Passionfruit

Strategic Agrichemical Review Process (SARP)

December 2020

Hort Innovation
Project – MT19008

Hort Innovation Project Number:
MT19008 – 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 passionfruit industry across Australia. The information in this report will assist the industry with its agrichemical selection and usage into the future.

Date of report:
December 2020

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

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1. Summary

The Strategic Agrichemical Review Process (SARP) - Updates (MT19008) project is a strategic levy investment of the Hort Innovation Passionfruit Fund. A Strategic Agrichemical Review Process (SARP), through the process of a desktop audit and industry liaison;

(i) Assesses the importance of the diseases, insects and weeds (plant pests) that can affect a horticultural industry;
(ii) Evaluates the availability and effectiveness of fungicides, insecticides and herbicides (pesticides) to control the plant pests;
(iii) Determines any gaps in the pest control strategy and
(iv) Identifies suitable new or alternatives pesticides to address the gaps.

Alternative pesticides should ideally be selected for benefits of:

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

The results of this process will provide the passionfruit industry with sound pesticide usage for the future that the industry can pursue for registration with the manufacturer, or minor-use permits with the Australian Pesticide and Veterinary Medicines Authority (APVMA).

1.1 Diseases

The high priority diseases are:

Common name	Scientific name
Alternata Spot	*Alternaria alternata*
Brown Spot	*Alternaria passiflorae*
Septoria Spot	*Septoria passiflorae*
Cladosporium Rot / Scab	*Cladosporium oxysporum*

1.2 Insects, mites and other pests

The high priority insects, mites and other pests are:

Common name	Scientific name
Queensland Fruit Fly	*Bactrocera tryoni*
Passionvine Mite	*Brevipalpus phoenicis*
Hemispherical Scale	*Saissetia coffeae*
Red Scale	*Aonidiella aurantii*

1.3 Weeds

No weeds have been identified as a high priority weeds, however the following are rated as a moderate priority.

Common Name	Scientific Name
Crowsfoot Grass	*Dactyloctenium aegyptium*
Nutgrass	*Cyperus rotundus*
Marshmallow	*Malva parviflora*

2. The Australian Passionfruit Industry

Passionfruit are a tropical and sub-tropical fruit, so although they can be grown in many parts of Australia, the major growing regions are northern NSW, the Sunshine Coast, Wide Bay area and all the way up the tropical Queensland coast as far as Cooktown.

Western Australia has a small commercial industry up the west coast and in the Kununurra area and there are a small number of growers in the Northern Territory.

The Australian passionfruit industry produced 4,743 tonnes for the year ending June 2019 with a value of production of $20.6 million while the wholesale value of fresh supply was $24.2 million. The fresh market accounts for 94% of Australian production and none currently being exported.

Queensland and New South Wales dominate the Australian production and their growers are able to supply the fresh market year round.

Fresh Passionfruit Seasonality by State[1]

State	18/19 Tonnes	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales	1,643												
Victoria	5												
Queensland	2,847												
Western Australia	237												
SA/NT	10												
Availability Legend			High			Medium			Low			None	

Year on year production is relatively stable with passionfruit well established in the Australian domestic market.

[1] Hort Innovation (2020). Australian Horticulture Statistics Handbook 2018/19. [online] Available at: https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/

3. Introduction

3.1 Background

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

Growers may face severe losses from diseases, pests and weeds due to a lack of registered or approved (via a permit) chemical control tools.

Environmental concerns, consumer demands, and public opinion are also significant influences in the marketplace related to pest management practices. Industry IPM practitioners must strive to implement best management practices and tools to incorporate a pest management regime where strategies work in harmony with each other to achieve the desired effects while posing the least risks.

In combination with cultural practices, pesticides are important tools in passionfruit 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 passionfruit industry regarding pesticide access, Hort Innovation undertook a review of the pesticide requirements via a Strategic Agrichemical Review Process (SARP) in 2016. 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 passionfruit 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 passionfruit 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 passionfruit but attempts to prioritise the major problems.

Exotic plant pests, not present in Australia, are not addressed in this document. A biosecurity plan has been developed for the passionfruit industry in consultation with industry, government and scientists. The Biosecurity Plan outlines key threats to the industry, risk mitigation plans, identification and categorisation of exotic pests and contingency plans. High priority exotic pests have been assessed based on their potential to enter, establish, and spread in Australia (e.g. environmental factors, host range, vectors) and the cost to industry of control measures. More information is available at the link below.

https://www.planthealthaustralia.com.au/industries/passionfruit/

3.2 Minor use permits and registration

From a pesticide access perspective, the APVMA classifies passionfruit as a minor crop. The crop fits within the APVMA crop group Crop Group 006: Assorted tropical and sub-tropical fruits – inedible peel, within the Subgroup 006E, Assorted tropical and sub-tropical, Inedible Peel - Vines. Therefore, access to minor use permits can be relatively straight forward as long as a reasonable justification is provided in accordance to the APVMA's minor use guidance (https://apvma.gov.au/node/10931).
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 passionfruit industry is for manufacturers to register new pesticides uses in the crop.

3.3 Methods

The current update of the Passionfruit Strategic Agrichemical Review Process (SARP), which was last updated in 2016, was conducted by desktop audit and included an online industry survey. The process included gathering, collating and confirming information. The steps in the process were:

Process of Review	**Activity / Date**
Industry survey	Preparation and circulation of online industry survey to update priority pests and identify priority control gaps. Survey released: 14 January 2020 Survey closed: 31 March 2020
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 MT17019
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 passionfruit
Appendix 2. Products available for control of insects, mites and other pests in passionfruit
Appendix 3. Products available for weed control in passionfruit
Appendix 4. Current permits for use in passionfruit
Appendix 5. Passionfruit Maximum Residue Limits (MRLs)
Appendix 6. Passionfruit Agrichemical Regulatory Risk Assessment

4. Diseases, pests and weeds of passionfruit

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[2].

Information on regulatory risk derived from project MT17019 (Chapter 4) - Regulatory support and coordination (Appendix 6) has been incorporated.

Some of the suggested options have no overseas MRLs (see Appendix 5). If treated fruit is to be exported nil residues at harvest would be needed for these options.

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.

4.1 Diseases of passionfruit

4.1.1 Disease priorities

Common name	Scientific name
High	
Alternata Spot	*Alternaria alternata*
Brown Spot	*Alternaria passiflorae*
Septoria Spot	*Septoria passiflorae*
Cladosporium Rot / Scab	*Cladosporium oxysporum*
Moderate	
Anthracnose	*Colletotrichum gloeosporioides*
Phytophthora Blight	*Phytophthora nicotianae var. parasitica*
Trunk (Stem) Canker	*Phytophthora nicotianae*
Root and Collar Rot	*Phytophthora cinnamomi*
Fusarium Wilt	*Fusarium oxysporum*
Bacterial Spot	*Xanthomonas axonopodis*
Passionfruit Woodiness	*Passionfruit Woodiness Virus*
Low	
Passionfruit Yellow Mosaic	*Passionfruit Yellow Mosaic Virus (Yymovirus)*
Cucumber Mosaic	*Cucumber Mosaic Virus*

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

Passionfruit are affected by numerous pre-harvest diseases that affect fruit quality. The most serious are Alternata Spot / Brown Spot (*Alternaria alternata* and *Alternaria passiflorae*) which cause major fruit loss during the warm, wet periods from October to April; and Anthracnose (*Colletotrichum gloeosporoides*), which is most severe in cool, wet periods[3].

The high priority diseases identified by the passionfruit industry are very similar to those named in the 2016 SARP report. The major leaf spots (Alternata, Septoria and Brown Spot) remain at the top of the priority list. Cladosporium Rot/Scab, has also been nominated as high priority. It was not on the priority list for the previous SARP.

There are several disease issues that are ranked as moderate priority, including Anthracnose, various forms of Phytophthora, Fusarium Wilt and Passionfruit Woodiness Virus. Most of these diseases have limited control options available and the nature of the disorders means that potential solutions are limited at the current time.

Growers should adopt good cultural practices such as drainage and irrigation management, canopy management and general farm hygiene in order to keep diseases in check in passionfruit vineyards.

In controlling fungal and bacterial diseases, the industry should be mindful of resistance management. CropLife Australia has a resistance management strategy and users must refer to it before using any product[4].

CropLife Australia recommends that in the absence of a specific resistance management strategy the use of fungicides from a specific mode of action be limited to a maximum of one-third of the total. The number of consecutive applications of the same group should also be limited by rotating/alternating between products from different activity groups. An exception is the use of Group M fungicides as they have a low risk of resistance development.

[3] https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/pf18002-postharvest-best-practice-guide.pdf
[4] https://www.croplife.org.au/resources/programs/resistance-management/fungicide-resistance-management-strategies1/fungicide-resistance-management-strategies1-draft/

