mould / Post Harvest, Sour Rot / Post Harvest, Stem-End Rot / Post Harvest, Anthracnose, Black Core Rot and Greasy Spot. Available and potential products for control of diseases are listed in Section 4.1.2.

Industry consultation indicated that while disease priorities varied between growing regions, that for most areas disease management was not a big issue. There is not much routine application of fungicide in North Queensland, but other areas in Queensland use regular

programs to control Emperor Brown Spot and Citrus Black Spot. Southern growing regions do not require a large regime of fungicide applications and post-harvest diseases are relatively easy to manage.

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 particular 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].

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

4.1.2 Available and potential products for priority diseases

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

Availability		Regulatory risk (refer to Appendix 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
Phytophthora Brown Rot, Trunk Collar Rot & Root Rot (*Phytophthora* spp.) **Priority: Moderate**							
Rated as a high priority in QLD, and as a moderate priority in NSW, SA and VIC. Phytophthora is a soil-borne disease that infects the roots and crowns of trees. Affected trees initially suffer nutrient and moisture deficiencies because of damaged roots, and the tree may eventually die as a result of the disease. An integrated management system is required to protect trees, including selection of planting sites with good drainage, irrigation management to avoid excessive watering, fungicide application and general tree health through nutrition and pruning management.							
Copper as Copper Oxychloride	M1	Protectant	1	A	ALL	Registered in citrus for control of **Brown Rot (*Phytophthora citrophthora*)**. Apply before or immediately after the first autumn rains or at first sign of disease. Maximum number of treatments not specified.	-
					QLD & WA	Registered in citrus for control of **Collar Rot (*Phytophthora* spp.)** and Pink Disease (*Certicium salmonicolor*). Apply before onset of autumn rains. Maximum number of treatments not specified.	
Copper as Cuprous Oxide	M1	Protectant	1	A	QLD	Registered in citrus for control of **Brown Rot (*Phytophthora citrophthora*)** and Brown Spot (mandarins) (*Alternaria citri*). Apply late autumn when symptoms first emerge. It is important to cover the lower half of the tree. Maximum number of treatments not specified.	-
Phosphorous Acid	33	Protectant & Curative	NR	A	ALL	Registered in citrus for control of Phytophthora Root Rot (*Phytophthora nicotianae var parasitice*) and **Collar Rot (*Phytophthora citrophthora*)**. Apply 2 applications, the first in later winter prior to flowering and the second in autumn applied to mature fruit.	-

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.	-
Isotianil (Routine 200SC) Bayer	P3	Chemical Elicitor	NR	P		Registered for use in bananas for Yellow Sigatoka and Leaf Speckle. Registered in SE Asia for Citrus Canker as a foliar spray and/or soil drench. To be evaluated by the JMPR in 2023.	-
Mandipropamid (Revus) Syngenta	40	Protectant & Curative		P		Registered for control of Downy Mildew in grapes, lettuce, leafy vegetables and oilseed poppies. US registration for control of **Phytophthora** in various crops, including as a foliar application for protection of citrus from **Phytophthora Root Rot**.	-
Metalaxyl-M (Ridomil Gold 25G) Syngenta	4	Protectant & Curative		P		Registered for control of **Phytophthora Root Rot** in avocado, macadamia and peaches.	-
Oxathiapiprolin (Zorvec Enicade) Corteva	49	Protectant & Curative		P		Registered for control of Downy Mildew in bulb vegetables, brassica vegetables, cucurbits, leafy vegetables, brassica leafy vegetables and poppies. US registration for control of **Phytophthora** Canker and Brown Rot in citrus.	-
Streptomyces lydicus (Actinovate)	BM 02	Biological	NR	P		Registered for the suppression of Powdery Mildew and **Phytophthora** in strawberries.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Blue Mould / Post Harvest (*Penicillium italicum*) **Green Mould / Post Harvest** (*Penicillium digitatum*) **Priority: Moderate**							
Rated as a high priority in QLD and SA, a moderate priority in VIC, and as a low priority in NSW. Blue Mould and Green Mould are the most important post-harvest diseases of citrus. They are wound pathogens that only infect the fruit through peel injuries produced in the field during harvest and during packing and handling. An integrated approach is needed to manage these diseases, including fruit handling procedures, hygiene and sanitation, fungicides and post-harvest refrigeration.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	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 Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of **Blue Mould (*Penicillium italicum*)**, **Green Mould (*Penicillium digitatum*)** and Diplodia Stem End Rot. Apply as a dip or flood spray for 1 minute.	R3
Fludioxonil + Propiconazole (Chairman) Syngenta	12+3	Protectant / Post-Harvest Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of **Blue Mould (*Penicillium italicum*)**, **Green Mould (*Penicillium digitatum*)** and Sour Rot (*Geotrichum candidum var. citri-aurant*). Apply as a dip or flood spray for 30 seconds.	R3
Guazatine Acetate (Panoctine)	M7	Protectant / Post-Harvest Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of **Blue Mould (*Penicillium italicum*)**, **Green Mould (*Penicillium digitatum*)** and Sour Rot (*Geotrichum candidum var. citri-aurant*). Apply as a bulk dip within 24 hours of harvest. For packing line, flood fruit for 30 seconds within 24 hours of harvest.	R3
Imazalil (Magnate)	3	Protectant / Post-Harvest Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of **Blue Mould (*Penicillium italicum*)** and **Green Mould (*Penicillium digitatum*).** Apply to fruit as a bulk dip, flood or spray before waxing and preferably within 24 hours of harvest.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Imazalil + Pyrimethanil (Pyxis)	3+9	Protectant / Post-Harvest Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of **Blue Mould (*Penicillium italicum*)** and **Green Mould (*Penicillium digitatum*).** Use as a bulk dip, flood or drench for 30 seconds, preferably within 24 hours of harvest.	R2
Iodine	M	Protectant / Post Harvest Dip	NR	A	ALL	Registered in citrus as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Peroxyacetic Acid	M	Protectant / Post Harvest Dip	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.	-
Pyrimethanil (Penbotec)	9	Protectant / Post-Harvest Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of **Blue Mould (*Penicillium italicum*)** and **Green Mould (*Penicillium digitatum*).** Use as a bulk dip, flood or drench for 30 seconds, preferably within 24 hours of harvest.	-
Sodium Orthophenylphenate Tetrahydrate (Preventol ON)		Protectant / Post-Harvest Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of **Blue Mould**. Dip the fruit for up to 2 minutes, and wash off after dipping.	-
Thiabendazole (Tecto)	1	Protectant / Post-Harvest Treatment	NR	A	QLD, NSW, VIC, SA & WA	Registered in citrus as a post-harvest treatment for control of **Blue Mould (*Penicillium italicum*)**, **Green Mould (*Penicillium digitatum*)** and Stem End Rot (*Phomopsis citri*). Apply as a dip treatment for a minimum of 30 seconds and fruit should not be rinsed.	-
Aureobasidium pullulans (Botector) Nufarm	BM 01	Biological	NR	P		Registered in grapes and berries for control of Botrytis and suppression of several other fungal pathogens (Anthracnose, Phomopsis and Rhizopus) in berries. US registration for post-harvest control of **Blue Mould (*Penicillium italicum*)**, **Green Mould (*Penicillium digitatum*)** and Sour Rot in citrus.	-
Fludioxonil + Azoxystrobin (Graduate A+) Syngenta	12+11	Protectant / Post-Harvest Treatment		P		Registered as a post-harvest dip, drench or flood spray for control of Side Rot caused by Anthracnose and Stem End Rot in avocado.	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 *Botrytis* in berries, grapes and strawberries and control of *Botrytis* and *Sclerotinia* in leafy vegetables, lettuce and potatoes. US registration for control of **Blue Mould (*Penicillium italicum*)**, **Green Mould (*Penicillium digitatum*)**, Anthracnose and *Alternaria citri* in lemon and lime.	R3
Sour Rot / Post Harvest (*Geotrichum candidum var. citri-aurant*) **Priority: Moderate**							
Rated as a high priority in QLD and SA, a moderate priority in VIC, and as a low priority in NSW. Sour Rot is a major post-harvest decay that is prevalent in high rainfall regions and during fruit degreening. An integrated approach is needed to manage this disease, including fruit handling procedures, hygiene and sanitation, fungicides and post-harvest refrigeration.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	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 + Propiconazole (Chairman) Syngenta	12+3	Protectant / Post-Harvest Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and **Sour Rot (*Geotrichum candidum var. citri-aurant*)**. Apply as a dip or flood spray for 30 seconds.	R3
Guazatine Acetate (Panoctine)	M7	Protectant / Post-Harvest Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and **Sour Rot (*Geotrichum candidum var. citri-aurant*)**. Apply as a bulk dip within 24 hours of harvest. For packing line, flood fruit for 30 seconds within 24 hours of harvest.	R3
Iodine	M	Protectant / Post Harvest Dip	NR	A	ALL	Registered in citrus as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Aureobasidium pullulans (Botector) Nufarm	BM 01	Biological	NR	P		Registered in grapes and berries for control of Botrytis and suppression of several other fungal pathogens (Anthracnose, Phomopsis and Rhizopus) in berries. US registration for post-harvest control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and **Sour Rot** in citrus.	-
Fludioxonil + Azoxystrobin (Graduate A+) Syngenta	12+11	Protectant / Post-Harvest Treatment		P		Registered as a post-harvest dip, drench or flood spray for control of Side Rot caused by Anthracnose and Stem End Rot in avocado.	R3
Stem-End Rot / Post Harvest (*Phomopsis citri* / *Diplodia* spp.) **Priority: Moderate**							
Rated as a high priority in QLD and SA, a moderate priority in VIC, and as a low priority in NSW. Post-harvest disease that is more prevalent in drier growing region. It can be promoted by water stress during fruit development so managing irrigation and Phytophthora infection is critical. Avoid harvesting immature fruit and cool fruit immediately after harvest and store in well ventilated containers.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	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	M	Protectant / Post Harvest Dip	NR	A	ALL	Registered in citrus as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Thiabendazole (Tecto)	1	Protectant / Post-Harvest Treatment	NR	A	QLD, NSW, VIC, SA & WA	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and **Stem End Rot** (*Phomopsis citri*). Apply as a dip treatment for a minimum of 30 seconds and fruit should not be rinsed.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Fludioxonil (Scholar)	12	Protectant / Post-Harvest Treatment	NR	P-A	ALL	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and Diplodia Stem End Rot.	R3
Fludioxonil + Azoxystrobin (Graduate A+) Syngenta	12+11	Protectant / Post-Harvest Treatment		P		Registered as a post-harvest dip, drench or flood spray for control of Side Rot caused by Anthracnose and Stem End Rot in avocado.	R3
Anthracnose (*Colletotrichum gloeosporiodes*) **Priority: Moderate**							
Rated as a high priority in QLD, and as a moderate priority in NSW, SA and VIC. Infections are seen as small, black, irregular spots that cause death and shedding of flowers, leading to poor fruit set. Disease outbreaks in crop will also lead to carry-over infection and post-harvest rots. In-crop and post-harvest control measures are required, including good orchard hygiene and fungicide cover sprays. Anthracnose infections will have serious impacts on fruit quality if not controlled. Annual pruning after harvest removes deadwood and reduces the risk of symptoms developing in the orchard. Applying a protectant copper spray before autumn rain will reduce anthracnose in the orchard. Growers can consider applying a second copper spray if fruit will be harvested late in the season[5]. Post-harvest management includes fungicide treatments, keeping fruit cool and minimising delays in the supply chain.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	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	M	Protectant / Post Harvest Dip	NR	A	ALL	Registered in citrus as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Copper	M1	Protectant	1	P-A	ALL	Registered in citrus for control of Black Spot, Melanose, Smoky Blotch and Scab (lemons).	-

[5] www.dpi.nsw.gov.au/agriculture/horticulture/citrus/content/crop-management/orchard-management-factsheets/copper-sprays

