

# **Blackberries and Raspberries**

# Strategic Agrichemical Review Process (SARP)

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

#### **Date of report:**

August 2020

#### **Disclaimer:**

Hort Innovation makes no representations and expressly disclaims all warranties (to the extent permitted by law) about the accuracy, completeness, or currency of information in the blackberries and raspberries industry SARP Report. Users of this material should take independent action before relying on its accuracy in any way.

Reliance on any information provided by Hort Innovation is entirely at your own risk. Hort Innovation is not responsible for, and will not be liable for, any loss, damage, claim, expense, cost (including legal costs) or other liability arising in any way (including from Hort Innovation or any other person's negligence or otherwise) from your use or non-use of the blackberries and raspberries industry SARP Report, or from reliance on information contained in the material or that Hort Innovation provides to you by any other means.

#### Legal Notice:

Copyright © Horticulture Innovation Australia Limited 2020

Copyright subsists in the Blackberries and Raspberries SARP. Horticulture Innovation Australia Limited (Hort Innovation) owns the copyright, other than as permitted under the Copyright ACT 1968 (Cth). The Blackberries and Raspberries SARP (in part or as a whole) cannot be reproduced, published, communicated or adapted without the prior written consent of Hort Innovation. Any request or enquiry to use the Blackberries and Raspberries SARP should be addressed to:

Communications Manager Hort Innovation Level 7, 141 Walker Street North Sydney NSW 2060 Australia Email: communications@horticulture.com.au Phone: 02 8295 2300

Hort Innovation Strategic levy investment RASPBERRY AND BLACKBERRY FUND This project has been funded by Hort Innovation using the raspberry and blackberry research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

# **Table of Contents**

1. Summary	4
<ul> <li>1.1 Diseases</li> <li>1.2 Insects, Mites and Other Pests</li> <li>1.3 Weeds</li> <li>1.4 Plant Growth Regulators</li> </ul>	. 5 . 5 . 5 . 5
2. The Australian Blackberries and Raspberries Industry	6
3. Introduction	7
<ul> <li>3.1 Background.</li> <li>3.2 Minor use permits and registration</li></ul>	.7 .8 .8 .9 .9
3.4.2 Appendices	. 9
4. Diseases, pests and weeds of Blackberries and Raspberries	10
<ul> <li>4.1 Diseases of Blackberries and Raspberries</li></ul>	11 11 12 30 30 33 68 69 75 75 76
5. References	77
5.1 Information: 5.2 Abbreviations and Definitions: 5.3 Acknowledgements:	77 77 77
6. Appendices	78
Appendix 1. Products available for disease control in Blackberries and Raspberries	79 83 87 88 89 92 96

# 1. Summary

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

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

- (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 Blackberries and Raspberries 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
Grey Mould	Botrytis cinerea

#### 1.2 Insects, Mites and Other Pests

The high priority insects, mites and other pests are:

Common name	Scientific name
Two Spotted Mite	Tetranychus urticae
Green Stink Bug	Plautia affinis
Green Vegetable Bug	Nezara viridula
Western Flower Thrips	Frankliniella occidentalis
Green Mirid	Creontiades dilutus
Brown Mirid	Creontiades pacificus
Crop Mirid	Sidnia kinbergi

#### 1.3 Weeds

The high priority weeds are:

Common name	Scientific name
Blackberry Nightshade	Solanum nigrum
Marshmallow	Malva parviflora

#### **1.4 Plant Growth Regulators**

There were no high priority Plant Growth Regulator issues identified but Initiation of flowering was rated as moderate priority.

Issue	
Initiation of flowering	

# 2. The Australian Blackberries and Raspberries Industry

Blackberries and raspberries are commonly referred to as Rubus *spp*. They are grown across a wide and diverse range of conditions in Australia. Major producing regions include South East Queensland; North Coast, Central and Southern Tableland regions in New South Wales; Yarra Valley in Victoria; Northern and Southern Tasmania; Adelaide Hills in South Australia; and Gin Gin and the Great Southern Region in Western Australia.

Production for the year ending June 2019 was 9,478 tonnes and was valued at \$207.5 m. The wholesale value of fresh supply was \$243.2 m with \$224 m distributed into retail and \$19.4 m into food service.

State	18/19 Tonnes	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales	2,158												
Victoria	2,440												
Queensland	1,502												
Western Australia	469												
South Australia	188												
Tasmania	2,721												
Availability	Availability Legend		Hi	gh		Med	dium		Lc	w		No	ne

#### Blackberries and Raspberries Harvest Season by State<sup>1</sup>

#### Seasonality by Rubus Berry type

State	18/19 Tonnes	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Raspberries	8,057												
Blackberries	1,327												
Other	95												
Availability Legend			Hi	gh		Med	dium		Lo	w		No	ne

Blackberry and Raspberry production has been growing strongly in recent years, with strong domestic consumption underpinning demand and continued favourable prices for growers. There is considerable scope for fresh grown berries to displace frozen imports. Export volumes are low, with only 1 percent of total production going to fresh export in 2018/19. Another 7 percent went to processing and 93 percent went into domestic fresh supply.

There is very limited international trade of Blackberries and Raspberries. Australian export volumes are very small, with the two major destinations being India and Fiji. For the year ending June 2019, an additional 8,326 tonnes of frozen Rubus berries were imported, while 25 tonnes were exported.

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

# **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 Blackberries and Raspberries 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 Blackberries and Raspberries industry regarding pesticide access, Hort Innovation undertook a review of the pesticide requirements via a Strategic Agrichemical Review Process (SARP) in 2014. 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 Blackberries and Raspberries 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 Blackberries and Raspberries 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 Blackberries and Raspberries 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 Blackberries and Raspberries 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/berries/

#### 3.2 Minor use permits and registration

From a pesticide access perspective, the APVMA classifies blackberries and raspberries as a minor crop. The crop fits within the APVMA Crop Group 004: Berries and other small fruits, within the Subgroup 004A: Cane Berries. 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 (<u>https://apvma.gov.au/node/10931</u>). 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 blackberries and raspberries industry is for manufacturers to register new pesticides uses in the crop.

#### 3.3 Methods

The current update of the Blackberries and Raspberries 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 Blackberries and Raspberries Appendix 2. Products available for control of insects, mites and other pests in Blackberries and Raspberries

Appendix 3. Products available for weed control in Blackberries and Raspberries

Appendix 4. Plant Growth Regulators available in Blackberries and Raspberries

Appendix 5. Current permits for use in Blackberries and Raspberries

Appendix 6. Blackberries and Raspberries Maximum Residue Limits (MRLs)

Appendix 7. Blackberries and Raspberries regulatory risk assessment

## 4. Diseases, pests and weeds of Blackberries and Raspberries

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.

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

Information on regulatory risk derived from project MT17019 (Chapter 4) - Regulatory support and coordination (Appendix 7) has been incorporated. Some of the suggested options have no overseas MRLs (see Appendix 6). 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 Blackberries and Raspberries

#### 4.1.1 Disease priorities

Common name	Scientific name
High	
Grey Mould	Botrytis cinerea
Moderate	
Phytophthora Root Rot	Phytophthora spp.
Downy Mildew (blackberries)	Peronospora spp.
Fruit Rot (raspberries)	Cladosporium spp.
Low	
Yellow Rust (raspberries)	Phragmidium rubi-idaei
Anthracnose / Cane Spot	Elsinöe veneta
Alternaria Fruit Rot	Alternaria spp.
Powdery Mildew	Podosphaera macularis and Erysiphe spp.
Septoria Leaf Spot (raspberries)	Septoria rubi
Alternata Leaf Spot	Alternaria alternata
Phomopsis Blight	Phomopsis spp.
Crown Gall (blackberries)	Agrobacterium tumefaciens
American Gooseberry Mildew	Sphaerotheca morsuvae

Grey Mould is the most important disease of blackberries and raspberries in Australia. It is particularly dominant in priority for blackberries, but it is also the most important disease in raspberries. Grey Mould is rated high priority in all regions except Western Australia, where it is rated moderate priority.

Phytophthora Root Rot is rated high priority in Victoria and Tasmania, and moderate priority in New South Wales and Western Australia. Phytophthora has increased in importance recently and attention should be paid to sourcing disease-free planting material, managing water quality and the strategic use of fungicides to prevent infection and spread.

Downy Mildew is predominantly an issue in blackberries and is becoming more significant. Cultural practices such as maintaining good airflow are critical. Fruit Rot is a significant post-harvest issue in raspberries.

Yellow Rust has declined in significance since the last SARP report in 2016. This has been because of newer varieties with better disease tolerance, and shorter production cycles leading to reduced disease exposure.

#### 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 regist	ration or pern	nit app	roval		R1	R1 Short-term: Critical concern over retaining access					
Р	Potential - a	possible can	didate to purs	ue for	regist	ration or perm	nit R2	R2 Medium-term: Maintaining access of significant concern					
P-A	Potential, alre	eady approv	ed in the crop	for ar	nother	use	R3	Long-term: Potential issues asso	ciated with use - Monitoring requir	ed			
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or G									zing (G)				
Harvest			Н				Not	Required when used as directed	NR				
Grazing			G				No (	Grazing Permitted	NG				
Disease Active Ir (Trade N	/ ngredient lame)	Chemical group	Activity	WHP, days	Availability	States		Comments		Regulatory risk			
Grey Mould ( <i>Botrytis cinerea</i> ) Priority: High Grey Mould is rated as a high priority in all regions except Western Australia, where it is rated moderate priority. It is particularly the dominant disease in blackberries and does affect raspberries as well. Infection at flowering will prevent fruit formation and reduce yields. Cultural practices should be used in													
	on with a pre	eventative						ter narvest, cool berries rapidly and use	support pads in stacked trays.				
<i>pullulans</i> 14940 & I (Botector) Nufarm	Strain DSM DSM 14941 )	-	Protectant	INK	A	ALL	control of <b>G</b> Fruit Rot an beginning o 6 applicatio disease infe	<b>Grey Mould</b> and suppression of Anthrac and Rhizopus Fruit Rot. Apply as a prever of bloom until harvest. Apply as part of a ns at 5-7 day intervals, particularly whe ection.	nose Fruit Rot, Phomopsis tative treatment from the spray program, using up to n weather conditions favour				
Azoxystro (Amistar)	bin	11	Curative / Protectant	1	A	ALL	Registered Cladosporiu applications	in <i>Rubus</i> spp. for control of Anthracnose im. Begin applications at the onset of di sper season with a minimum retreatme	e, <b>Botrytis</b> and sease. Apply a maximum of 3 nt interval of 14 days.	-			
Bacillus amyloque strain QS <sup>-</sup> (Serenade Bayer PER88058	e <i>faciens</i> T 713 e Opti) 3	44	Biological / Protectant	NR	A	ALL (excl. VIC)	Permitted ir of <b>Botrytis</b> repeat at 5- disease sym	n blackberries and raspberries (field & p s <b>Grey Mould</b> . Begin applications prior -10 day intervals as part of a preventation -10 preventation provide a preventation of the	rotected cropping) for control to disease development and ve spray program before on not limited.	-			

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Boscalid + Pyraclostrobin (Pristine) BASF PER82986	7+11	Curative / Protectant	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of <b>Grey Mould</b> , Anthracnose, Alternaria Leaf Spot & Fruit Rot, Leaf Spot & Blotch, Monilinia Blight, Phomopsis and Powdery Mildew and suppression of Rust. Use preventatively, commencing applications when conditions favour disease infection from the white bud stage onwards. Apply a maximum of 3 foliar applications within an annual production cycle, with consecutive treatments 7-14 days apart. Do not apply more than 2 consecutive applications, before using a fungicide from an alternate MoA group for 2 applications.	-
Captan PER13958	M4	Protectant	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp., <i>Ribe</i> spp. and Blueberries for control of Cane Spot, Spur Blights and <b>Botrytis Flower &amp; Fruit Rot</b> . Apply the first foliar application after the green tip spray and then repeat every 10-14 days until the season ends. Do not use more than 5 applications per year.	-
Chlorothalonil PER14449	M5	Protectant	28	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Grey Mould</b> , Rusts, Downy Mildew and Septoria Leaf Spot. Apply at early bloom, 2 weeks later and at veraison (onset of ripening). Do not use more than 3 applications per year.	R2
Cyprodinil + Fludioxonil (Switch) Syngenta PER14422	9+12	Curative / Protectant	7	A	ALL (excl. VIC)	Permitted in Blackberries and Raspberries (field & protected cropping) for control of <b>Grey Mould</b> . Apply as a protectant spray at the first signs of infection or at white bud. Do not exceed a maximum of 4 applications per season, with no more than 2 applications sequentially (7-14 days apart) before using a fungicide from a different MoA group for 2 applications.	-
Fenhexamid (Teldor) Bayer PER14424	17	Curative / Protectant	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of <b>Grey Mould</b> . Apply at first signs of infection or white bud. Do not exceed a maximum of 4 applications per season, with not more than 2 applications sequentially before using a fungicide from an alternate MoA group. Allow a minimum retreatment interval of 7-10 days between consecutive applications.	-
Iprodione (Rovral)	2	Curative / Protectant	1	Α	ALL	Registered in raspberries for control of <b>Grey Mould</b> . Apply at 10% blossom and full bloom. For fruit protection, apply at 2-3 weeks pre-harvest. Treatments per season not limited.	R2
Mancozeb PER13958	M3	Protectant	7	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Grey Mould</b> , Rust and Mildew. Apply early bloom and repeat at 10-14 day intervals. Treatments per season not limited.	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Pyrimethanil (Scala) Bayer PER13958	9	Curative / Protectant	1		ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Grey Mould</b> . Apply at critical time for disease development. Do not use more than 1 application (800 gai/ha).	-
Fenpyrazamine (Prolectus) Sumitomo	17	Curative / Protectant		Ρ		Registered in grapes for control of <b>Botrytis</b> . No AU MRL. Codex MRL 5 mg/kg.	-
Florylpicoxamid (Adavelt) Corteva	21	Curative / Protectant		Р		New Mode of Action fungicide being developed in AU. Corteva claim activity on <b>Botrytis</b> . No MRL's for AU or Codex. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		Ρ		Hort Innovation project ST16006 underway to generate data to gain a label registration in <i>Rubus</i> spp. for control of <b>Grey Mould</b> and Anthracnose. Registered in the US in Fruit, small vine climbing, except fuzzy kiwifruit, subgroup 13-07F for control of Powdery Mildew, Botrytis Bunch Rot / Grey Mould, Black Rot, Sour Rot and suppression of Phomopsis Cane and Leaf Spot. Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3
Isofetamid (Kenja) ISK	7	Curative / Protectant		Ρ		Registration pending for control of <b>Botrytis</b> in berries. No AU MRL. Codex MRL 3 mg/kg.	-
NUL3195 Nufarm	TBC			Р		New fungicide from Nufarm with activity on <b>Botrytis</b> and Powdery Mildew.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Curative / Protectant		Ρ		Registration pending in Australia for control of <b>Botrytis</b> , Alternaria, Powdery Mildew & Anthracnose in berries. Registered in the US for control of Botrytis in various crops, including berry crops. Pydiflumetofen: No MRLs for AU or Codex. Fludioxonil: AU MRL T2 mg/kg. Codex MRL 5 mg/kg.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
--	-------------------	----------	-----------	--------------	--------	----------	--------------------

Phytophthora Root Rot (*Phytophthora* spp.)

#### **Priority: Moderate**

Phytophthora Root Rot is rated as a high priority in Victoria and Tasmania, and moderate priority in New South Wales and Western Australia. The disease develops when soil temperatures are above 12°C, where there is poor drainage, water ponding, heavy soils, or low levels of organic matter in the soil. It has become evident in substrate grown crops in recent years. It is likely that the infection has been imported in these cases. The most important management options are to use disease free nursery stock, maintain good drainage and avoid over-watering of bushes. Fungicides are available as an additional option during times of high infection risk.