4.1.2 Available and potential products for priority diseases

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

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

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Alternata Spot (*Alternaria alternata*) **Priority: High**							
Alternata Spot is rated as a high priority in QLD and NSW. Infections are favoured by periods of extended wet weather. A regular protectant program is key to managing the disease, along with maintaining good hygiene in the vineyard.							
Azoxystrobin (Amistar)	11	Curative / Protectant	1	A	ALL	Registered in passionfruit for control of **Alternaria** and Cladosporium. Apply 2 to 3 applications at 14-day intervals over flowering. Do not exceed 5 applications per crop.	-
Iprodione (Rovral)	2	Protectant	1	A	QLD, NSW, WA & NT	Registered in passionfruit for control of **Alternata Spot**. Used to support a regular protectant program, should be used before, during and after wet periods that promote the disease. Iprodione should always be applied with a protectant fungicide. Do not apply more than 4 applications per season.	R2
Iprodione (other brands)	2	Protectant	7	A	QLD, NSW, WA & NT	Registered in passionfruit for control of **Alternata Spot**. Used to support a regular protectant program, should be used before, during and after wet periods that promote the disease. Iprodione should always be applied with a protectant fungicide. Do not apply more than 4 applications per season.	R2
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Curative / Protectant	1	P-A	ALL	Registered in passionfruit for control of Septoria Spot and Brown Spot.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		P		Hort Innovation Project ST16006 generating data for a registration in Tropical & Subtropical Fruit (inedible peel). Registration expected in 2022 for control of **Alternata Spot**, Brown Spot, Anthracnose and Septoria Spot.	R3
Florylpicoxamid (Adavelt) Corteva	21	Curative / Protectant		P		New Mode of Action fungicide being developed for AU, with activity on a broad range of foliar diseases, including **Alternaria**. Due for registration in 2023.	-
Mefentrifluconazole (Belanty) BASF	3	Curative / Protectant		P		Registered for control of Black Spot in apples and Powdery Mildew in grapes, also with activity on **Alternaria**.	-
Brown Spot (*Alternaria passiflorae*) **Priority: High**							
Brown Spot is rated as a high priority in QLD and NSW. It is similar to Alternata Spot, being favoured by the same conditions and with similar control measures available.							
Copper (Cu) present as copper oxychloride	M1	Protectant	1	A	ALL	Registered in passionfruit for control of **Brown Spot**, Septoria Spot and Phytophthora Blight. Apply every 2 weeks (4 in NSW/ACT) from October to May and 3-4 weeks (2 months in NSW/ACT) during winter. Treatments per season not limited.	-
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Curative / Protectant	1	A	ALL	Registered in passionfruit for control of Septoria Spot and **Brown Spot**. Apply as a foliar spray when conditions favour disease development. Do not exceed 3 treatments per year.	-
Mancozeb (Dithane)	M3	Protectant	1	A	QLD, NSW	Registered in passionfruit for control of **Brown Spot**, Septoria Spot and Anthracnose. Apply at 10-14 day intervals from October to May and at 21-28 day intervals for the remainder of the year. Treatments per season not limited.	R2
Iprodione	2	Protectant	1	P-A	QLD, NSW, WA & NT	Registered in passionfruit for control of Alternata Spot.	R2
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		P		Hort Innovation Project ST16006 generating data for a registration in Tropical & Subtropical Fruit (inedible peel). Registration expected in 2022 for control of Alternata Spot, **Brown Spot**, Anthracnose and Septoria Spot.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Florylpicoxamid (Adavelt) Corteva	21	Curative / Protectant		P		New Mode of Action fungicide being developed for AU, with activity on a broad range of foliar diseases, including **Alternaria**. Due for registration in 2023.	-
Mefentrifluconazole (Belanty) BASF	3	Curative / Protectant		P		Registered for control of Black Spot in apples and Powdery Mildew in grapes, also with activity on **Alternaria**.	-
Septoria Spot (*Septoria passiflorae*) **Priority: High**							
Septoria Spot is rated as a high priority in QLD and NSW. Infections are favoured by periods of extended wet weather. A regular protectant program is key to managing the disease, along with maintaining good hygiene in the vineyard.							
Copper (Cu) present as copper oxychloride	M1	Protectant	1	A	ALL	Registered in passionfruit for control of Brown Spot, **Septoria Spot** and Phytophthora Blight. Apply every 2 weeks (4 in NSW/ACT) from October to May and 3-4 weeks (2 months in NSW/ACT) during winter. Treatments per season not limited.	-
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Curative / Protectant	1	A	ALL	Registered in passionfruit for control of **Septoria Spot** and Brown Spot. Apply as a foliar spray when conditions favour disease development. Do not exceed 3 treatments per year.	-
Mancozeb (Dithane)	M3	Protectant	1	A	QLD, NSW	Registered in passionfruit for control of Brown Spot, **Septoria Spot** and Anthracnose. Apply at 10-14 day intervals from October to May and at 21-28 day intervals for the remainder of the year. Treatments per season not limited.	R2
Pyraclostrobin (Cabrio) BASF PER12781	11	Curative / Protectant	H:1 NG	A	NSW, QLD, NT & WA	Permitted in passionfruit for control of Anthracnose and **Septoria Spot**. DO NOT apply more than three applications of strobilurin fungicides per crop per season. DO NOT apply consecutive applications of strobilurin fungicides. Applications should be alternated with other registered protectant fungicides e.g. copper or mancozeb.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		P		Hort Innovation Project ST16006 generating data for a registration in Tropical & Subtropical Fruit (inedible peel). Registration expected in 2022 for control of Alternata Spot, Brown Spot, Anthracnose and **Septoria Spot**.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Florylpicoxamid (Adavelt) Corteva	21	Curative / Protectant		P		New Mode of Action fungicide being developed for AU, with activity on a broad range of foliar diseases, including **Septoria**. Due for registration in 2023.	-
Cladosporium Rot / Scab (*Cladosporium oxysporum*) **Priority: High**							
Cladosporium is rated as a high priority in QLD and a moderate priority in NSW. It causes superficial damage to fruit which can impact on marketability. Options for control are limited.							
Azoxystrobin (Amistar)	11	Curative / Protectant	1	A	ALL	Registered in passionfruit for control of Alternaria and **Cladosporium**. Apply 2 to 3 applications at 14-day intervals over flowering. Do not exceed 5 applications per crop.	-
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Curative / Protectant	1	P-A	ALL	Registered in passionfruit for control of Septoria Spot and Brown Spot.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		P		Hort Innovation Project ST16006 generating data for a registration in Tropical & Subtropical Fruit (inedible peel). Registration expected in 2022 for control of Alternata Spot, Brown Spot, Anthracnose and Septoria Spot.	R3
Anthracnose (*Colletotrichum gloeosporioides*) **Priority: Moderate**							
Anthracnose is rated as a moderate priority in QLD and NSW. It is a key disease in passionfruit and a regular protectant program is needed to manage the disease. There has been a high reliance on mancozeb which is a risk for ongoing access. Alternative options are limited at this stage.							
Mancozeb (Dithane)	M3	Protectant	1	A	QLD, NSW	Registered in passionfruit for control of Brown Spot, Septoria Spot and **Anthracnose**. Apply at 10-14 day intervals from October to May and at 21-28 day intervals for the remainder of the year. Treatments per season not limited.	R2
Petroleum Oil		Protectant	1	A	NSW, WA	Registered in passionfruit for control of **Anthracnose**. Apply with mancozeb and in accordance with the mancozeb label. Treatments per season not limited.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Pyraclostrobin (Cabrio) BASF PER12781	11	Curative / Protectant	H:1 NG	A	NSW, QLD, NT & WA	Permitted in passionfruit for control of **Anthracnose** and Septoria Spot. DO NOT apply more than three applications of strobilurin fungicides per crop per season. DO NOT apply consecutive applications of strobilurin fungicides. Applications should be alternated with other registered protectant fungicides e.g. copper or mancozeb.	-
Azoxystrobin (Amistar)	11	Curative / Protectant	1	P-A	ALL	Registered in passionfruit for control of Alternaria and Cladosporium. Registered for control of Anthracnose in various crops.	-
Copper	M1	Protectant	1	P-A	ALL	Copper is registered in passionfruit for control of Phytophthora Stem Canker, Brown Spot and Septoria Spot. Copper is registered for control of Anthracnose in various crops.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		P		Hort Innovation Project ST16006 generating data for a registration in Tropical & Subtropical Fruit (inedible peel). Registration expected in 2022 for control of Alternata Spot, Brown Spot, **Anthracnose** and Septoria Spot.	R3
Aureobasidium pullulans Strain DSM 14940 & DSM 14941 (Botector) Nufarm	-	Biological / Protectant	NR	P		Registered in berries for suppression of **Anthracnose**. No MRLs required for a biological product.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Opti) Bayer	BM 02	Protectant		P		Registered in avocados and mangos for control of **Anthracnose**. No MRLs required for a biological product.	-
Florylpicoxamid (Adavelt) Corteva	21	Curative / Protectant		P		New Mode of Action fungicide being developed for AU, with activity on a broad range of foliar diseases, including **Anthracnose**. Due for registration in 2023.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Phytophthora Blight (*Phytophthora nicotianae*) **Priority: Moderate**							
Phytophthora Blight is rated as a moderate priority in QLD and NSW. It can damage the leaves and fruit during wet weather. Limited options are available but regular protectant fungicide program will assist to reduce disease incidence.							
Phosphorous (Phosphonic) Acid present as Mono- And Dipotassium Phosphite PER87607	33	Curative / Protectant	NR	A	ALL (excl. VIC)	Permitted in passionfruit for control of **Phytophthora Blight**. Apply up to a maximum of 4 foliar applications per crop. For preventative activity, apply every 5-6 weeks. As a curative, apply every 3 weeks until disease is under control.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Provides suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.	-
Mandipropamid (Revus) Syngenta	40	Curative / Protectant		P		Mandipropamid has US registrations for **Phytophthora** in various crops, including as a foliar application for protection of citrus from **Phytophthora** Root Rot.	-
Metalaxyl-M (Ridomil Gold) Syngenta	4	Curative / Protectant		P		Registered for control of Phytophthora in various crops. AU MRL 0.05 mg/kg.	-
Oxathiopiprolin (Zorvec Enicade) Corteva	49	Protectant & Curative		P		Current AU registrations only for Downy Mildew but known to have broad activity in the oomycete group. US registration for control of **Phytophthora** Canker and Brown Rot in citrus.	-
Streptomyces lydicus (Actinovate)	BM 02	Biological	NR	P		Registered in strawberries for the suppression of Powdery Mildew and **Phytophthora**. No MRLs required for biological product.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Trunk (Stem) Canker (*Phytophthora nicotianae*) **Priority: Moderate**							
Trunk Canker is rated as a moderate priority in QLD and NSW. It is caused by the same pathogen as Phytophthora Blight. Stem infections can lead to lesions in the bark which will spread rapidly if not treated.							
Copper (Cu) present as cupric hydroxide	M1	Protectant	1	A	QLD, NSW	Registered for control of **Phytophthora Stem Canker**. Apply to stems of vines wherever cankers appear, after removing dead tissue. Repeat applications up to a maximum of 5 per season until natural healing is commenced. Can be mixed with water or a water-based paint.	-
Copper (Cu) present as copper oxychloride	M1	Protectant	1	A	WA, QLD, NT, NSW & ACT	Registered in passionfruit for control of Brown Spot, Septoria Spot and **Phytophthora Blight**. Apply to infected area after removing dead tissue. Repeat frequently until healing commences. Treatments per season not limited.	-
Copper (Cu) present as cuprous oxide	M1	Protectant	1	A	ALL	Registered for control of **Phytophthora Stem Canker**. Apply to stems of vines wherever cankers appear, after removing dead tissue. Repeat applications up to a maximum of 5 per season until natural healing is commenced. Can be mixed with water or a water-based paint.	-
Copper (Cu) Present as Tribasic Copper Sulphate	M1	Protectant	1	A	ALL	Registered for control of **Phytophthora Stem Canker**. Apply to stems of vines wherever cankers appear, after removing dead tissue. Repeat applications up to a maximum of 5 per season until natural healing is commenced. Can be mixed with water or a water-based paint.	-
Copper (Cu) Present as Cupric Ammonium Complex	M1	Protectant	1	A	ALL	Registered for control of **Phytophthora Stem Canker**. Apply to stems of vines wherever cankers appear, after removing dead tissue. Repeat applications up to a maximum of 5 per season until natural healing is commenced. Can be mixed with water or a water-based paint.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Provides suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.	-
Mandipropamid (Revus) Syngenta	40	Curative / Protectant		P		Mandipropamid has US registrations for **Phytophthora** in various crops, including as a foliar application for protection of citrus from **Phytophthora** Root Rot.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Metalaxyl-M (Ridomil Gold) Syngenta	4	Curative / Protectant		P		Registered for control of Phytophthora in various crops. AU MRL 0.05 mg/kg.	-
Oxathiopiprolin (Zorvec Enicade) Corteva	49	Protectant & Curative		P		Current AU registrations only for Downy Mildew but known to have broad activity in the oomycete group. US registration for control of **Phytophthora** Canker and Brown Rot in citrus.	-
Streptomyces lydicus (Actinovate)	BM 02	Biological	NR	P		Registered in strawberries for the suppression of Powdery Mildew and **Phytophthora**. No MRLs required for biological product.	-
Root and Collar Rot (*Phytophthora cinnamomi*) **Priority: Moderate**							
Root and Collar Rot is rated as a moderate priority in QLD and NSW. It is a soil borne disease that can attack the roots and base of the vine, impacting on plant health and, in severe cases, causing death of vines. Selection of well drained planting sites is important. Care should be taken not to apply too much or too little irrigation.							
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Provides suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.	-
Phosphorous (Phosphonic) Acid present as Mono- And Dipotassium Phosphite (PER87607)	33	Curative / Protectant	NR	P-A	ALL (excl. VIC)	Permitted in passionfruit for control of **Phytophthora** Blight. Apply up to a maximum of 4 foliar applications per crop. For preventative activity, apply every 5-6 weeks. As a curative, apply every 3 weeks until disease is under control.	-
Mandipropamid (Revus) Syngenta	40	Curative / Protectant		P		Mandipropamid has US registrations for **Phytophthora** in various crops, including as a foliar application for protection of citrus from **Phytophthora Root Rot**.	-
Metalaxyl-M (Ridomil Gold) Syngenta	4	Curative / Protectant		P		Registered for control of **Phytophthora** in various crops. AU MRL 0.05 mg/kg.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Oxathiopiprolin (Zorvec Enicade) Corteva	49	Protectant & Curative		P		Current AU registrations only for Downy Mildew but known to have broad activity in the oomycete group. US registration for control of **Phytophthora** Canker and Brown Rot in citrus.	-
Streptomyces lydicus (Actinovate)	BM 02	Biological	NR	P		Registered in strawberries for the suppression of Powdery Mildew and **Phytophthora**. No MRLs required for biological product.	-
Fusarium Wilt (*Fusarium oxysporum*) **Priority: Moderate**							
Fusarium Wilt is rated as a moderate priority. It disrupts the vascular system of the vine, leading to poor vine health and premature loss of leaves. Ensure planting material is pathogen free and use biosecurity measures to protect plants from infection via machinery or people.							
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime) Bayer	BM 02	Biological	NR	P-A	ALL	Registered in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Provides suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.	-
Bacterial Spot (*Xanthomonas axonopodis*) **Priority: Moderate**							
Bacterial Spot is rated as a moderate priority in QLD and NSW. It does not require specific control measures although the use of copper fungicides for control of leaf fungal diseases may assist to reduce incidence.							
Bacillus amyloliquefaciens Strain QST 713 (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for suppression of Bacterial Spot in tomatoes. MRLs not required for a biological product.	-
Passionfruit Woodiness (*Passionfruit Woodiness Virus*) **Priority: Moderate**							
Passionfruit Woodiness Virus is rated as a moderate priority in QLD and a low priority in NSW. It causes leaf distortion and discolouration as well as reducing fruit size. The disease is vectored by aphids but can also be spread by pruning tools. Ensure disease-free planting material is used and use good hygiene in the vineyard by keeping weed hosts in check and eliminating pruning transmission. Aphid control is not practical to control infection.							
No control options available.							