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Fludioxonil (Scholar)	12	Protectant / Post-Harvest Treatment	NR	P-A	ALL	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and Diplodia Stem End Rot.	R3
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a label registration for control of Emperor Brown Spot in tangelos and Blossom Mould (Botrytis cinerea) in lemons. BASF submitted data to the APVMA in February 2022 for Merivon and a label extension pending approval, May 2023.	-
Aureobasidium pullulans (Botector) Nufarm	BM 01	Biological	NR	P		Registered in grapes and berries for control of Botrytis and suppression of several other fungal pathogens (**Anthracnose**, Phomopsis and Rhizopus) in berries. US registration for control of **Anthracnose** in berries, stone fruit, almonds, fruiting vegetables, cucurbits, leafy vegetables, ornamentals and hops.	-
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for control of **Anthracnose** in avocado and several tropical fruits. US registration for control of **Anthracnose**, Alternaria, Greasy Spot, Alternaria Brown Spot and Melanose in citrus.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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 Citrus Canker, **Anthracnose**, Greasy Spot, Alternaria Brown Spot, Melanose and Scab in citrus.	-
BLAD (Problad Plus)	BM 01	Biological	NR	P		Registered in stone fruit for suppression of Brown Rot. US registration for control of **Anthracnose** in grapes and strawberries.	-
Fludioxonil + Azoxystrobin (Graduate A+) Syngenta	12+11	Protectant / Post-Harvest Treatment		P		Registered as a post-harvest dip, drench or flood spray for control of Side Rot caused by **Anthracnose** and Stem End Rot in avocado.	R3
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.	-
Isofetamid (Kenja) ISK / AgNova	7	Protectant & Curative		P		Registered in berries for control of Botrytis Grey Mould. US registration for control of **Anthracnose** in almonds, grapes and low-growing berries.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of *Botrytis* in berries, grapes and strawberries and control of *Botrytis* and *Sclerotinia* in leafy vegetables, lettuce and potatoes. US registration for control of **Anthracnose** in berries and grape and small fruit vine climbing (except fuzzy Kiwifruit) and suppression of **Anthracnose** in lemon and lime.	R3
Pydiflumetofen +Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Registered for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. US registration for control of **Anthracnose** in almonds, stone fruit and tree nuts.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Black Core Rot (*Alternaria alternata*) **Priority: Moderate**							
Rated as a moderate priority in NSW, and as a low priority in QLD, SA and VIC. A problem in southern growing regions with winter rainfall and hot, dry summers. Infected fruit can develop black core rot inside the fruit without showing any external symptoms. Spores can enter the fruit during early fruit development through small wounds, but it will usually stay dormant until after harvest. Well pruned trees with better air circulation tend to have lower spore loads. Delays to harvest of susceptible varieties will allow infected fruit to drop prematurely.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	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	M	Protectant / Post Harvest Dip	NR	A	ALL	Registered in citrus as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Fludioxonil (Scholar)	12	Protectant / Post-Harvest Treatment	NR	P-A	ALL	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and Diplodia Stem End Rot.	R3
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Chitin Synthase Inhibitor		P		Registered for control of Grey Mould and Powdery Mildew in grapes and berries, and control of Powdery Mildew and **Alternaria** in Apples. Nufarm are planning a label extension to include use in fruiting vegetables, almonds, stone fruit and avocado.	-
Pydiflumetofen +Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Registered for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. US registration for control of **Alternaria** in almonds, pistachios, stone fruit and tree nuts.	R3
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 Anthracnose, **Alternaria**, Greasy Spot, Alternaria Brown Spot and Melanose in citrus.	-
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 Citrus Canker, Anthracnose, Greasy Spot, Alternaria Brown Spot, Melanose and Scab in citrus.	-
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.	-
Fluazinam (Shirlan) Syngenta	29	Protectant		P		Registered in Brassica vegetables for control of Club Root. US registration for control of ***Alternaria*** in carrots.	-
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a label registration for control of Emperor Brown Spot in tangelos and Blossom Mould (Botrytis cinerea) in lemons. BASF submitted data to the APVMA in February 2022 for Merivon and a label extension pending approval, May 2023.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of Botrytis in berries and grapes, and Botrytis and Sclerotinia in leafy vegetables and potato. US registration for control of ***Alternaria citri*** in lemon and lime.	R3
Greasy Spot (*Mycosphaerella* spp.) **Priority: Moderate**							
Rated as a moderate priority in SA and VIC, and as a low priority in NSW and QLD. Greasy Spot appears as foliar lesions which can cause leaves to fall prematurely. This can result in reduced tree vigour and yield. Greasy Spot also infects the fruit of grapefruit producing rind blotch. Orchard hygiene and canopy management contribute to effective disease management, with fungicides targeting other foliar pathogens likely to impact on Greasy Spot as well.							
Azoxystrobin (Amistar)	11	Protectant & Curative	NR	P-A	ALL	Registered in citrus for control of Brown Spot and Black Spot. Registered for control of *Mycosphaerella graminicola* in wheat.	-
Copper	M1	Protectant	1	P-A	ALL	Registered in citrus for control of Brown Rot (*Phytophthora citrophthora*). Registered for control of Leaf Spot in strawberries.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a label registration for control of Emperor Brown Spot in tangelos and Blossom Mould (Botrytis cinerea) in lemons. BASF submitted data to the APVMA in February 2022 for Merivon and a label extension pending approval, May 2023.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Azoxystrobin + Tebuconazole (Veritas Opti) Adama	11+3	Protectant & Curative		P		Registered for control of *Mycosphaerella graminicola* in wheat.	R3
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 Anthracnose, Alternaria, **Greasy Spot**, Alternaria Brown Spot and Melanose in citrus.	-
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 Citrus Canker, Anthracnose, **Greasy Spot**, Alternaria Brown Spot, Melanose and Scab in citrus.	-
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.**	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of *Botrytis* in berries, grapes and strawberries and control of *Botrytis* and *Sclerotinia* in leafy vegetables, lettuce and potatoes. US registration for control of ***Mycosphaerella* spp.** in brassica vegetables, grapes and small fruit vine climbing (except fuzzy Kiwifruit).	R3
Citrus Black Spot (*Phyllosticta citricarpa*) **Priority: Low**							
Rated as a high priority in QLD, and as a low priority in NSW, SA and VIC. Predominantly affects the rind of fruit, making it unmarketable. Severe infestations can cause fruit loss. Spores are released over summer with symptoms not seen until autumn or winter. Fungicide applications should be targeted to periods of infection and will be supported by good orchard hygiene and canopy management.							
Azoxystrobin (Amistar)	11	Protectant & Curative	NR	A	ALL	Registered in citrus for control of Brown Spot (*Alternaria* spp.) and **Black Spot (*Guignardia citricarpa*)**. Maximum of 2 applications, with a minimum re-treatment interval of 14 days.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Copper as Copper Hydroxide, Tribasic Copper Sulphate, Copper Ammonium Acetate	M1	Protectant	1	A	ALL	Registered in citrus for control of **Black Spot**, Melanose, Smoky Blotch (*Gloeodes pomigena*) and Scab (lemons) (*Elsinoe fawcettii*). Apply at petal fall. Maximum number of applications not specified.	-
Copper as Copper Oxychloride	M1	Protectant	1	A	QLD & NT	Registered in citrus for control of **Black Spot**, Melanose, Smoky Blotch (*Gloeodes pomigena*) and Scab (lemons) (*Elsinoe fawcettii*). Apply at 50-75% petal fall and 6 and 12 weeks later. Maximum number of applications not specified.	-
Copper as Cuprous Oxide	M1	Protectant	1	A	ALL	Registered in citrus for control of **Black Spot**, Melanose, Smoky Blotch and Scab. Apply after 50-80% petal fall. Repeat after 6-8 weeks. Maximum number of applications not specified.	-
Mancozeb	M3	Protectant	NR	A	ALL	Registered in citrus for control of **Black Spot**. On heavy soil, apply at 8 and at 15 weeks after a copper spray at petal fall. On light soil, apply at 6 and at 13 weeks after a copper spray at petal fall. In QLD, apply at 6 and at 12 weeks after a copper spray at ½ to ¾ petal fall.	R2
Propineb (Antracol)	M3	Protectant	7	A	NSW, VIC, SA, WA & QLD	Registered in citrus for control of **Black Spot**. Apply at 6 and at 12 weeks after copper spray at petal fall. In NSW coastal lowlands and highlands, apply at 8 and at 14 weeks after the petal fall copper spray.	R2
Zineb	M3	Protectant	7	A	NSW, SA & TAS	Registered in citrus for control of **Black Spot** and Speckled Blotch. Apply 6-12 weeks after copper spray at petal fall.	R2
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	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		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a label registration for control of Emperor Brown Spot in tangelos and Blossom Mould (*Botrytis cinerea*) in lemons. BASF submitted data to the APVMA in February 2022 for Merivon and a label extension pending approval, May 2023.	-
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.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of *Botrytis* in berries, grapes and strawberries and control of *Botrytis* and *Sclerotinia* in leafy vegetables, lettuce and potatoes. US registration for control of **Black Rot (*Guignardia* spp.)** in grapes and small fruit vine climbing (except fuzzy Kiwifruit).	R3
Brown Spot / Emperor Brown Spot (*Alternaria alternata*, *A. citri*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Emperor Brown Spot infection will lead to lesions on the leaves and the fruit. It mainly impacts mandarins, tangelos and tangors in humid, high rainfall areas and is predominantly spread by wind-driven spores. Fungicide applications should be targeted to periods of infection and will be supported by good orchard hygiene and canopy management. Storing fruit below 20°C after harvest can suppress postharvest disease development.							
Azoxystrobin (Amistar)	11	Protectant & Curative	NR	A	ALL	Registered in citrus for control of **Brown Spot (*Alternaria* spp.)** and Black Spot (*Guignardia citricarpa*). Maximum of 2 applications, with a minimum re-treatment interval of 14 days.	-
Captan PER82043	M4	Protectant	28	A	QLD	Permitted in mandarins for control of **Emperor Brown Spot**. Commence applications at the onset of weather conditions conducive to development of Emperor Brown Spot. Apply a maximum of 4 applications per crop, with a minimum 28 day interval between consecutive treatments.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Copper as Copper Oxychloride	M1	Protectant	1	A	ALL (excl. TAS)	Registered in citrus for control of **Brown Spot** (mandarins). Apply at bud burst and at 50-75% petal fall. If necessary due to weather conditions, apply further treatments at 6-8 week intervals. Maximum number of applications not specified.	-
Copper as Cuprous Oxide	M1	Protectant	1	A	QLD	Registered in citrus for control of **Brown Rot (*Phytophthora citrophthora*)** and Brown Spot (mandarins) (*Alternaria citri*). Apply at bud burst, petal fall and again after 6-12 weeks. In young trees (up to 8 years old) a pre-blossom spray should be used. Maximum number of treatments not specified.	-
Iprodione (Rovral)	2	Protectant & Curative	NR	A	QLD, WA & NT	Registered in mandarins (non-bearing) for control of **Alternaria Leaf Spot / Brown Spot (*Alternaria alternata*)**. Apply to non-bearing trees of Murcott variety monthly from first flush in spring until flushing ceases in the autumn. Reduce intervals to fortnightly during periods of wet weather. Maximum number of treatments not specified.	R3
Iprodione (Rovral) PER14772	2	Protectant & Curative	56	A	QLD	Permitted in mandarins, tangelos for control of **Emperor Brown Spot**. Time applications to coincide with spring flush (fruit set), following thinning (fruit 20-30mm) during January and autumn flush (fruit 30-40mm) during April. Maximum of 3 applications per season, with a minimum of 60 days between applications.	R3
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a label registration for control of Emperor Brown Spot in tangelos and Blossom Mould (Botrytis cinerea) in lemons. BASF submitted data to the APVMA in February 2022 for Merivon and a label extension pending approval, May 2023.	-
Pydiflumetofen +Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Registered for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. US registration for control of **Alternaria** in almonds, pistachios, stone fruit and tree nuts.	R3
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 Anthracnose, Alternaria, Greasy Spot, **Alternaria Brown Spot** and Melanose in citrus.	-
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 Citrus Canker, Anthracnose, Greasy Spot, **Alternaria Brown Spot**, Melanose and Scab in citrus.	-
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.	-
Fluazinam (Shirlan) Syngenta	29	Protectant		P		Registered in Brassica vegetables for control of Club Root. US registration for control of ***Alternaria*** in carrots.	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Chitin Synthase Inhibitor		P		Registered for control of Grey Mould and Powdery Mildew in grapes and berries, and control of Powdery Mildew and **Alternaria** in Apples. Nufarm are planning a label extension to include use in fruiting vegetables, almonds, stone fruit and avocado.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of Botrytis in berries and grapes, and Botrytis and Sclerotinia in leafy vegetables and potato. US registration for control of ***Alternaria citri*** in lemon and lime.	R3
Botrytis / Blossom Mould (*Botrytis cinerea*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Sporadic disease that can attack the flowers and young fruit of lemons. It can reduce fruit set and cause injury to young fruit. Practice good orchard hygiene and canopy management to reduce the incidence of infections.							
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (*Alternaria*) and Blossom Mould (*Botrytis cinerea*). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a label registration for control of Emperor Brown Spot in tangelos and Blossom Mould (Botrytis cinerea) in lemons. BASF submitted data to the APVMA in February 2022 for Merivon and a label extension pending approval, May 2023.	-
Aureobasidium pullulans (Botector) Nufarm	BM 01	Biological	NR	P		Registered in grapes and berries for control of Botrytis and suppression of several other fungal pathogens (Anthracnose, Phomopsis and Rhizopus) in berries. US registration for control of **Botrytis** in berries, grapes and tomatoes.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered 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 **Botrytis** in artichoke, asparagus, berries, bulb vegetables, fruiting vegetables, grape, herbs, legume vegetables, root / tuber & corm vegetables, stone fruit, strawberries and kiwi and for control of Anthracnose, Alternaria, Greasy Spot, Alternaria Brown Spot and Melanose in citrus.	-
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 **Botrytis** in artichoke, asparagus, berries, brassica leafy vegetables, bulb vegetables, fruiting vegetables, grape, leafy vegetables, legume vegetables, pome fruit, stone fruit, strawberries, tobacco and root and tuber vegetables and for control of Citrus Canker, Anthracnose, Greasy Spot, Alternaria Brown Spot, Melanose and Scab in citrus.	-
BLAD (Problad Plus)	BM 01	Biological	NR	P		Registered in stone fruit for suppression of Brown Rot. US registration for control of **Botrytis** in fruiting vegetables, grapes, strawberries and ornamentals.	-
Isofetamid (Kenja) ISK / AgNova	7	Protectant & Curative		P		Registered in berries for control of Botrytis Grey Mould. US registration for control of **Botrytis** in almonds, legume vegetables, grapes and low-growing berries.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of Botrytis in berries and grapes, and Botrytis and Sclerotinia in leafy vegetables and potato. US registration for control of **Botrytis** in bushberries, bulb vegetables, cucurbits, fruiting vegetables, grape and small fruit vine climbing (except fuzzy Kiwifruit), specific leaf petioles, leafy greens, pistachio, potato, strawberries and tuberous and corm vegetables.	R3
Streptomyces lydicus (Actinovate)	BM 02	Biological	NR	P		Registered for the suppression of Powdery Mildew and Phytophthora in strawberries. US registration for control of Citrus Canker, **Botrytis** and Citrus Blast in citrus.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Melanose (*Phomopsis citri*) **Priority: Low**							
Rated as a moderate priority in QLD, and as a low priority in NSW, SA and VIC. Melanose is a minor disease but infections can lead to superficial fruit damage and downgrading, particularly in coastal and tropical growing regions. Practice good orchard hygiene and ensure the correct timing of fungicide applications to reduce the impact of the disease.							
Copper as Copper Hydroxide, Tribasic Copper Sulphate, Copper Ammonium Acetate	M1	Protectant	1	A	ALL	Registered in citrus for control of Black Spot, **Melanose**, Smoky Blotch (*Gloeodes pomigena*) and Scab (lemons) (*Elsinoe fawcettii*). Apply at petal fall. Maximum number of applications not specified.	-
Copper as Copper Oxychloride	M1	Protectant	1	A	QLD & NT	Registered in citrus for control of Black Spot, **Melanose**, Smoky Blotch (*Gloeodes pomigena*) and Scab (lemons) (*Elsinoe fawcettii*). Apply at 50-75% petal fall and 6 and 12 weeks later. Maximum number of applications not specified.	-
Copper as Cuprous Oxide	M1	Protectant	1	A	ALL	Registered in citrus for control of Black Spot, **Melanose**, Smoky Blotch and Scab. Apply after 50-80% petal fall. Repeat after 6-8 weeks. Maximum number of applications not specified.	-
Sulfur	M2	Protectant	NR	A	NSW & WA	Registered in citrus for control of **Melanose**. May be added to copper spray at petal fall or applied separately during spring and autumn. Maximum number of applications and re-treatment interval not specified.	-
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered 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 Anthracnose, Alternaria, Greasy Spot, Alternaria Brown Spot and **Melanose** in citrus.	-
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 Citrus Canker, Anthracnose, Greasy Spot, Alternaria Brown Spot, **Melanose** and Scab in citrus.	-
Pink Disease (*Erythricium salmonicolor*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Pink Disease causes bark necrosis and gumming on stems and branches. It is uncommon in citrus but early detection, removal and destruction of infected plant material should prevent serious outbreaks.							
Copper as Copper Oxychloride	M1	Protectant	1	A	QLD & WA	Registered in citrus for control of Collar Rot (*Phytophthora* spp.) and **Pink Disease (*Certicium salmonicolor*)**. Apply before onset of autumn rains. Maximum number of treatments not specified.	-
Scab (*Elsinoe fawcettii*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Scab is a serious disease of lemons grown in coastal areas. It attacks the fruit, leaves and twigs with infection favoured by moist conditions. Practice good orchard hygiene and ensure the correct timing of fungicide applications to reduce the impact of the disease.							
Copper as Copper Hydroxide, Tribasic Copper Sulphate, Copper Ammonium Acetate	M1	Protectant	1	A	ALL	Registered in citrus for control of Black Spot, Melanose, Smoky Blotch (*Gloeodes pomigena*) and **Scab** (lemons) (*Elsinoe fawcettii*). Apply at petal fall. Maximum number of applications not specified.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Copper as Copper Oxychloride	M1	Protectant	1	A	QLD & NT	Registered in citrus for control of Black Spot, Melanose, Smoky Blotch (*Gloeodes pomigena*) and **Scab** (lemons) (*Elsinoe fawcettii*). Apply at 50-75% petal fall and 6 and 12 weeks later. Maximum number of applications not specified.	-
Copper as Cuprous Oxide	M1	Protectant	1	A	ALL	Registered in citrus for control of Black Spot, Melanose, Smoky Blotch and **Scab**. Apply after 50-80% petal fall. Repeat after 6-8 weeks. Maximum number of applications not specified.	-
Zineb	M3	Protectant	7	A	QLD	Registered in citrus for control of **Scab**. Apply 6-12 weeks after copper spray at petal fall.	R2
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-
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 Citrus Canker, Anthracnose, Greasy Spot, Alternaria Brown Spot, Melanose and **Scab** in citrus.	-
Septoria Spot (*Septoria citri*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Septoria Spot is an important disease of lemons in inland areas. Uncontrolled infections can cause downgrading of fruit. Practice good orchard hygiene and ensure the correct timing of fungicide applications to reduce the impact of the disease.							
Copper as Copper Oxychloride	M1	Protectant	1	A	ALL (excl. QLD)	Registered in citrus for control of **Septoria Spot**. Apply early to mid March. Maximum number of applications not specified.	-
Copper as Cuprous Oxide	M1	Protectant	1	A	NSW, VIC, SA & WA	Registered in citrus for control of **Septoria Spot** and Lemon Scab. Apply mid March. Maximum number of applications not specified.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (Alternaria) and Blossom Mould (Botrytis cinerea). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a citrus crop group label registration for Luna Experience and Luna Sensation for various diseases, including Black spot and Emperor Brown spot (*Alternaria*) and Blossom Mould (*Botrytis cinerea*). Bayer submitted data to the APVMA in September 2021 for Luna Experience and a label extension pending approval, end of 2022.	-
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a label registration for control of Emperor Brown Spot in tangelos and Blossom Mould (Botrytis cinerea) in lemons. BASF submitted data to the APVMA in February 2022 for Merivon and a label extension pending approval, May 2023.	-
Pydiflumetofen +Difenoconazole (Miravis Duo) Syngenta	7+3	Protectant & Curative		P		Registered for control of various diseases in fruiting vegetables, cucurbits, root vegetables, celery and peanuts. US registration for control of **Septoria** in pistachios and tree nuts.	R3
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protectant & Curative		P		Registered for control of *Botrytis* in berries, grapes and strawberries and control of *Botrytis* and *Sclerotinia* in leafy vegetables, lettuce and potatoes. US registration for control of **Septoria** in cucurbits, fruiting vegetables, grape and small fruit vine climbing (except fuzzy kiwifruit), specific leaf petioles, leafy greens, potato, tuberous and corm vegetables and for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*), Anthracnose and *Alternaria citri* in lemon and lime.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Black Pit & Citrus Blast (*Pseudomonas syringae*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Sporadic disease that is favoured by extended wet weather and will usually impact on the stems and leaves. Fruit infection is seen occasionally in lemons and mandarins but only rarely in oranges. Practice good orchard hygiene and canopy management to reduce infections.							
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant		P		Registered in tomatoes for the suppression of Bacterial Speck, Bacterial Spot, Bacterial Canker and Powdery Mildew. US registration for suppression of ***Pseudomonas syringae*** in cucurbits and tomatoes.	-
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 ***Pseudomonas syringae*** in berries, cucurbits, fruiting vegetables and stone fruit and for control of Anthracnose, Alternaria, Greasy Spot, Alternaria Brown Spot and Melanose in citrus.	-
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 Citrus Canker, Anthracnose, Greasy Spot, Alternaria Brown Spot, Melanose and Scab in citrus.	-
Streptomyces lydicus (Actinovate)	BM 02	Biological	NR	P		Registered for the suppression of Powdery Mildew and Phytophthora in strawberries. US registration for control of ***Pseudomonas syringae*** in berries, fruiting vegetables, leafy vegetables, stone fruit, tobacco and tree nuts and for control of Citrus Canker, Botrytis and **Citrus Blast** in citrus.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Diplodia Fruit Rot (*Lasiodiplodia theobromae*) **Priority: Low**							
Rated as a high priority in SA, and as a low priority in NSW, QLD and VIC. Diplodia Fruit Rot infections are rare and only symptoms only appear post-harvest. Practices used to combat other post-harvest infections will assist in protecting against Diplodia, including fruit handling procedures, hygiene and sanitation, fungicides and post-harvest refrigeration.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	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 Treatment	NR	A	ALL	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and **Diplodia Stem End Rot**. Apply as a dip or flood spray for 1 minute.	R3
Iodine	M	Protectant / Post Harvest Dip	NR	A	ALL	Registered in citrus as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Thiabendazole (Tecto)	1	Protectant / Post-Harvest Treatment	NR	A	QLD, NSW, VIC, SA & WA	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and **Stem End Rot** (*Phomopsis citri*). Apply as a dip treatment for a minimum of 30 seconds and fruit should not be rinsed.	-
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 ***Lasiodiplodia* spp.** in grapes and for control of Citrus Canker, Anthracnose, Greasy Spot, Alternaria Brown Spot, Melanose and Scab in citrus.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Rhizopus (*Rhizopus* spp.) **Priority: Low**							
Rated as a high priority in SA, and as a low priority in NSW, QLD and VIC. Rhizopus infections are rare and only symptoms only appear post-harvest. Practices used to combat other post-harvest infections will assist in protecting against Rhizopus, including fruit handling procedures, hygiene and sanitation, fungicides and post-harvest refrigeration.							
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	NR	A	ALL	Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	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	M	Protectant / Post Harvest Dip	NR	A	ALL	Registered in citrus as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Fludioxonil (Scholar)	12	Protectant / Post-Harvest Treatment	NR	P-A	ALL	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and Diplodia Stem End Rot.	R3
Thiabendazole (Tecto)	1	Protectant / Post-Harvest Treatment	NR	P-A	QLD, NSW, VIC, SA & WA	Registered in citrus as a post-harvest treatment for control of Blue Mould (*Penicillium italicum*), Green Mould (*Penicillium digitatum*) and Stem End Rot (*Phomopsis citri*).	-
Aureobasidium pullulans (Botector) Nufarm	BM 01	Biological	NR	P		Registered in grapes and berries for control of Botrytis and suppression of several other fungal pathogens (Anthracnose, Phomopsis and **Rhizopus**) in berries. US registration for control of ***Rhizopus* spp.** in berries.	-
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 ***Rhizopus* spp.** in grapes and for control of Anthracnose, Alternaria, Greasy Spot, Alternaria Brown Spot and Melanose in citrus.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
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 ***Rhizopus* spp.** in grapes, stone fruit and tree nuts and for control of Citrus Canker, Anthracnose, Greasy Spot, Alternaria Brown Spot, Melanose and Scab in citrus.	-
Fluxapyroxad + Pyraclostrobin (Merivon) BASF	7+11	Protectant & Curative		P		Hort Innovation project ST16006 generated data to support a label registration for control of Emperor Brown Spot in tangelos and Blossom Mould (*Botrytis cinerea*) in lemons.BASF submitted data to the APVMA in February 2022 for Merivon and a label extension pending approval, May 2023.	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Chitin Synthase Inhibitor		P		Registered for control of Grey Mould and Powdery Mildew in grapes and berries, and control of Powdery Mildew and Alternaria in Apples. Nufarm are planning a label extension to include use in fruiting vegetables, almonds, stone fruit and avocado.	-
Sooty Blotch (*Gloeodes pomigena*) **Priority: Low**							
Rated as a moderate priority in SA, and as a low priority in NSW, QLD and VIC. Sooty Blotch is a rind blemish which is mostly superficial. Good canopy management will reduce the incidence of infections.							
Copper as Copper Hydroxide, Tribasic Copper Sulphate, Copper Ammonium Acetate	M1	Protectant	1	A	ALL	Registered in citrus for control of Black Spot, Melanose, **Smoky Blotch (*Gloeodes pomigena*)** and Scab (lemons) (*Elsinoe fawcettii*). Apply at petal fall. Maximum number of applications not specified.	-
Copper as Copper Oxychloride	M1	Protectant	1	A	QLD & NT	Registered in citrus for control of Black Spot, Melanose, **Smoky Blotch (*Gloeodes pomigena*)** and Scab (lemons) (*Elsinoe fawcettii*). Apply at 50-75% petal fall and 6 and 12 weeks later. Maximum number of applications not specified.	-
Copper as Cuprous Oxide	M1	Protectant	1	A	ALL	Registered in citrus for control of Black Spot, Melanose, **Smoky Blotch** and Scab. Apply after 50-80% petal fall. Repeat after 6-8 weeks. Maximum number of applications not specified.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory Risk
Bacillus amyloliquefaciens (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered 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 **Sooty Blotch** in pome fruit and for control of Anthracnose, Alternaria, Greasy Spot, Alternaria Brown Spot and Melanose in citrus.	-

4.2 Insect and mite pests of citrus

4.2.1 Insect and mite pest priorities

Common name	Scientific name
High	
Citrus Gall Wasp	*Bruchophagus fellis*
Queensland Fruit Fly	*Bactrocera tryoni*
Light Brown Apple Moth	*Epiphyas postvittana*
Kelly's Citrus Thrips	*Pezothrips kellyanus*
Citrophilous Mealybug	*Pseudococcus calceolariae*
Long-tailed Mealybug	*Pseudococcus longispinus*
Red Scale	*Aonidiella aurantii*
Spined Citrus Bug	*Biprorulus bibax*
Kaytdids	*Caedicia simplex*
Moderate	
Mediterranean Fruit Fly	*Ceratitis capitata*
Loopers	*Chrysodeixis* spp.
Earwigs	Dermaptera
Fuller's Rose Weevil	*Asynonychus cervinus*
Citrus Rust Thrips	*Chaetanaphothrips orchidii*
Two Spotted Mite	*Tetranychus urticae*
Soft Brown Scale	*Coccus hesperidum*
Cottony Citrus Scale	*Pulvinaria polygonata*
Citrus Leafminer	*Phyllocnistis citrella*
Citrus Nematode	*Tylenchulus semipenetrans*
Snails	Gastropoda

Common name	Scientific name
Low	
Citrus Mealybug	*Planococcus citri*
Greenhouse Thrips	*Heliothrips haemorrhoidalis*
Ants	Formicidae
Australian Citrus Leafhopper	*Empoasca smithi*
Fruitpiercing Moth	*Eudocima salaminia*
Sorghum Head Caterpillar	*Cryptoblabes adoceta*
Orange Fruitborer	*Isotenes miserana*
Heliothis	*Helicoverpa* spp.
Large Citrus Butterfly	*Papilio aegeus*
Small Citrus Butterfly	*Papilio anactus*
Yellow Peach Moth	*Conogethes punctiferalis*
Fall Armyworm	*Spodoptera frugiperda*
Elephant Weevil	*Orthorhinus cylindrirostris*
Citrus Leafeating Weevil	*Eutinophaea bicristata*
Fruiteating Weevil	*Perperus angustibasis*
Broad Mite	*Polyphagotarsone-mus latus*
Brown Citrus Rust Mite	*Tegolophus australis*
Citrus Bud Mite	*Aceria sheldoni*
Citrus Flat Mite	*Panonychus citri*
Citrus Rust (Maori) Mite	*Phyllocoptruta oleivora*
Oriental Spider Mite	*Eutetranychus orientalis*
Black (Brown Olive) Scale	*Saissetia oleae*
Long Soft Scale	*Coccus longulus*
Citricola Scale	*Coccus pseudomagnoliarum*
Circular Black Scale	*Chrysomphalus aonidum*
Hemispherical Scale	*Saissetia coffeae*
Pink Wax Scale	*Ceroplastes rubens*
Purple (Mussel) Scale	*Lepidosaphes beckii*
White Louse Scale / Citrus Snow Scale	*Unaspis citri*
White Wax Scale	*Ceroplastes destructor*
Fruit Spotting Bugs	*Amblypelta* spp.
Bronze Orange Bug	*Musgraveia sulciventris*
Rutherglen Bug	*Nysius vinitor*
Black Citrus Aphid	*Toxoptera citricida*

The high priority insect pests identified by the survey were Citrus Gall Wasp, Queensland Fruit Fly, Light Brown Apple Moth, Kelly's Citrus Thrips, Citrophilous Mealybug, Longtail Mealybug, Red Scale, Spined Citrus Bug and Kaytdids. 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 citrus 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
Citrus Gall Wasp (*Bruchophagus fellis*) **Priority: High**								
Rated as a high priority in NSW, QLD, SA and VIC. Citrus Gall Wasp is reported as a widespread problem across different crop types, and most regions with the exception of North Queensland. The wasp infests young flush growth in spring, causing woody galls to form round the larvae. Affected trees lose vigour, which can result in reduced fruit size.								
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	A	ALL	Registered in citrus for control of **Gall Wasp**, Leafminer, Fullers Rose Weevil and California Red Scale. Apply through micro-irrigation 2 weeks after flowering (petal drop) has finished. Maximum number of applications not specified.	M Bee:VH	R2
Imidacloprid	4A	Contact & Ingestion	140	A	ALL	Registered in citrus for control of Black Citrus Aphid, Citrus Leafminer, Pink Wax Scale and Red Scale and suppression of **Citrus Gall Wasp**. Apply as a soil drench, or via micro-irrigation or drip irrigation. Apply during spring and summer at early gall wasp emergence. Maximum of 1 application per season.	M Bee:M	R2
Kaolin, Calcined (Surround WP)	-	Contact	NR	A	ALL	Registered in citrus for repellance of **Citrus Gall Wasp**. Apply to new growth prior to emergence of adult gall wasps. Apply at intervals of 7-10 days. Maximum number of applications not specified.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Queensland Fruit Fly (*Bactrocera tryoni*) **Mediterranean Fruit Fly** (*Ceratitis capitata*) **Priority: High**								
Queensland Fruit Fly is rated as a high priority in NSW, QLD, SA and VIC. Mediterranean Fruit Fly is rated as a high priority in SA, a moderate priority in VIC, and as a low priority in NSW and QLD. Fruit Fly lay eggs in ripening fruit, subsequently hatching maggots that cause feeding damage to the flesh. A range of control measures should be implemented in order to control the pest and avoid fruit damage. Top of mind pest for many because of protocols but comment made that it prefers many other types of fruit if they are around. Eg stone fruit, avocados.								
4-(P-Acetoxyphenyl) - 2-Butanone + Malathion	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
Abamectin	6	Contact	7	A	ALL	Registered in citrus for control of Brown Citrus Rust Mite (*Tegolophus australis*), Citrus Rust Mite (*Phyllocoptera oleivora*), Broad Mite (*Polyphagotars onemus latus*) and **Queensland Fruit Fly**. Apply when fruit fly activity is initially observed, in combination with a protein-based lure, in a 1m wide band spray to the tree skirt. Apply to one side of every row or second row of trees. Apply a maximum of 6 applications per season with a minimum retreatment interval of 7 days.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of **Mediterranean Fruit Fly** and **Queensland Fruit Fly**. Apply as part of a broader fruit fly management program when monitoring indicates fruit fly activity. Apply in rotation with insecticides from a different mode of action using a 7 day interval. Maximum of 2 applications per season.	M Bee:M	R2
Dimethoate	1B	Contact	7	A	QLD, NSW, VIC & WA	Registered in citrus (except Meyer lemons, Seville oranges and cumquats) for control of **Queensland Fruit Fly**. Apply as 2 cover sprays 2 weeks apart, 7 weeks and 5 weeks before harvest. If harvesting is delayed a third spray may be required. In WA only, apply at about 6 weeks before fruit ripens and reapply at fortnightly intervals. The last application should be one week before fruit ripens.	H Bee:H	R1
					WA & VIC	Registered in citrus (except Meyer lemons, Seville oranges and cumquats) for control of **Mediterranean Fruit Fly**. Apply as 2 cover sprays 2 weeks apart, 7 weeks and 5 weeks before harvest. If harvesting is delayed a third spray may be required. In WA only, apply at about 6 weeks before fruit ripens and reapply at fortnightly intervals. The last application should be one week before fruit ripens.		