Metalaxyl-M (Ridomil Gold 25G) Syngenta PER13958	4	Protectant	48	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <i>Phytophthora</i> spp. Apply directly to the soil and water in. Treatments per season not limited.	-
Metham PER82024	-	Fumigant	NR	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of soil borne pathogens, including <i>Phytophthora</i> spp. Apply through trickle irrigation to moist soil under plastic mulch at 5-8 weeks prior to planting. Flush all lines and equipment with clean water after use. Puncture plastic 2 weeks after treatment to allow dissipation of metham.	-
Phosphorous Acid PER13958	33	Protectant	NR	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <i>Phytophthora</i> spp. Apply a maximum of 3 foliar applications as follows. In single crop/spring cultivars, apply when primocanes are 200-300 mm high, 1 week prior to first flower and one month prior to leaf fall in autumn. In dual crop/autumn cropping cultivars, apply when primocanes are 200-300 mm high, one week prior to first flower and immediately when autumn harvest terminates.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	44	Biological Soil Ameliorant	NR	P-A	ALL	Available in berries for application to soil to improve bioavailability of soil resources to horticultural crops. No MRLs required for biological product.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Mandipropamid (Revus) Syngenta	40	Curative / Protectant		Р		Current AU registration for control of Downy Mildew in grapes, lettuce, leafy vegetables and oilseed poppies. Registered in the US for <b>Phytophthora</b> in various crops, including as a foliar application for protection of citrus from Phytophthora Root Rot. No MRLs in place for AU or Codex.	-
Oxathiapiprolin (Zorvec Enicade) Corteva	49	Curative / Protectant		Р		Current AU registrations for control of Downy Mildew in bulb vegetables, brassicas, cucurbits, leafy vegetables and poppies. Registered in the US for control of Phytophthora Canker and Brown Rot in citrus. No AU MRL. Codex MRL 0.5 mg/kg.	-
Priority: Moderate Downy Mildew in blac Australia. The disease warm, humid condition leaf wetness. Remove	ckberries is e rarely infe ons and is n e and destro	rated as a m ects raspberr nost prevaler ov infected p	nodera ies bu nt dur orunin	ate pri It has ing we a's to	ority in New been seen ir et weather w reduce inoci	South Wales and Tasmania, high priority in Victoria, and low priority in Western wet seasons for crops grown in low lying fields with poor airflow. The disease fav with temperatures between 18-22°C. Ensure good canopy airflow to reduce periods alum build-up.	ours of
Chlorothalonil PER14449	M5	Protectant	28	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Grey Mould, Rusts, <b>Downy Mildew</b> and Septoria Leaf Spot. Apply when conditions favour disease, then repeat at 7-14 day intervals. Do not use more than 3 applications per year.	R2
Mancozeb PER13958	M3	Protectant	7	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Grey Mould, Rust and <b>Mildew</b> . Apply early bloom and repeat at 10-14 day intervals. Treatments per season not limited.	R2
Metalaxyl-M + Mancozeb (Ridomil Gold MZ) Syngenta PER84973	4+M3	Protectant	14	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Downy Mildew</b> . Apply a maximum of 2 applications when conditions favour disease development. Apply at 14 day intervals from bud burst to pre-flowering, reducing to 10 day intervals from tight cluster to early fruit formation. Continue the program using Non-Group 4 fungicides with protectant activity. Apply a maximum of 4 applications within an annual production cycle.	R2
Copper (Cu) present as Copper Hydroxide PER14443	M1	Protectant	NR	P-A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Rust and Leaf Spot. Copper is registered for control of <b>Downy Mildew</b> in various fruit and vegetable crops.	-
Azoxystrobin + Oxathiapiprolin (Orondis Flexi) Syngenta	11+49	Curative / Protectant		Р		Registered in onions for control of <b>Downy Mildew</b> . Azoxystrobin: AU MRL T5 mg/kg, Codex MRL 5 mg/kg. Oxathiapiprolin: No AU MRL. Codex MRL 0.5 mg/kg.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Cyazofamid (Ranman) ISK/UPL	21	Curative / Protectant		Р		Registered in brassica leafy vegetables for control of <b>Downy Mildew</b> . No MRLs for AU or Codex.	-
Dimethomorph + Ametoctradin (Zampro) AgNova/BASF	40+45	Protectant		Р		Registered for control of <b>Downy Mildew</b> in grapevines. Dimethomorph: No MRLs for AU or Codex. Ametoctradin: No MRLs for AU or Codex.	-
Fluopicolide + Propamocarb (Infinito) Bayer	28+43	Curative / Protectant		Ρ		Registered for control of <b>Downy Mildew</b> in various vegetable crops and poppies. Registration work underway through Hort Innovation project ST17000 for control of Downy Mildew in blackberries and raspberries. Fluopicolide: No MRLs for AU or Codex. Propamocarb: No MRLs for AU or Codex.	-
Mandipropamid (Revus) Syngenta	40	Curative / Protectant		Р		Current AU registration for control of <b>Downy Mildew</b> in grapes, lettuce, leafy vegetables and oilseed poppies. No MRLs in place for AU or Codex.	-
Oxathiapiprolin (Zorvec Enicade) Corteva	49	Curative / Protectant		Р		Current AU registrations for control of <b>Downy Mildew</b> in bulb vegetables, brassicas, cucurbits, leafy vegetables and poppies. No AU MRL. Codex MRL 0.5 mg/kg.	-
Fruit Rot ( <i>Cladospor</i> Priority: Moderate	<i>rium</i> spp.)						

Fruit Rot in raspberries is rated as a moderate priority in New South Wales and Tasmania, high priority in Victoria, and low priority in Western Australia. Fruit Rot is primarily a post-harvest storage disease. Infections usually do not cause damage to the fruit, but the mycelial growth makes it unappealing and unmarketable. Fruit Rot is commonly associated with fruit that is sunburned or has suffered other damage.

Azoxystrobin	11	Curative /	1	Α	ALL	Registered in Rubus spp. For control of Anthracnose, Botrytis and	-
(Amistar)		Protectant				<b>Cladosporium</b> . Begin applications at the onset of disease. Apply a maximum of	
						3 applications per season with a minimum retreatment interval of 14 days.	
Bromo Chloro	-	Sanitiser /	NR	Α	ALL	Registered in fruit as a post-harvest treatment for external rot causing	-
Dimethyl Hydantoin (BCDMH)		Post- Harvest Treatment				organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.	

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Chlorine	-	Sanitiser / Post- Harvest Treatment	NR	A	ALL	Registered in fruit as a post-harvest treatment for bacteria and fungi. Post- harvest spray. Must make contact with the fruit for at least 30 seconds. Can also be used as a general disinfectant for equipment.	-
Iodine	М	Post- Harvest Sanitiser	NR	A	ALL	Registered in berries as a post-harvest treatment for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.	-
Aureobasidium pullulans Strain DSM 14940 & DSM 14941 (Botector) Nufarm	-	Biological / Protectant	NR	P-A	ALL	Registered in blackberries and raspberries (field & protected cropping) for control of Grey Mould and suppression of Anthracnose Fruit Rot, Phomopsis Fruit Rot and Rhizopus Fruit Rot.	-
<i>Bacillus</i> <i>amyloquefaciens</i> strain QST 713 (Serenade Opti Biofungicide) PER88058	44	Biological / Protectant	NR	P-A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of Botrytis Grey Mould.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		Р		Hort Innovation project ST16006 underway to gain registration in <i>Rubus</i> spp. for control of Grey Mould and Anthracnose. Registered in the US for control of <i>Cladosporium</i> in tree nuts, stone fruit and bulb vegetables. Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3
Pyraclostrobin + Fluxapyroxad (Merivon) BASF	11+7	Curative / Protectant		Ρ		Registered in almonds for control of Freckle and Scab ( <i>Cladosporium</i> spp.) Pyraclostrobin: AU MRL T3 mg/kg, Codex MRL 3 mg/kg Fluxapyroxad: No AU MRL, Codex MRL 7 mg/kg.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk								
Yellow Rust ( <i>Phragh</i> Priority: Low	'ellow Rust ( <i>Phragmidium rubidaei</i> ) 'riority: Low														
Yellow Rust in raspbe Rust has declined in i cycles has also reduce of the canes. Maintair risk.	erries is rate mportance ed exposure ning an ope	ed as a low p in recent yea e to rust. The en canopy is	riority ars wi e dise impor	in all th nev ase is tant to	regions exc wer varieties favoured by o promote a	ept New South Wales and Western Australia, where it is rated moderate priority. Y less susceptible to infection. The use of long cane production and shorter product prolonged wet conditions in spring, and severe infestations will lead to total defol irflow and several fungicide options are available to use during periods of high infe	ellow ion iation ection								
Boscalid + Pyraclostrobin (Pristine) PER82986	7+11	Curative / Protectant	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Grey Mould, Anthracnose, Alternaria Leaf Spot & Fruit Rot, Leaf Spot & Blotch, Monilinia Blight, Phomopsis and Powdery Mildew and suppression of <b>Rust</b> . Use preventatively, commencing applications when conditions favour disease infection. Apply a maximum of 3 foliar applications within an annual production cycle, with consecutive treatments 7-14 days apart. Do not apply more than 2 consecutive applications.	-								
Chlorothalonil PER14449	M5	Protectant	28	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Grey Mould, <b>Rusts</b> , Downy Mildew and Septoria Leaf Spot. Apply when conditions favour disease, then repeat at 7-14 day intervals. Do not use more than 3 applications per year.	R2								
Copper (Cu) present as Copper Hydroxide PER14443	M1	Protectant	NR	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Rust</b> and Leaf Spot. Use 1 application only. Canes must not be bearing fruit at the time of application.	-								
Copper (Cu) present as Copper Oxychloride (Coppox) Grochem	M1	Protectant	NR	A	ALL	Registered in <i>Rubus</i> spp. (including raspberries and blackberries) for control of <b>Rust</b> and Leaf Spot, and in raspberries for control of Anthracnose, <b>Rust</b> and Spur Blight. In <i>Rubus</i> spp., apply one application only and canes must not be bearing fruit at the time of application. In raspberries, apply at bud movement, just prior to blossom, repeat at petal fall and after harvest.	-								
Mancozeb PER13958	M3	Protectant	7	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Grey Mould, <b>Rust</b> and Mildew. Apply early bloom and repeat at 10-14 day intervals. Treatments per season not limited.	R2								
Aureobasidium pullulans Strain DSM 14940 & DSM 14941 (Botector) Nufarm	-	Biological / Protectant	NR	P-A	ALL	Registered in blackberries and raspberries (field & protected cropping) for control of Grey Mould and suppression of Anthracnose Fruit Rot, Phomopsis Fruit Rot and Rhizopus Fruit Rot. Also has activity on <b>Yellow Rust</b> .	-								

Blackberries and Raspberries SARP – August 2020 Version 2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<i>Bacillus amyloquefaciens</i> strain QST 713 (Serenade Opti) PER88058	44	Biological / Protectant	NR	P-A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of Botrytis Grey Mould. Also has activity on <b>Yellow Rust</b> .	-
<i>Bacillius amyloliquefaciens</i> (Serifel) BASF	44	Biological / Protectant		Ρ		Registered for control of Botrytis in grapes and strawberries. BASF claim control/suppression of <b>Yellow Rust</b> . No MRLs required for biological product.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protectant & Curative		Ρ		Hort Innovation project ST16006 underway to gain registration in <i>Rubus</i> spp. for control of Grey Mould and Anthracnose. Registered in the US for control of various types of rust in tree nuts, stone fruit and bulb vegetables. Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3
Myclobutanil (Systhane) Corteva	3	Curative		Ρ		Registered in the USA for <b>Yellow Rust</b> control at 35-70 g ai/ha with a seasonal maximum of 280 g ai/ha. No MRLs for AU or Codex	-

#### Anthracnose / Cane Spot (*Elsinöe veneta*) Priority: Low

Anthracnose is rated as a low priority in all regions and it is rarely seen in *Rubus* spp. Infections usually affect the stems, but it can also affect the leaves and fruit. It can be introduced by infected plants or by spores that are dispersed by rain, wind or human activity. Severe infections can cause the stem to become weak and die. Control begins with clean, disease-free planting material, promoting airflow in the canopy and the use of fungicides in crop.

Azoxystrobin	11	Curative /	1	Α	ALL	Registered in Rubus spp. For control of <b>Anthracnose</b> , Botrytis and	-
(Amistar)		Protectant				Cladosporium. Begin applications at the onset of disease. Apply a maximum of 3	
						applications per season with a minimum retreatment interval of 14 days.	
Boscalid +	7+11	Curative /	1	Α	ALL	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Grey Mould,	-
Pyraclostrobin		Protectant			(excl. VIC)	Anthracnose, Alternaria Leaf Spot & Fruit Rot, Leaf Spot & Blotch, Monilinia	
(Pristine)						Blight, Phomopsis and Powdery Mildew and suppression of Rust. Use	
BASF						preventatively, commencing applications when conditions favour disease	
PER82986						infection. Apply a maximum of 3 foliar applications within an annual production	
						cycle, with consecutive treatments 7-14 days apart. Do not apply more than 2	
						consecutive applications.	

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Captan PER13958	M4	Protectant	1	A	ALL (excl. VIC)	Permitted in for control of <b>Cane Spot</b> , Spur Blights and Botrytis Flower & Fruit Rot. Apply the first foliar application after the green tip spray and then repeat every 10-14 days until the season ends. Do not use more than 5 applications per year.	-
Copper (Cu) present as Copper Oxychloride (Coppox) GroChem	M1	Protectant	NR	A	ALL	Registered in <i>Rubus</i> spp. (including raspberries and blackberries) for control of Rust and Leaf Spot, and in raspberries for control of <b>Anthracnose</b> , Rust and Spur Blight. In <i>Rubus</i> spp., apply one application only and canes must not be bearing fruit at the time of application. In raspberries, apply at bud movement, just prior to blossom, repeat at petal fall and after harvest.	-
Aureobasidium pullulans Strain DSM 14940 & DSM 14941 (Botector) Nufarm	-	Biological / Protectant	NR	P-A	ALL	Registered in blackberries and raspberries (field & protected cropping) for control of Grey Mould and suppression of Anthracnose Fruit Rot, Phomopsis Fruit Rot and Rhizopus Fruit Rot. Also registered for control of <b>Anthracnose</b> in strawberries.	-
Bacillus amyloquefaciens strain QST 713 (Serenade Opti Biofungicide) PER88058	44	Biological / Protectant	NR	P-A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of Botrytis Grey Mould. Registered for control of <b>Anthracnose</b> in avocados. Treatments per season not limited.	-
FloryIpicoxamid (Adavelt) Corteva	21	Protectant / Curative		Р		New Mode of Action fungicide being developed in AU. Corteva claim activity on <b>Anthracnose</b> . No MRL's for AU or Codex. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		Ρ		Hort Innovation project ST16006 underway to generate data to gain a label registration in <i>Rubus</i> spp. for control of Grey Mould and <b>Anthracnose</b> . Registered in the US in Fruit, small vine climbing, except fuzzy kiwifruit, subgroup 13-07F for control of Powdery Mildew, Botrytis Bunch Rot / Grey Mould, Black Rot, Sour Rot and suppression of Phomopsis Cane and Leaf Spot. Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Isofetamid (Kenja) ISK	7	Curative / Protectant		Р		Registration pending for control of Botrytis in berries, and with known activity on <b>Anthracnose</b> . Has registration in the US for control of Anthracnose in berries. No AU MRL. Codex MRL 3 mg/kg.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Curative / Protectant		Р		Registration pending in Australia for control of Botrytis, Alternaria, Powdery Mildew & <b>Anthracnose</b> in berries. Registered in the US for control of Anthracnose in various crops, including berry crops. Pydiflumetofen: No MRLs for AU or Codex. Fludioxonil: AU MRL T2 mg/kg. Codex MRL 5 mg/kg.	-
Alternaria Fruit Rot	<b>t</b> ( <i>Alternar</i>	<i>ia</i> spp.)					
Alternaria Fruit Rot is berries which develop hygiene, pruning to n Boscalid + Pyraclostrobin (Pristine) BASF PER82986	rated as a p into a gre naintain gc 7+11	low priority ey-green mas bod canopy ve Curative / Protectant	in all i s of m entilat 1	region nyceliu ion an A	s except Tas im and dark id rapid cool ALL (excl. VIC)	smania, where it is rated moderate priority. First symptoms are sunken lesions on to green spores on the surface of the berries. Management should include strict orch ing of fruit after harvest in combination with post-harvest treatments. Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Grey Mould, Anthracnose, <b>Alternaria Leaf Spot &amp; Fruit Rot</b> , Leaf Spot & Blotch, Monilinia Blight, Phomopsis and Powdery Mildew and suppression of Rust. Use preventatively, commencing applications when conditions favour disease infection. Apply a maximum of 3 foliar applications within an annual production cycle, with consecutive treatments 7-14 days apart. Do not apply more than 2	:he Iard -
Bromo Chloro Dimethyl Hydantoin (BCDMH)	-	Sanitiser / Post- Harvest Treatment	NR	A	ALL	for 2 applications. Registered in fruit & vegetables for control of bacteria and <b>fungi</b> by post- harvest surface sterilisation of fruit using spray or dip. Minimum contact 60 seconds.	-
Chlorine	-	Sanitiser / Post- Harvest Treatment	NR	A	ALL	Registered in fruit & vegetables for control of bacteria and <b>fungi</b> as a post- harvest spray. Minimum contact 30 seconds.	-
Iodine	-	Post- Harvest Treatment	NR	A	ALL	Registered in berries for sanitation of <b>post-harvest decay and diseases</b> . Dip fruit for a minimum of 1 minute.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Florylpicoxamid (Adavelt) Corteva	21	Protectant / Curative		Р		New Mode of Action fungicide being developed in AU. Corteva claim activity on <b>Alternaria</b> . No MRL's for AU or Codex. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		Ρ		Hort Innovation project ST16006 underway to generate data to gain a label registration in <i>Rubus</i> spp. for control of Grey Mould and Anthracnose. Registered in the US in Fruit, small vine climbing, except fuzzy kiwifruit, subgroup 13-07F for control of Powdery Mildew, Botrytis Bunch Rot / Grey Mould, Black Rot, Sour Rot and suppression of Phomopsis Cane and Leaf Spot and registered in various crops for control of <i>Alternaria</i> spp. Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Curative / Protectant		Ρ		Registration pending in Australia for control of Botrytis, <b>Alternaria</b> , Powdery Mildew & Anthracnose in berries. Registered in the US for control of Alternaria in various crops, including berry crops. Pydiflumetofen: No MRLs for AU or Codex. Fludioxonil: AU MRL T2 mg/kg. Codex MRL 5 mg/kg.	-