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Passionfruit Yellow Mosaic (*Passionfruit Yellow Mosaic Virus*) **Cucumber Mosaic** (*Cucumber Mosaic Virus*) **Priority: Low**							
Passionfruit Yellow Mosaic Virus and Cucumber Mosaic are rated as a low priority in QLD and NSW. Use virus-free seedlings for new plantings and maintain good hygiene in vineyard to ensure any weed hosts and infected plants are removed promptly.							
No control options available.							

4.2 Insect, mites and other pests of passionfruit

4.2.1 Insect, mites and other pest priorities

Common name	Scientific name
High	
Queensland Fruit Fly	*Bactrocera tryoni*
Passionvine Mite	*Brevipalpus phoenicis*
Hemispherical Scale	*Saissetia coffeae*
Red Scale	*Aonidiella aurantii*
Moderate	
Fruit Spotting Bug	*Amblypelta nitida*
Banana Spotting Bug	*Amblypelta lutescens*
Pacific Spider Mite	*Tetranychus pacificus*
Two Spotted Mite	*Tetranychus urticae*
Passionvine Bug	*Fabrictilis gonagra*
Green Vegetable Bug	*Nezara viridula*
Passionvine Mealybug	*Planococcus minor*
Citrus Mealybug	*Planococcus citri*
Coffee Stem Borer	*Coleoptera*
White Louse Scale	*Unaspis citri*
Black Scale	*Saissetia oleae*

Common name	Scientific name
Low	
Ants	Formicidae
Mediterranean Fruit Fly	*Ceratitis capitata*
Western Flower Thrips	*Frankliniella occidentalis*
Banana-Silvering Thrips	*Hercinothrips bicinctus*
Tomato Thrips	*Frankliniella schultzei*
Red Banded Thrips	*Selenothrips rubrocinctus*
Longtail Mealybug	*Pseudococcus longispinus*
Melon Aphid	*Aphis gossypii*
Green Peach Aphid	*Myzus persicae*
Flower eating Caterpillars	Lepidoptera
Cabbage Moth	*Plutella xylostella*
Cabbage White Butterfly	*Pieris rapae*
Leafroller Caterpillars	Tortricidae
Native Budworm	*Helicoverpa punctigera*
Cotton Bollworm	*Helicoverpa armigera*
Light Brown Apple Moth	*Epiphyas postvittana*
Looper	Geometridae
Painted Vine Moth	*Agarista agricola*
Armyworms	*Spodoptera* spp.
Sorghum Head Caterpillar	*Cryptoblabes adoceta*
Yellow Peach Moth	*Conogethes punctiferalis*

Exotic pests and new incursions which could be potential threats are listed below:

Common Name	Scientific name
Fall Armyworm	*Spodoptera frugiperda*

4.2.2 Available and potential products for priority insects, mites and other pests

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

Availability		Regulatory risk (refer to Appendix 6)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG
IPM – indicative overall impact on beneficials (based on the Cotton Pest Management Guide 2018-19 and cotton use patterns)			
VL – Very low; L – Low; M – Moderate; H – High; VH – Very High; - not specified			

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Queensland Fruit Fly (*Bactrocera tryoni*) **Priority: High**								
Queensland Fruit Fly is rated as a high priority in QLD and NSW. Fruit Fly management is critical to ensure protection of fruit from stings in the vineyard and to ensure that infested fruit is not sent to market. Fruit fly traps as well as general vineyard hygiene and post-harvest dips are the key to managing Fruit Fly.								
4-(P-Acetoxyphenyl) -2-Butanone + Maldison	1B	Contact	NR	A	ALL	Registered in fruit trees for use as a trap for **Queensland Fruit Fly**. Used to detect the presence of Fruit Fly in the orchard to assist with making decisions about control.	H Bee H	R3
4-(P-Acetoxyphenyl) -2-Butanone + Fipronil	2B	Contact	NR	A	ALL	Registered in fruit crops for population reduction and population monitoring of **Queensland Fruit Fly** and Lesser Queensland Fruit Fly. Single stations can be used for population monitoring. Control of fruit fly required placement of 16 stations per hectare and should be used in conjunction with regular insecticide cover sprays.	M Bee VH	R3
Chlorpyrifos (Lorsban)	1B	Contact / Systemic	14	A	NSW, QLD	Registered in passionfruit as a bait spray for **Queensland Fruit Fly**. Mix with a protein lure and spray along the bottom of the vines. Repeat every 7-10 days during periods of fruit fly susceptibility. Avoid contact with fruit. Treatments per season not limited.	H Bee H	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dimethoate	1B	Post-Harvest Dip	NR	A	NSW, WA	Registered in passionfruit as a post-harvest dip for control of **Queensland Fruit Fly.** Immerse fruit in emulsion for one minute or according to the requirements of the importing state or country.	H Bee H	R1
Maldison (Fyfanon)	1B	Fruit Fly 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	Fruit Fly Bait Concentrate	NR	A	ALL	Registered in fruit for control of Fruit Flies including **Queensland Fruit Fly** and Mediterranean Fruit Fly. Apply as either a band or a spot spray to the lower canopy of fruiting plants. Begin applications as soon as monitoring traps indicate flies are present and fruit is at a susceptible stage. Repeat applications every 7 days, re-applying sooner if rain washes off the deposit. Avoid spraying the fruit as phytotoxicity may occur.	L Bee H	-
Trichlorfon (Lepidex) (PER12450)	1B	Contact	7	A	ACT, NSW, NT, QLD, SA & WA	Permitted in passionfruit for control of **Queensland Fruit Fly** and Mediterranean Fruit Fly. Apply as a cover spray to the point of runoff via air-blast sprayer or equivalent. Repeat at half concentration (125 mL/100L) every 7-10 days. Apply a maximum of 4 applications per season	H Bee H	R2
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact / Systemic and IGR		P		Hort Innovation project ST16006 generating residue, efficacy and crop safety data to enable registration in Tropical and Sub-Tropical Fruits (inedible peel) for control of Spotting Bugs, Hoppers, Scale and Mealybug. Registered for suppression of **Queensland Fruit Fly** in avocado, citrus and mango. Acetamiprid: AU MRL 0.1 mg/kg. Pyriproxyfen: AU MRL 0.1 mg/kg.	M Bee H	R2
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact / Systemic and Ingestion		P		Registered for suppression of **Queensland Fruit Fly** in stone fruit. Acetamiprid: AU MRL 0.1 mg/kg.	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 / Systemic		P		Hort Innovation project ST19020 data generation (AgVet Grant) for label registration to control Fruit Spotting Bugs in Tropical & Sub-Tropical Fruits (inedible peel). Expected to also have activity on **Fruit Fly**.	L Bee L	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on fruit flies.		-
Passionvine Mite (*Brevipalpus phoenicis*) **Priority: High**								
Passionvine Mite is rated as a high priority in NSW and a moderate priority in QLD. They pose a significant risk to passionfruit vines. The use of broad spectrum chemistry to control other insect pests can contribute to increased mite numbers by taking out beneficial insects that are natural predators of mites. Early treatment of mite outbreaks is critical to prevent them spreading.								
Abamectin PER14665	6	Contact	1	A	ALL (excl. VIC)	Permitted in passionfruit for control of **Passionvine Mite** and Two-Spotted Mite. Apply before pest populations reach economic threshold levels. If conditions continue to favour mite development, a second application may be required 14-20 days later. DO NOT apply more than 2 sprays per season.	M Bee H	-
Fenbutatin Oxide (Torque) (PER84258)	12B	Contact / Ingestion	7	A	ALL (excl. VIC)	Permitted in passionfruit for control of **Passionvine Mite** and Two-Spotted Mite. Apply at the first sign of mite activity and repeat as infestations indicate. DO NOT apply more than 2 applications per season of fenbutatin oxide with a retreatment interval of 14 days.	L Bee L	R3
Petroleum Oil PER14662		Contact	NR	A	ALL (excl. VIC)	Permitted passionfruit for control of **Passionvine Mite** and Two-Spotted Mite. Apply at the first sign of mite activity and repeat as infestations indicate up to a maximum 6 spray applications per growing season. A minimum interval of 14 days should elapse between consecutive sprays in the first month. It is recommended that additional sprays are applied at monthly intervals for up to 6 months (depending on observed mite activity levels).	L Bee L	-
Propargite (Omite)	12C	Contact / Systemic	7	A	QLD, WA	Registered in passionfruit for control of **Passionvine Mite**. Apply as a cover spray. Best results are achieved by using 2 sprays at 10-14 day interval. DO NOT apply more than twice per season.	M Bee L	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spiromesifen (Oberon) Bayer	23			P		Hort Innovation Project ST18001 generating data to support a registration for control of **Passionvine Mite** and Two Spotted Mite in passionfruit. US registrations for Mites in various crops.	M Bee VL	-
Beauveria bassiana (Velifer) BASF	UN	Biological / Protectant	NR	P		Registered for suppression of Onion Thrips and Western Flower Thrips in protected vegetables and ornamentals and has activity on Thrips, Aphids, Whitefly and **Mites**. No MRLs required for a biological product.	L Bee L	-
Bifenazate (Acramite) UPL	2D	Contact / Systemic		P		Broad spectrum miticide registered in various fruit crops.	L Bee H	-
Etoxazole (Paramite) Sumitomo	10B	Contact / Systemic		P		Broad spectrum miticide registered in various fruit crops. AU MRL 0.05 mg/kg.	L Bee VL	-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, **Mites** and Caterpillars.		-
Hemispherical Scale (*Saissetia coffeae*) **Red Scale** (*Aonidiella aurantii*) **Priority: High**								
Hemispherical Scale is rated as a moderate priority in QLD and NSW. Red Scale is rated as a high priority in QLD and a moderate priority in NSW. Infestations are common and can cause poor general health of vines when severe. The use of broad-spectrum chemistry can contribute to outbreaks of scale, as well as excessive dust from roads around the vineyard.								
Buprofezin (Applaud) Corteva	16	Contact & Ingestion	1	A	ALL	Registered in passionfruit for control of Mealybugs and **Scale Insects**. Apply a maximum of 2 applications per season, 21 days apart when significant pest infestations develop.	M Bee L	-
Methidathion (Suprathion)	1B	Contact	14	A	QLD, NSW, WA	**Note: Suprathion Registration Cancelled by ADAMA and the use of Suprathion will not be permitted after 4-Feb-21.** Previously registered in passionfruit for control of Mealybug, **Red Scale** and **Other Scale Insects**. Apply 1 or 2 sprays, 2-3 weeks apart depending on the degree of infestation.	H Bee H	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Paraffinic Oil		Contact	1	A	ALL	Registered in passionfruit for control of **Red Scale** and **Hemispherical Scale** and suppression of Passionvine Mealy Bug. A minimum interval of 14 days should elapse between sprays in the first month with additional applications applied at monthly intervals for up to 6 months. Spray no more than 4 times during growing season.	L Bee L	-
Spirotetramat (Movento) Bayer	23	Ingestion	3	A	ALL	Registered in passionfruit for control of **Red Scale** and suppression of Citrus Mealybug. Commence applications immediately after peak flowering coinciding with the onset of crawler emergence or when pest numbers reach economic threshold. Apply a second application no less than 21 days after the first application if required. Maximum of 2 applications per year.	M Bee L	-
Sulfoxaflor (Transform) Corteva PER85397	4C	Contact and Ingestion	7	P-A	NSW, NT, QLD & WA	Permitted in passionfruit for control of Fruit Spotting Bug and Banana Spotting Bug. Registered for control of **Scale Insects** in citrus. Hort Innovation project ST17000 generating data to support a label registration for control of Spotting Bugs and registrant to extrapolate to other pests.	M Bee VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact / Systemic and IGR		P		Hort Innovation project ST16006 generating residue, efficacy and crop safety data to enable registration in Tropical and Sub-Tropical Fruits (inedible peel) for control of Spotting Bugs, Hoppers, **Scale** and Mealybug. Acetamiprid: AU MRL 0.1 mg/kg. Pyriproxyfen: AU MRL 0.1 mg/kg.	M Bee H	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact / Systemic		P		Hort Innovation project ST19020 data generation (AgVet Grant) for label registration to control Fruit Spotting Bugs in Tropical & Sub-Tropical Fruits (inedible peel). Expected to also have activity on **Scale**.	L Bee L	-
NUL3145 Nufarm	TBC			P		New product in development from Nufarm with activity on **Scale**, Nematodes, Mealybug and Whitefly.		-