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Dimethoate PER87164	1B	Contact	NR	A	ALL	Permitted in citrus (excluding edible skin species) as a post-harvest treatment for control of **Queensland Fruit Fly (*Bactrocera tryoni*)**, Lesser Queensland Fruit Fly (*Bactrocera neohumeralis*), Northern Territory or Darwin Fruit Fly (*Bactrocera aquilonis*) and **Mediterranean Fly (*Ceratitis capitata*)**. Do not use on fruit that has received a pre-harvest treatment with dimethoate. Apply as a post-harvest dip for 1 minute or floodspray for a minimum of 10 seconds after which fruit must remain wet for not less than 60 seconds.	H Bee:H	R1
Dimethoate PER13859	1B	Contact	NR	A	ALL	Permitted in non-bearing fruit fly host crops for control of **Fruit Fly**. Apply as a foliar and/or ground cover spray to both fallen and retained fruit after final harvest. Do not use more than 2 applications per season.	H Bee:H	R1
Maldison (Fyfanon)	1B	Contact / Bait	3	A	ALL	Registered in fruit trees for control of all **Fruit Fly** species excluding Mediterranean Fruit Fly. Mix with a protein lure and apply to the foliage, starting 6 weeks before normal ripening of the tree and repeat at 4-10 day intervals while fruit remains on the tree. Avoid contact of the bait with the fruit. Treatments per season not limited.	H Bee:H	R3
Spinosad (Naturalure) Corteva	5	Ingestion	NR	A	ALL	Registered in tree crops as a bait application for the control of **Queensland Fruit Fly** and **Mediterranean Fruit Fly**. Apply as a band or a spot spray every 7 days. Maximum number of applications not specified.	L Bee:L	-
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	P-A	ALL	Registered in citrus for control of Gall Wasp, Leafminer, Fullers Rose Weevil and California Red Scale. Registered in pome fruit, persimmons, stone fruit and table grapes for control of **Queensland Fruit Fly** and **Mediterranean Fruit Fly**.	M Bee:VH	R2
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of **Queensland Fruit Fly** in stone fruit.	M Bee:M	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 for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. Possible activity against **Fruit Fly**.	L Bee:L	-
Etofenprox (Trebon) Sipcam	3A	Contact		P		Registered for control of **Queensland Fruit Fly** and **Mediterranean Fruit Fly** in stone fruit.	VH Bee:H	-
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of **Mediterranean Fruit Fly (*Ceratitis capitata*)** in stone fruit.	L-M Bee:VH	-
Light Brown Apple Moth (*Epiphyas postvittana*) **Priority: High**								
Rated as a high priority in NSW and VIC, a moderate priority in SA, and as a low priority in QLD. Light Brown Apple Moth causes fruit drop and a halo type scar around the stem end of the fruit. Regular monitoring and an integrated approach including preserving beneficial species, mating disruption and good orchard hygiene should be used to reduce damage in orchards.								
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, **Light Brown Apple Moth**, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly. Apply from early post-flowering when numbers exceed economic thresholds. Do not apply consecutive applications and ensure a minimum interval of 8 weeks between applications. Maximum of 2 applications per season.	M Bee:M	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Bacillus thuringiensis subsp Kurstaki Strain HD-1	11	Ingestion	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	3	A	ALL	Registered in oranges & lemons for control of Bronze Orange Bug, Citrus Leaf-Eating Weevil, **Light Brown Apple Moth**, Orange Fruit Borer, Spined Citrus Bug, Yellow Peach Moth, Fullers Rose Weevil, White Wax Scale and Pink Wax Scale. Apply at first sign of pest activity and repeat at intervals of 2 weeks or as necessary. Maximum number of applications not specified.	H Bee:H	R3
Cyantraniliprole (Exirel) FMC	28	Ingestion	NR NG	A	ALL	Registered in citrus for control of Kelly's Citrus Thrips (*Pezothrips kellyanus*), **Light Brown Apple Moth (*Epiphyas postvittana*)** and Fullers Rose Weevil (*Asynonychus cervinus*). Apply after flowering once local pest thresholds are reached. Maximum of 2 applications per season.	M Bee:VH	-
E-11-tetradecen-1-yl acetate + E-9-E-11-tretradecadien-1yl acetate (Splat LBAM Mating Distruption)	-	Mating Disruption	NR	A	ALL	Registered in orchards for mating disruption of **Light Brown Apple Moth (*Epiphyas postvittana*)**. Apply early in the season, prior to or at the first sign of male flight. Reapply as needed based on pheromone bait traps to monitor infestation levels.	VL Bee:VL	-
Ethyl Formate	-	Fumigant	-	A	ALL	Registered as a post-harvest treatment in citrus for control of **Light Brown Apple Moth (*Epiphyas postvittana*)**, Fullers Rose Weevil (*Asynonychus cervinus*), California Red Scale (*Aonidiella aurantii*), Bean Thrips (*Caliothrips fasciatus*), Longtailed Mealybug (*Pseudococcus longispinus*) and Citrus Mealybug (*Planococcus citri*).	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Methoxyfenozide (Prodigy) Corteva	18	Ingestion	1 NG	A	ALL	Registered in citrus for control of **Light Brown Apple Moth**. Apply when eggs and very small larvae are first seen in flower clusters or developing fruitlets. A second spray may be required 2-3 weeks later if larvae hatch over an extended period.	VL Bee:VL	-
Spinetoram (Delegate) Corteva	5	Ingestion	1 NG	A	ALL	Registered in citrus for control of Citrus Leafminer, **Light Brown Apple Moth** and Helicoverpa (Corn Earworm & Native Budworm). Target sprays against mature eggs and newly hatched larvae. Maximum of 4 applications per season.	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR G:14	A	ALL	Registered in citrus for control of Citrus Leafminer, **Light Brown Apple Moth** and Helicoverpa (Corn Earworm & Native Budworm). Target sprays against mature eggs and newly hatched larvae. Maximum of 4 applications per season.	L Bee:L	-
Tebufenozide (Mimic)	18	Ingestion	1	A	ALL	Registered in citrus for control of **Light Brown Apple Moth**. Apply when 1st to 3rd instar larvae are first seen in flower clusters or developing fruitlets. A second spray may be required 2-3 weeks later if larvae hatch over an extended period.	L Bee:L	-
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of **Light Brown Apple Moth** in apples, pears and stone fruit.	M Bee:M	R2
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Application submitted for registration of broflanilide (Cimegra) for control of various insects including Diamond Back Moth, Cabbage White Butterfly and Western Flower Thrips in brassica and leafy vegetables.	-	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of **Light Brown Apple Moth (*Epiphyas postvittana*)** in celery, blueberries, *Rubus* spp., pome fruit, stone fruit and grapes.	L Bee:H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of **Light Brown Apple Moth** in pome fruit.	L-M Bee:VH	-
Kelly's Citrus Thrips (*Pezothrips kellyanus*) **Priority: High**								
Rated as a high priority in NSW, SA and VIC, and as a low priority in QLD. Sporadic pest that are predominantly an issue in the Riverland / Sunraysia growing regions. They feed on young and mature fruit causing scurfing and rind blemish respectively. These blemishes downgrade fruit quality and reduce the pack-out of export quality fruit. Regular monitoring and timely and judicious use of insecticides is required to control Kelly's Citrus Thrips.								
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, **Kelly's Citrus Thrips**, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly. After flowering has finished, apply when local thresholds are reached, typically just prior to calyx closure. Do not use consecutive applications. Maximum of 2 applications per season.	M Bee:M	R2
Cyantraniliprole (Exirel) FMC	28	Ingestion	NR NG	A	ALL	Registered in citrus for control of **Kelly's Citrus Thrips (*Pezothrips kellyanus*)**, Light Brown Apple Moth (*Epiphyas postvittana*) and Fullers Rose Weevil (*Asynonychus cervinus*). Apply after flowering once local pest thresholds are reached. Maximum of 2 applications per season.	M Bee:VH	-
Dimethoate	1B	Contact	7	A	ALL	Registered in citrus (except Meyer lemons, Seville oranges and cumquats) for control of Aphids, **Thrips** and Wingless Grasshopper. Apply when pests appear. Maximum number of applications not specified.	H Bee:H	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit trees for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, **Thrips** and Leafhopper. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. Number of treatments not specified.	VH Bee:H	-
Potassium Salts of Fatty Acid (Natrasoap)	UNE	Contact	NR	A	ALL	Registered in fruit trees for control of Aphids, **Thrips**, Mealybug, Two Spotted Mites, Spider Mite, and Whitefly. Do not use during the hot part of the day. Use a retreatment interval of 5-7 days. Maximum number of applications not specified.	L Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	21	A	ALL	Registered in citrus for control of Red Scale, Mussel Scale, White Louse Scale (Citrus Snow Scale), Soft Brown Scale, Pink Wax Scale and **Kelly's Citrus Thrips**, and suppression of Citrus Mealybug. Apply after flowering once local thresholds are reached. Where thrips pressure is moderate to high apply a second application, no less than 14 days after the first, and prior to calyx closure.	M Bee:VL	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, **Kelly's Citrus Thrips**, Fruit Spotting Bug and Banana Spotting Bug. Monitor crops from flowering onwards and commence applications once local pest thresholds are reached. Maximum of 2 applications per season with a re-treatment interval of 14 days.	M Bee:H	-
Thiamethoxam (Actara)	4A	Contact & Ingestion	49	A	ALL	Registered in citrus for control of **Kelly's Citrus Thrips (*Pezothrips kellyanus*)**. Apply as a foliar application when thrips larvae incidence is >5% fruit infested, typically just prior to calyx closure. Do not make consecutive applications and do not use more than 2 applications per season.	M Bee:VH	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Abamectin	6	Contact	7	P-A	ALL	Registered in citrus for control of Brown Citrus Rust Mite (*Tegolophus australis*), Citrus Rust Mite (*Phyllocoptera oleivora*), Broad Mite (*Polyphagotars onemus latus*) and Queensland Fruit Fly. Registered in adzuki beans, mung beans and navy beans for control of Onion Thrips.	M Bee:H	-
Spinetoram (Delegate) Corteva	5	Ingestion	1 NG	P-A	ALL	Registered in citrus for control of Citrus Leafminer, Light Brown Apple Moth and Helicoverpa (Corn Earworm & Native Budworm). Registered for control of Western Flower Thrips in pome fruit and stone fruit.	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR G:14	P-A	ALL	Registered in citrus for control of Citrus Leafminer, Light Brown Apple Moth and Helicoverpa (Corn Earworm & Native Budworm). Registered for control of Banana Rust Thrips in bananas, and the control of Western Flower Thrips in brassica vegetables, cucurbits, fruiting vegetables, leafy vegetables, legume vegetables, ornamentals, berries, pome fruit and stone fruit, and control of Red-Banded Thrips in tropical & sub-tropical fruit (inedible peel).	L Bee:L	-
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of Plague Thrips in apples.	M Bee:M	R2
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	P		Registered for suppression of Western Flower Thrips in protected vegetables.	L Bee:L	-
Clitoria ternatea Extract (Sero-X) Growth Agriculture	-	Biological		P		Registered in cotton for control of *Helicoverpa* spp., Green Mirids and Silverleaf Whitefly and in brassica leafy vegetables for control of Diamondback Moth. Label extension has been submitted seeking to add new uses for control of Silverleaf Whitefly and **Thrips** in brassicas and cucurbits.	L Bee VL	-
Dimpropyridaz (Axalion) BASF	7			P		New active in development with BASF to control Whitefly, Aphid and **Thrips** in leafy vegetables, brassica vegetables, fruiting vegetables and cucurbits.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Scirtothrips in macadamias.	L Bee:L	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, **Thrips** and Helicoverpa in fruiting vegetables.	-	-
Citrophilous Mealybug (*Pseudococcus calceolariae*) **Longtail Mealybug** (*Pseudococcus longispinus*) **Citrus Mealybug** (*Planococcus citri*) **Priority: High**								
Citrophilous Mealybug and Longtail Mealybug are rated as a high priority in NSW, SA and VIC, and as a low priority in QLD. Citrus Mealybug is rated as a high priority in QLD, a moderate priority in VIC, and as a low priority in NSW and SA. Mealybugs are a widespread issue. They come in late season when the trees are bushy and are usually induced through use of broad-spectrum chemistry used for control of other pests. If you don't control ants, then you get problems with mealybug. The honeydew produced by mealybugs encourages Sooty Mould growth, which downgrades fruit quality and can impact on tree health in severe cases.								
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, **Citrus Mealybug**, **Longtailed Mealybug**, **Citrophilus Mealybug**, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly. Apply post-flowering when monitoring indicates the onset of crawler release. After initial application, apply an insecticide with an alternate mode-of-action if required but no less than 21 days later. Maximum of 2 applications per season.	M Bee:M	R2
Buprofezin (Applaud)	16	Ingestion	28	A	ALL	Registered in citrus for control of Red Scale, White Louse Scale, Longtail Mealybug, Citrus Mealybug, **Citrophilous Mealybug** and Jassids (Leafhoppers). Apply if thresholds are exceeded in spring-summer, repeat after 21-28 days if necessary. Maximum 2 applications per season.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Ethyl Formate	-	Fumigant	-	A	ALL	Registered as a post-harvest treatment in citrus for control of Light Brown Apple Moth (*Epiphyas postvittana*), Fullers Rose Weevil (*Asynonychus cervinus*), California Red Scale (*Aonidiella aurantii*), Bean Thrips (*Caliothrips fasciatus*), **Longtailed Mealybug (*Pseudococcus longispinus*)** and **Citrus Mealybug (*Planococcus citri*)**.	-	-
Potassium Salts of Fatty Acid (Natrasoap)	UNE	Contact	NR	A	ALL	Registered in fruit trees for control of Aphids, Thrips, **Mealybug**, Two Spotted Mites, Spider Mite, and Whitefly. Do not use during the hot part of the day. Use a retreatment interval of 5-7 days. Maximum number of applications not specified.	L Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	21	A	ALL	Registered in citrus for control of Red Scale, Mussel Scale, White Louse Scale (Citrus Snow Scale), Soft Brown Scale, Pink Wax Scale and Kelly's Citrus Thrips, and suppression of **Citrus Mealybug**. Commence applications after flowering at the onset of crawler emergence or when pest numbers reach economic threshold. Apply a second application 21-35 days after the first application if required. Maximum of 3 applications per season and no more than 2 applications within 90 days of harvest.	M Bee:VL	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in citrus for control of **Citrophilous Mealybug**, **Citrus Mealybug**, **Longtailed Mealybug**, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, Kelly's Citrus Thrips, Fruit Spotting Bug and Banana Spotting Bug. Apply as part of a programme targeting crawlers when they are exposed and before they are protected under the fruit calyces or established between touching fruit. Maximum of 2 applications per season with a re-treatment interval of 14-21 days.	M Bee:H	-
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	P-A	ALL	Registered in citrus for control of Gall Wasp, Leafminer, Fullers Rose Weevil and California Red Scale. Registered for control of **Mealybug** in apples, pears, table grapes and wine grapes.	M Bee:VH	R2