**Powdery Mildew** (*Podosphaera macularis and Erysiphe* spp.)

#### **Priority:** Low

Powdery Mildew is rated as a low priority in all regions except Victoria and Western Australia, where it is rated moderate priority. Spores are spread by wind, and infections start on dry leaves in high humidity with temperatures over 15°C. The disease attacks the leaves and stems. Severely diseased plants can be stunted, and late buds can be prevented from developing into fruit. Fungal growth on the fruit can make it unsaleable. Late-forming, infected primocanes should be removed and canopy airflow maintained by regular pruning. Fungicides are available for preventing infections in crop.

Boscalid +	7+11	Curative /	1	A	ALL	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Grey Mould,	-
Pyraclostrobin		Protectant			(excl. VIC)	Anthracnose, Alternaria Leaf Spot & Fruit Rot, Leaf Spot & Blotch, Monilinia	
(Pristine)						Blight, Phomopsis and <b>Powdery Mildew</b> and suppression of Rust. Use	
BASF						preventatively, commencing applications when conditions favour disease	
PER82986						infection. Apply a maximum of 3 foliar applications within an annual production cycle, with consecutive treatments 7-14 days apart. Do not apply more than 2 consecutive applications, before using a fungicide from an alternate MoA group for 2 applications.	

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Mancozeb PER13958	M3	Protectant	7	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Grey Mould, Rust and <b>Mildew</b> . Apply early bloom and repeat at 10-14 day intervals. Treatments per season not limited.	R2
Triadimenol (Bayfidan) PER13958	3	Curative/ Protectant	7	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Powdery Mildew</b> . Apply at first sign of disease or as a preventative treatment starting at green tip. Repeat at 10-14 day intervals whilst conditions favour disease. Treatments per season not limited.	R3
Cyflufenamid (Flute) AgNova	U6	Curative/ Protectant		Р		Registered for control of <b>Powdery Mildew</b> in strawberries. No MRLs for AU or Codex.	-
FloryIpicoxamid (Adavelt) Corteva	21	Protectant / Curative		Р		New Mode of Action fungicide being developed in AU. Corteva claim activity on <b>Powdery Mildew</b> . No MRL's for AU or Codex. Scheduled for JMPR evaluation in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		Ρ		Hort Innovation project ST16006 underway to generate data to gain a label registration in <i>Rubus</i> spp. for control of Grey Mould and Anthracnose. Registered in the US in Fruit, small vine climbing, except fuzzy kiwifruit, subgroup 13-07F for control of <b>Powdery Mildew</b> , Botrytis Bunch Rot / Grey Mould, Black Rot, Sour Rot and suppression of Phomopsis Cane and Leaf Spot. Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3
Isofetamid (Kenja) ISK	7	Curative / Protectant		Р		Registration pending for control of Botrytis in berries, and with known activity on <b>Powdery Mildew</b> . Has registration in the US for control of Powdery Mildew in berries. No AU MRL, Codex MRL 3 mg/kg.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Curative / Protectant		Р		Registration pending in Australia for control of Botrytis, Alternaria, <b>Powdery</b> <b>Mildew</b> & Anthracnose in berries. Registered in the US for control of <b>Powdery</b> <b>Mildew</b> in various crops, including berry crops. Pydiflumetofen: No MRLs for AU or Codex. Fludioxonil: AU MRL T2 mg/kg. Codex MRL 5 mg/kg.	-
Pyriofenone (Kusabi) ISK	50	Protectant		Ρ		Registered in the US for control of <b>Powdery Mildew</b> in berries. No AU MRL. Codex MRL 0.9 mg/kg.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Septoria Leaf Spot Priority: Low	(Septoria	rubi)					
Septoria Leaf Spot in generally appears mid The pathogen overwi and orchard hygiene.	raspberrie d to late se nters in inf Septoria L	s is rated as a eason and is f fected plant ti leaf Spot doe	a low avour issue. s not	priorit ed by Mana affect	y in all regic wet weathe gement stra blackberries	ons. The disease causes small brown leaf spots and lesions on succulent stems. Inf r. Infections rarely develop in severity and often the crop will grow out of the disea tegies include avoiding overhead irrigation, pruning to maintain good canopy venti s.	ection ase. lation
Boscalid + Pyraclostrobin (Pristine) BASF PER82986	7+11	Curative / Protectant	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Grey Mould, Anthracnose, Alternaria Leaf Spot & Fruit Rot, <b>Leaf Spot</b> & Blotch, Monilinia Blight, Phomopsis and Powdery Mildew and suppression of Rust. Use preventatively, commencing applications when conditions favour disease infection. Apply a maximum of 3 foliar applications within an annual production cycle, with consecutive treatments 7-14 days apart. Do not apply more than 2 consecutive applications, before using a fungicide from an alternate MoA group for 2 applications.	-
Chlorothalonil PER14449	M5	Protectant	28	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Grey Mould, Rusts, Downy Mildew and <b>Septoria Leaf Spot</b> . Apply when conditions favour disease, then repeat at 7-14 day intervals. Do not use more than 3 applications per year.	R2
Copper (Cu) present as Copper Hydroxide PER14443	M1	Protectant	NR	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Rust and <b>Leaf Spot</b> . Use 1 application only. Canes must not be bearing fruit at the time of application.	-
Copper (Cu) present as Copper Oxychloride (Coppox) GroChem	M1	Protectant	NR	A	ALL	Registered in <i>Rubus</i> spp. (including raspberries and blackberries) for control of Rust and <b>Leaf Spot</b> , and in raspberries for control of Anthracnose, Rust and Spur Blight. In <i>Rubus</i> spp., apply one application only and canes must not be bearing fruit at the time of application. In raspberries, apply at bud movement, just prior to blossom, repeat at petal fall and after harvest.	-
Florylpicoxamid (Adavelt) Corteva	21	Protectant / Curative		Ρ		New Mode of Action fungicide being developed in AU. Corteva claim activity on <b>Septoria</b> . No MRL's for AU or Codex. Scheduled for JMPR evaluation in 2023.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		Ρ		Hort Innovation project ST16006 underway to generate data to gain a label registration in <i>Rubus</i> spp. for control of Grey Mould and Anthracnose. Registered in the US in Fruit, small vine climbing, except fuzzy kiwifruit, subgroup 13-07F for control of Powdery Mildew, Botrytis Bunch Rot / Grey Mould, Black Rot, Sour Rot and suppression of Phomopsis Cane and Leaf Spot. Also has activity on <i>Septoria</i> spp. Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3
Alternata Leaf Spot	<b>t</b> ( <i>Alternari</i>	a alternata)					
Alternata Leaf Spot is	rated as a	low priority	in all r	ogion		umptoms are usually minor, with leaf spot infections having minimal effects on	
production, but they	can be a so	ource of infect	tion fo	or Alte	ernaria Fruit	Rot. Control measures used for other foliar pathogens will keep it in check.	
Boscalid + Pyraclostrobin (Pristine) BASF PER82986	7+11	Curative / Protectant	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Grey Mould, Anthracnose, <b>Alternaria Leaf Spot &amp; Fruit Rot</b> , Leaf Spot & Blotch, Monilinia Blight, Phomopsis and Powdery Mildew and suppression of Rust. Use preventatively, commencing applications when conditions favour disease infection. Apply a maximum of 3 foliar applications within an annual production cycle, with consecutive treatments 7-14 days apart. Do not apply more than 2 consecutive applications, before using a fungicide from an alternate MoA group for 2 applications.	-
Copper (Cu) present as Copper Hydroxide PER14443	M1	Protectant	NR	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Rust and <b>Leaf Spot</b> . Use 1 application only. Canes must not be bearing fruit at the time of application.	-
Copper (Cu) present as Copper Oxychloride (Coppox) GroChem	M1	Protectant	NR	A	ALL	Registered in <i>Rubus</i> spp. (including raspberries and blackberries) for control of Rust and <b>Leaf Spot</b> , and in raspberries for control of Anthracnose, Rust and Spur Blight. In <i>Rubus</i> spp., apply one application only and canes must not be bearing fruit at the time of application. In raspberries, apply at bud movement, just prior to blossom, repeat at petal fall and after harvest.	-
Florylpicoxamid (Adavelt) Corteva	21	Protectant / Curative		Ρ		New Mode of Action fungicide being developed in AU. Corteva claim activity on <b>Alternaria</b> . No MRL's for AU or Codex. Scheduled for JMPR evaluation in 2023.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		Ρ		Hort Innovation project ST16006 underway to generate data to gain a label registration in <i>Rubus</i> spp. for control of Grey Mould and Anthracnose. Registered in the US in Fruit, small vine climbing, except fuzzy kiwifruit, subgroup 13-07F for control of Powdery Mildew, Botrytis Bunch Rot / Grey Mould, Black Rot, Sour Rot and suppression of Phomopsis Cane and Leaf Spot and registered in various crops for control of <i>Alternaria</i> spp. Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Curative / Protectant		Ρ		Registration pending in Australia for control of Botrytis, <b>Alternaria</b> , Powdery Mildew & Anthracnose in berries. Registered in the US for control of Alternaria in various crops, including berry crops. Pydiflumetofen: No MRLs for AU or Codex. Fludioxonil: AU MRL T2 mg/kg. Codex MRL 5 mg/kg.	-
Phomopsis Blight ( Priority: Low	Phomopsis	spp.)					

Phomopsis Blight is rated as a low priority in all regions. The disease causes necrotic lesions to form on the bud shortly after green tip. These lesions can spread and cause the infected buds to die. Leaf spots can develop later in the season and a fruit rot can also develop at harvest. Management includes strict orchard hygiene and removal of infected plant material, avoiding overhead irrigation, the use of resistant varieties, and timely harvest to avoid allowing over-ripe fruit to develop.

Aureobasidium	-	Biological /	NR	Α	ALL	Registered in blackberries and raspberries (field & protected cropping) for	-
<i>pullulans</i> Strain DSM		Protectant				control of Grey Mould and suppression of Anthracnose Fruit Rot, Phomopsis	
14940 & DSM 14941						Fruit Rot and Rhizopus Fruit Rot. Apply as a preventative treatment from the	
(Botector)						beginning of bloom until harvest. Apply as part of a spray program, using up to	
Nufarm						6 applications at 5-7 day intervals, particularly when weather conditions favour	
						disease infection	

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Boscalid + Pyraclostrobin (Pristine) BASF PER82986	7+11	Curative / Protectant	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Grey Mould, Anthracnose, Alternaria Leaf Spot & Fruit Rot, Leaf Spot & Blotch, Monilinia Blight, <b>Phomopsis</b> and Powdery Mildew and suppression of Rust. Use preventatively, commencing applications when conditions favour disease infection. Apply a maximum of 3 foliar applications within an annual production cycle, with consecutive treatments 7-14 days apart. Do not apply more than 2 consecutive applications, before using a fungicide from an alternate MoA group for 2 applications.	-
Mancozeb + Metalaxyl-M (Ridomil Gold MZ) Syngenta	M3+4	Protectant	14	P-A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Downy Mildew</b> . Registered for control of <i>Phomopsis</i> Leaf Blight in strawberries. Apply a maximum of 4 applications within an annual production cycle.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Curative / Protectant		Ρ		Hort Innovation project ST16006 underway to generate data to gain a label registration in <i>Rubus</i> spp. for control of Grey Mould and Anthracnose. Registered in the US in Fruit, small vine climbing, except fuzzy kiwifruit, subgroup 13-07F for control of Powdery Mildew, Botrytis Bunch Rot / Grey Mould, Black Rot, Sour Rot and suppression of <b>Phomopsis Cane and Leaf Spot</b> . Fluopyram – No AU MRL. Codex MRL 5 mg/kg. Tebuconazole – No MRLs for AU or Codex.	R3
Crown Gall (Agrobacterium tumefaciens) Priority: Low							
Crown Gall can affect blackberries and is rated as a low priority in all regions. The disease causes galls to form on the crown of the plant and on the roots. Severe infections can cause plants to become unthrifty. The disease is spread by movement of soil, infected plant material or via budding and grafting tools. Strict orchard hygiene should be employed to manage the spread.							