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: Moderate**								
Fruit Spotting Bugs are rated as a moderate priority in QLD and NSW. If not controlled, they can cause substantial loss of marketable fruit.								
Sulfoxaflor (Transform) Corteva PER85397	4C	Contact and Ingestion	7	A	NSW, NT, QLD & WA	Permitted in passionfruit for control of **Fruit Spotting Bug** and **Banana Spotting Bug**. Apply only when monitoring of the crop indicates that the pest is present and active in sufficient numbers to cause economic damage. DO NOT apply more than 2 applications per year with a minimum of 14 days between consecutive sprays. Hort Innovation project ST17000 generating data to support a label registration for this use.	M Bee VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact / Systemic and IGR		P		Hort Innovation project ST16006 generating residue, efficacy and crop safety data to enable registration in Tropical and Sub-Tropical Fruits (inedible peel) for control of **Spotting Bugs**, Hoppers, Scale and Mealybug. Acetamiprid: AU MRL 0.1 mg/kg. Pyriproxyfen: AU MRL 0.1 mg/kg.	M Bee H	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact / Systemic		P		Hort Innovation project ST19020 data generation (AgVet Grant) for label registration to control **Fruit Spotting Bugs** in Tropical & Sub-Tropical Fruits (inedible peel). Registered for control of Fruit Spotting Bugs in macadamia.	L Bee L	-
NUL3445	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Pacific Spider Mite (*Tetranychus pacificus*) **Two Spotted Mite** (*Tetranychus urticae*) **Priority: Moderate**								
Pacific Spider Mite is rated as a moderate priority in QLD and NSW. Two Spotted Mite is rated as a moderate priority in QLD and a low priority in NSW. They pose a significant risk to passionfruit vines. The use of broad-spectrum chemistry to control other insect pests can contribute to increased mite numbers by taking out beneficial insects that are natural predators of mites. Early treatment of mite outbreaks is critical to prevent them spreading.								
Abamectin PER14665	6	Contact	1	A	ALL (excl. VIC)	Permitted in passionfruit for control of Passionvine Mite and **Two-Spotted Mite**. Apply before pest populations reach economic threshold levels. If conditions continue to favour mite development, a second application may be required 14-20 days later. DO NOT apply more than 2 sprays per season.	M Bee H	-
Fatty Acids – Potassium Salt (Natrasoap)		Contact	NR	A	ALL	Registered in fruit for control of Aphids, Thrips, Mealybug, **Two Spotted Mite**, **Spider Mite** and Whitefly. Apply as a cover spray. Treatments per season not limited.	L Bee L	-
Fenbutatin Oxide (Torque) (PER84258)	12B	Contact / Ingestion	7	A	ALL (excl. VIC)	Permitted in passionfruit for control of Passionvine Mite and **Two-Spotted Mite**. Apply at the first sign of mite activity and repeat as infestations indicate. DO NOT apply more than 2 applications per season of fenbutatin oxide with a retreatment interval of 14 days.	L Bee L	R3
Petroleum Oil PER14662		Contact	NR	A	ALL (excl. VIC)	Permitted passionfruit for control of Passionvine Mite and **Two-Spotted Mite**. Apply at the first sign of mite activity and repeat as infestations indicate up to a maximum 6 spray applications per growing season. A minimum interval of 14 days should elapse between consecutive sprays in the first month. It is recommended that additional sprays are applied at monthly intervals for up to 6 months (depending on observed mite activity levels).	L Bee L	-
Spiromesifen (Oberon) Bayer	23			P		Hort Innovation Project ST18001 generating data to support a registration for control of Passionvine Mite and **Two Spotted Mite** in passionfruit. US registrations for **Mites** in various crops.	M Bee VL	-
Beauveria bassiana (Velifer) BASF	UN	Biological / Protectant		P		Registered for suppression of Onion Thrips and Western Flower Thrips in protected vegetables and ornamentals and has activity on Thrips, Aphids, Whitefly and **Mites**. No MRLs required for a biological product.	L Bee L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Bifenazate (Acramite) UPL	2D	Contact / Systemic		P		Broad spectrum miticide registered in various fruit crops.	L Bee H	-
Cyflumetofen (Danisaraba) BASF	25A	Contact		P		BASF is seeking registration in Australia for the control of Spider Mites in various crops. Will not control mite species other than Spider Mites.	L Bee L	-
Etoxazole (Paramite) Sumitomo	10B	Contact / Systemic		P		Broad spectrum miticide registered in various fruit crops. AU MRL 0.05 mg/kg.	L Bee VL	-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, **Mites** and Caterpillars.		-
Passionvine Bug (*Fabrictilis gonagra*) **Priority: Moderate**								
Passionvine Bug is rated as a moderate priority in QLD and NSW. It is frequently observed in Queensland but rarely causes crop damage. No control options are available.								
Sulfoxaflor (Transform) Corteva PER85397	4C	Contact and Ingestion	7	P-A	NSW, NT, QLD & WA	Permitted in passionfruit for control of Fruit Spotting Bug and Banana Spotting Bug. Hort Innovation project ST17000 generating data to support a label registration for control of Spotting Bugs and registrant to extrapolate to other pests.	M Bee VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact / Systemic and IGR		P		Hort Innovation project ST16006 generating residue, efficacy and crop safety data to enable registration in Tropical and Sub-Tropical Fruits (inedible peel) for control of Spotting Bugs, Hoppers, Scale and Mealybug. Acetamiprid: AU MRL 0.1 mg/kg. Pyriproxyfen: AU MRL 0.1 mg/kg.	M Bee H	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact / Systemic		P		ST19020 data generation (AgVet Grant) for label registration to control Fruit Spotting Bugs in Tropical & Sub-Tropical Fruits (inedible peel). Registered for control of Fruit Spotting Bugs in macadamia.	L Bee L	-
NUL3445	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Green Vegetable Bug (*Nezara viridula*) **Priority: Moderate**								
Green Vegetable Bug is rated as a moderate priority in QLD and NSW. They can cause significant damage to fruit in some years.								
Trichlorfon (Lepidex)	1B	Contact	2	A	QLD, NT	Registered in passionfruit for control of **Green Vegetable Bug** and Passion Vine Bug. Apply as a cover spray when pests are first seen. Treatments per season not limited.	H Bee H	R2
Sulfoxaflor (Transform) Corteva PER85397	4C	Contact and Ingestion	7	P-A	NSW, NT, QLD & WA	Permitted in passionfruit for control of Fruit Spotting Bug and Banana Spotting Bug. Hort Innovation project ST17000 generating data to support a label registration for control of Spotting Bugs and registrant to extrapolate to other pests.	M Bee VH	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact / Systemic		P		ST19020 data generation (AgVet Grant) for label registration to control Fruit Spotting Bugs in Tropical & Sub-Tropical Fruits (inedible peel). Registered for control of Fruit Spotting Bugs in macadamia.	L Bee L	-
NUL3445	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Passionvine Mealybug (*Planococcus minor*) **Citrus Mealybug** (*Planococcus citri*) **Priority: Moderate**								
Passionvine Mealybug is rated as a moderate priority in QLD and NSW. Citrus Mealybug is rated as a moderate priority in QLD and a low priority in NSW. The use of broad-spectrum chemistry to control other insect pests can lead to outbreaks by taking out natural predators. Early treatment is critical to prevent them spreading in the vineyard.								
Buprofezin (Applaud) Corteva	16	Contact & Ingestion	1	A	ALL	Registered in passionfruit for control of **Mealybugs** and Scale Insects. Apply a maximum of 2 applications per season, 21 days apart when significant pest infestations develop.	M Bee L	-
Fatty Acids – Potassium Salt (Natrasoap)		Contact	NR	A	ALL	Registered in fruit for control of Aphids, Thrips, **Mealybug**, Two Spotted Mite, Spider Mite and Whitefly. Apply as a cover spray. Treatments per season not limited.	L Bee L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Methidathion (Suprathion)	1B	Contact	14	A	QLD, NSW & WA	**Note: Suprathion Registration Cancelled by ADAMA and the use of Suprathion will not be permitted after 4-Feb-21.** Previously registered in passionfruit for control of **Mealybug**, Red Scale and Other Scale Insects. Apply 1 or 2 sprays, 2-3 weeks apart depending on the degree of infestation.	H Bee H	R1
Paraffinic Oil		Contact	1	A	ALL	Registered in passionfruit for control of Red Scale and Hemispherical Scale and suppression of **Passionvine Mealy Bug**. A minimum interval of 14 days should elapse between sprays in the first month with additional applications applied at monthly intervals for up to 6 months. Spray no more than 4 times during growing season.	L Bee L	-
Spirotetramat (Movento) Bayer	23	Ingestion	3	A	ALL	Registered in passionfruit for control of Red Scale and suppression of **Citrus Mealybug**. Commence applications immediately after peak flowering coinciding with the onset of crawler emergence or when pest numbers reach economic threshold. Apply a second application no less than 21 days after the first application if required. Maximum of 2 applications per year.	M Bee L	-
Sulfoxaflor (Transform) Corteva PER85397	4C	Ingestion	7	P-A	NSW, NT, QLD & WA	Permitted in passionfruit for control of Fruit Spotting Bug and Banana Spotting Bug. Registered for control of Citrus Mealybug in citrus. Hort Innovation project ST17000 generating data to support a label registration for control of Spotting Bugs and registrant to extrapolate to other pests.	M Bee VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact / Systemic and IGR		P		Hort Innovation project ST16006 generating residue, efficacy and crop safety data to enable registration in Tropical and Sub-Tropical Fruits (inedible peel) for control of Spotting Bugs, Hoppers, Scale and **Mealybug**. Acetamiprid: AU MRL 0.1 mg/kg. Pyriproxyfen: AU MRL 0.1 mg/kg.	M Bee H	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact / Systemic		P		Hort Innovation project ST19020 data generation (AgVet Grant) for label registration to control Fruit Spotting Bugs in Tropical & Sub-Tropical Fruits (inedible peel). Expected to also have activity on **Mealybug**.	L Bee L	-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Coffee Stem Borer (*Coleoptera*) **Priority: Moderate**								
Coffee Stem Borer are rated as a moderate priority in QLD and NSW. Larvae feed inside the stem, causing the stems to weaken and die. May cause premature fruit drop as the transport of water and nutrients are interrupted. Affected plant parts should be removed and destroyed.								
DC-163 Bayer		Ingestion		P		Hort Innovation project ST17000 in progress to generate data in Tropical & Sub-Tropical Fruit (inedible peel) for control of lepidoptera and borers, including **Coffee Stem Borer** in passionfruit. Project completion expected in March 2022.	L-M Bee VH	-
White Louse Scale (*Unaspis citri*) **Black Scale** (*Saissetia oleae*) **Priority: Moderate**								
White Louse Scale is rated as a low priority in QLD and a moderate priority in NSW. Black Scale is rated as a moderate priority in QLD and a low priority in NSW. Scale infestations are common and can cause poor general health of vines when severe. The use of broad-spectrum chemistry can contribute to outbreaks of scale, as well as excessive dust from roads around the vineyard.								
Buprofezin (Applaud) Corteva	16	Contact & Ingestion	1	A	ALL	Registered in passionfruit for control of Mealybugs and **Scale Insects**. Apply a maximum of 2 applications per season, 21 days apart when significant pest infestations develop.	M Bee L	-
Methidathion (Suprathion)	1B	Contact	14	A	QLD, NSW & WA	**Note: Suprathion Registration Cancelled by ADAMA and the use of Suprathion will not be permitted after 4-Feb-21.** Previously registered in passionfruit for control of Mealybug, **Red Scale** and **Other Scale Insects**. Apply 1 or 2 sprays, 2-3 weeks apart depending on the degree of infestation.	H Bee H	R1
Spirotetramat (Movento) Bayer	23	Ingestion	3	P-A	ALL	Registered in passionfruit for control of Red Scale and suppression of Citrus Mealybug.	M Bee L	-
Sulfoxaflor (Transform) Corteva PER85397	4C	Contact and Ingestion	7	P-A	NSW, NT, QLD & WA	Permitted in passionfruit for control of Fruit Spotting Bug and Banana Spotting Bug. Registered for control of **Scale Insects** in citrus. Hort Innovation project ST17000 generating data to support a label registration for control of Spotting Bugs and registrant to extrapolate to other pests.	M Bee VH	-