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 citrus for control of Citrus Leafminer, Red Scale, White Wax Scale, Pink Wax Scale, Circular Black Scale, Black Scale, Soft Brown Scale, Broad Mite, Brown Citrus Rust Mite, Citrus Red Mite and Citrus Rust Mite. Registered for control of **Mealybug** in grapes.	L Bee:L	-
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of **Longtailed Mealybug** in apples and pears.	M Bee:M	R2
Flonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of **Mealybug** in apples and pears.	M Bee:VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of **Mealybug** in citrus 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
Red Scale (*Aonidiella aurantii*) **Priority: High**								
Rated as a high priority in NSW, QLD, SA and VIC. Red Scale infests leaves, fruits, twigs and limbs of all citrus varieties. Severe infestations will impact on general tree health and can cause fruit quality problems. An integrated management approach is effective and should incorporate the reduction of dust in the orchard, preservation of parasitoid species and the timely and judicious use of insecticides. Ant control is important because they often defend scale insects from predators and parasites.								
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, **Red Scale**, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly. Apply post-flowering when monitoring indicates the onset of crawler release. After initial application, apply an insecticide with an alternate mode-of-action if required but no less than 21 days later. Maximum of 2 applications per season.	M Bee:M	R2
Buprofezin (Applaud)	16	Ingestion	28	A	ALL	Registered in citrus for control of **Red Scale**, White Louse Scale, Longtail Mealybug, Citrus Mealybug, Citrophilous Mealybug and Jassids (Leafhoppers). Apply when there is heavy crawler emergence, particularly in summer. Where the infestation is severe, a second application may be required 14-28 days later. Maximum 2 applications per season.	L Bee:L	-
Chlorpyrifos	1B	Contact	14	A	ALL (excl. TAS)	Registered in citrus for control of **California Red Scale (*Aonidiella aurantii*)**. Apply during November-March. Two applications may be necessary under conditions of heavy scale infestation. Maximum number of applications and re-treatment interval not specified.	H Bee:H	R1
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	A	ALL	Registered in citrus for control of Gall Wasp, Leafminer, Fullers Rose Weevil and **California Red Scale**. Apply through micro-irrigation 2 weeks after flowering (petal drop) has finished. Maximum number of applications not specified.	M Bee:VH	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Ethyl Formate	-	Fumigant	-	A	ALL	Registered as a post-harvest treatment in citrus for control of Light Brown Apple Moth (*Epiphyas postvittana*), Fullers Rose Weevil (*Asynonychus cervinus*), **California Red Scale (*Aonidiella aurantii*)**, Bean Thrips (*Caliothrips fasciatus*), Longtailed Mealybug (*Pseudococcus longispinus*) and Citrus Mealybug (*Planococcus citri*).	-	-
Imidacloprid	4A	Contact & Ingestion	140	A	ALL	Registered in citrus for control of Black Citrus Aphid, Citrus Leafminer, Pink Wax Scale and **Red Scale** and suppression of Citrus Gall Wasp. Apply as a soil drench, or via micro-irrigation or drip irrigation. Apply during late spring to early summer, after main flowering has finished and prior to or at the onset of crawler emergence.	M Bee:M	R2
Petroleum Oil	-	Contact	1	A	ALL	Registered in citrus for control of Citrus Leafminer, **Red Scale**, White Wax Scale, Pink Wax Scale, Circular Black Scale, Black Scale, Soft Brown Scale, Broad Mite, Brown Citrus Rust Mite, Citrus Red Mite and Citrus Rust Mite. Apply between November and March, using up to 2 applications if required.	L Bee:L	-
Pyriproxyfen (Admiral)	7C	Ingestion	7	A	QLD	Registered in citrus for control of **Red Scale (*Aonidiella aurantii*)** and Black Scale (*Saissetia oleae*). Apply at the time of crawler release. Maximum 2 applications per season. Re-treatment interval not specified.	VL Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	21	A	ALL	Registered in citrus for control of **Red Scale**, Mussel Scale, White Louse Scale (Citrus Snow Scale), Soft Brown Scale, Pink Wax Scale and Kelly's Citrus Thrips, and suppression of Citrus Mealybug. Commence applications after flowering at the onset of crawler emergence or when pest numbers reach economic threshold. Apply a second application 21-35 days after the first application if required. Maximum of 3 applications per season with no more than 2 applications within 90 days of harvest.	M Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, **Red Scale**, Kelly's Citrus Thrips, Fruit Spotting Bug and Banana Spotting Bug. Monitor crops from flowering onwards and commence applications once local pest thresholds are reached. Maximum of 2 applications per season with a re-treatment interval of 14 days.	M Bee:H	-
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of San Jose Scale in apples, pears and stonefruit.	M Bee:M	R2
Fenoxycarb (Insegar) Syngenta	7B	Contact & Ingestion		P		Registered for control of **Scale** in apples, pears and olives.	L Bee:VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of **Scale Insects** in citrus, pome fruit and stone fruit.	L Bee:L	-
Spined Citrus Bug (*Biprorulus bibax*) **Priority: High**								
Rated as a high priority in NSW, and as a moderate priority in QLD, SA and VIC. Sporadic pest that causes direct feeding damage to fruits, mainly in lemons and mandarins but has also been reported in oranges. Regular monitoring and an integrated management approach is effective and should incorporate preservation of parasitoid and other beneficial species and the timely and judicious use of insecticides.								
Carbaryl	1A	Contact	3	A	ALL	Registered in oranges & lemons for control of Bronze Orange Bug, Citrus Leaf-Eating Weevil, Light Brown Apple Moth, Orange Fruit Borer, **Spined Citrus Bug**, Yellow Peach Moth, Fullers Rose Weevil, White Wax Scale and Pink Wax Scale. Apply at first sign of pest activity and repeat at intervals of 2 weeks or as necessary. Maximum number of applications not specified.	H Bee:H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Diazinon	1B	Contact	14	A	NSW, ACT & WA	Registered in citrus for control of **Spined Citrus Bug**. Thoroughly wet bugs. Do not spray fruit less than 2.5 cm diameter to avoid possible blemish. Maximum number of applications and re-treatment interval not specified.	H Bee:H	R3
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	P-A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly.	M Bee:M	R2
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, Kelly's Citrus Thrips, Fruit Spotting Bug and Banana Spotting Bug.	M Bee:H	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Fruit Spotting Bug in macadamias, avocados, mangoes and papaya.	L Bee:L	-
Kaytdids (*Caedicia simplex*) **Priority: High**								
Rated as a high priority in NSW, SA and VIC, and as a low priority in QLD. A pest of southern citrus regions only, it will infest all types of citrus. Nymphs and adults feed on flowers, leaves and fruits up to 30mm diameter. Feeding on fruits results in deep chalk-like scars on the fruit surface and fruit drop. Damage is more common in oranges than other citrus varieties.								
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of **Katydid** nymphs in citrus.	L Bee:L	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of **Inland Katydid** in stone fruit and grapes.	L Bee:H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Loopers (*Chrysodeixis* spp.) **Priority: Moderate**								
Rated as a high priority in SA and VIC, a moderate priority in NSW, and as a low priority in QLD. Loopers are voracious foliage feeders, and they will rarely attack flowers and fruit. Regular monitoring and an integrated management approach including preservation of beneficial species and timely and judicious application of insecticides should be used.								
Bacillus thuringiensis subsp Kurstaki Strain HD-1	11	Ingestion	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	-
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. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. Number of treatments not specified.	VH Bee:H	-
Cyantraniliprole (Exirel) FMC	28	Ingestion	NR NG	P-A	ALL	Registered in citrus for control of Kelly's Citrus Thrips, Light Brown Apple Moth and Fullers Rose Weevil. Registered for control of Soybean Looper in forage brassicas.	M Bee:VH	-
Methoxyfenozide (Prodigy) Corteva	18	Ingestion	1 NG	P-A	ALL	Registered in citrus for control of Light Brown Apple Moth. Registered for control of **Loopers** in apples and pears.	VL Bee:VL	-
Spinetoram (Delegate) Corteva	5	Ingestion	1 NG	P-A	ALL	Registered in citrus for control of Citrus Leafminer, Light Brown Apple Moth and Helicoverpa (Corn Earworm & Native Budworm). Registered for control of **Loopers** in pome fruit.	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR G:14	P-A	ALL	Registered in citrus for control of Citrus Leafminer, Light Brown Apple Moth and Helicoverpa (Corn Earworm & Native Budworm). Registered for control of **Loopers** in brassica vegetables, herbs, leafy vegetables, legume vegetables, root & tuber vegetables, avocado, berries, pome fruit and tropical & sub-tropical fruit (inedible peel).	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Application submitted for registration of broflanilide (Cimegra) for control of various insects including Diamond Back Moth, Cabbage White Butterfly and Western Flower Thrips in brassica and leafy vegetables.	-	-
Clitoria ternatea Extract (Sero-X) Growth Agriculture	-	Biological		P		Registered in cotton for control of *Helicoverpa* spp., Green Mirids and Silverleaf Whitefly and in brassica leafy vegetables for control of Diamondback Moth. Label extension has been submitted seeking to add new uses for control of Silverleaf Whitefly and Thrips in brassicas and cucurbits.	L Bee VL	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of **Soybean Looper** in fruiting vegetables.	L Bee:H	R3
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of Carob Moth in almonds, Light Brown Apple Moth in pome fruit and Oriental Fruit Moth in stone fruit. Canadian registration for suppression of Cabbage Looper in leafy vegetables and brassica vegetables.	L-M Bee:VH	-
Earwigs (Dermaptera) **Priority: Moderate**								
Rated as a high priority in VIC, a moderate priority in SA, and as a low priority in NSW and QLD. Nymphs and adults will climb trees and feed on flower buds, leaves and fruit during spring flush months. They can cause significant damage to young trees by feeding on new leaves. The main damage caused in fruit-bearing trees occurs in the first month after petal fall, which is the critical period to monitor and treat for the pest if required.								
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. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. Number of treatments not specified.	VH Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Application submitted for registration of broflanilide (Cimegra) for control of various insects including Diamond Back Moth, Cabbage White Butterfly and Western Flower Thrips in brassica and leafy vegetables.	-	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of **Earwigs** in stone fruit and strawberries.	L Bee:H	R3
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of various Beetles/Weevils, Fruit Fly and Caterpillars in almonds, macadamia, pome fruit and stone fruit.	L-M Bee:VH	-
Fuller's Rose Weevil (*Asynonychus cervinus*) **Priority: Moderate**								
Rated as a moderate priority in NSW, SA and VIC, and as a low priority in QLD. The presence of Fuller's Rose Weevil eggs on fruit is a major quarantine pest of concern for many Asian markets. The months just prior to harvest are the highest risk for infestation, but the pest needs to be managed on a year-round basis. Control measures require a multi-strategy approach based on orchard hygiene, skirting and weed control, as well as chemical control which is mandatory for quarantine-sensitive export markets.								
Carbaryl	1A	Contact	3	A	ALL	Registered in oranges & lemons for control of Bronze Orange Bug, Citrus Leaf-Eating Weevil, Light Brown Apple Moth, Orange Fruit Borer, Spined Citrus Bug, Yellow Peach Moth, **Fullers Rose Weevil**, White Wax Scale and Pink Wax Scale. Apply at first sign of pest activity and repeat at intervals of 2 weeks or as necessary. Maximum number of applications not specified.	H Bee:H	R3
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	A	ALL	Registered in citrus for control of Gall Wasp, Leafminer, **Fullers Rose Weevil** and California Red Scale. Apply through micro-irrigation 2 weeks after flowering (petal drop) has finished. Maximum number of applications not specified.	M Bee:VH	R2
Cyantraniliprole (Exirel) FMC	28	Ingestion	NR NG	A	ALL	Registered in citrus for control of Kelly's Citrus Thrips (*Pezothrips kellyanus*), Light Brown Apple Moth (*Epiphyas postvittana*) and **Fullers Rose Weevil (*Asynonychus cervinus*)**. Apply after flowering once local pest thresholds are reached. Maximum of 2 applications per season.	M Bee:VH	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Ethyl Formate	-	Fumigant	-	A	ALL	Registered as a post-harvest treatment in citrus for control of Light Brown Apple Moth (*Epiphyas postvittana*), **Fullers Rose Weevil (*Asynonychus cervinus*)**, California Red Scale (*Aonidiella aurantii*), Bean Thrips (*Caliothrips fasciatus*), Longtailed Mealybug (*Pseudococcus longispinus*) and Citrus Mealybug (*Planococcus citri*).	-	-
Gamma Cyhalothrin (Trojan) FMC	3A	Contact	28	A	ALL	Registered in oranges & lemons for control of **Fullers Rose Weevil (*Asynonychus cervinus*)**. Trees must be treated in the early stages of the adult weevils emerging from the ground. Appy spray solution to the tree trunk at about 300mm from the ground in a 100mm band. Maximum number of applications not specified.	VH Bee:H	-
Lambda-Cyhalothrin (Karate Zeon)	3A	Contact	28	A	ALL	Registered in citrus for control of **Fullers Rose Weevil (*Asynonychus cervinus*)**. Trees must be treated in the early stages of the adult weevils emerging from the ground. Appy spray solution to the tree trunk at about 300mm from the ground in a 100mm band. Maximum number of applications not specified.	VH Bee:H	-
Imidacloprid	4A	Contact & Ingestion	140	P-A	ALL	Registered in citrus for control of Black Citrus Aphid, Citrus Leafminer, Pink Wax Scale and Red Scale and suppression of Citrus Gall Wasp. Registered for control of Banana Weevil Borer in bananas.	M Bee:M	R2
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of **Fuller's Rose Weevil** in pome fruit and stone fruit.	L Bee:H	R3
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of Sigastus Weevil in macadamia, Apple Weevil, **Fuller's Rose Weevil** and Garden Weevil in pome fruit and stone fruit.	L-M Bee:VH	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Citrus Rust Thrips (*Chaetanaphothrips orchidii*) **Greenhouse Thrips** (*Heliothrips haemorrhoidalis*) **Priority: Moderate**								
Citrus Rust Thrips are rated as a moderate priority in QLD, SA and VIC, and as a low priority in NSW. Greenhouse Thrips are rated as a low priority in NSW, QLD, SA and VIC. Thrips feed on young and mature fruit causing scurfing and rind blemish respectively. These blemishes downgrade fruit quality and reduce the pack-out of export quality fruit. Regular monitoring and timely and judicious use of insecticides is required to control thrips.								
Dimethoate	1B	Contact	7	A	ALL	Registered in citrus (except Meyer lemons, Seville oranges and cumquats) for control of Aphids, **Thrips** and Wingless Grasshopper. Apply when pests appear. Maximum number of applications not specified.	H Bee:H	R1
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. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. Number of treatments 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. Apply as a cover spray. Number of treatments not specified.	L Bee:L	-
Abamectin	6	Contact	7	P-A	ALL	Registered in citrus for control of Brown Citrus Rust Mite (*Tegolophus australis*), Citrus Rust Mite (*Phyllocoptera oleivora*), Broad Mite (*Polyphagotars onemus latus*) and Queensland Fruit Fly. Registered in adzuki beans, mung beans and navy beans for control of Onion Thrips.	M Bee:H	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	P-A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly	M Bee:M	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Cyantraniliprole (Exirel) FMC	28	Ingestion	NR NG	P-A	ALL	Registered in citrus for control of Kelly's Citrus Thrips, Light Brown Apple Moth and Fullers Rose Weevil.	M Bee:VH	-
Spinetoram (Delegate) Corteva	5	Ingestion	1 NG	P-A	ALL	Registered in citrus for control of Citrus Leafminer, Light Brown Apple Moth and Helicoverpa (Corn Earworm & Native Budworm). Registered for control of Western Flower Thrips in pome fruit and stone fruit.	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR G:14	P-A	ALL	Registered in citrus for control of Citrus Leafminer, Light Brown Apple Moth and Helicoverpa (Corn Earworm & Native Budworm). Registered for control of various **Thrips** in banana, brassica vegetables, cucurbits, fruiting vegetables, leafy vegetables, legume vegetables, ornamentals, berries, pome fruit, stone fruit and tropical & sub-tropical fruit (inedible peel).	L Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	21	P-A	ALL	Registered in citrus for control of Red Scale, Mussel Scale, White Louse Scale (Citrus Snow Scale), Soft Brown Scale, Pink Wax Scale and Kelly's Citrus Thrips, and suppression of Citrus Mealybug.	M Bee:VL	-
Thiamethoxam (Actara)	4A	Contact & Ingestion	49	P-A	ALL	Registered in citrus for control of Kelly's Citrus Thrips.	M Bee:VH	R2
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of Plague Thrips in apples.	M Bee:M	R2
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	P		Registered for suppression of Western Flower Thrips in protected vegetables.	L Bee:L	-
Clitoria ternatea Extract (Sero-X) Growth Agriculture	-	Biological		P		Registered in cotton for control of *Helicoverpa* spp., Green Mirids and Silverleaf Whitefly and in brassica leafy vegetables for control of Diamondback Moth. Label extension has been submitted seeking to add new uses for control of Silverleaf Whitefly and **Thrips** in brassicas and cucurbits.	L Bee VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Dimpropyridaz (Axalion) BASF	7			P		New active in development with BASF to control Whitefly, Aphid and **Thrips** in leafy vegetables, brassica vegetables, fruiting vegetables and cucurbits.	-	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Scirtothrips in macadamias.	L Bee:L	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, **Thrips** and Helicoverpa in fruiting vegetables.	-	-
Two Spotted Mite (*Tetranychus urticae*) **Priority: Moderate**								
Rated as a moderate priority in NSW, QLD, SA and VIC. Mites damage the tree by causing leaves to turn brown and fall, leading to reduced yield and fruit quality. Management options include reducing dust in the orchard, promotion or introduction of predatory mites and judicious use of miticides while maintaining beneficial populations.								
Cyflumetofen (Danisaraba) BASF	25A	Contact	NR NG	A	ALL	Registered in citrus for control of **Two Spotted Mite (*Tetranychus urticae*)**, Citrus Red Mite (*Panonychus citri*) and Oriental Spider Mite (*Euteranychus orientalis*). Maximum of 2 applications per season, with a re-treatment interval of 14 days.	L Bee:L	-
Potassium Salts of Fatty Acid (Natrasoap)	UNE	Contact	NR	A	ALL	Registered in fruit trees for control of Aphids, Thrips, Mealybug, **Two Spotted Mites**, Spider Mite, and Whitefly. Do not use during the hot part of the day. Use a retreatment interval of 5-7 days. Maximum number of applications not specified.	L Bee:L	-
Abamectin	6	Contact	7	P-A	ALL	Registered in citrus for control of Brown Citrus Rust Mite (*Tegolophus australis*), Citrus Rust Mite (*Phyllocoptera oleivora*), Broad Mite (*Polyphagotars onemus latus*) and Queensland Fruit Fly.	M Bee:H	-
Etoxazole (Paramite)	10B	IGR / Contact	7 NG	P-A	ALL	Registered in citrus for control of Oriental Spider Mite (*Euteranychus orientalis*).	L Bee:VL	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Fenbutatin Oxide (Torque)	12B	Contact	7	P-A	ALL	Registered in citrus for control of Citrus Rust Mite (*Phyllocoptruta oleivora*), Brown Citrus Rust Mite (*Tegolophus australis*) and Citrus Bud Mite (*Eriophyes sheldoni*).	L Bee:L	R2
Mancozeb	M3	Contact	NR	P-A	ALL	Registered in citrus for control of Citrus Rust Mite, Brown Citrus Mite and Citrus Bud Mite.	H Bee:H	R2
Petroleum Oil	-	Contact	1	P-A	ALL	Registered in citrus for control of Citrus Leafminer, Red Scale, White Wax Scale, Pink Wax Scale, Circular Black Scale, Black Scale, Soft Brown Scale, Broad Mite, Brown Citrus Rust Mite, Citrus Red Mite and Citrus Rust Mite.	L Bee:L	-
Propineb (Antracol)	M3	Contact	7	P-A	NSW, VIC, SA, WA & QLD	Registered in citrus for control of Citrus Rust Mite.	H Bee:H	R2
Sulfur	M2	Contact	NR	P-A	NSW, VIC, QLD, SA & WA	Registered in citrus for control of Citrus Rust Mite, Brown Citrus Rust Mite and Bud Mite.	L Bee:L	-
Zineb	M3	Contact	7	P-A	NSW & QLD	Registered in citrus for control of Brown Citrus Rust Mite and Citrus Rust Mite	H Bee:H	R2
Spiromesifen (Oberon) Bayer	23	Ingestion		P		Hort Innovation project ST18001 is generating data to support a new Australian label registration for control of various mites in citrus.	M Bee:VL	-
Acequinocyl (Kanemite) UPL	20B	Contact & Ingestion		P		Registered for control of **Two Spotted Mites** in pome fruit and stone fruit. US registration for the control of *Tetranychi* and *Brevipalpid* mites.	L Bee:L	-
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	P		Registered for suppression of **Two Spotted Mite** in protected vegetables.	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		First global application is proposed for 2023 for Thrips, Bugs, **Mites** and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
Soft Brown Scale (*Coccus hesperidum*) **Cottony Citrus Scale** (*Pulvinaria polygonata*) **Priority: Moderate**								
Rated as a moderate priority in NSW, QLD, SA and VIC. Scale infests leaves, fruits, twigs and limbs of all citrus varieties. Severe infestations will impact on general tree health and can cause fruit quality problems. An integrated management approach is effective and should incorporate the reduction of dust in the orchard, preservation of parasitoid species and the timely and judicious use of insecticides. Ant control is important because they often defend scale insects from predators and parasites.								
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, **Cottony Cushion Scale**, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, **Soft Brown Scale**, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly. Apply post-flowering when monitoring indicates the onset of crawler release. After initial application, apply an insecticide with an alternate mode-of-action if required but no less than 21 days later. Maximum of 2 applications per season.	M Bee:M	R2
Petroleum Oil	-	Contact	1	A	ALL	Registered in citrus for control of Citrus Leafminer, Red Scale, White Wax Scale, Pink Wax Scale, Circular Black Scale, Black Scale, **Soft Brown Scale**, Broad Mite, Brown Citrus Rust Mite, Citrus Red Mite and Citrus Rust Mite. Apply between November and March, using up to 2 applications if required.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Spirotetramat (Movento) Bayer	23	Ingestion	21	A	ALL	Registered in citrus for control of Red Scale, Mussel Scale, White Louse Scale (Citrus Snow Scale), Soft Brown Scale, Pink Wax Scale and Kelly's Citrus Thrips, and suppression of **Citrus Mealybug**. Commence applications after flowering at the onset of crawler emergence or when pest numbers reach economic threshold. Apply a second application 21-35 days after the first application if required. Maximum of 3 applications per season and no more than 2 applications within 90 days of harvest.	M Bee:VL	-
Buprofezin (Applaud)	16	Ingestion	28	P-A	ALL	Registered in citrus for control of Red Scale, White Louse Scale, Longtail Mealybug, Citrus Mealybug, Citrophilous Mealybug and Jassids (Leafhoppers).	L Bee:L	-
Carbaryl	1A	Contact	3	P-A	ALL	Registered in oranges & lemons for control of Bronze Orange Bug, Citrus Leaf-Eating Weevil, Light Brown Apple Moth, Orange Fruit Borer, Spined Citrus Bug, Yellow Peach Moth, Fullers Rose Weevil, White Wax Scale and Pink Wax Scale.	H Bee:H	R3
Chlorpyrifos	1B	Contact	14	P-A	ALL (excl. TAS)	Registered in citrus for control of California Red Scale.	H Bee:H	R1
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	P-A	ALL	Registered in citrus for control of Gall Wasp, Leafminer, Fullers Rose Weevil and California Red Scale.	M Bee:VH	R2
Ethyl Formate	-	Fumigant	-	P-A	ALL	Registered as a post-harvest treatment in citrus for control of Light Brown Apple Moth, Fullers Rose Weevil, California Red Scale, Bean Thrips, Longtailed Mealybug and Citrus Mealybug.	-	-
Imidacloprid	4A	Contact & Ingestion	140	P-A	ALL	Registered in citrus for control of Black Citrus Aphid, Citrus Leafminer, Pink Wax Scale and Red Scale and suppression of Citrus Gall Wasp.	M Bee:M	R2
Pyriproxyfen (Admiral)	7C	Ingestion	7	P-A	QLD	Registered in citrus for control of Red Scale and Black Scale.	VL 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	1	P-A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, Kelly's Citrus Thrips, Fruit Spotting Bug and Banana Spotting Bug.	M Bee:H	-
Sulfur	M2	Contact	NR	P-A	NSW & WA	Registered in citrus for control of White Louse Scale.	L Bee:L	-
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of San Jose Scale in apples, pears and stonefruit.	M Bee:M	R2
Fenoxycarb (Insegar) Syngenta	7B	Contact & Ingestion		P		Registered for control of **Scale** in apples, pears and olives.	L Bee:VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of **Scale Insects** in citrus, pome fruit and stone fruit.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Citrus Leafminer (*Phyllocnistis citrella*) **Priority: Moderate**								
Rated as a high priority in QLD, a moderate priority in SA and VIC, and as a low priority in NSW. Citrus Leafminer larvae feed inside immature foliage, leading to twisted and curled leaves. Infestations generally occur in late summer or autumn and are often related to low natural predator activity. Chemical control can be difficult to achieve once the larvae are entrenched inside the leaves.								
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, **Citrus Leafminer**, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly. Apply in late spring after the main flowering period has finished and prior to the summer or autumn flush. Minimum re-treatment interval of 8 weeks and do not use consecutive applications. Maximum of 2 applications per season.	M Bee:M	R2
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	A	ALL	Registered in citrus for control of Gall Wasp, **Leafminer**, Fullers Rose Weevil and California Red Scale. Apply through micro-irrigation 2 weeks after flowering (petal drop) has finished. Maximum number of applications not specified.	M Bee:VH	R2
Diazinon	1B	Contact	14	A	QLD, NSW, ACT & WA	Registered in citrus for control of **Citrus Leafminer**. Spray young growth every 10 days when pests are active. Maximum number of applications and re-treatment interval not specified.	H Bee:H	R3
Imidacloprid	4A	Contact & Ingestion	140	A	ALL	Registered in citrus for control of Black Citrus Aphid, **Citrus Leafminer**, Pink Wax Scale and Red Scale and suppression of Citrus Gall Wasp. Apply as a soil drench, or via micro-irrigation or drip irrigation. Apply during late spring to early summer, after main flowering has finished and prior to the summer or autumn flush.	M Bee:M	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Permethrin (Ambush)	3A	Contact	NR	A	ALL (excl. TAS)	Registered in citrus (non-bearing trees only) for control of **Citrus Leafminer (*Phyllocnistis citrella*)**. Apply during periods to leaf flush every 21 days to nursery plants and apply a spray or dip prior to despatch from nursery.	VH Bee:H	R3
Petroleum Oil	-	Contact	1	A	ALL	Registered in citrus for control of **Citrus Leafminer**, Red Scale, White Wax Scale, Pink Wax Scale, Circular Black Scale, Black Scale, Soft Brown Scale, Broad Mite, Brown Citrus Rust Mite, Citrus Red Mite and Citrus Rust Mite. Apply between November and March, using up to 2 applications if required.	L Bee:L	-
Spinetoram (Delegate) Corteva	5	Ingestion	1 NG	A	ALL	Registered in citrus for control of **Citrus Leafminer**, Light Brown Apple Moth and Helicoverpa (Corn Earworm & Native Budworm). Target sprays against mature eggs and newly hatched larvae. Maximum of 4 applications per season.	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR G:14	A	ALL	Registered in citrus for control of **Citrus Leafminer**, Light Brown Apple Moth and Helicoverpa (Corn Earworm & Native Budworm). Target sprays against mature eggs and newly hatched larvae. Maximum of 4 applications per season.	L Bee:L	-
Cyantraniliprole (Exirel) FMC	28	Ingestion	NR NG	P-A	ALL	Registered in citrus for control of Kelly's Citrus Thrips, Light Brown Apple Moth and Fullers Rose Weevil.	M Bee:VH	-
Methoxyfenozide (Prodigy) Corteva	18	Ingestion	1 NG	P-A	ALL	Registered in citrus for control of Light Brown Apple Moth.	VL Bee:VL	-
Tebufenozide (Mimic)	18	Ingestion	1	P-A	ALL	Registered in citrus for control of Light Brown Apple Moth.	L Bee:L	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Application submitted for registration of broflanilide (Cimegra) for control of various insects including Diamond Back Moth, Cabbage White Butterfly and Western Flower Thrips in brassica and leafy vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of Carob Moth in almonds, Light Brown Apple Moth in pome fruit and Oriental Fruit Moth in stone fruit. Canadian registration for suppression of Cabbage Looper in leafy vegetables and brassica vegetables. US Registration for control of Citrus Leafminer (post-flowering) in citrus.	L-M Bee:VH	-