Agrobacterium -	Protectant NR	A	NSW, TAS	Permitted in <i>Rubus</i> spp. as a pre-plant treatment for control of <b>Crown Gall</b> .	-
radiobacter	/ Pre-Plant			Completely immerse root system in solution before planting.	
NoGall	Seedling				
PER13150	Treatment				

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
American Goosebe	r <b>ry Mildev</b>	V (Sphaeroth	neca r	norsuv	/ae)		
Priority: Low							
American Gooseberry	Mildew is I	rated as a low	w pric	ority in	all regions.	Closely related to Powdery Mildew, incidence is rare in Australian berry crops. Will	be
controlled by measure	es employe	d for other for	oliar c	lisease	es.		
Mancozeb	M3	Protectant	7	Α	ALL	Permitted in <i>Rubus</i> spp. for control of Grey Mould, Rust and <b>Mildew</b> . Apply	R2
PER13958					(excl. VIC)	early bloom and repeat at 10-14 day intervals. Treatments per season not	
					(0,10.1 120)	limited.	
Boscalid +	7+11	Curative /	1	P-A	ALL	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Grey Mould,	-
Pvraclostrobin		Protectant			(excl. VIC)	Anthracnose, Alternaria Leaf Spot & Fruit Rot, Leaf Spot & Blotch, Monilinia	
(Pristine)					(	Blight, Phomopsis and Powdery Mildew and suppression of Rust.	
BASE							
DFR82986							
Pyraclostrobin (Pristine) BASF PER82986	7+11	Protectant	T	P-A	(excl. VIC)	Anthracnose, Alternaria Leaf Spot & Fruit Rot, Leaf Spot & Blotch, Monilinia Blight, Phomopsis and Powdery Mildew and suppression of Rust.	-

#### 4.2 Insects, mites and other pests of Blackberries and Raspberries

#### 4.2.1 Insect, mite and other pest priorities

Common name	Scientific name
High	
Two Spotted Mite	Tetranychus urticae
Green Stink Bug	Plautia affinis
Green Vegetable Bug	Nezara viridula
Western Flower Thrips	Frankliniella occidentalis
Green Mirid	Creontiades dilutus
Brown Mirid	Creontiades pacificus
Crop Mirid	Sidnia kinbergi
Moderate	
Loopers	Chrysodeixis spp.
Cluster Caterpillar	Spodoptera litura
Light Brown Apple Moth	Epiphyas postvittana
Cotton Bollworm / Corn Earworm	Helicoverpa armigera
Native Budworm	Helicoverpa punctigera
Rutherglen Bug	Nysius vinitor
Broad Mite	Polyphagotarsonemus latus
Red Berry Mite	Acalitus essigi
Plague Thrips	Thrips imaginis
Cottonseed Bug	Oxycarenus luctuosus
Leafhoppers / Jassids	Cicadellidae
Greenhouse Whitefly	Trialeurodes vaporariorum
Green Peach Aphid	Myzus persicae
Queensland Fruit Fly	Bactrocera tryoni
Grasshoppers	Orthoptera

Common name	Scientific name
Low	
Bean Spider Mite	Tetranychus ludeni
European Red Spider Mite	Panonychus citri
Bryobia and Clover Mite	Bryobia spp.
Raspberry Leaf & Bud Mite (Eriophyid mite)	Phyllocoptes gracilis
Carmine Mite	Tetranychus cinnabarinus
Apple Dimpling Bug (High WA)	Campylomma liebknechti
Mealybugs	Pseudococcus spp.
Harlequin Bug	Dindymus versicolor
Strawberry Bug	Euander lacertosus
Slugs & Snails	Gastropoda
Black Vine Weevil	Otiorhynchus sulcatus
Elephant Weevil	Orthorhinus cylindrirostris
Fullers Rose Weevil	Asynonychus cervinus
Dried Fruit Beetle	Carpophilus spp.
Red-Shouldered Leaf Beetle	Monolepta australis
Scale Insects – Soft Scale, Armoured Scale and Felted Scale	Coccidae spp., Diaspididae spp., Eriococcidae spp.
Mediterranean Fruit Fly	Ceratitis capitata
Redlegged Earth Mite	Halotydeus destructor

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

Common Name	Scientific name
Fall Armyworm	Spodoptera frugiperda

The pests identified as high priorities in blackberries and raspberries are Two Spotted Mite, Green Stink Bug, Green Vegetable Bug, Western Flower Thrips, Green Mirid, Brown Mirid and Crop Mirid.

Two Spotted Mite are most commonly found in red raspberries. High infestations can cause leaves to be marked by white stippling or bronzing from mite feeding. Severe damage can reduce photosynthetic capacity and therefore yield and fruit quality.

Green Stink Bug and Green Vegetable Bug cause similar feeding damage, by piercing and sucking sap from buds and blossoms. Green Stink Bug will also feed directly on fruit causing discolouration and reduced firmness.

Western Flower Thrips damage fruit by feeding on the drupelets adjacent to the calyx, producing a speckled, silver appearance.

Three types of mirids will attack raspberries, Green Mirids, Brown Mirids and Crop Mirids. Adults and nymphs pierce plant tissue and release a chemical that destroys cells in the feeding zone. They damage buds, flower and growing points through feeding. This results in reduced berry weight and increased fruit distortion.

It is important to take an Integrated Pest Management (IPM) approach to pest control in blackberries and raspberries. The diversity of insects that will attack the crop means that a planned, strategic approach is required. A range of control measures should be used, including cultural controls, biological controls and insecticides. Beneficial insects such as predators, parasitoids and pollinators should be encouraged and can be introduced artificially if required. Insecticide choice should be made with regard to preserving the beneficial insects that play an important role in the crop.

Bees also play an important role as pollinators of blackberries and raspberries. Extra care should be taken with insect control measures used at flowering time, to avoid impacting on pollinators. Always refer to the pesticide label for guidance about preserving bees.

The diverse range of invertebrate pests in blackberries and raspberries necessitates careful planning with resistance management. There are several pest strategies that apply to berries on the CropLife website<sup>2</sup>, including Aphids, Two-spotted Mite, Fall Armyworm and Western Flower Thrips.

<sup>&</sup>lt;sup>2</sup> www.croplife.org.au/resources/programs/resistance-management/

#### 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.

	Av	ailability	Regulatory risk (refer to Appendix 6)							
А	Available via either registrati	on or permit approval	R1	Short-term: Critical concern over retaining	access					
Р	Potential - a possible candid	ate to pursue for registration or permit	R2	Medium-term: Maintaining access of signifi	cant concern					
P-A	Potential, already approved	in the crop for another use	R3	Long-term: Potential issues associated with	n use - Monitoring required					
	Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)									
Harvest		Н	Not Require	ed when used as directed	NR					
Grazing		G	No Grazing	Permitted	NG					
IPM – indicative overall impact on beneficials (based on the Cotton Pest Management Guide 2019-20 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 rick
---	-------------------	----------	-----------	--------------	--------	----------	--------------------------	--------------------

**Two Spotted Mite** (*Tetranychus urticae*) **Priority: High** 

Two Spotted Mite is rated as a high priority in all regions. Two Spotted Mite are most commonly found in red raspberries. High infestations can cause leaves to be marked by white stippling or bronzing from mite feeding. Severe damage can reduce photosynthetic capacity and therefore yield and fruit quality. An IPM approach should be used to manage mites, utilising beneficial predators and non-disruptive insecticides in a planned control strategy.

Abamectin	6	Ingestion	7	A	ALL	Registered in blackberries and raspberries for control of <b>Two Spotted</b>	М	-
		-				Mite and Queensland Fruit Fly. Apply as a foliar spray when the pest	Bee H	
						incidence reaches economic threshold. Do not use more than 2		
						applications per crop, with a minimum retreatment interval of 28 days		
						between consecutive applications.		
Bifenazate	20	Contact &	H:1	A	ALL	Permitted in blackberries and raspberries for control of <b>Two Spotted</b>	L	-
(Acramite)		Ingestion	G:28		(excl. VIC)	Mite and European Red Spider Mite. Apply as a foliar spray when the	Bee H	
PER14425						pest incidence reaches economic threshold. Do not apply more than		
						two applications per crop per season, with a minimum interval of 21		
						days between consecutive applications. Do not apply sequential		
						applications. A different acaricide should be used between Bifenazate		
						applications.		

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Botanical Oil (Eco-Oil) PER14234	-	Contact	NR	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Two Spotted Mite</b> . Apply as a foliar spray when mites first appear. Apply 2 sprays 3-5 days apart. If mite reinfestation is observed, repeat application, with a minimum of 7 days interval since the last spray treatment. Do not use more than 3 separate applications to plants within a 4-8 week period.	L Bee L	-
Dimethoate	1B	Contact	7	A	ALL	Registered in blackberries and raspberries for control of <b>Spider Mites</b> , Thrips, Jassids, Aphids and Red Legged Earth Mite. Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited,	H Bee H	R1
Etoxazole (Paramite) Sumitomo PER89406	10B	Contact / IGR	H:1 NG	A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of <b>Two Spotted Mite</b> and Bean Spider Mite. Apply as a cover spray when mites first appear. Target increasing nymph population before a large number of adults are present. Do not use more than 1 application per season.	L Bee VL	-
Fenbutatin Oxide (Torque) BASF PER89407	12B	Contact	H:1 NG	A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of <b>Two Spotted Mite</b> , European Red Mite, Broad Mite, Bean Spider Mite and Red Berry Mite. Apply as a cover spray when mites first appear, well before dense infestation develops and repeat as infestations indicate. Do not use more than 2 applications per season. Two applications at 14 days apart is usually adequate.	L Bee L	R3
Petroleum Oil PER13957	-	Contact	1	A	ALL (excl. VIC)	Permitted in Rubus spp. for control of <b>Two Spotted Mite</b> and Scale Insects. Apply as a cover spray every 5-7 days or as required. Treatments per season not limited.	L Bee L	-
Sulphur PER87245	M2	Contact	NR	A	ALL	Permitted in blackberries for control of Broad Mite, <b>Two Spotted</b> <b>Mite</b> , Bean Spider Mite and Red Berry Mite. Apply as a foliar spray to new growing canes during the vegetative growth stage. Do not use more than 10 applications per crop with a minimum retreatment interval of 7-14 days between consecutive applications. Avoid spray contact with flowers.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spiromesifen (Oberon) Bayer	23	Ingestion		Ρ		New Australian Registration pending for control of <b>Mites</b> . Hort Innovation is undertaking data generation projects across multiple commodities for a new label registration in Australia, including project ST19020 for control of various mites in <i>Rubus</i> spp. US registration for control of Two Spotted Mite in low growing berries. No MRLs for AU or Codex.	M Bee VL	-
Acequinocyl (Kanemite) UPL	20B	Contact & Ingestion		Ρ		Registration is progressing for use in pome and stone fruit for control of Mites. Registered for control of various mites including <b>Two Spotted</b> <b>Mite</b> for strawberries in the US, and control of <b>Two Spotted Mite</b> for greenhouse ornamentals, greenhouse tomato, pepper, eggplant and cucumber in Canada. No MRLs for AU or Codex.		-
<i>Beauvaria bassiana</i> (Velifer) BASF	UN	Biological	NR	Р		Registered for suppression of <b>Two Spotted Mite</b> in protected vegetables and ornamentals. No MRLs required for biological product.		-
Cyflumetofen (Danisaraba) BASF	25A	Contact		Р		BASF is seeking registration in Australia for the control of Spider Mites in various crops. Rubus spp. not currently in scope but strawberries expected on the initial label. No MRLs for AU or Codex.	L Bee L	-
Hexythiazox (Calibre) Nufarm	10A	IGR / Contact		Р		Registered for control of <b>Two Spotted Mite</b> in strawberries. AU MRL 1 mg/kg. No Codex MRL.	L Bee L	-
SYNFOI21 Syngenta	TBC			Р		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Green Stink Bug (/ Green Vegetable B Priority: High	Plautia af Bug ( <i>Nez</i>	finis) ara viridula)	1	-			1	
Green Stink Bug is ra a moderate priority. Stink Bug will also fe	ated as a Green St ed direct	high priority ink Bug and ly on fruit ca	/ in all r Green ausing d	egions. Vegetab liscolour	Green Vegeta le Bug cause ation and red	ble Bug is rated as a high in all regions except New South Wales, where similar feeding damage, by piercing and sucking sap from buds and bloss luced firmness.	it is rate soms. Gr	d as een
Carbaryl (Bugmaster)	1A	Contact	7	P-A	ALL	Registered in raspberries for control of various pests, including Rutherglen Bug and Mealy Bug. Also has activity on <b>Green Stink Bug</b> and <b>Green Vegetable Bug</b> .	H Bee H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk			
Dimethoate	1B	Contact	7	P-A	ALL	Registered in blackberries and raspberries for control of Spider Mites, Thrips, Jassids, Aphids and Red Legged Earth Mite. Registered for control of <b>Green Vegetable Bug</b> in various crops.	H Bee H	R1			
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion / IGR		Ρ		Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label as well as <b>Green Vegetable Bug</b> . Registered in grapes for control of Scale, Light Brown Apple Moth and Long Tailed Mealybug. Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriproxifen: No MRLs for AU or Codex.	M Bee H	-			
Flonicamid (Mainman) UPL	29	Ingestion		Ρ		Hort Innovation project ST17000 generated residue, efficacy and crop safety data to support a minor use permit in raspberries and blackberries for various bugs including <b>Green Vegetable Bugs</b> , Rutherglen bugs, Mirids, Jassids, Aphids and Greenhouse Whitefly. Permit application submitted in February 2020 and currently pending APVMA approval in Aug-Sep 2020. AU MRL T2 mg/kg.	M Bee VL	-			
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		Ρ		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of Aphids and Whitefly, in bushberries for control of Aphids, Thrips and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and Leafhoppers in various crops. No MRLs for AU or Codex.	L Bee L	-			
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-			
SYNFOI21 Syngenta	TBC			Ρ		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			
--	-------------------	---------------	-----------	--------------	--------	--	--------------------------	--------------------	--	--	--
Western Flower Tl Priority: High	nrips (Fr	ankliniella o	ccidenta	alis)							
Western Hower Thrips are rated as a high priority in all regions except Victoria, where they are rated as a moderate priority. Western Flower Thrips damage fruit by feeding on the drupelets adjacent to the calyx, producing a speckled, silver appearance. Biological measures, such as predatory mite releases, are an effective management strategy to use in conjunction with judicious use of insecticides.											
Dimethoate	1B	Contact	7	A	ALL	Registered in blackberries and raspberries for control of Spider Mites, <b>Thrips</b> , Jassids, Aphids and Red Legged Earth Mite. Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited.	H Bee H	R1			
Spinetoram (Success Neo) Corteva	5	Ingestion	1	A	ALL	Registered in blackberries and raspberries for control of Loopers, Light Brown Apple Moth, <i>Helicoverpa</i> and <b>Western Flower Thrips</b> . Make 3 consecutive applications at 3-5 day intervals when temperatures are greater than 20°C or 6-12 day intervals when temperatures are less than 20°C. Use a product with an alternate mode of action for any additional treatments required. Do not exceed 3 consecutive applications.	M Bee VH	-			
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	A	ALL	Registered in blackberries and raspberries for control of Loopers, Light Brown Apple Moth, <i>Helicoverpa</i> and <b>Western Flower Thrips</b> . Make 3 consecutive applications at 3-5 day intervals when temperatures are greater than 20°C or 6-12 day intervals when temperatures are less than 20°C. Use a product with an alternate mode of action for any additional treatments required. Do not exceed 3 consecutive applications.	L Bee H	-			
<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	Р		Registered for suppression of Onion Thrips and <b>Western Flower</b> <b>Thrips</b> 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 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-			
Spirotetramat (Movento) Bayer	23	Ingestion		Р		Registered for control of <b>Western Flower Thrips</b> in various vegetable crops. No MRLs for AU or Codex.	M Bee L	-			