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 / Systemic and IGR		P		Hort Innovation project ST16006 generating residue, efficacy and crop safety data to enable registration in Tropical and Sub-Tropical Fruits (inedible peel) for control of Spotting Bugs, Hoppers, **Scale** and Mealybug. Acetamiprid: AU MRL 0.1 mg/kg. Pyriproxyfen: AU MRL 0.1 mg/kg.	M Bee H	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact / Systemic		P		Hort Innovation project ST19020 data generation (AgVet Grant) for label registration to control Fruit Spotting Bugs in Tropical & Sub-Tropical Fruits (inedible peel). Expected to also have activity on **Scale**.	L Bee L	-
NUL3145 Nufarm	TBC			P		New product in development from Nufarm with activity on **Scale**, Nematodes, Mealybug and Whitefly.		-
Ants (*Formicidae*) **Priority: Low**								
Ants are rated as a low priority in QLD and NSW. They are a nuisance pest in vineyards, causing inconvenience to workers and potentially contaminating harvest without causing damage to the fruit.								
Pyriproxyfen (Distance Ant Bait) Sumitomo	7C	IGR / Bait	NR	A	ALL	Registered in Tropical Fruit Plantations for control of invasive and 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 Granular Ant Bait) BASF	30	Bait Ingestion	NR	P	ALL	Registered for use in non-crop areas for the control of ants. Slow acting.	L	
Metaflumizone (Siesta Ant Bait) BASF	22B	Ingestion		P		Registration pending in AU.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Mediterranean Fruit Fly (*Ceratitis capitata*) **Priority: Low**								
Mediterranean Fruit Fly is rated as a low priority in QLD and a low priority in NSW. They are rarely found in passionfruit. They cause similar fruit damage as Queensland Fruit Fly but occurrence is much less.								
Maldison (Fyfanon)	1B	Fruit Tree / Fruit Fly Bait	3	A	ALL	Registered in fruit trees for control of **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	Fruit Fly Bait Concentrate	NR	A	ALL	Registered in fruit for control of Fruit Flies including Queensland Fruit Fly and **Mediterranean Fruit Fly**. Apply as either a band or a spot spray to the lower canopy of fruiting plants. Begin applications as soon as monitoring traps indicate flies are present and fruit is at a susceptible stage. Repeat applications every 7 days, re-applying sooner if rain washes off the deposit. Avoid spraying the fruit as phytotoxicity may occur.	L Bee H	-
Trichlorfon (Lepidex) PER12450	1B	Contact	7	A	ACT, NSW, NT, QLD, SA & WA	Permitted in passionfruit for control of Queensland Fruit Fly and **Mediterranean Fruit Fly**. Apply as a cover spray to the point of runoff via air-blast sprayer or equivalent. Repeat at half concentration (125 mL/100L) every 7-10 days. Apply a maximum of 4 applications per season	H Bee H	R2
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact / Systemic and IGR		P		Hort Innovation project ST16006 generating residue, efficacy and crop safety data to enable registration in Tropical and Sub-Tropical Fruits (inedible peel) for control of Spotting Bugs, Hoppers, Scale and Mealybug. Registered for suppression of Queensland Fruit Fly in avocado, citrus and mango. Acetamiprid: AU MRL 0.1 mg/kg. Pyriproxyfen: AU MRL 0.1 mg/kg.	M Bee H	R2
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact / Systemic and Ingestion		P		Registered for suppression of **Mediterranean Fruit Fly** in stone fruit. Acetamiprid: AU MRL 0.1 mg/kg.	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 / Systemic		P		Hort Innovation project ST19020 data generation (AgVet Grant) for label registration to control Fruit Spotting Bugs in Tropical & Sub-Tropical Fruits (inedible peel). Expected to also have activity on **Fruit Fly**.	L Bee L	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on fruit flies.		-
Western Flower Thrips (*Frankliniella occidentalis*) **Banana-Silvering Thrips** (*Hercinothrips bicinctus*) **Tomato Thrips** (*Frankliniella schultzei*) **Red Banded Thrips** (*Selenothrips rubrocinctus*) **Priority: Low**								
Western Flower Thrips is rated as a moderate priority in QLD and a low priority in NSW. Banana-Silvering Thrips, Tomato Thrips and Red Banded Thrips are rated as a low priority in QLD and NSW. They can damage leaves, flowers and fruit, however in passionfruit this damage is minor and infrequent. Control is rarely warranted.								
Fatty Acids – Potassium Salt (Natrasoap)		Contact	NR	A	ALL	Registered in fruit for control of Aphids, **Thrips**, Mealybug, Two Spotted Mite, Spider Mite and Whitefly. Apply as a cover spray. Treatments per season not limited.	L Bee L	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit crops for control of Ants, Aphids, Caterpillar, Earwigs, Whitefly, **Thrips** and Leafhopper. Apply as a cover spray when pests are evident. Re-apply as necessary. Treatments per season not limited.	H Bee H	-
Spinetoram (Success Neo) Corteva	5	Ingestion	NR	A	ALL	Registered in passionfruit for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, **Red-Banded Thrips** and Sorghum Head Caterpillar. Target sprays against mature eggs and newly hatched larvae when numbers exceed spray threshold. Apply repeat applications at 7-14 day intervals as new infestations occur. Do not make more than 4 applications per season.	M Bee VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR	A	ALL	Registered in passionfruit for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, **Red-Banded Thrips** and Sorghum Head Caterpillar. Target sprays against mature eggs and newly hatched larvae when numbers exceed spray threshold. Apply repeat applications at 7-14 day intervals as new infestations occur. Do not make more than 4 applications per season.	L Bee H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spirotetramat (Movento) Bayer	23	Ingestion	3	P-A	ALL	Registered in passionfruit for control of Red Scale and suppression of Citrus Mealybug. Registered for control of Thrips in various vegetable crops, citrus and grapes.	M Bee L	-
Beauveria bassiana (Velifer) BASF	UN	Biological / Protectant	NR	P		Registered for suppression of Onion Thrips and **Western Flower Thrips** in protected vegetables and ornamentals and has activity on **Thrips**, Aphids, Whitefly and Mites. No MRLs required for a biological product.	L Bee L	-
NUL3445	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Longtail Mealybug (*Pseudococcus longispinus*) **Priority: Low**								
Longtail Mealybug is rated as a low priority in QLD and NSW. The use of broad-spectrum chemistry to control other insect pests can lead to outbreaks by taking out natural predators. Early treatment is critical to prevent them spreading in the vineyard.								
Buprofezin (Applaud) Corteva	16	Contact & Ingestion	1	A	ALL	Registered in passionfruit for control of **Mealybugs** and Scale Insects. Apply a maximum of 2 applications per season, 21 days apart when significant pest infestations develop.	M Bee L	-
Fatty Acids – Potassium Salt (Natrasoap)		Contact	NR	A	ALL	Registered in fruit for control of Aphids, Thrips, **Mealybug**, Two Spotted Mite, Spider Mite and Whitefly. Apply as a cover spray. Treatments per season not limited.	L Bee L	-
Methidathion (Suprathion)	1B	Contact	14	A	QLD, NSW & WA	**Note: Suprathion Registration Cancelled by ADAMA and the use of Suprathion will not be permitted after 4-Feb-21.** Previously registered in passionfruit for control of **Mealybug**, Red Scale and Other Scale Insects. Apply 1 or 2 sprays, 2-3 weeks apart depending on the degree of infestation.	H Bee H	R1
Paraffinic Oil		Contact	1	P-A	ALL	Registered in passionfruit for control of Red Scale and Hemispherical Scale and suppression of Passionvine Mealy Bug.	L Bee L	-
Spirotetramat (Movento) Bayer	23	Ingestion	3	P-A	ALL	Registered in passionfruit for control of Red Scale and suppression of Citrus Mealybug.	M Bee L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Sulfoxaflor (Transform) Corteva PER85397	4C	Ingestion	7	P-A	NSW, NT, QLD & WA	Permitted in passionfruit for control of Fruit Spotting Bug and Banana Spotting Bug. Registered for control of Citrus Mealybug in citrus. Hort Innovation project ST17000 generating data to support a label registration for control of Spotting Bugs and registrant to extrapolate to other pests.	M Bee VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact / Systemic and IGR		P		Hort Innovation project ST16006 generating residue, efficacy and crop safety data to enable registration in Tropical and Sub-Tropical Fruits (inedible peel) for control of Spotting Bugs, Hoppers, Scale and **Mealybug**. Acetamiprid: AU MRL 0.1 mg/kg. Pyriproxyfen: AU MRL 0.1 mg/kg.	M Bee H	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact / Systemic		P		Hort Innovation project ST19020 data generation (AgVet Grant) for label registration to control Fruit Spotting Bugs in Tropical & Sub-Tropical Fruits (inedible peel). Expected to also have activity on **Mealybug**.	L Bee L	-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Melon Aphid *(Aphis gossypii)* **Green Peach Aphid** *(Myzus persicae)* **Priority: Low**								
Melon Aphid and Green Peach Aphid are rated as a low priority in QLD and NSW. Aphids do not generally attack passionfruit. They are known to vector Passionfruit Woodiness Virus, however aphid control is not effective at stopping transmission of the disease. Aphid control is rarely warranted.								
Fatty Acids – Potassium Salt (Natrasoap)		Contact	NR	A	ALL	Registered in fruit for control of **Aphids**, Thrips, Mealybug, Two Spotted Mite, Spider Mite and Whitefly. Apply as a cover spray. Treatments per season not limited.	L Bee L	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in fruit crops for control of Ants, **Aphids**, Caterpillar, Earwigs, Whitefly, Thrips and Leafhopper. Apply as a cover spray when pests are evident. Re-apply as necessary. Treatments per season not limited.	H Bee H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Sulfoxaflor (Transform) Corteva PER85397	4C	Ingestion	7	P-A	NSW, NT, QLD & WA	Permitted in passionfruit for control of Fruit Spotting Bug and Banana Spotting Bug. Registered for control of Citrus Mealybug in citrus. Registered for control of **Green Peach Aphid** and **Melon Aphid** in various crops. Hort Innovation project ST17000 generating data to support a label registration for control of Spotting Bugs and registrant to extrapolate to other pests.	M Bee VH	-
Spirotetramat (Movento) Bayer	23	Ingestion	3	P-A	ALL	Registered in passionfruit for control of Red Scale and suppression of Citrus Mealybug. Registered for control of **Green Peach Aphid** and **Melon Aphid** in various crops.	M Bee L	-
Afidopyropen (Versys) BASF	9D	Ingestion		P		Registered for control of aphids in various crops. Hort Innovation project ST18001 generating data to support a registration for control of **Aphids** in passionfruit.	L Bee VL	-
Beauveria bassiana (Velifer) BASF	UN	Biological / Protectant	NR	P		Registered for suppression of Onion Thrips and Western Flower Thrips in protected vegetables and ornamentals and has activity on Thrips, **Aphids**, Whitefly and Mites. No MRLs required for a biological product.	L Bee L	-
Flonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of **Green Peach Aphid** and **Melon Aphid** in cotton and cucurbits.	M Bee VL	-
Flower eating Caterpillars (*Lepidoptera*); **Cabbage Moth** *(Plutella xylostella);* **Cabbage White Butterfly** *(Pieris rapae);* **Leafroller Caterpillars** (*Tortricidae*); **Native Budworm** *(Helicoverpa punctigera);* **Cotton Bollworm** *(Helicoverpa armigera);* **Light Brown Apple Moth** *(Epiphyas postvittana);* **Looper** (*Geometridae*); **Painted Vine Moth** *(Agarista agricola);* **Armyworms** *(Spodoptera* spp.*);* **Sorghum Head Caterpillar** *(Cryptoblabes adoceta);* **Yellow Peach Moth** *(Conogethes punctiferalis)* **Priority: Low**								
Caterpillar pests are rated as a low priority in QLD and NSW. Incidence is infrequent and they usually don't warrant control.								
Bacillus thuringiensis subsp Kurstaki Strain Hd-1	11	Ingestion	NR	A	ALL	Registered in fruit crops for control of Armyworm, Cotton Bollworm, **Native Budworm**, **Cabbage Moth**, **Cabbage White Butterfly**, Loopers, **Light Brown Apple Moth** and **Vine Moth**. Time spray to coincide with egg hatch. Treatments per season not limited.	VL Bee VL	-