Citrus Nematode (*Tylenchulus semipenetrans*) **Priority: Moderate**								
Rated as a high priority in QLD, a moderate priority in NSW, and as a low priority in SA and VIC. All citrus varieties can be susceptible to nematode attack, but some rootstocks are more resistant than others. Infestations will result in root damage that inhibits the trees' ability to take up water and nutrients.								
Cadusafos (Rugby)	1B	Contact	NR	A	ALL	Registered in citrus for control of **Citrus Nematode (*Tylenchulus semipenetrans*)** and Stubby Root Nematode (*Paratrichodorus lobatus*). Remove heavy leaf litter or mulch from the soil surface under the canopy of trees prior to each application. Apply granules evenly to the soil surface from the trunk to just outside the dripline of each tree, or in the case of mechanical application in an even band from the centre of the row to just outside the tree dripline. Apply 25-50mm of overhead or overlapping under-tree irrigation as soon as possible after application. Apply 2-3 times per season, at 2-month intervals.	H Bee:H	-
Abamectin (Tervigo) Syngenta	6	Contact		P		Registered for control of Root-Knot Nematode in peppers, chillis, cucurbits, eggplant and tomatoes**.**	M Bee:H	-
Fluazaindolizine (Reklemel, Salibro) Corteva	N-UN	Contact		P		Registered for control of Root-Knot Nematode in cucurbits, fruiting vegetables and root and tuber vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Fluensulfone (Nimitz) Adama	-	Contact		P		Registered for control of Root-Knot Nematode in peppers, carrot, chilli, cucurbits, eggplant, okra, potato, sugarcane, sweet potato and tomato.	L Bee:L	-
Fluopyram (Velum) Bayer	7			P		US registration for control of **nematodes** in a range of vegetables.	L Bee:L	-
SYNSTN1 Syngenta	TBC			P		Nematicide in development from Syngenta.	-	-
Snails (Gastropoda) **Priority: Moderate**								
Rated as a high priority in SA and VIC, a moderate priority in NSW, and as a low priority QLD. Snails cause damage in citrus by feeding on ripe and ripening fruit, leaves of young trees and young tree bark. Fruit damage appears as circular chewed areas in the rind. Management should include regular monitoring, baiting, pruning tree skirts, managing weeds and mowing the inter-row and banding tree trunks with copper foil or copper sulfate to prevent snails from climbing trees.								
Iron EDTA Complex	-	Contact	NR G:7	A	ALL	Registered in citrus for control of **Snails** & Slugs. Spread pellets evenly on ground. Maximum number of applications and re-treatment interval not specified.	-	-
Methiocarb (Mesurol)	1A	Contact	7	A	ALL	Registered in citrus for control of **Common Garden Snail**, Slugs, **White Italian Snail** and **White Snail**. Maximum number of applications and re-treatment interval not specified.	H Bee:M	R2
Metaldehyde	-	Contact & Ingestion		P		Registered for control of Slugs and **Snails** in vegetables.	-	-
Ants (Formicidae) **Priority: Low**								
Rated as a low priority in NSW, QLD, SA and VIC. Ants move pests around on the trees, but more importantly prevent natural parasites and predators from controlling pests. Removing ants allow the parasites and predators to control pests such as scale and mealybug.								
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. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. Number of treatments not specified.	VH Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Pyriproxyfen (Distance Ant Bait)	7C	Ingestion	NR	A	ALL	Registered in citrus for control of Invasive & Nuisance **Ants**. Apply baits in early spring or summer at first sign of ant activity. Do not exceed 3 applications per year and a minimum of 3 months between each treatment.	VL Bee:L	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Application submitted for registration of broflanilide (Cimegra) for control of various insects including Diamond Back Moth, Cabbage White Butterfly and Western Flower Thrips in brassica and leafy vegetables.	-	-
Metaflumizone (Siesta Ant Bait) BASF	22B	Ingestion		P		Pending registration as an **Ant** bait.	M Bee:M	-
Australian Citrus Leafhopper (*Empoasca smithi*) **Priority: Low**								
Rated as a low priority in NSW, QLD, SA and VIC. Has caused damage to developing fruit in QLD and NSW in the past but is rarely detected and control measures are not warranted.								
Buprofezin (Applaud)	16	Ingestion	28	A	ALL	Registered in citrus for control of Red Scale, White Louse Scale, Longtail Mealybug, Citrus Mealybug, Citrophilous Mealybug and **Jassids (Leafhoppers)**. Apply if thresholds are exceeded in spring-summer, repeat after 21-28 days if necessary. Maximum 2 applications per season.	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**. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. Number of treatments not specified.	VH Bee:H	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	P-A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly.	M Bee:M	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, Kelly's Citrus Thrips, Fruit Spotting Bug and Banana Spotting Bug. US registration for control of **Leafhoppers** in bushberry, caneberry, root & tuber vegetables, pome fruit, potatoes and small fruit vine climbing (except fuzzy kiwifruit).	M Bee:H	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. Registered for control of Mango Planthopper and Green Planthopper in avocado, mango and papaya. US registration for control of **Leafhoppers** in alfalfa, brassica vegetables, clover, cucurbits, fruiting vegetables, kava, leaf petiole vegetables, celtuce, leafy vegetables, legume vegetables, peanuts, pome fruit, root vegetables, small fruit vine climbing (except fuzzy kiwifruit), taro leaves and tuberous and corm vegetables.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Fruitpiercing Moth (*Eudocima salaminia*) **Sorghum Head Caterpillar** (*Cryptoblabes adoceta*) **Orange Fruitborer** (*Isotenes miserana*) **Heliothis** (*Helicoverpa* spp.) **Large Citrus Butterfly** (*Papilio aegeus*) **Small Citrus Butterfly** (*Papilio anactus*) **Yellow Peach Moth** (*Conogethes punctiferalis*) **Priority: Low**								
Fruitpiercing Moth, Sorghum Head Caterpillar and Orange Fruitborer are rated as a moderate priority in QLD, and as a low priority in NSW, SA and VIC. Heliothis is rated as a moderate priority in SA, and as a low priority in NSW, QLD and VIC. Large Citrus Butterfly, Small Citrus Butterfly and Yellow Peach Moth are rated as a low priority in NSW, QLD, SA and VIC. Most caterpillar pests are sporadic in occurrence and rarely warrant control measures in citrus.								
Bacillus thuringiensis subsp Kurstaki Strain HD-1	11	Ingestion	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	-
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. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. Number of treatments not specified.	VH Bee:H	-
Methomyl (Lannate)	1A	Contact	2	A	QLD, VIC, SA & WA	Registered in citrus for control of Larger Horned Citrus Bug, Bronze Orange Bug, **Budworms**, **Large Citrus Butterfly** and **Small Citrus Butterfly**. Spray if heavy infestations occur on young foliage and fruit. Maximum number of applications and re-treatment 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
Spinetoram (Delegate) Corteva	5	Ingestion	1 NG	A	ALL	Registered in citrus for control of Citrus Leafminer, Light Brown Apple Moth and **Helicoverpa (Corn Earworm & Native Budworm)**. Target sprays against mature eggs and newly hatched larvae. Maximum of 4 applications per season.	M Bee:H	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR G:14	A	ALL	Registered in citrus for control of Citrus Leafminer, Light Brown Apple Moth and **Helicoverpa (Corn Earworm & Native Budworm)**. Target sprays against mature eggs and newly hatched larvae. Maximum of 4 applications per season.	L Bee:L	-
Cyantraniliprole (Exirel) FMC	28	Ingestion	NR NG	P-A	ALL	Registered in citrus for control of Kelly's Citrus Thrips, Light Brown Apple Moth and Fullers Rose Weevil. Registered for control of **Cotton Bollworm** and **Native Budworm** in cotton.	M Bee:VH	-
Methoxyfenozide (Prodigy) Corteva	18	Ingestion	1 NG	P-A	ALL	Registered in citrus for control of Light Brown Apple Moth. Registered for control of **Native Budworm** and **Cotton Bollworm** in fruiting vegetables and control of **Yellow Peach Moth** in custard apples.	VL Bee:VL	-
Tebufenozide (Mimic)	18	Ingestion	1	P-A	ALL	Registered in citrus for control of Light Brown Apple Moth. Registered for control of **Yellow Peach Moth** in custard apples.	L Bee:L	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Application submitted for registration of broflanilide (Cimegra) for control of various insects including Diamond Back Moth, Cabbage White Butterfly and Western Flower Thrips in brassica and leafy vegetables.	-	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of various caterpillar pests in brassica vegetables, leafy vegetables, fruiting vegetables, celery, cucurbits, sweet corn, blueberries, *Rubus* spp., pome fruit, stone fruit, strawberries and grapes.	L Bee:H	R3
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of Carob Moth in almonds, Light Brown Apple Moth in pome fruit and Oriental Fruit Moth in stone fruit. Canadian registration for control of Corn Earworm in corn.	L-M Bee:VH	-
Fall Armyworm (*Spodoptera frugiperda*) **Priority: Low**								
Rated as a low priority in NSW, QLD, SA and VIC. Fall Armyworm is an exotic pest that can reproduce prolifically, especially in warm weather. It is important to monitor crops for any incursions.								
Chlorantraniliprole (Coragen) FMC PER89354	28	Ingestion	14 NG	A	ALL (excl. VIC)	Permitted in citrus for control of **Fall Armyworm**. Target eggs at hatch or small larvae (prior to 3rd instar). Maximum of 2 applications per crop with a minimum re-treatment interval of 7 days.	L Bee:VL	-
Methomyl (Lannate) PER89293	1A	Contact	2	A	ALL	Permitted in citrus for control of **Fall Armyworm**. Maximum number of applications and re-treatment interval not specified.	H Bee:H	R2
Spinetoram (Delegate) Corteva PER89241	5	Ingestion	1 NG	A	ALL (excl. VIC)	Permitted in citrus for control of **Fall Armyworm**. Target eggs at hatch or small larvae (prior to 3rd instar). Maximum of 4 applications per crop.	M Bee:H	-
Spinosad (Entrust Organic) Corteva PER89870	5	Ingestion	NR G:14	A	ALL (excl. VIC)	Permitted in citrus for control of **Fall Armyworm**. Target eggs at hatch or small larvae (prior to 3rd instar). Maximum of 4 applications per crop.	L Bee:L	-
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Application submitted for registration of broflanilide (Cimegra) for control of various insects including Diamond Back Moth, Cabbage White Butterfly and Western Flower Thrips in brassica and leafy vegetables.	-	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Elephant Weevil (*Orthorhinus cylindrirostris*) **Citrus Leafeating Weevil** (*Eutinophaea bicristata*) **Fruiteating Weevil** (*Perperus angustibasis*) **Priority: Low**								
Elephant Weevil is rated as a moderate priority in SA, and as a low priority in NSW, QLD and VIC. Citrus Leafeating Weevil and Fruiteating Weevil are rated as a low priority in NSW, QLD, SA and VIC. Weevils rarely cause significant economic damage in citrus. Regular monitoring should be used to determine the need for control measures.								
Bifenthrin (Talstar)	3A	Contact	NR	A	ALL	Registered in citrus for control of **Leafeating Weevil (*Eutinophaea bicristata*)**. Apply as a high volume band application to the ground on a 1.5-2m swath under trees. As a pre-emergence program, apply just prior to, or at the first sign of beetle emergence in mid-October. For post-emergence application, apply at peak beetle emergence in October/November as indicated by field monitoring.	VH Bee:H	-
Carbaryl	1A	Contact	3	A	ALL	Registered in oranges & lemons for control of Bronze Orange Bug, **Citrus Leaf-Eating Weevil**, Light Brown Apple Moth, Orange Fruit Borer, Spined Citrus Bug, Yellow Peach Moth, Fullers Rose Weevil, White Wax Scale and Pink Wax Scale. Apply at first sign of pest activity and repeat at intervals of 2 weeks or as necessary. Maximum number of applications not specified.	H Bee:H	R3
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	P-A	ALL	Registered in citrus for control of Gall Wasp, Leafminer, Fullers Rose Weevil and California Red Scale.	M Bee:VH	R2
Cyantraniliprole (Exirel) FMC	28	Ingestion	NR NG	P-A	ALL	Registered in citrus for control of Kelly's Citrus Thrips, Light Brown Apple Moth and Fullers Rose Weevil.	M Bee:VH	-
Gamma Cyhalothrin (Trojan) FMC	3A	Contact	28	A	ALL	Registered in oranges & lemons for control of Fullers Rose Weevil.	VH Bee:H	-
Lambda-Cyhalothrin (Karate Zeon)	3A	Contact	28	A	ALL	Registered in citrus for control of Fullers Rose Weevil.	VH Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of Fuller's Rose Weevil in pome fruit and stone fruit.	L Bee:H	R3
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of Sigastus Weevil in macadamia, Apple Weevil, Fuller's Rose Weevil and Garden Weevil in pome fruit and stone fruit.	L-M Bee:VH	-
Oriental Spider Mite (*Eutetranychus orientalis*) **Broad Mite** (*Polyphagotarsone-mus latus*) **Brown Citrus Rust Mite** (*Tegolophus australis*) **Citrus Bud Mite** (*Aceria sheldoni*) **Citrus Flat Mite** (*Brevipalpus lewisi*) **Citrus Red Mite** (*Panonychus citri*) **Citrus Rust (Maori) Mite** (*Phyllocoptruta oleivora*) **Priority: Low**								
Oriental Spider Mite is rated as a high priority in QLD, and as a low priority in NSW, SA and VIC. Broad Mite and Brown Citrus Rust Mite are rated as a moderate priority in QLD, and as a low priority in NSW, SA and VIC. All other mites are rated as a low priority in NSW, QLD, SA and VIC. Oriental Spider Mite is the most significant pest for lemons and limes in North Queensland. Mites are an induced pest as a result of the use of disruptive insecticides to control other pests. Mites damage the tree by causing leaves to turn brown and fall, leading to reduced yield and fruit quality. Management options include reducing dust in the orchard, promotion or introduction of predatory mites and judicious use of miticides while maintaining beneficial populations.								
Abamectin	6	Contact	7	A	ALL	Registered in citrus for control of **Brown Citrus Rust Mite (*Tegolophus australis*)**, **Citrus Rust Mite (*Phyllocoptera oleivora*)**, **Broad Mite (*Polyphagotars onemus latus*)** and Queensland Fruit Fly. Apply as indicated by pest incidence. Maximum of 1 application per season.	M Bee:H	-
Clofentezine (Apollo)	10A	IGR / Contact	NR	A	ALL	Registered in citrus (bare-rooted and potted nursery plants) for control of **Citrus Red Mite**. Apply as a 2 minute dip for budwood and thoroughly treat with a drenching spray or dip to all the above ground parts of bare-rooted or potted plants. Apply treatments as required.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Cyflumetofen (Danisaraba) BASF	25A	Contact	NR NG	A	ALL	Registered in citrus for control of Two Spotted Mite (*Tetranychus urticae*), **Citrus Red Mite (*Panonychus citri*)** and **Oriental Spider Mite (*Euteranychus orientalis*)**. Maximum of 2 applications per season, with a re-treatment interval of 14 days.	L Bee:L	-
Etoxazole (Paramite)	10B	IGR / Contact	7 NG	A	ALL	Registered in citrus for control of **Oriental Spider Mite (*Euteranychus orientalis*)**. Apply at the first sign of mite crawlers. Maximum 1 application per season.	L Bee:VL	R3
Fenbutatin Oxide (Torque)	12B	Contact	7	A	ALL	Registered in citrus for control of Citrus Rust Mite (*Phyllocoptruta oleivora*), **Brown Citrus Rust Mite (*Tegolophus australis*)** and **Citrus Bud Mite (*Eriophyes sheldoni*)**. Apply according to pest incidence, well before a dense infestation develops. Maximum number of applications and re-treatment interval not specified.	L Bee:L	R2
Mancozeb	M3	Contact	NR	A	ALL	Registered in citrus for control of **Citrus Rust Mite**, **Brown Citrus Mite** and **Citrus Bud Mite**. Apply at first sign of mite activity on fruit, usually between December and May. Maximum number of applications and re-treatment interval not specified.	H Bee:H	R2
Petroleum Oil	-	Contact	1	A	ALL	Registered in citrus for control of Citrus Leafminer, Red Scale, White Wax Scale, Pink Wax Scale, Circular Black Scale, Black Scale, Soft Brown Scale, **Broad Mite**, **Brown Citrus Rust Mite**, **Citrus Red Mite** and **Citrus Rust Mite**. Apply between November and March, using up to 2 applications if required.	L Bee:L	-
Potassium Salts of Fatty Acid (Natrasoap)	UNE	Contact	NR	A	ALL	Registered in fruit trees for control of Aphids, Thrips, Mealybug, Two Spotted Mites, **Spider Mite**, and Whitefly. Do not use during the hot part of the day. Use a retreatment interval of 5-7 days. Maximum number of applications not specified.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Sulfur	M2	Contact	NR	A	NSW, VIC, QLD, SA & WA	Registered in citrus for control of **Citrus Rust Mite**, **Brown Citrus Rust Mite** and **Bud Mite**. Apply during July to August. Leave at least 3 weeks between applications of oil and product. Maximum number of applications not specified.	L Bee:L	-
Zineb	M3	Contact	7	A	NSW & QLD	Registered in citrus for control of **Brown Citrus Rust Mite** and **Citrus Rust Mite**. Apply 6-12 weeks after copper spray at petal fall.	H Bee:H	R2
Spiromesifen (Oberon) Bayer	23	Ingestion		P		Hort Innovation project ST18001 is generating data to support a new Australian label registration for control of various mites in citrus.	M Bee:VL	-
Beauveria bassiana (Velifer) BASF	UN	Biological	NR	P		Registered for suppression of Two Spotted Mite in protected vegetables.	L Bee:L	-
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		First global application is proposed for 2023 for Thrips, Bugs, **Mites** and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Black (Brown Olive) Scale (*Saissetia oleae*) **Long Soft Scale** (*Coccus longulus*) **Citricola Scale** (*Coccus pseudomagnoliarum*) **Circular Black Scale** (*Chrysomphalus aonidum*) **Hemispherical Scale** (*Saissetia coffeae*) **Pink Wax Scale** (*Ceroplastes rubens*) **Purple (Mussel) Scale** (*Lepidosaphes beckii*) **White Louse Scale / Citrus Snow Scale** (*Unaspis citri*) **White Wax Scale** (*Ceroplastes destructor*) **Priority: Low**								
Long Soft Scale is rated as a moderate priority in QLD, and as a low priority in NSW, SA and VIC. Citricola Scale is rated as a moderate priority in NSW, and as a low priority in QLD, SA and VIC. All other scales are rated as a low priority in NSW, QLD, SA and VIC. Scale infests leaves, fruits, twigs and limbs of all citrus varieties. Severe infestations will impact on general tree health and can cause fruit quality problems. An integrated management approach is effective and should incorporate the reduction of dust in the orchard, preservation of parasitoid species and the timely and judicious use of insecticides. Ant control is important because they often defend scale insects from predators and parasites.								
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of **Black Scale**, **Citricola Scale**, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, **Pink Wax Scale**, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly. Apply post-flowering when monitoring indicates the onset of crawler release. After initial application, apply an insecticide with an alternate mode-of-action if required but no less than 21 days later. Maximum of 2 applications per season.	M Bee:M	R2
Buprofezin (Applaud)	16	Ingestion	28	A	ALL	Registered in citrus for control of Red Scale, **White Louse Scale**, Longtail Mealybug, Citrus Mealybug, Citrophilous Mealybug and Jassids (Leafhoppers). Apply when there is heavy crawler emergence, particularly in summer. Where the infestation is severe, a second application may be required 14-28 days later. Maximum 2 applications per season.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Carbaryl	1A	Contact	3	A	ALL	Registered in oranges & lemons for control of Bronze Orange Bug, Citrus Leaf-Eating Weevil, Light Brown Apple Moth, Orange Fruit Borer, Spined Citrus Bug, Yellow Peach Moth, Fullers Rose Weevil, **White Wax Scale** and **Pink Wax Scale**. Apply at first sign of pest activity and repeat at intervals of 2 weeks or as necessary. Maximum number of applications not specified.	H Bee:H	R3
Imidacloprid	4A	Contact & Ingestion	140	A	ALL	Registered in citrus for control of Black Citrus Aphid, Citrus Leafminer, **Pink Wax Scale** and Red Scale and suppression of Citrus Gall Wasp. Apply as a soil drench, or via micro-irrigation or drip irrigation. Apply during late spring to early summer, after main flowering has finished and prior to or at the onset of crawler emergence.	M Bee:M	R2
Petroleum Oil	-	Contact	1	A	ALL	Registered in citrus for control of Citrus Leafminer, Red Scale, **White Wax Scale**, **Pink Wax Scale**, **Circular Black Scale**, **Black Scale**, Soft Brown Scale, Broad Mite, Brown Citrus Rust Mite, Citrus Red Mite and Citrus Rust Mite. Apply between November and March, using up to 2 applications if required.	L Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	21	A	ALL	Registered in citrus for control of Red Scale, **Mussel Scale**, **White Louse Scale (Citrus Snow Scale)**, Soft Brown Scale, **Pink Wax Scale** and Kelly's Citrus Thrips, and suppression of Citrus Mealybug. Commence applications after flowering at the onset of crawler emergence or when pest numbers reach economic threshold. Apply a second application 21-35 days after the first application if required. Maximum of 3 applications per season with no more than 2 applications within 90 days of harvest.	M Bee:VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, **Pink Wax Scale**, **Citrus Snow (White Louse) Scale**, Red Scale, Kelly's Citrus Thrips, Fruit Spotting Bug and Banana Spotting Bug. Monitor crops from flowering onwards and commence applications once local pest thresholds are reached. Maximum of 2 applications per season with a re-treatment interval of 14 days.	M Bee:H	-
Sulfur	M2	Contact	NR	A	NSW & WA	Registered in citrus for control of **White Louse Scale**. May be added to copper spray at petal fall or applied separately during spring and autumn. Leave at least 3 weeks between applications of oil and product. Maximum number of applications not specified.	L Bee:L	-
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	P-A	ALL	Registered in citrus for control of Gall Wasp, Leafminer, Fullers Rose Weevil and California Red Scale.	M Bee:VH	R2
Pyriproxyfen (Admiral)	7C	Ingestion	7	P-A	QLD	Registered in citrus for control of Red Scale and Black Scale.	VL Bee:L	-
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of San Jose Scale in apples, pears and stonefruit.	M Bee:M	R2
Fenoxycarb (Insegar) Syngenta	7B	Contact & Ingestion		P		Registered for control of **Scale** in apples, pears and olives.	L Bee:VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of **Scale Insects** in citrus, pome fruit and stone fruit.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Fruit Spotting Bug (*Amblypelta nitida*) **Banana Spotting Bug** (*Amblypelta lutescens*) **Priority: Low**								
Rated as a low priority in NSW, QLD, SA and VIC. Fruit Spotting Bugs are an issue for citrus grown in North Queensland, particularly in limes but not so much in lemons. They cause feeding damage to the fruit and the foliage. They are an added concern for that region because pest numbers tend to build up in citrus before moving into avocados.								
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, **Fruit Spotting Bug** and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly. Apply from early post-flowering when numbers exceed economic thresholds. Do not apply consecutive applications and ensure a minimum interval of 8 weeks between applications. Maximum of 2 applications per season.	M Bee:M	R2
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, Kelly's Citrus Thrips, **Fruit Spotting Bug** and **Banana Spotting Bug**. Monitor crops from flowering onwards and commence applications once local pest thresholds are reached. Maximum of 2 applications per season with a re-treatment interval of 14 days.	M Bee:H	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Fruit Spotting Bug in macadamias, avocados, mangoes and papaya.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Bronze Orange Bug (*Musgraveia sulciventris*) **Rutherglen Bug** (*Nysius vinitor*) **Priority: Low**								
Rated as a low priority in NSW, QLD, SA and VIC. Minor and sporadic pests of citrus.								
Carbaryl	1A	Contact	3	A	ALL	Registered in oranges & lemons for control of **Bronze Orange Bug**, Citrus Leaf-Eating Weevil, Light Brown Apple Moth, Orange Fruit Borer, Spined Citrus Bug, Yellow Peach Moth, Fullers Rose Weevil, White Wax Scale and Pink Wax Scale. Apply at first sign of pest activity and repeat at intervals of 2 weeks or as necessary. Maximum number of applications not specified.	H Bee:H	R3
Dimethoate	1B	Contact	7	A	QLD, NSW, VIC, SA & WA	Registered in citrus (except Meyer lemons, Seville oranges and cumquats) for control of **Bronze Orange Bug**. Apply when pests appear. Maximum number of applications not specified.	H Bee:H	R1
Methomyl (Lannate)	1A	Contact	2	A	QLD, VIC, SA & WA	Registered in citrus for control of Larger Horned Citrus Bug, **Bronze Orange Bug**, Budworms, Large Citrus Butterfly and Small Citrus Butterfly. Spray if heavy infestations occur on young foliage and fruit. Maximum number of applications and re-treatment interval not specified.	H Bee:H	R2
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion	28 NG	P-A	ALL	Registered in citrus for control of Black Scale, Citricola Scale, Cottony Cushion Scale, Green Coffee Scale, Nigra Scale, Pink Wax Scale, Pulvinaria Scale, Red Scale, Soft Brown Scale, Citrus Mealybug, Longtailed Mealybug, Citrophilus Mealybug, Citrus Leafminer, Light Brown Apple Moth, Kelly's Citrus Thrips, Fruit Spotting Bug and suppression of Mediterranean Fruit Fly and Queensland Fruit Fly.	M Bee:M	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, Kelly's Citrus Thrips, Fruit Spotting Bug and Banana Spotting Bug. Registered for control of Rutherglen Bug in cucurbits, fruiting vegetables, leafy vegetables, root & tuber vegetables and brassica vegetables.	M Bee:H	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Fruit Spotting Bug in macadamias, avocados, mangoes and papaya.	L Bee:L	-
Black Citrus Aphid (*Toxoptera citricida*) **Priority: Low**								
Rated as a moderate priority in SA and VIC, and as a low priority in NSW and QLD. Minor and sporadic pests of citrus.								
Dimethoate	1B	Contact	7	A	ALL	Registered in citrus (except Meyer lemons, Seville oranges and cumquats) for control of **Aphids**, Thrips and Wingless Grasshopper. Apply when pests appear. Maximum number of applications not specified.	H Bee:H	R1
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. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. Number of treatments not specified.	VH Bee:H	-
Imidacloprid	4A	Contact & Ingestion	140	A	ALL	Registered in citrus for control of **Black Citrus Aphid**, Citrus Leafminer, Pink Wax Scale and Red Scale and suppression of Citrus Gall Wasp. Apply as a soil drench, or via micro-irrigation or drip irrigation. Apply during late spring to early summer, after main flowering has finished and prior to or at the onset of crawler emergence.	M Bee:M	R2
Pirimicarb	1A	Contact	2	A	ALL (excl. QLD)	Registered in citrus for control of **Citrus Aphid**. Apply when aphids appear. Maximum number of applications not specified.	VL Bee:VL	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Potassium Salts of Fatty Acid (Natrasoap)	UNE	Contact	NR	A	ALL	Registered in fruit trees for control of **Aphids**, Thrips, Mealybug, Two Spotted Mites, Spider Mite, and Whitefly. Do not use during the hot part of the day. Use a retreatment interval of 5-7 days. Maximum number of applications not specified.	L Bee:L	-
Clothianidin (Samurai)	4A	Contact & Ingestion	140 NG	P-A	ALL	Registered in citrus for control of Gall Wasp, Leafminer, Fullers Rose Weevil and California Red Scale. Registered for control of Wooly Apple Aphid in apples and Green Peach Aphid in peaches and nectarines.	M Bee:VH	R2
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in citrus for control of Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, Kelly's Citrus Thrips, Fruit Spotting Bug and Banana Spotting Bug. Registered for control of **Aphids** in cucurbits, fruiting vegetables, sweet corn, leafy vegetables, root & tuber vegetables, brassica vegetables, strawberries, pome fruit, stone fruit, tree nuts and nursery stock.	M Bee:H	-
Pymetrozine (Chess) Syngenta	9B	Contact & Ingestion		P		Registered for control of Aphids in brassica vegetables, tomatoes, eggplant, capsicum, sweet corn, lettuce, endive, chicory, radicchio, leafy vegetables, cucurbits, potatoes, stone fruit, almonds, pistachios, beetroot, celery, cut flowers and nursery stock.	L Bee:VL	R3
Afidopyropen (Versys) BASF	9D	Ingestion		P		Registered for control of **Aphids** in sweet corn, rhubarb, artichoke, brassica vegetables, celery, cucurbits, fruiting vegetables, strawberry, leafy vegetables, brassica leafy vegetables, parsley, potato, sweet potato, ginger and ornamentals.	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	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory Risk
Dimpropyridaz (Axalion) BASF	TBC			P		New active in development with BASF to control Whitefly, **Aphid** and Thrips in leafy vegetables, brassica vegetables, fruiting vegetables and cucurbits.	-	-
Flonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of Mealybugs in pome fruit, **Aphids** in potatoes, **Aphids** and Mirids in cotton, and **Aphids** and Silverleaf Whitefly in cucurbits.	M Bee:VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of **Aphids** in citrus.	L Bee:L	-