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk				
SYNFOI21 Syngenta	TBC			Ρ		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-				
Green Mirid ( <i>Creon</i> Brown Mirid ( <i>Creon</i> Crop Mirid ( <i>Sidnia H</i> Priority: High	Green Mirid ( <i>Creontiades dilutus</i> ) Grown Mirid ( <i>Creontiades pacificus</i> ) Grop Mirid ( <i>Sidnia kinbergi</i> ) Priority: High											
Green Mirid is rated a priority in all regions they are rated as a lo in the more northern buds, flower and gro	as a high except N ow priorit growing wing poir	priority in a lew South W y, and Tasn areas. Adul nts through	III region Vales, ra nania, w Its and r feeding.	is excepted as here th lymphs This re	ot Western Au a low priority. ey are rated a pierce plant t esults in reduc	Istralia, where it is rated as a moderate priority. Brown Mirids are rated a Crop Mirids are rated as a high priority in all regions except New South as a moderate priority. Mirids are a problem in all regions but their impor issue and release a chemical that destroys cells in the feeding zone. The ced berry weight and increased fruit distortion.	s a high Nales wh tance is le y damage	iere ess e				
Bifenthrin (Talstar) PER84972	3A	Contact	1	P-A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Monolepta Beetle and Plague Thrips. Registered for control of <b>Green Mirids</b> in cotton.	VH Bee H	R3				
Botanical Oil (Eco-Oil) PER14234	-	Contact	NR	P-A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Two Spotted Mite</b> . Will also provide suppression of <b>Mirids</b> .	L Bee L	-				
Carbaryl (Bugmaster)	1A	Contact	7	P-A	ALL	Registered in raspberries for control of various pests, including Rutherglen Bug and Mealy Bug. Also has activity on <b>Mirids</b> .	H Bee H	R3				
Dimethoate	1B	Contact	7	P-A	ALL	Registered in blackberries and raspberries for control of Spider Mites, Thrips, Jassids, Aphids and Red Legged Earth Mite. Registered for control of <b>Mirids</b> in cotton and pulse crops.	H Bee H	R1				
Indoxacarb (Avatar eVo) FMC	22A	Ingestion	H:3 NG	P-A	ALL	Registered in <i>Rubus</i> spp. (field grown only) for control of Light Brown Apple Moth. Registered in cotton for control of <b>Mirids</b> .	M Bee H	R3				
Petroleum Oil PER13957		Contact	1	P-A	ALL (excl. VIC)	Permitted in Rubus spp. for control of Two Spotted Mite and Scale Insects. Registered for suppression of <b>Green Mirids</b> in cotton.	L Bee L	-				
Sulfoxaflor (Transform) Corteva PER87141	4C	Ingestion	1	P-A	NSW, QLD	Permitted in blackberries and raspberries (field & protected cropping) for control of Cottonseed Bug. MT18018 to generate residue data in raspberries and blackberries for permit renewal. Due for completion December 2020. Registered in various crops for control of <b>Mirids</b> .	M Bee VH	-				

Blackberries and Raspberries SARP – August 2020 Version 2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion / IGR		Р		Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label. Registered in grapes for control of Scale, Light Brown Apple Moth and Long Tailed Mealybug. Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriproxifen: No MRLs for AU or Codex.	M Bee H	-
<i>Clitoria ternatea</i> Extract (Sero-X) Growth Ag		Biological		Р		Registered for control of <b>Mirids</b> in cotton. No MRL required for biological product.	L Bee VL	-
Flonicamid (Mainman) UPL	29	Ingestion		Ρ		Hort Innovation project ST17000 generated residue, efficacy and crop safety data to support a minor use permit in raspberries and blackberries for various bugs including Green Vegetable Bugs, Rutherglen bugs, <b>Mirids</b> , Jassids, Aphids and Greenhouse Whitefly. Permit application submitted in February 2020 and currently pending APVMA approval in Aug-Sep 2020. AU MRL T2 mg/kg.	M Bee VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		Ρ		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of Aphids and Whitefly, in bushberries for control of Aphids, Thrips and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and Leafhoppers in various crops. Also has good activity on <b>Mirids</b> based on Australian data. No MRLs for AU or Codex.	L Bee L	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			Ρ		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
Looper ( <i>Chrysodeix</i> Priority: Moderate	<i>dis</i> spp.)		I	1			11	I
Loopers are rated as and blackberries. Th	s a high p e larvae (	riority in all cause damag	regions ge by fe	except eding p	New South W redominantly	ales, where they are rated as a moderate priority. Loopers will attack bot on leaves, although they can also attack growing tips, flowers and fruit.	h raspbe	erries
Spinetoram (Success Neo) Corteva	5	Ingestion	1	A	ALL	Registered in blackberries and raspberries for control of <b>Loopers</b> , Light Brown Apple Moth, <i>Helicoverpa</i> and Western Flower Thrips. Target applications 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 crop.	M Bee VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	A	ALL	Registered in blackberries and raspberries for control of <b>Loopers</b> , Light Brown Apple Moth, <i>Helicoverpa</i> and Western Flower Thrips. Target applications 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 crop.	L Bee H	-
Carbaryl (Bugmaster)	1A	Contact	7	P-A	ALL	Registered in raspberries for control of various pests, including <i>Helicoverpa</i> and Armyworm. Also has activity on <b>Loopers</b> .	H Bee H	R3
Chlorantraniliprole (Coragen) FMC PER89353	28	Ingestions	H:3 NG	P-A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Fall Armyworm. Also has activity on <b>Loopers</b> .	L Bee VL	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion	H:3 NG	P-A	ALL	Registered in <i>Rubus</i> spp. (field grown only) for control of Light Brown Apple Moth. Also has activity on <b>Loopers</b> .	M Bee H	R3
Emamectin (Proclaim) Syngenta	6	Ingestion		Р		Registered for control of <b>Loopers</b> in strawberries and various vegetable crops. No MRLs for AU or Codex.	M Bee H	-
Methoxyfenozide (Prodigy) Corteva	18	Ingestion		Р		Registered in pome fruit for control of <b>Loopers</b> . No MRLs for AU or Codex.	VL Bee VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			Р		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Ρ		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, <b>Loopers</b> , Helicoverpa, Cluster Caterpillar and Monolepta beetle.	L-M Bee VH	-

Cluster Caterpillar (Spodoptera litura)

#### Priority: Moderate

Cluster Caterpillar is rated as a moderate priority in Victoria and Western Australia, a high priority in New South Wales and a low priority in Tasmania. Damage is caused by the larval stage. After hatching, they crawl around the plant feeding, particularly on tender tissues such as plant tips, flowers and fruit. Preservation and introduction of beneficial predators and parasitoids is a good strategy to support the judicious use of selective insecticides, particularly to protect flowers and the developing fruit.

Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of Grasshoppers, <i>Helicoverpa</i> spp., Mealy Bug, Rutherglen Bug, Weevils, <b>Armyworm</b> , Light Brown Apple Moth, Raspberry Fruit Caterpillar and Wingless Grasshopper. Apply at first signs of pests and repeat as required. Treatments per season not limited.	H Bee H	R3
Chlorantraniliprole (Coragen) FMC PER89353	28	Ingestion	H:3 NG	P-A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Fall Armyworm. Registered for control of <b>Cluster Caterpillar</b> in brassica vegetables and strawberries.	L Bee VL	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			Р		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			
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Р		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, Loopers, Helicoverpa, <b>Cluster Caterpillar</b> and Monolepta beetle.	L-M Bee VH	-			
Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ) Priority: Moderate											
Light Brown Apple M Damage is caused by Preservation and intr protect flowers and t	oth is rat y the larv oduction the develo	ed as a moo al stage. Aft of beneficia oping fruit.	derate p cer hatcl Il predat	priority in hing, the tors and	n Western Aus ey crawl arour I parasitoids is	stralia, a high priority in Victoria and Tasmania and a low priority in New s nd the plant feeding, particularly on tender tissues such as plant tips, flow a good strategy to support the judicious use of selective insecticides, pa	South Wavers and Inticularly	ales fruit. ⁄ to			
Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of Grasshoppers, <i>Helicoverpa</i> spp., Mealy Bug, Rutherglen Bug, Weevils, Armyworm, <b>Light Brown Apple</b> <b>Moth</b> , Raspberry Fruit Caterpillar and Wingless Grasshopper. Apply at first signs of pests and repeat as required. Treatments per season not limited.	H Bee H	R3			
Indoxacarb (Avatar eVo) FMC	22A	Ingestion	H:3 NG	A	ALL	Registered in <i>Rubus</i> spp. (field grown only) for control of <b>Light Brown</b> <b>Apple Moth</b> . Do not use more than 2 applications per crop, with a minimum retreatment interval of 7 days.	M Bee H	R3			
Indoxacarb (Avatar) PER13289	22A	Ingestion	3	A	ALL	Permitted in Rubus spp. (field & protected cropping) for control of <b>Light Brown Apple Moth</b> and Elephant Weevil Borer. Apply as eggs and larvae reach economic thresholds and damage is observed. Do not exceed 2 applications per crop with a minimum re-treatment interval of 7 days between consecutive applications.	M Bee H	R3			
Spinetoram (Success Neo) Corteva	5	Ingestion	1	A	ALL	Registered in blackberries and raspberries for control of Loopers, <b>Light</b> <b>Brown Apple Moth</b> , <i>Helicoverpa</i> and Western Flower Thrips. Target applications 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 crop.	M Bee VH	-			

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	A	ALL	Registered in blackberries and raspberries for control of Loopers, <b>Light</b> <b>Brown Apple Moth</b> , <i>Helicoverpa</i> and Western Flower Thrips. Target applications 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 crop.	L Bee H	-
Chlorantraniliprole (Coragen) FMC PER89353	28	Ingestion	H:3 NG	P-A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Fall Armyworm. Registered for control of <b>Light Brown Apple Moth</b> in pome fruit, stone fruit and grapes.	L Bee VL	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			Р		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Ρ		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; <b>Light Brown Apple Moth</b> , Loopers, Helicoverpa, Cluster Caterpillar and Monolepta beetle.	L-M Bee VH	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cotton Bollworm / Native Budworm ( Priority: Moderate	<b>/ Corn E</b> a <i>(Helicover</i> e	arworm (H rpa punctige	lelicover era)	pa armi	igera)			
<i>Helicoverpa</i> spp. are caused by the larval Preservation and intr protect flowers and t	rated as stage. Af roduction	a moderate ter hatching of beneficia	priority , they c al predat	in Tasr rawl arc tors and	mania and We ound the plan I parasitoids is	estern Australia, and as a low priority in New South Wales and Victoria. D t feeding, particularly on tender tissues such as plant tips, flowers and from s a good strategy to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicious use of selective insecticides, particularly to support the judicide selective insecticides, particularly to support the judicide selective insective insecticides, particularly to support the judicide selective select	amage is uit. articularly	; y to
Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of Grasshoppers, <i>Helicoverpa</i> <b>spp.</b> , Mealy Bug, Rutherglen Bug, Weevils, Armyworm, Light Brown Apple Moth, Raspberry Fruit Caterpillar and Wingless Grasshopper. Apply at first signs of pests and repeat as required. Treatments per season not limited.	H Bee H	R3
Nuclear Polyhedrosis Virus (Vivus) AgBiTech	-	Biological / Ingestion	NR	A	ALL	Registered in blackberries and raspberries for control of <b>Cotton</b> <b>Bollworm</b> and <b>Native Budworm</b> . Has a short residual activity and re-treatment may be required at 2-3 day intervals. Treatments per season not limited.	VL Bee VL	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	A	ALL	Registered in blackberries and raspberries for control of Loopers, Light Brown Apple Moth, <i>Helicoverpa</i> and Western Flower Thrips. Target applications 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 crop.	M Bee VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	A	ALL	Registered in blackberries and raspberries for control of Loopers, Light Brown Apple Moth, <i>Helicoverpa</i> and Western Flower Thrips. Target applications 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 crop.	L Bee H	-
Chlorantraniliprole (Coragen) FMC PER89353	28	Ingestion	H:3 NG	P-A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of Fall Armyworm. Registered for control of <i>Helicoverpa</i> spp. in various crops.	L Bee VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			Р		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Ρ		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, Loopers, <b>Helicoverpa</b> , Cluster Caterpillar and Monolepta beetle.	L-M Bee VH	-
Rutherglen Bug (/ Priority: Moderate	Vysius vin B	itor)						
Rutherglen Bug is ra seasonal pest that is sucking sap from fru	ted as a l most pre it and lea	high priority evalent in sp aves.	in all re oring and	egions e d summ	except Victoria Ier during war	and Tasmania, where it is rated as a moderate priority. Rutherglen Bug rm, dry periods and when surrounding weeds are drying off. They cause of	are a damage	by
Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of Grasshoppers, Heliothis, Mealy Bug, <b>Rutherglen Bug</b> , Weevils, Armyworm, Light Brown Apple Moth, Raspberry Fruit Caterpillar and Wingless Grasshopper. Apply at first signs of pests and repeat as required. Treatments per season not limited.	H Bee H	R3
Dimethoate	1B	Contact	7	A	QLD, VIC, TAS, SA & WA	Registered in blackberries and raspberries for control of Strawberry Bug and <b>Rutherglen Bug</b> . Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited.	H Bee H	R1
Sulfoxaflor (Transform) Corteva PER87141	4C	Ingestion	1	P-A	NSW, QLD	Permitted in blackberries and raspberries (field & protected cropping) for control of Cottonseed Bug. MT18018 to generate residue data in raspberries and blackberries for permit renewal. Due for completion December 2020. Registered in various crops for control of <b>Rutherglen Bug</b> .	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 & Ingestion / IGR		Ρ		Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label. Registered in grapes for control of Scale, Light Brown Apple Moth and Long Tailed Mealybug. Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriproxifen: No MRLs for AU or Codex.	M Bee H	-
Flonicamid (Mainman) UPL	29	Ingestion		Ρ		Hort Innovation project ST17000 generated residue, efficacy and crop safety data to support a minor use permit in raspberries and blackberries for various bugs including Green Vegetable Bugs, <b>Rutherglen bugs</b> , Mirids, Jassids, Aphids and Greenhouse Whitefly. Permit application submitted in February 2020 and currently pending APVMA approval in Aug-Sep 2020. AU MRL T2 mg/kg.	M Bee VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		Ρ		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of Aphids and Whitefly, in bushberries for control of Aphids, Thrips and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and Leafhoppers in various crops. No MRLs for AU or Codex.	L Bee L	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			Ρ		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
Broad Mite ( <i>Polyph</i> Priority: Moderate	agotarso. S	nemus latus	5)					
Broad Mite is rated a are very small and d underside. Damage i compressed and blos non-disruptive insect	as a mode ifficult to includes t ssoms that ticides in	erate priority see with the issue distori at dry up. As a planned o	in Tasn e naked tion, red s with Tv ontrol st	nania a eye. Tł uced te vo Społ rategy.	nd Western A ney differ fron erminal growth tted Mite, an 3	ustralia, a high priority in New South Wales, and a low priority in Victoria n other mites in that they feed on the upper surface of plant tissue rather h, leaves withering downward or curling upward, flower clusters that app IPM approach should be used to manage broad mites, utilising beneficial	. Broad r than the ear predator	mites e rs and
Fenbutatin Oxide (Torque) BASF PER89407	12B	Contact	H:1 NG	A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of Two Spotted Mite, European Red Mite, <b>Broad Mite</b> , Bean Spider Mite and Red Berry Mite. Apply as a cover spray when mites first appear, well before dense infestation develops and repeat as infestations indicate. Do not use more than 2 applications per season. Two applications at 14 days apart is usually adequate.	L Bee L	R3
Sulphur PER87245	M2	Contact	NR	A	ALL	Permitted in blackberries for control of <b>Broad Mite</b> , Two Spotted Mite, Bean Spider Mite and Red Berry Mite. Apply as a foliar spray to new growing canes during the vegetative growth stage. Do not use more than 10 applications per crop with a minimum retreatment interval of 7-14 days between consecutive applications. Avoid spray contact with flowers.		-
<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	Р		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	-
Spiromesifen (Oberon) Bayer	23	Ingestion		Ρ		No registration in Australia but studies are pending with Hort Innovation through ST19020 for control of Two Spotted Mite, Bean Spider Mite, <b>Broad Mite</b> , European Mite and Red Berry Mite. US registration for control of Two Spotted Mite in low growing berries. No MRLs for AU or Codex.	M Bee VL	-
SYNFOI21 Syngenta	TBC			Ρ		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
Plague Thrips ( <i>Thi</i> Priority: Moderate	rips imagi <b>e</b>	inis)						
Plague Thrips are ra Thrips cause similar the fruit by feeding	ted as a r damage f on the dru	moderate pr to Western I upelets adja	iority in Flower 7 cent to	Wester Thrips, t the caly	n Australia, a out they are le vx, producing	high priority in New South Wales and Victoria, and a low priority in Tasm ess prevalent in berries and infestations are generally easier to manage. T a speckled silver appearance.	ania. Pla They dan	igue nage
Bifenthrin (Talstar) PER84972	3A	Contact	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of Monolepta Beetle and <b>Plague</b> <b>Thrips</b> . Time application to flowering when the number of thrips are sufficient to require control. Apply a maximum of 4 foliar applications with minimum re-treatment interval of 7 days.	VH Bee H	R3
Dimethoate	18	Contact	7	A	ALL	Registered in blackberries and raspberries for control of Spider Mites, <b>Thrips</b> , Jassids, Aphids and Red Legged Earth Mite. Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited.	H Bee H	R1
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in blackberries and raspberries for control of Loopers, Light Brown Apple Moth, <i>Helicoverpa</i> and Western Flower Thrips. Also has activity on <b>Plague Thrips</b> .	M Bee VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in blackberries and raspberries for control of Loopers, Light Brown Apple Moth, <i>Helicoverpa</i> and Western Flower Thrips. Also has activity on <b>Plague Thrips</b> .	L Bee H	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		Ρ		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of Aphids and Whitefly, in bushberries for control of Aphids, <b>Thrips</b> and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and Leafhoppers in various crops. No MRLs for AU or Codex.	L Bee L	-
SYNFOI21 Syngenta	TBC			Р		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
Cottonseed Bug ( Priority: Moderate Cottonseed Bug is ra	Oxycarent e ated as a	moderate process	) riority ir	n New So	outh Wales, a	high priority in Victoria, and a low priority in Tasmania and Western Aus	tralia. Th	nis
Sulfoxaflor (Transform) Corteva PER87141	4C	Ingestion	1	A	NSW, QLD	Permitted in blackberries and raspberries (field & protected cropping) for control of <b>Cottonseed Bug</b> . Apply as a cover spray following first signs of pest infection. Do not apply more than 2 applications per crop with a minimum retreatment interval of 14 days. MT18018 to generate residue data in raspberries and blackberries for permit renewal.	M Bee VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion / IGR		Р		Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label. Registered in grapes for control of Scale, Light Brown Apple Moth and Long Tailed Mealybug. Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriproxifen: No MRLs for AU or Codex.	M Bee H	-
Flonicamid (Mainman) UPL	29	Ingestion		Р		Hort Innovation project ST17000 generated residue, efficacy and crop safety data to support a minor use permit in raspberries and blackberries for various bugs including Green Vegetable Bugs, Rutherglen bugs, Mirids, Jassids, Aphids and Greenhouse Whitefly. Permit application submitted in February 2020 and currently pending APVMA approval in Aug-Sep 2020. AU MRL T2 mg/kg.	M Bee VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		Р		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of Aphids and Whitefly, in bushberries for control of Aphids, Thrips and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and Leafhoppers in various crops. No MRLs for AU or Codex.	L Bee L	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
SYNFOI21 Syngenta	TBC			Р		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Leafhoppers / Jas Priority: Moderate	sids ( <i>Cic</i> a e	adellidae)						
Leafhoppers are rate piercing and sucking	ed as a mo damage	oderate pric to plant par	ority in a ts, mair	ll regior Ily the le	ns except Wes eaves.	stern Australia, where they are rated as a high priority. Adults and nymph	is cause	
Dimethoate	1B	Contact	7	A	ALL	Registered in blackberries and raspberries for control of Spider Mites, Thrips, <b>Jassids</b> , Aphids and Red Legged Earth Mite. Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited.	H Bee H	R1
Sulfoxaflor (Transform) Corteva PER87141	4C	Ingestion	1	P-A	NSW, QLD	Permitted in blackberries and raspberries (field & protected cropping) for control of Cottonseed Bug. MT18018 to generate residue data in raspberries and blackberries for permit renewal. Due for completion December 2020. Registered in various crops for control of various types of bugs.	M Bee VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion / IGR		Ρ		Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label. Registered in grapes for control of Scale, Light Brown Apple Moth and Long Tailed Mealybug. Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriproxifen: No MRLs for AU or Codex.	M Bee H	-
Flonicamid (Mainman) UPL	29	Ingestion		Ρ		Hort Innovation project ST17000 generated residue, efficacy and crop safety data to support a minor use permit in raspberries and blackberries for various bugs including Green Vegetable Bugs, Rutherglen bugs, Mirids, <b>Jassids</b> , Aphids and Greenhouse Whitefly. Permit application submitted in February 2020 and currently pending APVMA approval in Aug-Sep 2020. AU MRL T2 mg/kg.	M Bee VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		P		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of Aphids and Whitefly, in bushberries for control of Aphids, Thrips and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and <b>Leafhoppers</b> in various crops. No MRLs for AU or Codex.	L Bee L	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	TBC			Р		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Greenhouse Whitefly Adults and nymphs s pest in check and an	are rate suck on si IPM app	d as a mode ap and excr proach using	erate pr ete hon non-dis	iority in eydew v sruptive	New South W which can leac insecticides w	ales, a high priority in Victoria and Western Australia, and a low priority in to the development of sooty mould. Natural enemies play a large role in will assist in preventing whitefly build-up.	n Tasma 1 keeping	inia. 3 this
Sulfoxaflor (Transform) Corteva PER87141	4C	Ingestion	1	P-A	NSW, QLD	Permitted in blackberries and raspberries (field & protected cropping) for control of Cottonseed Bug. MT18018 to generate residue data in raspberries and blackberries for permit renewal. Due for completion December 2020. Registered in various crops for control of	M Bee VH	-
Flonicamid (Mainman) UPL	29	Ingestion		Р		Hort Innovation project ST17000 generated residue, efficacy and crop safety data to support a minor use permit in raspberries and blackberries for various bugs including Green Vegetable Bugs, Rutherglen bugs, Mirids, Jassids, Aphids and <b>Greenhouse Whitefly</b> . Permit application submitted in February 2020 and currently pending APVMA approval in Aug-Sep 2020. AU MRL T2 mg/kg.	M Bee VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		Р		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of Aphids and <b>Whitefly</b> , in bushberries for control of Aphids, Thrips and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and Leafhoppers in various crops. No MRLs for AU or Codex.	L Bee L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
NUL3145 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Scale Insects, Nematodes, Mealybug and Whitefly.		-