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 crops for control of Ants, Aphids, **Caterpillar**, Earwigs, Whitefly, Thrips and Leafhopper. Apply as a cover spray when pests are evident. Re-apply as necessary. Treatments per season not limited.	H Bee H	-
Spinetoram (Success Neo) Corteva	5	Ingestion	NR	A	ALL	Registered in passionfruit for control of **Flower-Eating Caterpillars**, **Leafrollers**, **Loopers**, **Yellow Peach Moth**, Red-Banded Thrips and **Sorghum Head Caterpillar**. Target sprays against mature eggs and newly hatched larvae when numbers exceed spray threshold. Apply repeat applications at 7-14 day intervals as new infestations occur. Do not make more than 4 applications per season.	M Bee VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR	A	ALL	Registered in passionfruit for control of **Flower-Eating Caterpillars**, **Leafrollers**, **Loopers**, **Yellow Peach Moth**, Red-Banded Thrips and **Sorghum Head Caterpillar**. Target sprays against mature eggs and newly hatched larvae when numbers exceed spray threshold. Apply repeat applications at 7-14 day intervals as new infestations occur. Do not make more than 4 applications per season.	L Bee H	-
DC-163 Bayer		Ingestion		P		Hort Innovation project ST17000 in progress to generate data in Tropical & Sub-Tropical Fruit (inedible peel) for control of lepidoptera and borers, including Coffee Stem Borer in passionfruit. Project completion expected in March 2022.	L-M Bee VH	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Fall Armyworm *(Spodoptera frugiperda)* **Priority: Unknown**								
Fall Armyworm has recently been detected in northern Australia, although not yet seen in passionfruit. Suspected detections should be reported to Biosecurity Agencies immediately.								
Spinetoram (Success Neo) Corteva PER89241	5	Ingestion	NR	A	ALL (excl. VIC)	Permitted in Tropical & Sub-Tropical Fruit (Inedible Peel) for control of **Fall Armyworm.** Target sprays against mature eggs and newly-hatched larvae when numbers exceed spray threshold. Apply repeat applications at 7-14 day intervals as new infestations occur. Do not use more than 4 applications per season.	M Bee VH	-
Spinosad (Entrust Organic) Corteva PER89870	5	Ingestion	NR	A	ALL (excl. VIC)	Permitted in Tropical & Sub-Tropical Fruit (Inedible Peel) for control of **Fall Armyworm.** Target sprays against mature eggs and newly-hatched larvae when numbers exceed spray threshold. Apply repeat applications at 7-14 day intervals as new infestations occur. Do not use more than 4 applications per season.	L Bee H	-
DC-163 Bayer		Ingestion		P		Hort Innovation project ST17000 in progress to generate data in Tropical & Sub-Tropical Fruit (inedible peel) for control of lepidoptera and borers, including Coffee Stem Borer in passionfruit. Project completion expected in March 2022.	L-M Bee VH	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	New			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-

4.3 Weeds in passionfruit

4.3.1 Weed priorities

Common Name	Scientific Name
Moderate	
Crowsfoot Grass	*Dactyloctenium aegyptium*
Nutgrass	*Cyperus rotundus*
Marshmallow	*Malva parviflora*

There are no high priority weeds identified but Crowsfoot Grass, Nutgrass and Marshmallow are nominated as moderate priority. All these weeds are difficult to control with herbicides and growers should adopt an integrated approach to managing them. Strategic herbicide use will assist, but the key to long term control is to use mulch and grass cover between vines and focus on reducing the soil seed bank by preventing seed set and destroying any weeds that reach flowering stage.

Specific resistance management strategies for high resistance risk (A and B) and moderate resistance risk (C, D, F, G, I, J, K, L, M, N, Q and Z) herbicide modes of action are available on the CropLife Australia webpage.
https://www.croplife.org.au/resources/programs/resistance-management/herbicide-resistance-management-strategies-2/

4.3.2 Available and potential products for weed control

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

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

Active ingredient (Trade Name)	Chemical Group	Situation / Crop	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Crowsfoot Grass (*Dactyloctenium aegyptium*) **Priority: Moderate**							
Crowsfoot Grass is rated as a moderate priority in QLD and NSW. It is a summer-growing, annual grass that is difficult to control with herbicides and tolerates low mowing heights.							
Fluazifop-P (Fusilade)	A***	Passionfruit / Directed Spray	Registered in passionfruit for control of various grass weeds, including **Crowsfoot Grass**. Direct the spray to the base of the vine. Repeat spray may be necessary if grasses are more advanced.	14	A	NSW, QLD, NT & WA	-
Glufosinate (Basta)	N**	Passionfruit / Directed or Shielded Spray	Registered in passionfruit for control of various grass and broadleaf weeds, including **Crowsfoot Grass**. Apply as a directed spray or spot spray. Do not allow spray to contact any part of the crop.	NR	A	NSW, QLD, NT, VIC, SA & WA	R3
Haloxyfop (Verdict)	A***	Passionfruit / Directed Spray or Spot Spray	Registered in passionfruit for control of various grass weeds, including **Crowsfoot Grass**. Apply as a directed spray or spot spray, directing the spray to the base of the vine and avoiding contact with fruit and foliage.	NR	A	ALL	-

Active ingredient (Trade Name)	Chemical Group	Situation / Crop	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Nutgrass (*Cyperus rotundus*) **Priority: Moderate**							
Nutgrass is rated as a moderate priority in QLD and NSW. It is a prolific sedge that is favoured by moist soil. Difficult to control with herbicides. Keep good ground cover and improve drainage.							
Glyphosate (Roundup)	M**	Tropical and Subtropical Fruit / Directed Spray, Shielded Spray or Wick Wiper	Registered in Tropical and Subtropical Fruit for control of various Grass and Broadleaf Weeds and **Nutgrass**. Do not allow spray to contact any part of the crop. Time application to flowering nutgrass. Multiple applications will be required.	NR	A	ALL	R3
Marshmallow (*Malva parviflora*) **Priority: Moderate**							
Marshmallow is rated as a moderate priority in QLD and NSW. It is a widespread weed that can grow year-round in most areas. Difficult to control with broad spectrum herbicides.							
Oxyfluorfen (Goal)	G**	Passionfruit / Directed Spray	Registered in passionfruit for control of various Grass and Broadleaf Weeds, including **Marshmallow**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	H:NR NG	A	ALL	-
Fluroxypyr (Starane) Corteva	I**		Registered in fallows for control of **Marshmallow**.		P		-
Grass and Broadleaf Weeds **Priority: Low**							
The key to weed management in orchards is maintaining ground cover in the inter-row with grass and mulch.							
Fluazifop-P (Fusilade)	A***	Passionfruit / Directed Spray	Registered in passionfruit for control of various **Grass Weeds**. Direct the spray to the base of the vine. Repeat spray may be necessary if grasses are more advanced.	14	A	NSW, QLD, NT & WA	-
Glufosinate (Basta)	N**	Passionfruit / Directed or Shielded Spray	Registered in passionfruit for control of various **Grass and Broadleaf Weeds**. Apply as a directed spray or spot spray. Do not allow spray to contact any part of the crop.	NR	A	NSW, QLD, NT, VIC, SA & WA	R3