4.3 Weeds in citrus

4.3.1 Weed priorities

Common Name	Scientific Name
High	
Flaxleaf Fleabane	*Conyza bonariensis*
Feather Top Rhodes Grass	*Chloris virgata*
Moderate	
Bridal Creeper	*Asparagus asparagoides*
Marshmallow	*Malva parviflora*
Fat Hen	*Chenopodium album*
Ryegrass	*Lolium* spp.
Couch Grass	*Cynodon dactylon*
Nutgrass	*Cyperus rotundus*
Low	
Moth Vine	*Araujia sericiflora*
Dock	*Rumex* spp.
Evening Primrose	*Oenothera* spp.
Hairy Willow Herb	*Epilobium hirsutum*
Soursob	*Oxalis pes-caprae*
Sowthistle	*Sonchus oleraceus*

Flaxleaf Fleabane and Feather Top Rhodes Grass were identified as high priority weeds in the feedback. 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].

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

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.

[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
Flaxleaf Fleabane (*Conyza bonariensis*) **Priority: High**							
Rated as a high priority in NSW, QLD, SA and VIC. 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.							
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**	Citrus / Residual Weed Control	Registered in citrus 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**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Flaxleaf Fleabane**. Apply treatment along the sides of crops and between rows of crops.	NR 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**	Citrus / Over 3 Years Old / Directed Spray, Shielded Spray or Wick Wiper	Registered in citrus for control of various grass and broadleaf weeds, including **Flaxleaf Fleabane**. 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
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**	Citrus / Established / Over 3 Years	Registered in citrus for control of grass and broadleaf weeds, including **Flaxleaf Fleabane**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
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		-
Feather Top Rhodes Grass (*Chloris virgata*) **Priority: High**							
Rated as a high priority in NSW, SA and VIC, and as a low priority in QLD. Feathertop Rhodes Grass is an aggressive grass weed that is difficult to control with herbicides. Multiple applications are required.							
Clethodim (Select)	1***	Non-Bearing Fruit Trees	Registered in non-bearing fruit trees for control of annual and perennial grass weeds, including **Feather Top Rhodes 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
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***	Citrus / Directed Spray	Registered in citrus as a directed spray for the control of grass weeds, including **Feather Top Rhodes Grass**.	14	A	NSW, QLD, NT & WA	-
Flumioxazin (Chateau)	14**	Citrus / Residual Weed Control	Registered in citrus for control of grass and broadleaf weeds, including **Feather Top Rhodes Grass**. Apply to bare soil using a directed spray at the base of trees.	98 G:28	A	ALL	-
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Feather Top Rhodes Grass**. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Over 3 Years Old / Directed Spray, Shielded Spray or Wick Wiper	Registered in citrus for control of various grass and broadleaf weeds, including **Feather Top Rhodes Grass**. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Haloxyfop (Verdict)	1***	Citrus / Directed Spray or Spot Spray	Registered in citrus for control of grass weeds, including **Feather Top Rhodes Grass**. 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, including **Feather Top Rhodes Grass**. 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 **Feather Top Rhodes Grass**. 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 **Feather Top Rhodes Grass**. 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		-
Bridal Creeper (*Asparagus asparagoides*) **Priority: Moderate**							
Rated as a moderate priority in NSW, SA and VIC, and as a low priority in QLD. Bridal Creeper is an invasive broadleaf perennial that is widespread in temperate regions. It is difficult to control with herbicides.							
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Over 3 Years Old / Directed Spray, Shielded Spray or Wick Wiper	Registered in citrus 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
Marshmallow (*Malva parviflora*) **Priority: Moderate**							
Rated as a high priority in QLD, a moderate priority in SA and VIC, and as a low priority in NSW. Adapted to a wide variety of environments and highly competitive weed. Control with knockdown herbicides can be unreliable.							
Carfentrazone (Hammer)	14**	Citrus / Directed Spray or Spot Spray	Registered in citrus 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	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**	Citrus / Residual Weed Control	Registered in citrus 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	-
Glyphosate (Roundup)	9**	Citrus / Directed or Shielded Spray	Registered in citrus for control of various grass and broadleaf weeds, including **Marshmallow**. 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	-
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

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Saflufenacil (Sharpen) BASF	14**	Citrus / Established / Over 3 Years	Registered in citrus for control of grass and broadleaf weeds, including **Marshmallow**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Oxyfluorfen (Goal)	14**		Registered for control of various grass and broadleaf weeds, including **Small Flowered Mallow**, in dormant treefruit, nuts and vines, duboisia, tropical & sub-tropical fruit (inedible peel), brassica vegetables, onions (seeded), tobacco, coffee and forestry trees. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.		P		-
Fat Hen (*Chenopodium album*) **Priority: Moderate**							
Rated as a high priority in QLD, SA and VIC, and as a low priority in NSW. 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.							
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**	Citrus / Residual Weed Control	Registered in citrus 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	-
Fluometuron	5**	Citrus / Residual Weed Control	Registered in citrus for control of grass and broadleaf weeds, including **Fat Hen**.	49	A	NSW & QLD	
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Fat Hen**. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Directed or Shielded Spray	Registered in citrus for control of various grass and broadleaf weeds, including **Fat Hen**. 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 **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	-
Oryzalin	3**	Fruit Trees / Non-Bearing / Directed Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Fat Hen**. 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, 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**	Citrus	Registered in citrus 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**	Citrus / Established / Over 3 Years	Registered in citrus for control of grass and broadleaf weeds, including **Fat Hen**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Simazine	5**	Citrus / Established At Least 12 Months	Registered in citrus for control of grass and broadleaf weeds, including **Fat Hen**.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Oxyfluorfen (Goal)	14**		Registered for control of various grass and broadleaf weeds, including **Fat Hen**, in dormant treefruit, nuts and vines, duboisia, tropical & sub-tropical fruit (inedible peel), brassica vegetables, onions (seeded), tobacco, coffee and forestry trees. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.		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		-
Ryegrass (*Lolium* spp.) **Priority: Moderate**							
Rated as a moderate priority in NSW, SA and VIC, and as a low priority in QLDWA. 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.							
Amitrole	34**	Orchards / Directed Spray	Registered in orchards as a directed spray for the control of grass and broadleaf weeds, including **Ryegrass**.	56	A	ALL	-
Bromacil (Hyvar X)	5**	Citrus / Established	Registered in citrus for control of annual grass and broadleaf weeds, including **Annual Ryegrass**.	NR	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***	Citrus / Directed Spray	Registered in citrus as a directed spray for the control of grass weeds, including **Ryegrass**.	14	A	NSW, QLD, NT & WA	-
Flumioxazin (Chateau)	14**	Citrus / Residual Weed Control	Registered in citrus 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	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Fluometuron	5**	Citrus / Residual Weed Control	Registered in citrus for control of grass and broadleaf weeds, including **Fat Hen**.	49	A	NSW & QLD	
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Ryegrass**. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Over 3 Years Old / Directed Spray, Shielded Spray or Wick Wiper	Registered in citrus 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***	Citrus / Directed Spray or Spot Spray	Registered in citrus for control of grass weeds, including **Annual Ryegrass**. Apply as a directed spray.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Grapefruit, Lemons, Mandarins, Oranges (Navel & Valencia)	Registered in grapefruit, lemons, mandarins, oranges (Navel & Valencia) for control of grass and broadleaf weeds, including **Annual Ryegrass**.	NR	A	ALL	-
Oryzalin	3**	Fruit Trees / Non-Bearing Fruit / Directed Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Annual Ryegrass**. 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, 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

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Pendimethalin (Stomp)	3**	Citrus	Registered in citrus 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	-
Saflufenacil (Sharpen) BASF	14**	Citrus / Established / Over 3 Years	Registered in citrus for control of grass and broadleaf weeds, including **Annual Ryegrass**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Simazine	5**	Citrus / Established At Least 12 Months	Registered in citrus for control of grass and broadleaf weeds, including **Fat Hen**.	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**.	NR	A	QLD, SA, WA, VIC & TAS	-
Napropamide (Devrinol)	0**		Registered in almonds, grapes, stone fruit and tomatoes for control of various grass and broadleaf weeds, including **Ryegrass**.		P		-
Oxyfluorfen (Goal)	14**		Registered for control of various grass and broadleaf weeds, including **Annual Ryegrass**, in dormant treefruit, nuts and vines, duboisia, tropical & sub-tropical fruit (inedible peel), brassica vegetables, onions (seeded), tobacco, coffee and forestry trees. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.		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		-
Couch Grass (*Cynodon dactylon*) **Priority: Moderate**							
Rated as a high priority in QLD, a moderate priority in SA and VIC, and as a low priority in NSW. 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.							
Fluazifop-P (Fusilade)	1***	Citrus / Directed Spray or Shielded Spray	Registered in citrus for control of grass weeds. Apply as a directed spray.	NR	A	ALL	-
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Couch Grass**. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Over 3 Years Old / Directed Spray, Shielded Spray or Wick Wiper	Registered in citrus for control of various grass and broadleaf weeds, including **Couch Grass**. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Haloxyfop (Verdict)	1***	Citrus / Directed Spray or Spot Spray	Registered in citrus for control of grass weeds, including **Couch Grass**. Apply as a directed spray.	NR	A	ALL	-
Norflurazon (Zoliar) AgNova	12**	Grapefruit, Lemons, Mandarins, Oranges (Navel & Valencia)	Registered in grapefruit, lemons, mandarins, oranges (Navel & Valencia) for control of grass and broadleaf weeds, including **Couch Grass**.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
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	-
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		-
Nutgrass (*Cyperus rotundus*) **Priority: Moderate**							
Rated as a high priority in QLD, a moderate priority in NSW and SA, and as a low priority in VIC. Nutgrass prefers damp, water-logged soils but can survive for years underground during dry times. Herbicide options are limited and unreliable. Improve soil drainage if possible.							
Glyphosate (Roundup)	9**	Citrus / Over 3 Years Old / Directed Spray, Shielded Spray or Wick Wiper	Registered in citrus for control of various grass and broadleaf weeds, including **Nutgrass**. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Norflurazon (Zoliar) AgNova	12**	Grapefruit, Lemons, Mandarins, Oranges (Navel & Valencia)	Registered in grapefruit, lemons, mandarins, oranges (Navel & Valencia) for control of grass and broadleaf weeds, including **Nutgrass**.	NR	A	ALL	-
Moth Vine (*Araujia sericiflora*) **Priority: Low**							
Rated as a moderate priority in SA, and as a low priority in NSW, QLD and VIC. Moth Vine is an aggressive perennial that can climb up to 7m. It smothers crops with thick, tangled growth and exudes a smelly, milky latex that may cause allergic reactions in farm workers.							
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Directed or Shielded Spray	Registered in citrus 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
Fluroxypyr (Starane)			Permit for control of **Moth Vine** in non-agricultural areas.		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: Low**							
Rated as a moderate priority in SA, and as a low priority in NSW, QLD and VIC. Widespread species that is prolific and difficult to control when established.							
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Dock**. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Directed or Shielded Spray	Registered in citrus for control of various grass and broadleaf weeds, including **Dock**. Do not allow spray to contact any part of the tree, including the trunk.	NR	A	ALL	R3
Norflurazon (Zoliar) AgNova	12**	Grapefruit, Lemons, Mandarins, Oranges (Navel & Valencia)	Registered in grapefruit, lemons, mandarins, oranges (Navel & Valencia) for control of grass and broadleaf weeds, including **Couch Grass**.	NR	A	ALL	-
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	-
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of annual grass and broadleaf weeds, including **Dock**. 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 **Dock**. 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 **Dock**. Do not allow spray to contact any part of the tree, including the trunk.	G:1	A	ALL	R3
Evening Primrose (*Oenothera* spp.) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Broadleaf weed that can be annual or perennial, it re-shoots from fleshy underground roots and is difficult to control with herbicides and mechanical means.							
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Directed or Shielded Spray	Registered in citrus 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		-
Hairy Willow Herb (*Epilobium hirsutum*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Aggressive broadleaf perennial which is currently only found in Victoria. It can reproduce from seed dispersal as well as underground rhizomes.							
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**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds. Apply treatment along the sides of crops and between rows of crops.	NR 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**	Citrus / Directed or Shielded Spray	Registered in citrus 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		-
Soursob (*Oxalis pes-caprae*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. Soursob is a low growing broadleaf that is highly competitive with other vegetation. It is difficult to control with herbicides.							
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**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Directed or Shielded Spray	Registered in citrus 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
Norflurazon (Zoliar) AgNova	12**	Grapefruit, Lemons, Mandarins, Oranges (Navel & Valencia)	Registered in grapefruit, lemons, mandarins, oranges (Navel & Valencia) for control of grass and broadleaf weeds, including **Soursob**.	NR	A	ALL	-
Oryzalin	3**	Fruit Trees / Non-Bearing Fruit / Directed Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Soursob**. 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
Simazine	5**	Citrus / Established At Least 12 Months	Registered in citrus for control of grass and broadleaf weeds, including **Soursob**.	NR	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		-
Sowthistle (*Sonchus oleraceus*) **Priority: Low**							
Rated as a low priority in NSW, QLD, SA and VIC. 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.							
Dichlobenil (Casoran)	29**	Orchards / Residual Weed Control	Registered in orchards for residual weed control of annual grass and broadleaf weeds.	NR	A	ALL	-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory Risk
Flumioxazin (Chateau)	14**	Citrus / Residual Weed Control	Registered in citrus 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	-
Fluometuron	5**	Citrus / Residual Weed Control	Registered in citrus for control of grass and broadleaf weeds, including **Sowthistle**.	49	A	NSW & QLD	
Glufosinate (Basta)	10**	Non-Bearing Fruit Trees / Directed or Shielded Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds. Apply treatment along the sides of crops and between rows of crops.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	9**	Citrus / Directed or Shielded Spray	Registered in citrus 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 **Sowthistle**. 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**	Grapefruit, Lemons, Mandarins, Oranges (Navel & Valencia)	Registered in grapefruit, lemons, mandarins, oranges (Navel & Valencia) for control of grass and broadleaf weeds, including **Sowthistle**.	NR	A	ALL	-
Oryzalin	3**	Fruit Trees / Non-Bearing Fruit / Directed Spray	Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including **Sowthistle**. 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

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
Pendimethalin (Stomp)	3**	Citrus	Registered in citrus 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**	Citrus / Established / Over 3 Years	Registered in citrus for control of grass and broadleaf weeds, including **Sowthistle**. Apply as a directed or shielded spray.	NR G:35	A	ALL	-
Simazine	5**	Citrus / Established At Least 12 Months	Registered in citrus for control of grass and broadleaf weeds, including **Sowthistle**.	NR	A	ALL	R3
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		-

4.4 Plant Growth Regulators in citrus

4.4.1 Plant Growth Regulator priorities

PGR Issue
Unknown
Control of Vegetative Growth
Increase Fruit Size
Extend Shelf Life
Reduction of Fruit Drop

Plant Growth Regulator priorities were not determined; however Control of Vegetative Growth, Increase Fruit Size, Extend Shelf Life and Reduction of Fruit Drop are all PGR issues that impact on citrus.