**Green Peach Aphid** (*Myzus persicae*) **Priority: Moderate** 

Green Peach Aphid is rated as a moderate priority in all regions except Tasmania, where they are rated as a high priority, and Western Australia where they are rated as a low priority. Can be confused with the larger Blackberry Aphid (*Macrosiphum funestum*) which is less susceptible to attack from parasitoids. Aphids cause direct feeding damage and secretion of honeydew tends to promote infestations of other sucking insects. They are a potential disease vector although the diseases of concern are not currently in Australia.

3			1					
Dimethoate	1B	Contact	7	A	ALL	Registered in blackberries and raspberries for control of Spider Mites, Thrips, Jassids, <b>Aphids</b> and Red Legged Earth Mite. Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited.	H Bee H	R1
Pirimicarb (Pirimor) Syngenta PER87439	1A	Contact / Ingestion	7	A	TAS	Permitted in blackberries (field & protected cropping) for control of <b>Green Peach Aphid</b> . Apply as a cover spray when local aphid thresholds are reached. Do not use more than 2 applications per year, with a minimum retreatment interval of 10-14 days. Do not make consecutive applications without rotating with an alternate mode-of-action insecticide.	VL Bee VL	R3
Sulfoxaflor (Transform) Corteva PER87441	4C	Ingestion	1	A	TAS	Permitted in blackberries (field & protected cropping) for control of <b>Green Peach Aphid</b> . Apply as a cover spray following first signs of pest infestation. Do not apply more than 2 applications per crop with a minimum retreatment interval of 14 days. Do not apply consecutive applications of Group 4C insecticides.	M Bee VH	-
Afidopyropen (Versys) BASF	9D	Ingestion		Р		Registration work underway through Hort Innovation project ST18001 for control of <b>Aphids</b> and Apple Dimpling Bug in <i>Rubus</i> spp. No MRLs for AU or Codex.	L Bee L	-
<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	Р		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
Flonicamid (Mainman) UPL	29	Ingestion		Ρ		Hort Innovation project ST17000 generated residue, efficacy and crop safety data to support a minor use permit in raspberries and blackberries for various bugs including Green Vegetable Bugs, Rutherglen bugs, Mirids, Jassids, <b>Aphids</b> and Greenhouse Whitefly. Permit application submitted in February 2020 and currently pending APVMA approval in Aug-Sep 2020. AU MRL T2 mg/kg.	M Bee VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		Ρ		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of <b>Aphids</b> and Whitefly, in bushberries for control of Aphids, Thrips and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and Leafhoppers in various crops. No MRLs for AU or Codex.	L Bee L	-
Queensland Fruit Priority: Moderate	Fly ( <i>Bacti</i> S	rocera tryor	<i>11</i> )					
Queensland Fruit Fly inside the fruit, creat protein bait sprays a	are rated ting interr	l as a mode nal rots and orchard hyg	erate prio fruit los iene.	ority in l s. A cor	New South W mbination of c	ales and as a low priority in all other regions. Damage is caused by the la control methods is required to manage fruit fly, including male annihilatio	nvae fee n techno	ding logy,
Abamectin	6	Ingestion	7	A	ALL	Registered in blackberries and raspberries for control of Two Spotted Mite and <b>Queensland Fruit Fly</b> . Apply as a foliar spray when the pest incidence reaches economic threshold. Do not use more than 2 applications per crop, with a minimum retreatment interval of 28 days between consecutive applications.	M Bee H	-
Maldison (Fyfanon) FMC	1B	Contact	3	A	ALL	Registered in <i>Rubus</i> spp. for control of <b>Fruit Fly</b> . Apply only to non- crop vegetation and fruit fly resting sites. Apply as a low pressure coarse foliar, spot or strip spray. Apply weekly from 6 weeks before harvest. Do not apply to plants or fruit directly.	H Bee H	-
Spinetoram (Success Neo) Corteva PER87408	5	Ingestion	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for suppression of <b>Queensland Fruit Fly</b> , Lesser Queensland Fruit Fly and Mediterranean Fruit Fly. Apply as a foliar spray after flower set. Do not apply more than 4 applications per season, with a minimum of 7-14 days between consecutive sprays. Must be used in conjunction with other control strategies to be effective.	M Bee VH	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spinosad (Naturalure) Corteva	5	Fruit Fly Bait Concentra te	NR	A	ALL	Registered in fruit for control of Fruit Flies including <b>Queensland Fruit</b> <b>Fly</b> 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	1B	Contact	2	A	QLD, NSW, VIC, WA & NT	Registered in fruit crops as a foliage bait for control of <b>Fruit Fly</b> . Apply as a coarse spray to the lower foliage at approximately weekly intervals. Commence application 2 weeks before crop is susceptible or as required by pest monitoring and the program of cover sprays. Treatments per season not limited.	H Bee H	R2
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion / IGR		Ρ		Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label. Registered in grapes for control of Scale, Light Brown Apple Moth and Long Tailed Mealybug. Registered in avocado, citrus and mango for suppression of <b>Queensland Fruit Fly</b> and Mediterranean Fruit Fly. Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriproxifen: No MRLs for AU or Codex.	M Bee H	-
NUL3445 Nufarm	TBC			P		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-

Pest / Active Ingredient (Trade Name)	<b>Chemical</b> group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Red Berry Mite (Ad Priority: Moderate	calitus es.	sigi)		1	1		1	1
Red Berry Mite is rat is microscopic and it flowering, the mites normally while other	ed as a n sucks sa move on s remain	noderate pri p from black to the flowe red and har	iority in kberry fl rs and c rd.	Westeri ower ar levelopi	n Australia, a nd fruit. They ng fruits. A to	high priority in Victoria and Tasmania, and a low priority in New South W overwinter under bud scales and become active on the foliage during spr oxin is injected into the fruit during feeding which causes some drupelets	ales. The ing. At to ripen	e pest
Fenbutatin Oxide (Torque) BASF PER89407	12B	Contact	H:1 NG	A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of Two Spotted Mite, European Red Mite, Broad Mite, Bean Spider Mite and <b>Red Berry Mite</b> . Apply as a cover spray when mites first appear, well before dense infestation develops and repeat as infestations indicate. Do not use more than 2 applications per season. Two applications at 14 days apart is usually adequate.	L Bee L	R3
Sulphur PER87245	M2	Contact	NR	A	ALL	Permitted in blackberries for control of Broad Mite, Two Spotted Mite, Bean Spider Mite and <b>Red Berry Mite</b> . Apply as a foliar spray to new growing canes during the vegetative growth stage. Do not use more than 10 applications per crop with a minimum retreatment interval of 7-14 days between consecutive applications. Avoid spray contact with flowers.		-
<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	Р		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	-
Spiromesifen (Oberon) Bayer	23	Ingestion		Р		No registration in Australia but studies are pending with Hort Innovation through ST19020 for control of Two Spotted Mite, Bean Spider Mite, Broad Mite, European Mite and <b>Red Berry Mite</b> . US registration for control of Two Spotted Mite in low growing berries. No MRLs for AU or Codex.	M Bee VL	-
SYNFOI21 Syngenta	TBC			Р		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
Grasshoppers ( <i>Orth</i> Priority: Moderate	hoptera)		1	1				1
Grasshoppers are rat can defoliate crops ra	ed as a a apidly.	moderate pr	iority in	Tasmar	nia and Weste	ern Australia, and as a low priority in other regions. Severe infestations of	grassho	ppers
Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of <b>Grasshoppers</b> , <i>Helicoverpa</i> spp., Mealy Bug, Rutherglen Bug, Weevils, Armyworm, Light Brown Apple Moth, Raspberry Fruit Caterpillar and <b>Wingless Grasshopper</b> . Apply at first signs of pests and repeat as required. Treatments per season not limited.	H Bee H	R3
Other Mites: Bean Raspberry Leaf & I Priority: Low	Spider Bud Mit	Mite ( <i>Tetra</i> e (Eriophid	nychus Mite)	ludeni), (Phylloc	<b>European R</b> coptes gracilis	ed Spider Mite ( <i>Panonychus citri</i> ), Bryobia and Clover Mite (Bryobia ), Carmine Mite ( <i>Tetranychus cinnabarinus</i> )	spp.),	
Bean Spider Mite is r priority in all regions. Leaf and Bud Mite is all regions. An IPM a	ated as a . Bryobia rated as pproach	a low priority and Clover a low priori should be u	in Victor Mite is i ty in all sed to n	oria and rated as regions nanage	Tasmania, and a low priority except Tasm mites, utilising	nd as a moderate priority in other regions. European Red Spider Mite is ra in all regions except Tasmania, where it is rated as a moderate priority. ania, where it is rated as a moderate priority. Carmine Mite is rated as a l g beneficial predators and non-disruptive insecticides in a planned contro	ated as a Raspber ow prior I strateg	a low ry rity in y
Bifenazate (Acramite) UPL PER14425	20	Contact & Ingestion	H:1 G:28	A	ALL (excl. VIC)	Permitted in blackberries and raspberries for control of Two Spotted Mite and <b>European Red Spider Mite</b> . Apply as a foliar spray when the pest incidence reaches economic threshold. Do not apply more than two applications per crop per season, with a minimum interval of 21 days between consecutive applications. Do not apply sequential applications. A different acaricide should be used between Bifenazate applications.	L Bee H	-
Dimethoate	1B	Contact	7	A	ALL	Registered in blackberries and raspberries for control of <b>Spider Mites</b> , Thrips, Jassids, Aphids and Red Legged Earth Mite. Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited.	H Bee H	R1
Etoxazole (Paramite) Sumitomo PER89406	10B	Contact / IGR	H:1 NG	A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of Two Spotted Mite and <b>Bean Spider Mite</b> . Apply as a cover spray when mites first appear. Target increasing nymph population before a large number of adults are present. Do not use more than 1 application per season.	L Bee VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Fenbutatin Oxide (Torque) BASF PER89407	12B	Contact	H:1 NG	A	ALL (excl. VIC)	Permitted in blackberries and raspberries (field & protected cropping) for control of Two Spotted Mite, <b>European Red Mite</b> , Broad Mite, <b>Bean Spider Mite</b> and Red Berry Mite. Apply as a cover spray when mites first appear, well before dense infestation develops and repeat as infestations indicate. Do not use more than 2 applications per season. Two applications at 14 days apart is usually adequate.	L Bee L	R3
Sulphur PER87245	M2	Contact	NR	A	ALL	Permitted in blackberries for control of Broad Mite, Two Spotted Mite, <b>Bean Spider Mite</b> and Red Berry Mite. Apply as a foliar spray to new growing canes during the vegetative growth stage. Do not use more than 10 applications per crop with a minimum retreatment interval of 7-14 days between consecutive applications. Avoid spray contact with flowers.		-
Acequinocyl (Kanemite) UPL	20B	Contact & Ingestion		Р		Registered for control of various mites including Two Spotted Mite for strawberries in the US. No registration in AU. No MRLs for AU or Codex.		-
<i>Beauvaria bassiana</i> (Velifer) BASF	UN	Biological		Р		Registered for suppression of Two Spotted Mite in protected vegetables and ornamentals. No MRLs required for biological product.		-
Spiromesifen (Oberon) Bayer	23	Ingestion		Ρ		No registration in Australia but studies are pending with Hort Innovation through ST19020 for control of Two Spotted Mite, <b>Bean</b> <b>Spider Mite</b> , Broad Mite, <b>European Mite</b> and Red Berry Mite. US registration for control of Two Spotted Mite in low growing berries. No MRLs for AU or Codex.	M Bee VL	-
SYNFOI21 Syngenta	TBC			Ρ		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
---	-------------------	----------	-----------	--------------	--------	----------	--------------------------	--------------------

Other Bugs: Apple Dimpling Bug (*Campylomma liebknechti*), Mealybugs (*Pseudococcus* spp.), Harlequin Bug (*Dindymus versicolor*), Strawberry Bug (*Euander lacertosus*)

#### **Priority: Low**

Apple Dimpling Bug is rated as a low priority in New South Wales, a high priority in Western Australia, and a moderate priority in other regions. Mealybug are rated as a low priority in all regions except Western Australia, where they are rated as a moderate priority. Harlequin Bug is rated as a low priority in New South Wales and Western Australia and as a moderate priority in Victoria and Tasmania. Strawberry Bug is rated as a low priority in all regions. All of these bugs can cause damage by sucking sap from fruit and leaves.