Active ingredient (Trade Name)	Chemical Group	Situation / Crop	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glyphosate (Roundup)	M**	Tropical and Subtropical Fruit / Directed Spray, Shielded Spray or Wick Wiper	Registered in Tropical and Subtropical Fruit for control of various **Grass and Broadleaf Weeds**. Do not allow spray to contact any part of the crop. Time application to flowering nutgrass. Multiple applications will be required.	NR	A	ALL	R3
Haloxyfop (Verdict)	A***	Passionfruit / Directed Spray or Spot Spray	Registered in passionfruit for control of various **Grass Weeds**. Apply as a directed spray or spot spray, directing the spray to the base of the vine and avoiding contact with fruit and foliage.	NR	A	ALL	-
Oryzalin	D**	Passionfruit / Non-Bearing Vines Only / Directed Spray	Registered in non-bearing passionfruit for control of **Grass and Broadleaf Weeds**. Apply as a directed pre-emergent spray to the soil surface adjacent to vines. Requires incorporation by rain or overhead irrigation within 21 days of application to activate the product.	NR	A	ALL	-
Oxyfluorfen (Goal)	G**	Passionfruit / Directed Spray	Registered in passionfruit for control of various **Grass and Broadleaf Weeds**. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	H:NR NG	A	ALL	-
Paraquat (Gramoxone)	L**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of **Annual Grass and Broadleaf Weeds**. Apply as a directed spray or spot spray. Avoid contact with any part of the crop.	H:1 G:7	A	ALL	R3
Paraquat + Diquat (SpraySeed)	L**	Orchards & Vineyards / Directed Spray or Spot Spray	Registered in orchards and vineyards for control of **Annual Grass and Broadleaf Weeds**. Apply as a directed spray or spot spray. Avoid contact with any part of the crop.	G:1	A	ALL	R3

5. References

5.1 Information:

AgChem Access Priority Access Forum	https://www.agrifutures.com.au/national-rural-issues/agvet-chemicals/
Australian Pesticide and Veterinary Medicines Authority	www.apvma.gov.au
APVMA Chemical review	https://apvma.gov.au/chemicals-and-products/chemical-review/listing
APVMA MRLs	www.legislation.gov.au/Details/F2020C00713
APVMA Permit search	https://productsearch.apvma.gov.au/permits
APVMA Product search	https://productsearch.apvma.gov.au/products
Codex MRL database	http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/
Cotton Pest Management Guide 2020-21	https://www.cottoninfo.com.au/publications/cotton-pest-management-guide
CropLife Australia	https://www.croplife.org.au/
Growcom – Infopest Database	www.infopest.com.au
Hort Innovation	www.horticulture.com.au
Ausveg	https://ausveg.com.au/
Agriculture and Food - WA	https://www.agric.wa.gov.au

5.2 Abbreviations and Definitions:

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

5.3 Acknowledgements:

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

6. Appendices:

Appendix 1. Products available for disease control in passionfruit
Appendix 2. Products available for control of insects, mites and other pests in passionfruit
Appendix 3. Products available for weed control in passionfruit
Appendix 4. Current permits for use in passionfruit
Appendix 5. Passionfruit Maximum Residue Limits (MRLs)
Appendix 6. Passionfruit Agrichemical Regulatory Risk Assessment

Appendix 1. Products available for disease control in passionfruit

Active Ingredient (Trade Name)	Chem. group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Azoxystrobin (Amistar)	11	Passionfruit	Alternaria Rot, Cladosporium	ALL	1	-
Copper (Cu) present as cupric hydroxide	M1	Passionfruit	Phytophthora Stem Canker	QLD, NSW	1	-
Copper (Cu) present as copper oxychloride	M1	Passionfruit	Phytophthora Stem Canker, Brown Spot, Septoria Spot	ALL	1	-
Copper (Cu) present as cuprous oxide	M1	Passionfruit	Phytophthora Stem Canker	ALL	1	-
Copper (Cu) Present as Tribasic Copper Sulphate	M1	Passionfruit	Phytophthora Stem Canker	ALL	1	-
Copper (Cu) Present as Cupric Ammonium Complex	M1	Passionfruit	Phytophthora Stem Canker	ALL	1	-
Iprodione (Rovral)	2	Passionfruit	Alternata Spot	QLD, NSW, WA & NT	1	R2
Iprodione (other brands)	2	Passionfruit	Alternata Spot	QLD, NSW, WA & NT	7	R2
Mancozeb (Dithane)	M3	Passionfruit	Brown Spot, Septoria Leaf Spot	QLD only	1	R2
Petroleum Oil		Passionfruit	Anthracnose	NSW, WA	1	-
Phosphorous (Phosphonic) Acid present as Mono- And Dipotassium Phosphite PER87607	33	Passionfruit	Phytophthora Blight *(Phytophthora parasitica)*	ALL (excl. VIC)	NR	-
Pyraclostrobin (Cabrio) BASF PER12781	11	Passionfruit	Anthracnose *(Colletotrichum gloeosporioides)* Septoria spot *(Septoria passiflorae)*	NSW, QLD, NT & WA	H:1 NG	-

Appendix 2. Products available for control of insects, mites and other pests in passionfruit

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
4-(P-Acetoxyphenyl) -2-Butanone + Maldison	1B	Fruit Trees / Fruit Fly Trap	Queensland Fruit Fly	ALL	NR	-
4-(P-Acetoxyphenyl) -2-Butanone + Fipronil	2B	Fruit Trees / Fruit Fly Trap	Queensland Fruit Fly Lesser Queensland Fruit Fly	ALL	NR	-
Abamectin PER14665	6	Passionfruit	Passionvine Mite *(Brevipalpus phoenicis)* Two Spotted Mite *(Tetranychus urticae)*	ALL (excl. VIC)	1	-
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	-
Buprofezin (Applaud) Corteva	16	Passionfruit	Mealybugs Scale Insects	ALL	1	
Chlorpyrifos (Lorsban)	1B	Passionfruit / Bait Spray	Queensland Fruit Fly	NSW, QLD	14	R1
Dimethoate	1B	Passionfruit / Post-Harvest Dip	Queensland Fruit Fly	NSW, WA	NR	R1
Fatty Acids – Potassium Salt (Natrasoap)		Fruit Trees	Aphids Thrips Mealybug Two-Spotted Mite Spider Mite Whitefly	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Fenbutatin Oxide (Torque) PER84258	12B	Passionfruit	Passionvine Mite *(Brevpalpus phoenicis)* Twospotted Mite *(Tetranychus urticae)*	ALL (excl. VIC)	7	R3
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Fruit Trees	Ants Aphids Caterpillar Earwigs Whitefly Thrips Leafhopper	ALL	1	-
Maldison (Fyfanon)	1B	Fruit Tree / Fruit Fly Bait Spray	Fruit Flies	ALL	3	R3
Methidathion (Suprathion)	1B	Passionfruit	Mealybugs Red Scale Other Scale Insects	QLD, NSW & WA	14	R1
Paraffinic Oil		Passionfruit	Red Scale Hemispherical Scale Passionvine Mealy Bug (suppression)	ALL	1	-
Petroleum Oil PER14662		Passionfruit	Passionvine Mite *(Brevpalpus phoenicis)* Two Spotted Mite *(Tetranychus urticae)*	ALL (excl. VIC)	NR	-
Propargite (Omite)	12C	Passionfruit	Passionvine Mite *(Brevpalpus phoenicis)*	QLD, WA	7	R3
Pyriproxyfen (Distance Ant Bait) Sumitomo	7C	Tropical Fruit Plantation / Ant Bait	Invasive and Nuisance Ants	ALL	NR	-
Spinetoram (Success Neo) Corteva	5	Passionfruit	Flower-Eating Caterpillars Leafrollers Loopers Yellow Peach Moth Red-Banded Thrips Sorghum Head Caterpillar	ALL	NR	-

Active Ingredient (Trade Name)	Chem. group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spinetoram (Success Neo) PER89241	5	Tropical & Sub-Tropical Fruits (inedible peel)	Fall Armyworm	ALL (excl. VIC)	NR	-
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	-
Spinosad (Entrust Organic) Corteva	5	Tropical & Sub-Tropical Fruits (inedible peel)	Flower-Eating Caterpillar Leafrollers Loopers Yellow Peach Moth Red-Banded Thrips Sorghum Head Caterpillar	ALL	NR	-
Spinosad (Entrust Organic) Corteva PER89870	5	Tropical & Sub-Tropical Fruits (inedible peel)	Fall Armyworm	ALL (excl. VIC)	NR	-
Spirotetramat (Movento) Bayer	23	Passionfruit	Red Scale Passionvine Mealy Bug (suppression)	ALL	3	-
Sulfoxaflor (Transform) Corteva PER85397	4C	Passionfruit	Fruit-Spotting Bug *(Amblypelta nitida)* Banana-Spotting Bug *(Amblypelta lutescens)*	NSW, NT, QLD & WA	7	-
Trichlorfon (Lepidex)	1B	Passionfruit	Green Vegetable Bug Passion Vine Bug	QLD, NT	2	R2
Trichlorfon (Lepidex) PER12450	1B	Passionfruit	Queensland Fruit Fly *(Bactrocera tryoni)* Mediterranean Fruit Fly *(Ceratitis capitata)*	ACT, NSW, NT, QLD, SA & WA	7	R2

Appendix 3. Products available for weed control in passionfruit

Active ingredient (Trade Name)	Chem. Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
Fluazifop – P (Fusilade)	A***	Passionfruit / Directed Spray	Grass Weeds.	14	NSW, QLD, NT & WA	-
Glufosinate (Basta)	N**	Passionfruit / Directed or Shielded Spray	Grass and Broadleaf Weeds. Do not allow spray to contact desirable foliage or green bark.	NR	NSW, QLD, NT, VIC, SA & WA	R3
Glyphosate (Roundup)	M**	Tropical Fruit / Directed Spray, Shielded Spray or Wick Wiper	Grass and Broadleaf Weeds. Do not allow spray to contact any part of the tree, including the trunk.	NR	ALL	R3
Glyphosate PER14421	M**	Passionfruit / Directed Spray	Grass and Broadleaf Weeds. Do not allow spray or spray drift to contact any part of the plant or trunk, particularly lower green leaves and green bark.	NR NG	ALL (excl. VIC)	R3
Haloxyfop (Verdict)	A***	Passionfruit / Directed Spray or Spot Spray	Grass Weeds.	NR	ALL	-
Oryzalin	D**	Passionfruit / Non-Bearing Vines Only / Directed Spray	Grass and Broadleaf Weeds.	NR	ALL	-
Oxyfluorfen (Goal)	G**	Passionfruit / Directed Spray	Grass and Broadleaf Weeds. If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.	H:NR NG	ALL	-
Paraquat (Gramoxone)	L**	Orchards & Vineyards / Directed Spray or Spot Spray	Annual Grass and Broadleaf Weeds.	H:1 G:7	ALL	R3
Paraquat + Diquat (SpraySeed)	L**	Orchards & Vineyards / Directed Spray or Spot Spray	Annual Grass and Broadleaf Weeds.	G:1	ALL	R3