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
Control of Vegetative Growth **Priority: Unknown**							
PGR priorities were not determined.							
Ethephon	PGR	Mandarins (Imperial) / Oranges (Navel, Valencia)	Registered in mandarins (Imperial) and oranges (Navel, Valencia) for thinning to increase fruit size, to reduce the size of heavy crop and to even out the production cycle.	NR	A	ALL (excl. TAS)	-
Triclopyr (Tops PGR)	4**	Oranges / Mandarins	Registered in oranges and mandarins for thinning and increasing fruit size.	NR	A	ALL	-
Gibberellins + 6-Benzyladenine (Cytolin)	PGR		Registered for stimulation of lateral growth in red delicious apples and non-bearing cherries.		P		-
Paclobutrazol	PGR		Registered in mangoes to reduce vegetative growth. Apply within 4 weeks after harvest or no later than mid-February. Do not treat trees with a canopy of less than 3m diameter.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use	WHP (days)	Availability	States	Regulatory Risk
Prohexadione-Calcium (Regalis)	PGR		Registered for reduction of shoot growth in apples and cherries.		P		-
Increase Fruit Size Priority: Unknown							
PGR priorities were not determined.							
Dichlorprop-P (Corasil)	PGR	Orange & Mandarin	Registered in oranges and mandarins for increasing fruit size.	NR	A	ALL	-
Ethephon	PGR	Mandarins (Imperial) / Oranges (Navel, Valencia)	Registered in mandarins (Imperial) and oranges (Navel, Valencia) for thinning to increase fruit size, to reduce the size of heavy crop and to even out the production cycle.	NR	A	ALL (excl. TAS)	-
Triclopyr (Tops PGR)	4**	Oranges / Mandarins	Registered in oranges and mandarins for thinning and increasing fruit size.	NR	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		-
Extend Shelf Life Priority: Unknown							
PGR priorities were not determined.							
Gibberellic Acid	PGR	Citrus	Registered in citrus to promote desirable harvest effects.	NR	A	ALL	-
1-Methylcyclopropene (Smartfresh)	PGR		Registered for **improved quality after shipping, storage and handling** in apples, mango, plums, apricot, broccoli, cabbage, carrot, cucumber, kiwifruit, melons, nectarine, persimmons, tomatoes, avocados, bananas, lettuce, papaya and pears.		P		-

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use	WHP (days)	Availability	States	Regulatory Risk
Amino Ethoxy Vinyl Glycine (Retain)	PGR		Registered for improved harvest management, fruit quality and enhanced storage potential in apples and stonefruit (except cherries)		P		-
Reduction of Fruit Drop Priority: Unknown							
PGR priorities were not determined.							
2,4 D Amine (Citrus Stop Drop)	4**	Navel Oranges / Mandarins / Grapefruit	Registered in Navel Oranges, mandarins and grapefruit for reduction of pre-harvest drop, retardation of colouring and to delay aging to the rind.	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
Citrus Plant Protection Guide 2021-22	https://www.dpi.nsw.gov.au/agriculture/horticulture/citrus/content/manuals-guides/citrus-plant-protection-and-management-guide
Codex MRL database	http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/
Cotton Pest Management Guide 2021-22	https://www.cottoninfo.com.au/publications/cotton-pest-management-guide
CropLife Australia (Resistance Management)	https://www.croplife.org.au/resources/programs/resistance-management/
Growcom – Infopest Database	www.infopest.com.au
Hort Innovation	www.horticulture.com.au

5.2 Abbreviations and Definitions:

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

5.3 Acknowledgements:

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6. Appendices:

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

Appendix 1. Products available for disease control in citrus

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Azoxystrobin (Amistar)	11	Citrus	Brown Spot (*Alternaria* spp.) Black Spot (*Guignardia citricarpa*)	ALL	NR	-
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	External Rot Causing Organisms	ALL	NR	-
Captan PER82043	M4	Mandarins	Emperor Brown Spot	QLD	28	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	Bacteria and Fungi	ALL	NR	-
Copper as Copper Hydroxide, Tribasic Copper Sulphate, Copper Ammonium Acetate	M1	Citrus	Black Spot, Melanose, Smoky Blotch (*Gloeodes pomigena*), Scab (lemons) (*Elsinow fawcettii*)	ALL	1	-
			Phytophthora Stem Canker	QLD & NSW		
Copper as Copper Oxychloride	M1	Citrus	Black Spot, Melanose, Smoky Blotch (*Gloeodes pomigena*), Scab (lemons) (*Elsinoe fawcettii*)	QLD & NT	1	-
			Septoria Spot	ALL (excl. QLD)		
			Brown Rot (*Phytophthora citrophthora*)	ALL		
			Collar Rot (*Phytophthora* spp.) Pink Disease (*Certicium salmonicolor*)	QLD & WA		
			Brown Spot (Mandarins)	ALL (excl. TAS)		
Copper as Cuprous Oxide	M1	Citrus	Black Spot, Melanose, Smoky Blotch, Scab	ALL	1	-
			Septoria Spot, Lemon Scab	NSW, VIC, SA & WA		
			Brown Rot (*Phytophthora citrophthora*) Brown Spot (Mandarins) (*Alternaria citri*)	QLD		

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Fludioxonil (Scholar)	12	Citrus / Post-Harvest	Blue Mould (*Penicillium italicum*) Green Mould (*Penicillium digitatum*) Diplodia Stem End Rot	ALL	NR	R3
Fludioxonil + Propiconazole (Chairman) Syngenta	12+3	Citrus / Post-Harvest	Blue Mould (*Penicillium italicum*) Green Mould (*Penicillium digitatum*) Sour Rot (*Geotrichum candidum var. citri-aurant*)	ALL	NR	R3
Guazatine Acetate (Panoctine)	M7	Citrus / Post-Harvest	Blue Mould (*Penicillium italicum*) Green Mould (*Penicillium digitatum*) Sour Rot (*Geotrichum candidum var. citri-aurant*)	ALL	NR	R3
Imazalil (Magnate)	3	Citrus / Post-Harvest	Blue Mould (*Penicillium italicum*) Green Mould (*Penicillium digitatum*)	ALL	NR	R2
Imazalil + Pyrimethanil (Pyxis)	3+9	Citrus / Post-Harvest	Blue Mould (*Penicillium italicum*) Green Mould (*Penicillium digitatum*)	ALL	NR	R2
Iodine	M	Citrus / Post Harvest Dip	Bacteria & Fungi	ALL	NR	-
Iprodione (Rovral)	2	Mandarins / Non-Bearing	Alternaria Leaf Spot / Brown Spot (*Alternaria alternata*)	QLD, WA & NT	NR	R3
Iprodione (Rovral) PER14772	2	Mandarins, Tangelos	Emperor Brown Spot	QLD	56	R3
Mancozeb	M3	Citrus	Black Spot	ALL	NR	R2
Peroxyacetic Acid	M	Sanitiser / Post-Harvest Treatment	Bacteria	ALL	NR	-
Phosphorous Acid	33	Citrus	Phytophthora Root Rot (*Phytophthora nicotianae var parasitice*) Collar Rot (*Phytophthora citrophthora*)	ALL	NR	-
Propineb (Antracol)	M3	Citrus	Black Spot	NSW, VIC, SA, WA & QLD	7	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Pyrimethanil (Penbotec)	9	Citrus / Post-Harvest	Blue Mould (*Penicillium italicum*) Green Mould (*Penicillium digitatum*)	ALL	NR	-
Sodium Orthophenylphenate Tetrahydrate (Preventol ON)		Citrus / Post-Harvest	Blue Mould	ALL	NR	-
Sulfur	M2	Citrus	Melanose	NSW & WA	NR	-
Thiabendazole (Tecto)	1	Citrus / Post-Harvest	Blue Mould (*Penicillium italicum*) Green Mould (*Penicillium digitatum*) Stem End Rot (*Phomopsis citri*)	QLD, NSW, VIC, SA & WA	NR	-
Zineb	M3	Citrus	Black Spot Speckled Blotch	NSW, SA & TAS	7	R2
			Scab	QLD		

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

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
Abamectin	6	Citrus	Brown Citrus Rust Mite (*Tegolophus australis*) Citrus Rust Mite (*Phyllocoptera oleivora*) Broad Mite (*Polyphagotars onemus latus*) Queensland Fruit Fly	ALL	7	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Citrus	Black Scale (*Saissetia oleae*), Citricola Scale (*Coccus pseudomagnoliarum*), Cottony Cushion Scale (*Icerya purchasi*), Green Coffee Scale (*Coccus viridis*), Nigra Scale (*Parasaissetia nigra*), Pink Wax Scale (*Ceroplastes rubens*), Pulvinaria Scale (*Pulvinaria polygonata*), Red Scale (*Aonidiella aurantii*), Soft Brown Scale (*Coccus hesperidum*), Citrus Mealybug (*Planococcus citri*), Longtailed Mealybug (*Pseudococcus longispinus*), Citrophilus Mealybug (*Pseudococcus calceolariae*), Citrus Leafminer (*Phyllocnistis citrella*), Light Brown Apple Moth (*Epiphyas postvittana*), Kelly's Citrus Thrips (*Pezothrips kellyanus*), Fruit Spotting Bug (*Amblypelta* spp.) Suppression of Mediterranean Fruit Fly (*Ceratitis capitata*), Queensland Fruit Fly (*Bactrocera tryoni*)	ALL	28 NG	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
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	-
Bifenthrin (Talstar)	3A	Citrus	Leafeating Weevil (*Eutinophaea bicristata*)	ALL	NR	-
Buprofezin (Applaud)	16	Citrus	Red Scale, White Louse Scale, Longtail Mealybug, Citrus Mealybug, Citrophilous Mealybug, Jassids (Leafhoppers)	ALL	28	-
Cadusafos (Rugby)	1B	Citrus	Citrus Nematode (*Tylenchulus semipenetrans*) Stubby Root Nematode (*Paratrichodorus lobatus*)	ALL	NR	-
Carbaryl	1A	Oranges & Lemons	Bronze Orange Bug, Citrus Leaf-Eating Weevil, Light Brown Apple Moth, Orange Fruit Borer, Spined Citrus Bug, Yellow Peach Moth, Fullers Rose Weevil, White Wax Scale, Pink Wax Scale	ALL	3	R3
Chlorantraniliprole (Coragen) FMC PER89354	28	Citrus	Fall Armyworm	ALL (excl. VIC)	14 NG	-
Chlorpyrifos	1B	Citrus	California Red Scale (*Aonidiella aurantii*)	ALL (excl. TAS)	14	R1
			Wingless Grasshopper	ALL (excl. QLD)		
Clofentezine (Apollo)	10A	Citrus / Bare-Rooted & Potted Nursery Plants	Citrus Red Mite	ALL	NR	-
Clothianidin (Samurai)	4A	Citrus	Gall Wasp, Leafminer, Fullers Rose Weevil, California Red Scale	ALL	140 NG	R2

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Cyantraniliprole (Exirel) FMC	28	Citrus	Kelly's Citrus Thrips (*Pezothrips kellyanus*), Light Brown Apple Moth (*Epiphyas postvittana*), Fullers Rose Weevil (*Asynonychus cervinus*)	ALL	NR NG	-
Cyflumetofen (Danisaraba) BASF	25A	Citrus	Two Spotted Mite (*Tetranychus urticae*), Citrus Red Mite (*Panonychus citri*), Oriental Spider Mite (*Euteranychus orientalis*)	ALL	7 NG	-
Diazinon	1B	Citrus	Spined Citrus Bug	NSW, ACT & WA	14	R3
			Citrus Leafminer	QLD, NSW, ACT & WA		
			Grasshoppers	QLD & WA		
Dimethoate	1B	Citrus / Except Meyer Lemons, Seville Oranges and Cumquats	Queensland Fruit Fly	QLD, NSW, VIC & WA	7	R1
			Mediterranean Fruit Fly	WA & VIC		
			Aphids Thrips Wingless Grasshopper	ALL		
			Bronze Orange Bug	QLD, NSW, VIC, SA & WA		
Dimethoate PER87164	1B	Citrus / Post-Harvest / Excluding Edible Skins Species	Queensland Fruit Fly (*Bactrocera tryoni*), Lesser Queensland Fruit Fly (*Bactrocera neohumeralis*), Northern Territory or Darwin Fruit Fly (*Bactrocera aquilonis*), Mediterranean Fly (*Ceratitis capitata*)	ALL	NR	R1
Dimethoate PER13859	1B	Fruit Fly Host Crops / After Harvest Only	Fruit Fly	ALL	NR	R1

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
E-11-tetradecen-1-yl acetate + E-9-E-11-tretradecadien-1yl acetate (Splat LBAM Mating Distruption)	-	Orchards	Light Brown Apple Moth (*Epiphyas postvittana*)	ALL	NR	-
Ethyl Formate	-	Citrus / Post-Harvest Fumigant	Light Brown Apple Moth (*Epiphyas postvittana*), Fullers Rose Weevil (*Asynonychus cervinus*), California Red Scale (*Aonidiella aurantii*), Bean Thrips (*Caliothrips fasciatus*), Longtailed Mealybug (*Pseudococcus longispinus*), Citrus Mealybug (*Planococcus citri*)	ALL	NR	-
Etoxazole (Paramite)	10B	Citrus	Oriental Spider Mite (*Euteranychus orientalis*)	ALL	7 NG	R3
Fenbutatin Oxide (Torque)	12B	Citrus	Citrus Rust Mite (*Phyllocoptruta oleivora*), Brown Citrus Rust Mite (*Tegolophus australis*), Citrus Bud Mite (*Eriophyes sheldoni*)	ALL	7	R2
Gamma Cyhalothrin (Trojan) FMC	3A	Oranges & Lemons	Fullers Rose Weevil (*Asynonychus cervinus*)	ALL	28	-
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	-
Imidacloprid	4A	Citrus	Black Citrus Aphid, Citrus Leafminer, Pink Wax Scale, Red Scale Suppression of Citrus Gall Wasp	ALL	140	R2
Iron EDTA Complex	-	Citrus	Snails & Slugs	ALL	NR G:7	-
Kaolin, Calcined (Surround WP)	-	Citrus	Repellence of Citrus Gall Wasp	ALL	NR	-
Lambda-Cyhalothrin (Karate Zeon)	3A	Citrus	Fullers Rose Weevil (*Asynonychus cervinus*)	ALL	28	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Maldison (Fyfanon)	1B	Citrus / Fruit Fly Bait Spray	Fruit Flies	ALL	3	R3
Mancozeb	M3	Citrus	Citrus Rust Mite Brown Citrus Mite Citrus Bud Mite	ALL	NR	R2
Methiocarb (Mesurol)	1A	Citrus	Common Garden Snail, Slugs, White Italian Snail, White Snail	ALL	7	
Methomyl (Lannate)	1A	Citrus	Larger Horned Citrus Bug, Bronze Orange Bug, Budworms, Large Citrus Butterfly, Small Citrus Butterfly	QLD, VIC, SA & WA	2	R2
Methomyl (Lannate) PER89293	1A	Citrus	Fall Armyworm (*Spodoptera frugiperda*)	ALL	2	R2
Methoxyfenozide (Prodigy) Corteva	18	Citrus	Light Brown Apple Moth	ALL	1 NG	-
Permethrin (Ambush)	3A	Citrus / Non-Bearing Trees	Citrus Leafminer (*Phyllocnistis citrella*)	ALL (excl. TAS)	NR	R3
Petroleum Oil	-	Citrus	Citrus Leafminer, Red Scale, White Wax Scale, Pink Wax Scale, Circular Black Scale, Black Scale, Soft Brown Scale, Broad Mite, Brown Citrus Rust Mite, Citrus Red Mite, Citrus Rust Mite	ALL	1	-
Pirimicarb	1A	Citrus	Citrus Aphid	ALL (excl. QLD)	2	R3
			Aphids	QLD & WA		

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Potassium Salts of Fatty Acid (Natrasoap)	-	Fruit Trees	Aphids Thrips Mealybug Two-Spotted Mite Spider Mite Whitefly	ALL	NR	-
Propineb (Antracol)	M3	Citrus	Citrus Rust Mite	NSW, VIC, SA, WA & QLD	7	R2
Pyriproxyfen (Admiral)	7C	Citrus	Red Scale (*Aonidiella aurantii*) Black Scale (*Saissetia oleae*)	QLD	7	-
Pyriproxyfen (Distance Ant Bait)	7C	Citrus	Invasive & Nuisance Ants	ALL	NR	-
Spinetoram (Delegate) Corteva	5	Citrus	Citrus Leafminer, Light Brown Apple Moth, Helicoverpa (Corn Earworm & Native Budworm)	ALL	1 NG	-
Spinetoram (Delegate) Corteva PER89241	5	Citrus	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	1 NG	-
Spinosad (Entrust Organic) Corteva	5	Citrus	Citrus Leafminer, Light Brown Apple Moth, Helicoverpa (Corn Earworm & Native Budworm)	ALL	NR G:14	-
Spinosad (Entrust Organic) Corteva PER89870	5	Citrus	Fall Armyworm (*Spodoptera frugiperda*)	ALL (excl. VIC)	NR 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	Citrus	Red Scale, Mussel Scale, White Louse Scale (Citrus Snow Scale), Soft Brown Scale, Pink Wax Scale, Kelly's Citrus Thrips, suppression of Citrus Mealybug	ALL	21	-
Sulfoxaflor (Transform) Corteva	4C	Citrus	Citrophilous Mealybug, Citrus Mealybug, Longtailed Mealybug, Citricola Scale, Pink Wax Scale, Citrus Snow (White Louse) Scale, Red Scale, Kelly's Citrus Thrips, Fruit Spotting Bug, Banana Spotting Bug	ALL	1	-
Sulfur	M2	Citrus	Citrus Rust Mite Brown Citrus Rust Mite Bud Mite	NSW, VIC, QLD, SA & WA	NR	-
			White Louse Scale	NSW & WA		
Tebufenozide (Mimic)	18	Citrus	Light Brown Apple Moth	ALL	1	-
Thiamethoxam (Actara)	4A	Citrus	Kelly's Citrus Thrips (*Pezothrips kellyanus*)	ALL	49	R2
Zineb	M3	Citrus	Brown Citrus Rust Mite Citrus Rust Mite	NSW & QLD	7	R2
			Citrus Bud Mite	QLD		

Appendix 3. Products available for weed control in citrus

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
2,2-DPA (Dalapon)	0**	Citrus	Kikuyu, Couch, *Paspalum dilatatum*	7	ALL	-
Amitrole	34**	Orchards / Directed Spray	Grass and Broadleaf Weeds	56	ALL	-
Bromacil (Hyvar X)	5**	Citrus / Established	Annual Grass and Broadleaf Weeds	NR	ALL	-
Carfentrazone (Hammer)	14**	Citrus / Tank Mix with Glyphosate	Broadleaf Weeds	NR	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***	Citrus/ Directed Spray or Shielded Spray	Annual Ryegrass, Barley Grass, Barnyard Grass, Brome Grasses, Crowsfoot Grass, Johnson Grass, Liverseed Grass, Prairie Grass, Summer Grass (Crabgrass), Wild Oats, Innocent Weed, Stinkgrass, Pigeon Grass and Foxtail (*Setaria* spp.) seedlings. Established plants of: Bent Grass, Couch Grass, English Couch (Rope Twitch), Water Couch, Johnson Grass, Kikuyu Grass, Paspalum	NR	ALL	-
Flumioxazin (Chateau) Sumitomo	14**	Citrus / Residual Weed Control	Annual Ryegrass (*Lolium rigidum*), Barnyard Grass (*Echinochloa colona*), Blackberry Nightshade (Solanum nigrum), Bluetop (*Ageratum houstonianum*), Capeweed (*Crassula colorata*), Creeping Speedwell (*Veronica persica*), Crowsfoot (*Eleusine indica*), Dwarf Nettle or Stinging Nettle (*Urtica urens*), Fat Hen (*Chenopodium album*), Feathertop Rhodes Grass (*Chloris virgata*), Fleabane (*Conyza bonariensis*), Green Summer Grass (*Brachiaria subquadripara*), Hog Weed (*Polygonum aviculare*), Marshmallow (*Malva parviflora*), Milk Thistle (*Sonchus oleraceus*), Pigweed (*Portulaca oleracea*), Small Flowered Mallow (*Modiola caroliniana*), Squirreltail Fescue (*Vulpia bromoides*), Summer Grass (*Digitaria ciliaris*), Toadrush (*Juncus bufonius*), Wild Mustard (*Sinapis arvensis*), Wild Radish (*Raphanus raphanistrum*), Wild Rose (*Cleome aculeate*), Wild Turnip (*Brassica tournefortii*)	98 G:28	ALL	-
Fluometuron	5**	Citrus / Residual Weed Control	Grass and Broadleaf Weeds	49	NSW & QLD	
Glufosinate (Basta)	10**	Citrus / Directed or Shielded Spray	Grass and Broadleaf Weeds	NR G:56	ALL	R3

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
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***	Citrus / Directed Spray	Couch, Rhodes Grass, Slender Rats Tail Grass, Buffel Grass, Green Panic, Johnson Grass, Kikuyu, Paspalum spp., Setaria spp., Annual Ryegrass, Barley Grass, Barnyard Grass, Brome Grass, Crowsfoot Grass, Lesser Canary Grass, Liverseed Grass, Mossman River Grass, Paradoxa Grass, Summer Grass, Volunteer Cereals, Wild Oats	NR	ALL	-
Isoxaben (Gallery) Corteva	29**	Bearing and Non-Bearing Fruit Tree / Residual Weed Control	Broadleaf Weeds	NR	ALL	-
Norflurazon (Zoliar)	12**	Grapefruit, Lemons, Mandarins, Oranges (Navel & Valencia)	Grass and Broadleaf Weeds	NR	ALL	-
Oryzalin	3**	Citrus / Residual Weed Control	Barnyard Grass, Guinea Grass, Love Grass, Paradoxa Grass, Pigeon Grass, Spiny Burr Grass, Summer Grass, Deadnettle, Fathen Fumitory, Pigweed, Sowthistle, Wireweed, Blackberry Nightshade, Caltrop, Paddymelon, Silverleaf Nightshade.	NR	ALL	-
Paraquat (Gramoxone)	22**	Orchards / Directed Spray or Spot Spray	Annual Grass and broadleaf weeds	1 G:7	ALL	R3

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
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**	Citrus	Grass and Broadleaf Weeds	NR	ALL	-
Saflufenacil (Sharpen) BASF	14**	Citrus / Established	Grass and Broadleaf Weeds	NR G:35	ALL	-
Simazine	5**	Citrus / Established At Least 12 Months	Grass and Broadleaf Weeds	NR	ALL	R3
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 citrus

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use	WHP (days)	States	Regulatory risk
2,4 D Amine (Citrus Stop Drop)	4**	Navel Oranges / Mandarins / Grapefruit	Reduction of pre-harvest drop. Retardation of colouring. Delay aging to rind.	NR	ALL	-
		Citrus	Post-Harvest dipping (Ethylene de-greening)			
Dichlorprop-P (Corasil)	Plant Growth Regulator	Orange & Mandarin	Increase fruit size	NR	ALL	-
Ethephon	Plant Growth Regulator	Mandarins (Imperial) / Oranges (Navel, Valencia)	Thinning to increase fruit Size, to reduce size of heavy crop and to even out the production cycle.	NR	ALL (excl. TAS)	-
Gibberellic Acid	Plant Growth Regulator	Citrus	Promote desirable harvest effects	NR	ALL	-
Triclopyr (Tops PGR)	4**	Oranges / Mandarins	Thinning and increasing fruit size	NR	ALL	-

Appendix 5. Current permits for use in citrus

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER82043 Version 2	Captan / Mandarins & Tangelos / Emperor Brown Spot	5-Oct-16	31-Jul-27	Hort Innovation
PER89354 Version 2	Chlorantraniliprole (Coragen) / Citrus / Fall Armyworm	10-Apr-20	30-Apr-23	Hort Innovation
PER86477 Version 3	Copper Sulphate / Citrus / Citrus Canker	18-May-18	30-Jun-22	DPIRD, WA
PER13859 Version 2	Dimethoate / Orchard clean-up - fruit fly host crops following harvest / Fruit Fly	9-Feb-15	31-Jul-24	Hort Innovation
PER87164 Version 2	Dimethoate / Citrus (Post-Harvest) dip or flood spray / Fruit Fly	1-Mar-19	31-Mar-24	Hort Innovation
PER14772 Version 3	Iprodione (Rovral) / Mandarins, Tangelos / Emperor Brown Spot	1-Oct-15	30-Jun-23	Citrus Australia
PER89293	Methomyl (Lannate) / Citrus / Fall Armyworm	10-Apr-20	30-Apr-23	Hort Innovation
PER86730 Version 2	SOPT (Preventol On) / Citrus / Citrus Canker	3-Jul-18	31-Jul-23	DPIRD, WA
PER89241	Spinetoram (Delegate) / Citrus / Fall Armyworm	6-Mar-20	31-Mar-23	Hort Innovation
PER89870	Spinosad (Entrust Organic) / Citrus / Fall Armyworm	21-Jul-20	31-Jul-23	Hort Innovation
PER90765	Thiram / Citrus Rootstock Seed / Albinism	1-Feb-22	28-Feb-25	Aust. Citrus Propagation Association

Appendix 6. Citrus Maximum Residue Limits (MRLs)

CODEX commodity groupings of citrus fruits and subgroups:

FC 0001	Citrus Fruits
FC 0002	Lemon and Limes
FC 0204	Lemon
FC 0205	Lime
FC 0003	Mandarin
FC 0206	Mandarin
FC 0004	Oranges, Sweet, Sour
FC 0005	Pummelo
	Fruit