					1			
Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of Grasshoppers, <i>Helicoverpa</i> spp., <b>Mealy Bug</b> , Rutherglen Bug, Weevils, Armyworm, Light Brown Apple Moth, Raspberry Fruit Caterpillar and Wingless Grasshopper. Apply at first signs of pests and repeat as required. Treatments per season not limited.		R3
Dimethoate	1B	Contact	7	A	QLD, VIC, TAS, SA & WA	Registered in blackberries and raspberries for control of <b>Strawberry</b> <b>Bug</b> and Rutherglen Bug. Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited.	H Bee H	R1
Sulfoxaflor (Transform) Corteva PER87141	4C	Ingestion	1	P-A	NSW, QLD	Permitted in blackberries and raspberries (field & protected cropping) for control of Cottonseed Bug. MT18018 to generate residue data in raspberries and blackberries for permit renewal. Due for completion December 2020. Registered in pome fruit for control of <b>Apple Dimpling Bug.</b>	M Bee VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion / IGR		Р		Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label. Registered in grapes for control of Scale, Light Brown Apple Moth and Long Tailed Mealybug. Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriproxifen: No MRLs for AU or Codex.	M Bee H	-
Afidopyropen (Versys) BASF	9D	Ingestion		Р		Registration work underway through Hort Innovation project ST18001 for control of Aphids and <b>Apple Dimpling Bug</b> in <i>Rubus</i> spp. No MRLs for AU or Codex.	L Bee L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flonicamid (Mainman) UPL	29	Ingestion		Ρ		Hort Innovation project ST17000 generated residue, efficacy and crop safety data to support a minor use permit in raspberries and blackberries for various bugs including Green Vegetable Bugs, Rutherglen bugs, Mirids, Jassids, Aphids and Greenhouse Whitefly. Permit application submitted in February 2020 and currently pending APVMA approval in Aug-Sep 2020. AU MRL T2 mg/kg.	M Bee VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact and Ingestion		Р		Registered in macadamias for control of Fruit Spotting Bugs, Lace Bug and Scirtothrips. Registered in the US in caneberries for control of Aphids and Whitefly, in bushberries for control of Aphids, Thrips and Blueberry Maggot and suppression of Scirtothrips, and control of Bugs and Leafhoppers in various crops. No MRLs for AU or Codex.	L Bee L	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
SYNFOI21 Syngenta	ТВС			Р		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for various pests including Thrips, Bugs, Mites and Caterpillars.		-
Slugs and Snails ( Priority: Low	Gastropo	da)		1	1	· · ·		1
Slugs and Snails are	rated as	a low priorit	ty in Ne	w South	Wales, a hig	h priority in Victoria, and a moderate priority in other regions.		
Iron Powder		Contact	NR	A	ALL	Registered in berry fruit for control of <b>Slugs</b> and <b>Snails</b> . Scatter pellets around the perimeter of the plot and also on the soil around or near plants to be protected. Reapply as bait is consumed or at least every 2 weeks while pests continue to be present.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Black Vine Weevil Priority: Low	(Otiorhy	nchus sulcat	tus)					
Black Vine Weevil is moderate priority.	rated as	a low priorit	y in all ı	regions (	except Tasma	ania, where it is rated as a high priority, and Western Australia, where it i	s rated a	is a
Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of Grasshoppers, <i>Helicoverpa</i> spp., Mealy Bug, Rutherglen Bug, <b>Weevils</b> , Armyworm, Light Brown Apple Moth, Raspberry Fruit Caterpillar and Wingless Grasshopper. Apply at first signs of pests and repeat as required. Treatments per season not limited.	H Bee H	R3
Indoxacarb (Avatar eVo) FMC	22A	Ingestion	H:3 NG	P-A	ALL	Registered in <i>Rubus</i> spp. (field grown only) for control of Light Brown Apple Moth. Registered in various crops for control of Weevils.	M Bee H	R3
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Ρ		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, Loopers, Helicocerpa, Cluster Caterpillar and Monolepta beetle.	L-M Bee VH	-
Elephant Weevil ( Priority: Low	Orthorhii	nus cylindriro	ostris)					
Elephant Weevil is ra	ted as a	low priority	in all re	gions.				
Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of Grasshoppers, <i>Helicoverpa</i> spp., Mealy Bug, Rutherglen Bug, <b>Weevils</b> , Armyworm, Light Brown Apple Moth, Raspberry Fruit Caterpillar and Wingless Grasshopper. Apply at first signs of pests and repeat as required. Treatments per season not	H Bee H	R3

limited.

Pest / Active Ingredient (Trade Name)	<b>Chemical</b> group	Activity	NHP, days	vailability	States	Comments	Impact on beneficials	legulatory risk
Indoxacarb (Avatar) PER13289	22A	Ingestion	3	A	ALL	Permitted in Rubus spp. (field & protected cropping) for control of Light Brown Apple Moth and <b>Elephant Weevil Borer</b> . Apply one week after pruning or when adults have emerged and are observed on cut surfaces or foliage of pruned plants. Do not exceed 2 applications per crop with a minimum re-treatment interval of 7 days between consecutive applications.	M Bee H	R3
Indoxacarb (Avatar eVo) FMC	22A	Ingestion	H:3 NG	P-A	ALL	Registered in <i>Rubus</i> spp. (field grown only) for control of Light Brown Apple Moth. Registered in various crops for control of Weevils.	M Bee H	R3
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Р		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, Loopers, Helicocerpa, Cluster Caterpillar and Monolepta beetle.	L-M Bee VH	-
Fullers Rose Weev Priority: Low	ril ( <i>Asyn</i> d	onychus cert	vinus)					
Fullers Rose Weevil	is rated a	s a low prio	rity in a	II region	s except Tasr	nania, where it is rated as a moderate priority.		
Carbaryl (Bugmaster)	1A	Contact	7	A	ALL	Registered in raspberries for control of Grasshoppers, <i>Helicoverpa</i> spp., Mealy Bug, Rutherglen Bug, <b>Weevils</b> , Armyworm, Light Brown Apple Moth, Raspberry Fruit Caterpillar and Wingless Grasshopper. Apply at first signs of pests and repeat as required. Treatments per season not limited.	H Bee H	R3
Indoxacarb (Avatar eVo) FMC	22A	Ingestion	H:3 NG	P-A	ALL	Registered in <i>Rubus</i> spp. (field grown only) for control of Light Brown Apple Moth. Registered in stone fruit for control of <b>Fuller's Rose</b> <b>Weevil</b> .	M Bee H	R3
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments		Regulatory risk
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Ρ		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, Loopers, Helicoverpa, Cluster Caterpillar and Monolepta beetle.		-
Dried Fruit Beetle Priority: Low	(Carpoph	<i>ilus</i> spp.)						
Dried Fruit Beetle is serious losses when Fallen fruit should be reduce the populatio	rated as a the beetle destroye n in sprin	a low priorit e bores into ed to break g.	y in all i ripenin the inse	egions ( g fruit. ( ct life cy	except Victori Orchard hygie ycle. Cover sp	a and Tasmania, where it is rated as a moderate priority. It has the poter one is a key cultural control as the adults lay their eggs in rotting or dama orays are not currently available but an attract-and-kill trapping system ca	ntial to c iged fruit in be use	ause :. ed to
Catcha A + Catcha B + Carpophilus Pheromone Lures (Carpophilus Catcha Trapping System)	-	Attract & Kill	NR	A	ALL	Registered in berry fruit for monitoring and control of <b>Carpophilus</b> <b>Beetle</b> . Contains 2 feeding attractants and an aggregation pheromone lure, which are prepared and/or placed into a trap. To be used in conjunction with Pest Strips containing dichlorvos. <u>For Monitoring:</u> Prior to fruit ripening, place 2 traps per block where block is <10ha, or 4 traps per block where block is >10ha. Install at eye level in the orchard. Replace co-attractants every 2 weeks. Do not use aggregation pheromones. <u>For population management:</u> Prior to fruit ripening, place 3 traps per ha. Install traps external to the orchard along the perimeter and placed upwind. Replace co-attractants every 2 weeks. Use aggregation pheromone lure.		-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Ρ		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, Loopers, Helicocerpa, Cluster Caterpillar and Monolepta beetle.	L-M Bee VH	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments		Regulatory risk
Red-Shouldered L Priority: Low	eaf Beet	ile ( <i>Monoleµ</i>	ota aust	ralis)	1			
Red-Shouldered Lea	f Beetle is	s rated as a	low price	ority in a	all regions.			
Bifenthrin (Talstar) PER84972	3A	Contact	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Monolepta Beetle</b> and Plague Thrips. Time application to flowering when the number of thrips are sufficient to require control. Apply a maximum of 4 foliar applications with minimum re-treatment interval of 7 days.	VH Bee H	R3
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Ρ		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, Loopers, Helicocerpa, Cluster Caterpillar and <b>Monolepta beetle</b> .	L-M Bee VH	-
Scale Insects – So	oft Scale	Armoured	l Scale,	, Felted	Scale (Cocc	idae spp., Diaspididae spp., Eriococcidae spp.)		
Priority: Low Scale Insects are rat lead to the developm	ed as a lonent of so	ow priority in ooty mould.	n all reg	ions. He	eavy scale infe	estations can cause feeding damage to leaves and fruit, and honeydew s	ecretion	can
Petroleum Oil PER13957	-	Contact	1	A	ALL (excl. VIC)	Permitted in Rubus spp. for control of Two Spotted Mite and <b>Scale</b> <b>Insects</b> . Apply as a cover spray every 5-7 days or as required. Treatments per season not limited.	L Bee L	-
Sulfoxaflor (Transform) Corteva PER87141	4C	Ingestion	1	P-A	NSW, QLD	Permitted in blackberries and raspberries (field & protected cropping) for control of Cottonseed Bug. MT18018 to generate residue data in raspberries and blackberries for permit renewal. Due for completion December 2020. Registered in citrus for control of various types of <b>Scale</b> .	M Bee VH	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments		Regulatory risk
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion / IGR		P	Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label. Registered in grapes for control of <b>Scale</b> , Light Brown Apple Moth and Long Tailed Mealybug. Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriprovifen: No MRLs for ALL or Codex		M Bee H	-
NUL3145 Nufarm	TBC			Р		New insecticide from Nufarm with activity on <b>Scale Insects</b> , Nematodes, Mealybug and Whitefly.		-
Mediterranean Fro Priority: Low	uit Fly (C	Ceratitis capi	itata)					
Mediterranean Fruit	Fly is rate	ed as a low j	priority	in all re	gions. It is rai	rely found in raspberries and blackberries.		
Maldison (Fyfanon) FMC	1B	Contact	3	A	ALL	Registered in <i>Rubus</i> spp. for control of <b>Fruit Fly</b> . Apply only to non- crop vegetation and fruit fly resting sites. Apply as a low pressure coarse foliar, spot or strip spray. Apply weekly from 6 weeks before harvest. Do not apply to plants or fruit directly.	H Bee H	-
Spinetoram (Success Neo) Corteva PER87408	5	Ingestion	1	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for suppression of Queensland Fruit Fly, Lesser Queensland Fruit Fly and <b>Mediterranean Fruit Fly</b> . Apply as a foliar spray after flower set. Do not apply more than 4 applications per season, with a minimum of 7-14 days between consecutive sprays. Must be used in conjunction with other control strategies to be effective.	M Bee VH	-
Spinosad (Naturalure) Corteva	5	Fruit Fly Bait Concentra te	NR	A	ALL	Registered in fruit for control of Fruit Flies including Queensland Fruit Fly and <b>Mediterranean Fruit Fly</b> . 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	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Trichlorfon	1B	Contact	2	A	QLD, NSW, VIC, WA & NT	Registered in fruit crops as a foliage bait for control of <b>Fruit Fly</b> . Apply as a coarse spray to the lower foliage at approximately weekly intervals. Commence application 2 weeks before crop is susceptible or as required by pest monitoring and the program of cover sprays. Treatments per season not limited.	H Bee H	R2
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion / IGR		Р		Hort Innovation project ST16006 data generation under development for a label extension in <i>Rubus</i> spp. for various pests on the Trivor label. Registered in grapes for control of Scale, Light Brown Apple Moth and Long Tailed Mealybug. Registered in avocado, citrus and mango for suppression of Queensland Fruit Fly and <b>Mediterranean Fruit Fly</b> . Acetamiprid: No AU MRL, Codex MRL 2 mg/kg. Pyriproxifen: No MRLs for AU or Codex.	M Bee H	-
NUL3445 Nufarm	TBC			Р		New insecticide from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and Thrips.		-
Redlegged Earth P Priority: Low Redlegged Earth Mit	Mite ( <i>Hal</i>	<i>lotydeus des</i> as a low pr	<i>structor</i> ) iority in	all regi	ons.			
Dimethoate	18	Contact	7	A	ALL	Registered in blackberries and raspberries for control of Spider Mites, Thrips, Jassids, Aphids and <b>Red Legged Earth Mite</b> . Apply when pest first appears and repeat at 3 weekly intervals or as necessary. Treatments per season not limited.	H Bee H	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments		Regulatory risk
Fall Armyworm <i>(S</i> Priority: Unknown	<i>podopter</i> I	a frugiperda	)	1	1			
Fall Armyworm has r	recently b	een detecte	ed in Aus	stralia fo	or the first tim	ne. It has not been seen in berry crops and the potential impact is current	tly unkno	own.
Chlorantraniliprole (Coragen) FMC PER89353	28	Ingestion	H:3 NG	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. (field & protected cropping) for control of <b>Fall</b> <b>Armyworm</b> . Treat when pests appear, targeting eggs at hatch or small larvae (prior to third instar stage) before the pest becomes entrenched. Do not apply more than 3 applications per crop with. Do not apply more than 2 consecutive applications, with a minimum interval of 7 days. Do not apply less than 7-14 days after the initial treatment.	L Bee VL	-
Indoxacarb (Avatar) FMC PER89278	22A	Ingestion	H:3 NG	A	ALL (excl. VIC)	Permitted in <i>Rubus</i> spp. for control of <b>Fall Armyworm</b> . Treat when pests appear, targeting eggs at hatch or small larvae (prior to third instar stage) before the pest becomes entrenched. Do not exceed a maximum of 2 applications per crop with a 7 day retreatment interval.	M Bee H	R3
Spinetoram (Success Neo) Corteva PER89241	5	Ingestion	1	A	ALL (excl. VIC)	Permitted in blackberries and raspberries for control of <b>Fall</b> <b>Armyworm</b> . Treat when pests appear, targeting eggs at hatch or small larvae (prior to third instar stage) before the pest becomes entrenched. Apply repeat applications at 7-14 day intervals as new infestations occur. Do not use more than 4 applications per crop.	M Bee VH	-
Spinosad (Entrust Organic) Corteva PER89870	5	Ingestion	1	A	ALL (excl. VIC)	Permitted in berry fruit for control of <b>Fall Armyworm</b> . Target sprays against eggs and newly hatched larvae (prior to third instar stage) before they become entrenched. Apply repeat applications at 7-14 day intervals as new infestations occur. Do not use more than 4 applications per crop.	L Bee H	-
SYNFOI21 Syngenta	TBC			Р		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
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		Ρ		Registered for control of various weevils, beetles and Lepidoptera in almonds, macadamias, pome and stone fruit. Hort Innovation project ST17000 data generation under development to register in raspberries and blackberries for various pests including; Light Brown Apple Moth, Loopers, Helicocerpa, Cluster Caterpillar and Monolepta beetle.	L-M Bee VH	-

# 4.3 Weeds of Blackberries and Raspberries

# 4.3.1 Weed priorities

Common Name	Scientific Name			
High				
Blackberry Nightshade	Solanum nigrum			
Marshmallow	Malva parviflora			
Moderate				
Sowthistle	Sonchus oleraceus			
Broadleaf Dock	Rumex obtusifolius			
Pigweed	Portulaca spp.			