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

Appendix 4. Current permits for use in passionfruit

Permit No.	Description	Issued Date	Expiry Date	Permit Holder
PER89870	Spinosad (Entrust Organic) / Various / Fall Armyworm	21-Jul-20	31-Jul-23	Hort Innovation
PER89241	Spinetoram (Success Neo) / Various / Fall Armyworm	06-Mar-20	31-Mar-23	Hort Innovation
PER87607	Phosphorous acid / Passionfruit / Phytophthora	05-Apr-19	30-Apr-24	Hort Innovation
PER85397	Sulfoxaflor (Transform) / Lychee, Mango, Papaya & Passionfruit / Fruit spotting bug and Banana spotting bug (NSW, NT, QLD, WA)	17-Apr-18	30-Apr-23	Hort Innovation
PER84258	Fenbutatin Oxide (Torque) / Passionfruit / Passionvine mite and Two-Spotted mite	24-Oct-17	20-Jun-21	Passionfruit Australia Inc c/- Hort Innovation
PER14662 Version 2	Petroleum oil / Passionfruit / Passionvine mite and Two-spotted mites	29-Mar-15	30-Jun-25	Passionfruit Australia Inc c/- Hort Innovation
PER14421 Version 3	Glyphosate / Passionfruit / Grass & Broadleaf Weeds	31-Oct-13	31-Aug-23	Passionfruit Australia Inc c/- Hort Innovation
PER12781 Version 3	Pyraclostrobin (Cabrio) / Passionfruit / Anthracnose & Septoria spot (NSW, QLD, NT, WA)	13-Mar-12	30-Jun-23	Passionfruit Australia Inc
PER12450 Version 6	Trichlorfon / Specified Fruit crops / Fruit fly (ACT, NSW, NT, QLD, SA, WA)	06-Oct-11	31-Jan-21	Growcom Australia

Appendix 5. Passionfruit Maximum Residue Limits (MRLs)

CODEX commodity grouping of Passionfruit and subgroups:

AO2 0002 Fruits
FI0030 Assorted Tropical and Sub-Tropical Fruit – Inedible Peel
FI0351 Passionfruit

Note: Australian Passionfruit are all consumed by the domestic market. Available information indicates that in the absence of specific limits in legislation, that some countries defer to Codex, followed by EU MRL standards, or apply a 0.01ppm default value. Food exported to New Zealand from Australia may be legally sold if it complies with Australian requirements. MRLs and legislation are subject to change; the values presented should not be relied on.

Chemical	Codex Code	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Abamectin	FI 0351	Passionfruit	0.2	
Amitrole	FI 0351	Passionfruit	*0.01	
Azoxystrobin	FI 0351	Passionfruit	0.5	
Bromide Ion		Fruits		20
Buprofezin	FI 0351	Passionfruit	2	
Chlorpyrifos	FI 0351	Passionfruit	*0.05	
Diazinon		Fruits	0.5	
Dicofol		Fruits	5	
Difenoconazole	FI 0351	Passionfruit		0.05
Diquat		Fruits	*0.05	
Fipronil	FI 0030	Tropical - inedible	T*0.01	
Glufosinate and Glufosinate-ammonium	FI 0030	Tropical - inedible		0.1
Glyphosate	FI 0351	Passionfruit	3	
Inorganic bromide		Fruits	20	
Iprodione	FI 0351	Passionfruit	10	
Metaldehyde		Fruits	1	
Methidathion	FI 0351	Passionfruit	0.2	
Methiocarb		Fruits	T0.1	
Methyl bromide		Fruits	T*0.05	
Omethoate		Fruits	2	
Oryzalin		Fruits	0.1	
Paraquat		Fruits	*0.05	
	FI 0030	Tropical - inedible		*0.01
Phosphorous acid	FI 0351	Passionfruit	T500	
	FI 0030	Tropical - inedible	T100	
Piperonyl butoxide		Fruits	8	
Pirimicarb		Fruits	0.5	
Prochloraz	FI 0030	Tropical - inedible		7
Propargite	FI 0351	Passionfruit	3	
Pyraclostrobin	FI 0351	Passionfruit	T1	0.2
Pyrethrins		Fruits	1	
Simazine		Fruits	*0.1	

Chemical	Codex Code	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Spinetoram	FI 0351	Passionfruit		0.4
Spinosad	FI 0351	Passionfruit		0.7
Tebuconazole	FI 0351	Passionfruit		0.1
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)
NR - Uses of substances where MRLs are not necessary / required.
T =Temporary MRL
E = The MRL is based on extraneous residues

Sources: AU MRLs: Australia New Zealand Food Standards Code – Schedule 20 – Maximum Residue Limits Variation Instrument No. APVMA 7, 2019. CODEX MRLs: Online CODEX database (Current to February 2020).

Appendix 6. Passionfruit Agrichemical Regulatory Risk Assessment

Passionfruit
Agrichemical Regulatory
Risk Assessment

September 2020

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

The use of agrichemicals can also be impacted through differences in standards between trading partners. The lack of an appropriate pesticide maximum residue limit (MRL) in an importing country can, for practical purposes, effectively prohibit use in the exporting country 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 Passion fruit as well as current initiatives aimed at addressing identified pest management deficiencies.

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

Problem	Active Constituents	Chemical Group	Comment	Activities
INSECT AND MITE PESTS				
Aphids				
Aphids	Dimethoate	1B	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	Data generation project ST18001 underway for a Versys® (**afidopyropen**) label registration with BASF
Fruit fly				
Fruit flies	Maldison	1B	APVMA: Under review – chemistry Codex: Re-evaluation scheduled for 2022/23	
Mediterranean fruit fly	Dimethoate (PER87164)	1B	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Trichlorfon (PER12450)	1B	APVMA: nominated for review Codex: No MRLs EU: Deregistered US: No MRLs	
Northern Territory fruit fly	Dimethoate (PER87164)	1B	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
Queensland fruit fly	Chlorpyrifos	1B	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR in 2021 Canada:Cancellation of most uses. EU: Cancellation of use USA – EPA decision to allow continued use	

Passionfruit Agrichemical Regulatory Risk Assessment

Problem	Active Constituents	Chemical Group	Comment	Activities
Queensland fruit fly	Dimethoate (PER87164)	**1B**	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	
	Trichlorfon (PER12450)	**1B**	APVMA: nominated for review Codex: No MRLs EU: Deregistered US: No MRLs	
Caterpillars				
Fall armyworm	Spinetoram (PER89241)	**5**		Data generation project ST17000 underway for a Assorted tropical fruits-inedible peel crop group label registration with Bayer - **DC-163** for various pests
	Spinosad (PER89870)	**5**		
Flower eating caterpillars	Spinetoram	**5**		
	Spinosad	**5**		
	Trichlorfon	**1B**	APVMA: nominated for review Codex: No MRLs EU: Deregistered US: No MRLs	
Leafroller caterpillars	Spinetoram	**5**		
	Spinosad	**5**		
Loopers	Spinetoram	**5**		
	Spinosad	**5**		
Sorghum head caterpillar	Spinetoram	**5**		
	Spinosad	**5**		
Yellow peach moth	Spinetoram	**5**		
	Spinosad	**5**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Mites				
Passionvine mite	Abamectin (PER14665)	**6**		Project ST18001 **Spiromesifen** (Oberon 240SC) Group 23, Bayer Label registration
	Fenbutatin oxide (PER84258)	**12B**	APVMA – Nominated for review Codex - To be reviewed 2020/21. No supporting registrant EU: No authorisation in place	
	Petroleum oil (PER14662)	**-**		
	Propargite	**12C**	APVMA: nominated for review	
Two-spotted mite	Abamectin (PER14665)	**6**		
	Fenbutatin oxide (PER84258)	**12B**	APVMA – Nominated for review Codex - To be reviewed 2020/21. No supporting registrant EU: No authorisation in place	
	Petroleum oil (PER14662)	**-**		
Plant bugs and leaf hoppers				
Banana-spotting bug Fruit-spotting bug	Sulfoxaflor (PER85397)	**4C**	USA – Pollinator concerns	Data Generation Projects ST16006 Trivor® (**acetamiprid + pyriproxyfen**) ST19020 Sivanto (**Flupyradiforone**) data generation – label registration
Passion vine bug	Trichlorfon	**1B**	APVMA: nominated for review Codex: No MRLs EU: Deregistered US: No MRLs	
Green vegetable bug	Trichlorfon	**1B**		

Problem	Active Constituents	Chemical Group	Comment	Activities
Scale and mealybug				
Citrus mealybug	Spirotetramat	**23**		Project ST16006 with Trivor® (**acetamiprid + pyriproxyfen**) data generation – registration ST19020 Sivanto (**Flupyradiforone**) data generation – label registration ST17000 Transform (**Sulfoxaflor**) Assorted tropical fruits-inedible peel – label registration
Mealybug	Buprofezin	**16**	Europe – In the process of deleting MRLs	
	Methidathion	**1B**	APVMA: Use will not be permitted in AU after 4 February 2021. EU: Deregistered USA: Deregistered	
Passionvine mealybug	Paraffinic oil	**-**		
Hemispherical scale	Paraffinic oil	**-**		
Red scale	Methidathion	**1B**	APVMA: Use will not be permitted in AU after 4 February 2021. EU: Deregistered USA: Deregistered	
	Paraffinic oil			
	Spirotetramat	**23**		
Scale insects	Buprofezin	**16**	Europe – In the process of deleting MRLs	
	Methidathion	**1B**	APVMA: Use will not be permitted in AU after 4 February 2021. EU: Deregistered USA: Deregistered	
Thrips				
Redbanded thrips	Spinetoram	**5**		
	Spinosad	**5**		

Problem	Active Constituents	Chemical Group	Comment	Activities
DISEASES				
Alternaria spot	Azoxystrobin	**11**		Data Generation Project ST16006 Luna Sensation & Luna Experience - Assorted tropical fruits- inedible peel crop group label registration for various diseases.
	Copper	**M1**	EU: Candidate for substitution	
	Iprodione	**2**	Europe – Deregistered Canada – Majority of food crop uses deleted Codex – Review scheduled for 2022/23	
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Under review Codex: To be reviewed 2022/23 EU: Proposed non-renewal of authorisation	
Anthracnose	Pyraclostrobin (PER12781)	**11**		
Brown spot	Copper	**M1**	EU: Candidate for substitution	
	Fluopyram + trifloxystrobin	**7 + 11**		
	Iprodione	**2**	Europe – Deregistered Canada – Majority of food crop uses deleted Codex – Review scheduled for 2022/23	
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Under review Codex: To be reviewed 2022/23 EU: Proposed non-renewal of authorisation	
Phytophthora blight	Copper	**M1**	EU: Candidate for substitution	
	Phosphorous acid (PER87607)	**33**		
Root and collar rot	Copper	**M1**		
Scab	Azoxystrobin	**11**		
Septoria spot	Copper	**M1**	EU: Candidate for substitution	
	Fluopyram + trifloxystrobin	**7 + 11**		
	Mancozeb	**M3**	APVMA: Nominated for review Canada: Under review Codex: To be reviewed 2022/23 EU: Proposed non-renewal of authorisation	
	Pyraclostrobin (PER12781)	**11**		
Trunk canker	Copper	**M1**	EU: Candidate for substitution	

Problem	Active Constituents	Chemical Group	Comment	Activities
WEEDS				
Broadleaf weeds and grasses	Diquat	**L**	APVMA - Currently under review Europe – deregistered	
	Fluazifop	**A**		
	Glufosinate	**N**	Europe – deregistered	
	Glyphosate (PER14421)	**M**	Ongoing issues internationally	
	Haloxyfop-P	**A**		
	Oryzalin	**D**		
	Oxyfluorfen	**G**	EU: Candidate for substitution	
	Paraquat	**L**	APVMA - Currently under review Europe – deregistered Rotterdam Convention - nominated	

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