Note: Australia exported 34% of total production in 2020/21. Of the different citrus groups, 36% of oranges are exported with the major international destinations being Japan, Hong Kong and China. Exports represent 36% of mandarin production with the major destinations being China, Thailand, Japan, New Zealand and Philippines. Exports are less significant for lemons and limes, representing 7% of production with the major destinations being Indonesia, Japan, Canada, China and Philippines. Exports represent 19% of grapefruit production, with the major destinations being Japan, China and Canada. 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
Abamectin	FC 0001	Citrus fruits	0.01	0.02
Acetamiprid	FC 0001	Citrus fruits	1	1
Acibenzolar-S-Methyl	FC 0001	Citrus fruits	-	0.01
Aldicarb	FC 0001	Citrus fruits	-	0.2
Aldrin and Dieldrin	FC 0001	Citrus fruits	E0.05	E0.05
Amitraz	FC 0004	Oranges, sweet, sour	-	0.5
Amitrole	FC 0001	Citrus fruits	*0.01	-
Azocyclotin	FC 0004	Oranges, sweet, sour	-	0.2
Azoxystrobin	FC 0001	Citrus fruits	3	15
Bifenthrin	FC 0001	Citrus fruits	*0.05	0.05
Boscalid	FC 0001	Citrus fruits	-	2
Bromacil	FC 0001	Citrus fruits	*0.04	-
Bromide Ion		Fruits	-	20
	FC 0001	Citrus fruits	-	30
Bromopropylate	FC 0001	Citrus fruits	-	2
Buprofezin	FC 0001	Citrus fruits	2	1
Cadusafos	FC 0001	Citrus fruits	*0.01	-
Captan	FC 0003	Mandarins	T3	-
Carbaryl	FC 0204	Lemon	3	-
	FC 0004	Oranges, sweet, sour	3	-
	FC 0001	Citrus fruits	-	15
Carbendazim	FC 0004	Oranges, sweet, sour	-	1
Carbofuran	FC 0004	Oranges, sweet, sour	-	0.5
	FC 0206	Mandarin	-	0.5

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Carbosulfan	FC 0004	Oranges, sweet, sour	-	0.1
	FC 0206	Mandarin	-	0.1
Carfentrazone-ethyl	FC 0001	Citrus fruits	*0.05	-
Chlorantraniliprole	FC 0001	Citrus fruits	T0.7	0.7
Chlordane	FC 0001	Citrus fruits	E0.02	-
		Fruits & Vegetables	-	E0.02
Chlorfenapyr	FC 0002	Lemons & Limes	-	0.8
	FC 0004	Oranges, sweet, sour	-	1.5
Chlorpyrifos	FC 0001	Citrus fruits	T0.5	1
Chlorpyrifos-Methyl	FC 0001	Citrus fruits	-	2
Clofentezine	FC 0001	Citrus fruits	-	0.5
Clothianidin	FC 0001	Citrus fruits	0.5	0.07
Cyantraniliprole	FC 0001	Citrus fruits	0.7	0.7
Cyflumetofen	FC 0001	Citrus fruits	0.3	0.3
Cyfluthrin	FC 0001	Citrus fruits	-	0.3
Cyhalothrin	FC 0001	Citrus fruits	*0.01	0.2
Cyhexatin	FC 0004	Oranges, sweet, sour	-	0.2
Cypermethrins	FC 0001	Citrus fruits (excl. pummelos)	-	0.3
	FC 0005	Pummelos	-	0.5
2,4-D	FC 0001	Citrus fruits	5	Po1
DDT		Fruits	E1	-
Deltamethrin	FC 0001	Citrus fruits	-	0.02
Diazinon	FC 0001	Citrus fruits	0.7	-
Dichlobenil	FC 0001	Citrus fruits	0.1	-
Dichlorprop-P	FC 0001	Citrus fruits	0.2	-
Dicofol		Fruits {except Strawberry}	5	-
Difenoconazole	FC 0001	Citrus fruits	-	0.6
Diflubenzuron	FC 0001	Citrus fruits	-	0.5
Dimethoate	FC 0001	Citrus fruits	5	-
	FC 0001	Citrus fruits (excl. kumquats)	-	5
2,2-DPA	FC 0001	Citrus fruits	*0.01	-
Diphenylamine		Fruits {except Apple; Pear}	0.5	-
Diquat		Fruits	*0.05	-
	FC 0001	Citrus fruits	-	*0.02
Dithianon		Fruits {except Blueberries}	2	-
Dithiocarbamates	FC 0001	Citrus fruits	0.2	-
	FC 0003	Mandarins	-	10
	FC 0004	Oranges, sweet, sour	-	2
Ethephon	FC 0003	Mandarins	2	-
	FC 0004	Oranges, sweet, sour	2	-
Ethion	FC 0001	Citrus fruits	1	-
Etoxazole	FC 0001	Citrus fruits	0.5	0.1
Fenbuconazole	FC 0001	Citrus fruits (excl. lemons & limes)	-	0.5
	FC 0002	Lemons & Limes	-	1
Fenbutatin Oxide	FC 0001	Citrus fruits	5	-
	FC 0001	Citrus fruits (incl. kumquats)	-	5
Fenpropathrin	FC 0001	Citrus fruits	-	2
Fenpyroximate	FC 0001	Citrus fruits	-	0.6

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Fenthion	FC 0001	Citrus fruits	-	2
Fipronil	FC 0001	Citrus fruits	T*0.01	-
Fluazifop-p-butyl	FC 0001	Citrus fruits	*0.02	*0.01
Fludioxonil	FC 0001	Citrus fruits	10	Po10
Flufenoxuron	FC 0004	Oranges, sweet, sour	-	0.4
Flumioxazin	FC 0001	Citrus fruits	*0.05	-
Fluometuron	FC 0001	Citrus fruits	0.5	-
Fluopyram	FC 0002	Lemons & Limes	-	1
	FC 0003	Mandarins	-	0.6
	FC 0004	Oranges, sweet, sour	-	0.6
	FC 0005	Pummelos	-	0.4
Flupyradifurone	FC 0002	Lemons & Limes	-	1.5
	FC 0003	Mandarins	-	1.5
	FC 0004	Oranges, sweet, sour	-	4
	FC 0005	Pummelos	-	0.7
Fluxapyroxad	FC 0004	Oranges, sweet, sour	-	0.3
Fosetyl Al	FC 0003	Mandarins	-	50
	FC 0004	Oranges, sweet, sour	-	20
Glufosinate	FC 0001	Citrus fruits	0.1	0.05
Glyphosate	FC 0001	Citrus fruits	0.5	-
Guazatine	FC 0001	Citrus fruits	5	Po5
Haloxyfop	FC 0001	Citrus fruits	*0.05	*0.02
Heptachlor	FC 0001	Citrus fruits	E0.01	E0.01
Hexythiazox	FC 0001	Citrus fruits	-	0.5
Imazalil	FC 0001	Citrus fruits	10	-
	FC 0001	Citrus fruits (excl. oranges, sweet, sour & lemons & limes)	-	Po5
	FC 0002	Lemons & Limes	-	Po15
	FC 0004	Oranges, sweet, sour	-	Po8
Imidacloprid	FC 0001	Citrus fruits	2	1
Inorganic Bromide	FC 0001	Citrus fruits	30	-
Iprodione	FC 0003	Mandarins	T5	-
Isoxaben	FC 0001	Citrus fruits	*0.01	-
Lufenuron	FC 0004	Oranges, sweet, sour	-	0.3
	FC 0205	Lime	-	0.4
Maldison	FC 0001	Citrus fruits	4	7
Metalaxyl	FC 0001	Citrus fruits	-	Po5
Methidathion	FC 0003	Mandarins	-	5
Methiocarb	FC 0001	Citrus fruits	0.1	-
Methomyl	FC 0001	Citrus fruits	1	1
Methoxyfenozide	FC 0001	Citrus fruits	1	2
Norflurazon	FC 0001	Citrus fruits	0.2	-
Omethoate	FC 0001	Citrus fruits	0.5	-
Oxathiapiprolin	FC 0001	Citrus fruits	-	0.05
Oxydemeton-Methyl	FC 0204	Lemon	-	0.2
Paraquat		Fruits {except Olives}	*0.05	-
	FC 0001	Citrus fruits	-	0.02
Pendimethalin	FC 0001	Citrus fruits	*0.05	0.03

Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Permethrin	FC 0001	Citrus fruits	-	0.5
2-Phenylphenol	FC 0001	Citrus fruits	-	Po10
Phosmet	FC 0001	Citrus fruits	-	3
Phosphorous Acid	FC 0001	Citrus fruits	100	-
Piperonyl Butoxide		Fruits	8	-
	FC 0001	Citrus fruits	-	5
Pirimicarb		Fruits {except Blackberries}	0.5	-
	FC 0001	Citrus fruits	-	3
Prochloraz	FC 0001	Citrus fruits	-	Po10
Propargite	FC 0001	Citrus fruits	-	3
Propiconazole	FC 0001	Citrus fruits	7	-
	FC 0002	Lemons & Limes	-	Po10
	FC 0003	Mandarins	-	Po10
	FC 0004	Oranges, sweet, sour	-	Po10
	FC 0005	Pummelos	-	Po4
Propineb	FC 0001	Citrus fruits	10	-
Pyraclostrobin	FC 0001	Citrus fruits	-	2
Pyrethrins		Fruits	1	-
	FC 0001	Citrus fruits	-	0.05
Pyrimethanil	FC 0001	Citrus fruits	10	Po7
Pyriproxyfen	FC 0001	Citrus fruits	0.3	0.5
Saflufenacil	FC 0001	Citrus fruits	*0.03	0.01
Simazine		Fruits	*0.1	-
Spinetoram	FC 0001	Citrus fruits	0.2	-
	FC 0003	Mandarins	-	0.15
	FC 0004	Oranges, sweet, sour	-	0.07
Spinosad	FC 0001	Citrus fruits	0.3	0.3
Spirodiclofen	FC 0001	Citrus fruits	-	0.4
Spirotetramat	FC 0001	Citrus fruits	1	0.5
Sulfoxaflor	FC 0001	Citrus fruits	0.7	-
	FC 0002	Lemons & Limes	-	0.4
	FC 0003	Mandarins	-	0.8
	FC 0004	Oranges, sweet, sour	-	0.8
	FC 0005	Pummelos	-	0.15
Tebuconazole	FC 0001	Citrus fruits	T0.05	-
Tebufenozide	FC 0001	Citrus fruits	1	2
Teflubenzuron	FC 0002	Lemons & Limes	-	0.5
	FC 0004	Oranges, sweet, sour	-	0.5
Thiabendazole	FC 0001	Citrus fruits	10	Po7
Thiamethoxam	FC 0001	Citrus fruits	1	0.5
Trichlorfon	FC 0005	Pummelos	T3	-
Triclopyr	FC 0001	Citrus fruits	0.2	-
Trifloxystrobin	FC 0001	Citrus fruits	-	0.5
Trifluralin		Fruits	*0.05	-

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

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

Sources: APVMA MRLs: Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2019. Compilation 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. Citrus Agrichemical Regulatory Risk Assessment

Citrus
Agrichemical Regulatory
Risk Assessment

March 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.

Citrus 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	Chemical Group	Problem	Comment
Abamectin	**6**	Broad mite	EU: Restricted use to permanent greenhouses only
		Brown citrus rust mite	
		Citrus red mite (PER13059) Citrus rust (Maori) mite	
		Mediterranean fruit fly, (Bait spray – spot treatment or strip spray)	
		Queensland fruit fly (PER91073 – SA Biosecurity) (Bait spray – spot treatment or strip spray)	
Acetamiprid	**4A**	Black (Brown olive) scale	APVMA: Under review
Acetamiprid + pyriproxyfen	**4A + 7C**	Citrophilus mealybug	Acetamiprid APVMA: Under review
		Citrus leafminer	
		Citrus mealybug	
		Cottony citrus scale	
		Fruit-spotting bugs	
		Kelly's citrus thrips	
		Lightbrown apple moth	
		Longtailed mealybug	
		Mealy bugs	
		Nigra scale	
		Pink wax scale	
		Pulvinaria scale	
		Red scale	
		Soft brown scale	
		Fruit fly(Cover spray)	

Active	Chemical Group	Problem	Comment
Bifenthrin	**3A**	Citrus leaf eating weevil	Canada: Not authorised EU: Not authorised
Buprofezin	**16**	Jassids	EU: MRLs set to limit of quantification
		Mealy bugs	
		Red scale	
		White louse scale	
Cadusafos	**1B**	Citrus nematode	
		Stubby root nematode	
Carbaryl	**1A**	Bronze orange bug	Canada: Reviewed, large number of uses deleted Codex: Review scheduled, support uncertain EU: No Authorisation
		Citrus butterflies (larvae)	
		Citrus leaf eating weevil	
		Fruit piercing moth	
		Fuller's rose weevil	
		Lightbrown apple moth	
		Orange fruit borer	
		Pink wax scale	
		Spined citrus bug	
		White wax scale	
		Yellow peach moth	
Chlorantraniliprole	**28**	Fall armyworm (PER89354)	
Chlorpyrifos	**1B**	Ants	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
		Mealy bugs	
		Citrus leaf eating weevil	
		Citrus rust thrips	
		Fruit eating weevil	
		Fruit fly (Bait spray)	
		Fuller's rose weevil	
		Purple (Mussel) scale	
		Red scale	
		White louse scale	

Active	Chemical Group	Problem	Comment
Clofentezine	**10A**	Citrus red mite (PER13059)	EU: Under review
Clothianidin	**4A**	Citrus gall wasp Citrus leafminer Fuller's rose weevil Red scale	APVMA: Under review Canada: Field uses cancelled or amended EU: Not authorised USA: Re-registration with new risk mitigation measures
Cyantraniliprole	**28**	Fuller's rose weevil Kelly's citrus thrips Lightbrown apple moth	
Cyflumetofen	**25A**	Citrus red mite Oriental spider mite Two-spotted mite	
Diazinon	**1B**	Citrus leafminer Spined citrus bug	APVMA: Under review EU: No authorisation in place Codex: JMPR re-evaluation scheduled
Dimethoate	**1B**	Aphids Bronze orange bug Bugs Thrips Fruit fly (Cover spray) Fruit fly (PER13859 – After harvest orchard clean-up treatment) Fruit fly (PER87164 – Post-harvest)	Codex: MRL deletion recommended. EU: Not authorised
Ethyl formate	**8A**	Bean thrips (exotic) (Post-harvest) Fuller's rose weevil (Post-harvest) Mealy bugs (Post-harvest) Red scale (Post-harvest) Lightbrown apple moth (Post-harvest)	EU: No authorisation in place
Etoxazole	**10B**	Oriental spider mite	EU: Only uses on greenhouse ornamentals approved & Candidate for substitution

Active	Chemical Group	Problem	Comment
Fenbutatin oxide	**12B**	Brown citrus rust mite	APVMA: nominated for review Codex: To be reviewed. No supporting registrant EU: No authorisation in place
		Citrus bud mite	
		Citrus rust (Maori) mite	
Imidacloprid	**4A**	Aphids	APVMA: Under review Canada: Field uses cancelled or amended EU: No authorisation in place expiry of the grace periods (June 2022), USA: Re-registration with new risk mitigation measures
		Citrus gall wasp	
		Citrus leafminer	
		Pink wax scale	
		Red scale	
		White wax scale	
Lambda-cyhalothrin	**3A**	Fuller's rose weevil	EU: Candidate for substitution
		Queensland fruit fly (PER12961 – SA Biosecurity) (Soil drench)	
Malathion/maldison	**1B**	Aphids	APVMA: Under review Codex: Re-evaluation scheduled for 2023/24 EU: Restricted use to permanent greenhouses
		Bronze orange bug	
		Citrus butterflies (larvae)	
		Pink wax scale	
		Purple (Mussel) scale	
		Red scale	
		Rutherglen bug	
		Soft brown scale	
		Spined citrus bug	
		Thrips	
		Treehoppers	
		Fruit fly(cover spray and bait spray)	
Mancozeb	**M3**	Brown citrus rust mite	APVMA: nominated for review Canada: Many uses cancelled Codex: To be reviewed 2023/24 EU: Authorisation not renewed
		Citrus bud mite	
		Citrus rust (Maori) mite	

Active	Chemical Group	Problem	Comment
Methomyl	**1A**	Bronze orange bug	APVMA: nominated for review Canada: Re-evaluation completed. Majority of uses removed EU: No authorisations in place
		Large citrus butterfly	
		Lightbrown apple moth	
		Mealy bugs	
		Small citrus butterfly	
		Spined citrus bug	
		Fall armyworm(PER89293)	
Methoxyfenozide	**18**	Lightbrown apple moth	EU: Proposed restricted authorisation & Candidate for substitution
Paraffinic/petroleum oil	**UNM**	Black (Brown olive) scale	
		Broad mite	
		Brown citrus rust mite	
		Circular black scale	
		Citrus red mite	
		Citrus rust (Maori) mite	
		Citrus thrips	
		Lightbrown apple moth	
		Mealy bugs	
		Pink wax scale	
		Red scale	
		Rose scale	
		Scale insects	
		Soft brown scale	
		Spider mites (Red spider),	
		White louse scale	
		White wax scale	
		Whiteflies	
Permethrin	**3A**	Citrus leafminer	Codex: Re-evaluation scheduled, support uncertain EU: No authorisation

Active	Chemical Group	Problem	Comment
Pheromone		Lightbrown apple moth	
Pirimicarb	**1A**	Aphids	Codex: JMPR re-evaluation scheduled EU: Candidate for substitution
Propineb	**M3**	Citrus rust (Maori) mite	APVMA: nominated for review EU: No authorisation in place Codex: To be reviewed 2023/24
Pyrethrins	**3A**	**Ants**	
		Aphids	
		Black (Brown olive) scale	
		Bronze orange bug	
		Circular black scale	
		Citrus leafminer	
		Diamondback moth	
		Greenhouse thrips	
		Leafhoppers	
		Mealy bugs	
		Pink wax scale	
		Purple (Mussel) scale	
		Red scale	
		Scale insects	
		Soft brown scale	
		Thrips	
		Two-spotted (Red spider) mite	
		White wax scale	
		Whiteflies	
		Fruit fly (Cover spray)	

Active	Chemical Group	Problem	Comment
Pyriproxyfen	**7C**	Ants	
		Black (Brown olive) scale	
		Cottony citrus scale	
		Red scale	
		Scale insects	
		White louse scale	
Spinetoram	**5**	Citrus leafminer	
		Helicoverpa species	
		Lightbrown apple moth	
		Fall armyworm (PER89241)	
Spinosad	**5**	Citrus leafminer	
		Helicoverpa species	
		Lightbrown apple moth	
		Fruit fly (Bait spray)	
		Fall armyworm (PER89870)	
Spirotetramat	**23**	Kelly's citrus thrips	
		Mealy bugs	
		Pink wax scale	
		Purple (Mussel) scale	
		Red scale	
		Soft brown scale	
		White louse scale	
Sulfoxaflor	**4C**	Citricola scale	USA: Pollinator concerns EU: Restricted to permanent glasshouses only
		Citrus mealybug	
		Fruit-spotting bugs	
		Kelly's citrus thrips	
		Pink wax scale	
		Red scale	
		White louse scale	

Active	Chemical Group	Problem	Comment
Sulfur	**UN**	Brown citrus rust mite	
		Citrus bud mite	
		Citrus rust (Maori) mite	
		White louse scale	
Tebufenozide	**18**	Lightbrown apple moth	
Thiamethoxam	**4A**	Kelly's citrus thrips	APVMA: Under review Canada: Some field uses cancelled or amended Europe: Outdoor uses withdrawn USA: Re-registration with new risk mitigation measures
		Brown marmorated stink bug (Biosecurity pest) (PER82367)	
		Yellow spotted stink bug (Exotic pest) (PER82367)	
Trichlorfon	**1B**	Fruit fly (Bait spray)	APVMA: nominated for review Codex: No MRLs EU: No authorisations USA: No MRLs
Zineb	**M3**	Brown citrus rust mite	APVMA: nominated for review Codex: To be reviewed 2023/24 EU: No authorisation in place
		Citrus bud mite	
		Citrus rust (Maori) mite	

Active	Chemical Group	Problem	Comment
Azoxystrobin	**11**	Black spot	
		Brown spot/rot	
Captan	**M4**	Emperor brown spot (PER82043 – Mandarins & Tangelos)	
Copper	**M1**	Black spot	EU: Candidates for substitution
		Citrus canker	
		Emperor brown spot	
		Melanose	
		Phytophthora	
		Pink disease	
		Scab	
		Septoria spot	
		Sooty blotch	
Fludioxonil	**12**	Blue mould	EU: Under review, & candidate for substitution
		Diplodia fruit rot	
		Green mould	
		Stem-end rot	
Fludioxonil + propiconazole	**12 + 3**	Blue mould	Fludioxonil EU: Under review, Candidate for substitution Propiconazole APVMA: nominated for review EU: Approval not renewed
		Green mould	
		Sour rot	
Guazatine	**M7**	Sour rot	EU: No authorisation in place
		Blue mould	
		Green mould	

Active	Chemical Group	Problem	Comment
Imazalil	**3**	Blue mould Green mould	Codex: Oranges and lemon MRLs only EU: Under review
Imazalil + pyrimethanil	**3 + 9**	Green mould	Imazalil Codex: Oranges and lemon MRLs only EU: Under review
Iodine	**M**	Citrus canker Fungi	
Iprodione		Emperor brown spot (PER14772) Mandarins & Tangelos	Canada: Majority of food crop uses deleted Codex: Review scheduled EU: No authorisation in place
Mancozeb	**M3**	Black spot	APVMA: nominated for review Canada: Many uses cancelled Codex: To be reviewed 2023/24 EU: Authorisation not renewed
Paraffinic/petroleum oil	**UNM-**	Black spot Brown rot/collar rot/root rot Melanose Scab Sooty blotch Sooty mould	
Phosphorous acid	**33**	Brown rot/collar rot/root rot	
Propineb	**M3**	Black spot	APVMA: nominated for review EU: No authorisation in place Codex: To be reviewed 2023/24
Pyrimethanil	**9**	Blue mould Green mould	
SOPP (orthophenylphenol)	**-**	Blue mould Citrus canker	

Active	Chemical Group	Problem	Comment
Sulfur	**M2**	Melanose	
		Sooty blotch	
Thiabendazole	**1**	Blue mould	
		Green mould	
		Stem-end rot	
Zineb	**M3**	Black spot	APVMA: nominated for review Codex: To be reviewed 2023/24 EU: No authorisation in place
		Scab	

Active	Chemical Group	Comment
WEEDS		
2,2-DPA as Na salt	**0**	
Bromacil	**5**	EU: Not authorised
Diquat	**22**	APVMA: Currently under review EU: Not authorised
Carfentrazone-ethyl	**14**	
Dichlobenil	**29**	EU: No authorisation in place
Fluazifop-P	**1**	
Flumioxazin	**14**	EU: Candidates for substitution
Glufosinate	**9**	EU: Not authorised
Glyphosate	**10**	Ongoing issues internationally EU: Under review
Haloxyfop	**1**	EU: No authorisation in place
Norflurazon	**12**	EU: Not authorised
Oryzalin	**3**	EU: No authorisation in place
Paraquat	**22**	APVMA: Currently under review EU: Not authorised Rotterdam Convention: nomination
Pendimethalin	**3**	EU: Candidates for substitution
Saflufenacil	**14**	EU: No authorisation in place
Simazine	**5**	APVMA: nominated for review EU: No authorisation in place
PLANT GROWTH REGULATORS		
2.4-D		
Dichlorprop-P		
Ethephon		
Gibberellic acid		
Triclopyr		

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