Blackberry Nightshade and Marshmallow have been identified as high priority weeds in blackberries and raspberries. Sowthistle, Broadleaf Dock and Pigweed have been identified as moderate priority. There is confirmed resistance in Sowthistle to Groups B, I and M herbicides<sup>3</sup>. These priorities are similar to those detailed in the 2016 SARP Report. It is important to keep orchards free of these weeds, particularly as they all play an important role as hosts for insect pests such as Two Spotted Mites and Plant Bugs.

Berry orchards should have a planned, integrated weed management program which combines cultural controls with strategic use of herbicides. Ground cover should be maintained in the inter-row with grass, mulch, weed mat, or a combination of these. The key to achieving effective results with herbicides is to target young, actively growing weeds.

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<sup>4</sup>.

<sup>&</sup>lt;sup>3</sup> <u>https://www.croplife.org.au/resources/programs/resistance-management/herbicide-resistant-weeds-list-draft-</u> <u>3/</u>

<sup>&</sup>lt;sup>4</sup> <u>https://www.croplife.org.au/resources/programs/resistance-management/herbicide-resistance-management-</u> <u>strategies-2/</u>

### 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											
Р	Potential – a possible candidate to pursue for	registration	or permit								
P-A	Potential, already approved in the crop for an	other 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	s of significant concern							
***	High resistance risk	R3	Long-term: Potential issues assoc	ciated with use - Monitoring required							
Wi	Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)										
Harvest	Н	Not Require	NR								
Grazing	G	No Grazing	Permitted	NG							

	Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
--	-----------------------------------	-------------------	-----------------	----------------------	---------------	--------------	--------	--------------------

Blackberry Nightshade (*Solanum nigrum*) Priority: High

Blackberry Nightshade is rated as a high priority in all regions except New South Wales, where it is rated as a low priority. It is a prolific weed that is widely adapted and difficult to eradicate, mainly due to its long-term seed viability.

Oryzalin	D**	Blackberry and Raspberry /	Registered in non-bearing blackberries and raspberries for the	NR	Α	ALL	-
		Non-Bearing Fruit / Directed	control of various grass and broadleaf weeds, including				
		Spray	Blackberry Nightshade. Apply as a directed spray to weed-				
			free soil. At least 12.5mm of irrigation or rainfall is required				
			within 21 days of application to activate the herbicide.				
			Treatments per season not limited.				
Chlorthal Dimethyl	D**		Registered in various crops, including strawberries for control		Р		-
(Dacthal)			of Blackberry Nightshade. No MRLs for AU or Codex.				

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk			
Fluroxypyr (Starane) Corteva	I**		Registered in various crops for control of Blackberry Nightshade. No MRLs for AU or Codex.		Р		-			
Rimsulfuron (Titus) Corteva	В		Registered for use in raspberries and blackberries in the USA for the control of various BL weeds. Registered in AU for control of various broadleaf weeds, including Blackberry Nightshade, in processing tomatoes. No MRLs for AU or Codex.		Ρ		-			
Marshmallow ( <i>Malva parviflora</i> ) Priority: High										
Marshmallow is rated as a high priority in all regions except Western Australia, where it is rated as a moderate priority, and New South Wales where it is rated as a low priority. It is adapted to a wide variety of environments and highly competitive weed. Control with knockdown berbicides can be unreliable.										
Paraquat + Diquat (SpraySeed) Syngenta	L**	Orchards / Directed Spray	Registered in orchards for control of Grass and Broadleaf Weeds, including <b>Marshmallow</b> . Treatments per season not limited.	G:7	A	ALL	R3			
Rimsulfuron (Titus) Corteva	В		Registered for use in raspberries and blackberries in the USA for the control of various BL weeds, including <i>Malva neglecta</i> at 70 g ai/ha. Registered in AU for control of broadleaf weeds in processing tomatoes. No MRLs for AU or Codex.		Ρ		-			
Sowthistle (Sonchus oleraceus) Priority: Moderate										
Sowthistle is rated as regions and is prone	s a mode to develo	rate priority in Western Austral opment of herbicide resistance	lia, a high priority in Tasmania, and a low priority in other region.	ns. It is pr	olific ar	nd widesprea	d in all			
Glufosinate (Basta	N**	Caneberry Fruits / Inter-Row / Directed or Shielded Spray	Registered in caneberry fruits for control of Grass and Broadleaf Weeds, including <b>Sowthistle</b> . Apply as a directed or shielded spray to the inter-row area. Take care not to allow spray or spray drift to contact the crop.	NR G:56	A	ALL	R3			
Glyphosate (Roundup)	M**	Berries / Directed Spray, Shielded Spray or Wick Wiper	Registered in berries for control of Grass and Broadleaf Weeds, including <b>Sowthistle</b> . Do not allow spray to contact any part of the bush. Treatments per season not limited.	NR	A	ALL	R3			

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Oryzalin	D**	Blackberry and Raspberry / Non-Bearing Fruit / Directed Spray	Registered in non-bearing blackberries and raspberries for the control of Grass and Broadleaf Weeds, including <b>Sowthistle</b> . Apply as a directed spray to weed-free soil. At least 12.5mm of irrigation or rainfall is required within 21 days of application to activate the herbicide. Treatments per season not limited.	NR	A	ALL	-
Paraquat + Diquat (SpraySeed) Syngenta	L**	Orchards / Directed Spray	Registered in orchards for control of Grass and Broadleaf Weeds, including <b>Sowthistle</b> . Treatments per season not limited.	G:7	A	ALL	R3
Simazine	C**	Berry Fruit / Directed Spray / Residual Weed Control	Registered in berry fruit for control of Grass and Broadleaf Weeds, including <b>Sowthistle</b> . Berry vines should be at least 1 year old. Do not apply to foliage or when fruit is present. Apply to bare, moist soil. Treatments per season not limited.	NR	A	ALL	R3
Chlorthal Dimethyl (Dacthal)	D**		Registered in various crops, including strawberries for control of Sowthistle. No MRLs for AU or Codex.		Р		-
Fluroxypyr (Starane) Corteva	I**		Registered in non-crop areas and pastures for control of Sowthistle. No MRLs for AU or Codex.		Р		-
Broadleaf Dock (R	umex obi	tusifolius)		1			
Broadleaf Dock is rat	ed as a r with hert	noderate priority in Tasmania a picides.	and Western Australia, and as a low priority in other regions. It	is an aggr	ressive	perennial tha	t is
Glyphosate (Roundup)	M**	Berries / Directed Spray, Shielded Spray or Wick Wiper	Registered in berries for control of Grass and Broadleaf Weeds, including <b>Docks</b> . Do not allow spray to contact any part of the bush. Treatments per season not limited.	NR	A	ALL	R3
Chlorthal Dimethyl (Dacthal)	D**		Registered in various crops, including strawberries for control of Dock. No MRLs for AU or Codex.		Р		-
Fluroxypyr (Starane) Corteva	I**		Registered in various crops for control of Dock. No MRLs for AU or Codex.		Р		-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Pigweed ( <i>Portulaca</i> Priority: Moderate	spp.)	· · · · · · · · · · · · · · · · · ·				·	
and can be difficult t	a high pr o control	ority in Western Australia, and with herbicides.	as a low priority in other regions. It is a summer growing week	d that com	ipetes a	aggressively ii	n-crop
Glufosinate (Basta	N**	Caneberry Fruits / Inter-Row / Directed or Shielded Spray	Registered in caneberry fruits for control of Grass and Broadleaf Weeds, including <b>Pigweed</b> . Apply as a directed or shielded spray to the inter-row area. Take care not to allow spray or spray drift to contact the crop.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	M**	Berries / Directed Spray, Shielded Spray or Wick Wiper	Registered in berries for control of Grass and Broadleaf Weeds, including <b>Pigweed</b> . Do not allow spray to contact any part of the bush. Treatments per season not limited.	NR	A	ALL	R3
Oryzalin	D**	Blackberry and Raspberry / Non-Bearing Fruit / Directed Spray	Registered in non-bearing blackberries and raspberries for the control of Grass and Broadleaf Weeds, including <b>Pigweed</b> . Apply as a directed spray to weed-free soil. At least 12.5mm of irrigation or rainfall is required within 21 days of application to activate the herbicide. Treatments per season not limited.	NR	A	ALL	-
Paraquat + Diquat (SpraySeed) Syngenta	L**	Orchards / Directed Spray	Registered in orchards for control of Grass and Broadleaf Weeds, including <b>Pigweed</b> . Treatments per season not limited.	G:7	A	ALL	R3
Fluroxypyr (Starane) Corteva	I**		Registered in various crops for control of Pigweed. No MRLs for AU or Codex.		Ρ		-
Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
-------------------------------------	-------------------	---	--	---------------	--------------	--------------------	--------------------
Grass and Broadle Priority: Low	af Weed	ds			1		1
The key to weed mai	nagemer	nt in orchards is maintaining gro	ound cover in the inter-row with grass and mulch.				
Dichlobenil (Casoron) UPL	0**	Raspberries / Granule Application / Residual Weed Control	Permitted in raspberries for control of <b>Annual Grass and</b> <b>Broadleaf Weeds</b> . Apply using a calibrated granular chemical applicator. Apply late winter to early spring before growth has started. Ensure the soil surface is weed free. One application will provide effective season-long control of weeds.	NR	A	TAS	-
Glufosinate (Basta	N**	Caneberry Fruits / Inter-Row / Directed or Shielded Spray	Registered in caneberry fruits for control of <b>Grass and</b> <b>Broadleaf Weeds</b> . Apply as a directed or shielded spray to the inter-row area. Take care not to allow spray or spray drift to contact the crop.	NR G:56	A	ALL	R3
Glyphosate (Roundup)	M**	Berries / Directed Spray, Shielded Spray or Wick Wiper	Registered in berries for control of <b>Grass and Broadleaf</b> <b>Weeds</b> . Do not allow spray to contact any part of the bush. Treatments per season not limited.	NR	A	ALL	R3
Metham PER82024	-	Blueberry / Soil Fumigation / Trickle Irrigation	Permitted in <i>Rubus</i> spp. as a fumigation treatment for control of <b>Germinating Weed Seeds</b> . Apply through trickle irrigation to moist soil under plastic mulch. Puncture plastic 2 weeks after treatment to allow dissipation of fumigant.	NR	A	ALL (excl. VIC)	-
Oryzalin	D**	Blackberry and Raspberry / Non-Bearing Fruit / Directed Spray	Registered in non-bearing blackberries and raspberries for the control of <b>grass and broadleaf weeds</b> . Apply as a directed spray to weed-free soil. At least 12.5mm of irrigation or rainfall is required within 21 days of application to activate the herbicide. Treatments per season not limited.	NR	A	ALL	-
Paraquat (Gramoxone) Syngenta	L**	Orchards / Directed Spray or Spot Spray	Registered in orchards for control of <b>annual grass and</b> <b>broadleaf weeds</b> . Apply as a directed spray or spot spray. Treatments per season not limited.	H:1 G:7	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Paraquat + Diquat (SpraySeed) Syngenta	L**	Orchards / Directed Spray	Registered in orchards for control of <b>Grass and Broadleaf</b> <b>Weeds</b> . Treatments per season not limited.	G:7	A	ALL	R3
Simazine	C**	Berry Fruit / Directed Spray / Residual Weed Control	Registered in berry fruit for control of <b>Grass and Broadleaf</b> <b>Weeds</b> . Berry vines should be at least 1 year old. Do not apply to foliage or when fruit is present. Apply to bare, moist soil. Treatments per season not limited.	NR	A	ALL	R3
Napropamide (Devrinol) UPL	К		Registered in the USA in Bushberries for residual grass control at 4.5 kg ai/ha		Р		-
Sucker Control Priority: Unknown							
Control of suckers is	used to	reduce the number of fruit-pro	ducing stems on bushes.				
Carfentrazone-Ethyl (Spotlight) PER14233	G**	<i>Rubus</i> spp. / Sucker Control	Permitted in <i>Rubus</i> spp. for <b>Sucker Control</b> (Cane Burning). Apply to suckers less than 300mm long, before any lignification occurs. Avoid spray drift onto desirable green stems, foliage, fruit or flowers.	NR G:14	A	ALL	-
Glufosinate (Basta)	N**	Blackberries and Raspberries / Directed or Shielded Spray	Registered in blackberries and raspberries for control of <b>Primocane and Suckers</b> . Apply as a directed spray to suckers and primocanes, preferably when they are less than 15cm high. Contact with flowers, developing fruit or desirable foliage will cause damage.	NR G:56	A	NSW, ACT, VIC & TAS	R3

### 4.4 Plant Growth Regulators in Blackberries and Raspberries

#### 4.4.1 Plant Growth Regulator Priorities

Priority
Moderate
Initiation of Flowering
Low
Promote Vegetative Growth
Restriction of Vegetative Growth
Promote Fruit Ripening

No Plant Growth Regulator (PGR) issues have been nominated as high priority. Initiation of Flowering was identified as being of moderate priority.

### 4.4.2 Available and Potential Plant Growth Regulators

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

Availability				Regulatory risk (refer to	Appendix 7)				
А	Available via either registration or permit approval       R1       Short-term: Critical concern over retaining access			etaining access					
Р	P Potential – a possible candidate to pursue for registration or permit			Medium-term: Maintaining access of significant concern					
P-A	Potential, already approved in the crop for another use			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		Н	Not Required when used as directed		NR				
Grazing		G	No Grazing Pe	ermitted	NG				

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk		
Initiation of Flowering Priority: Moderate									
Initiation of Flowerin Regulators currently	Initiation of Flowering is rated as a moderate priority in New South Wales and Tasmania, and as a low priority in other regions. There are no Plant Growth Regulators currently available for this use.								
No options available Promote Fruit Rin	enina								
Priority: Low	<b>5</b>								
Promotion of Fruit R stimulating existing	Ripening is ra fruit to ripen	ted as a low priority in all	regions. A permit is available for the use of Ethephon to prom	ote unifor	m matur	ity, by			
Ethephon PER86213	Plant Growth Regulator	<i>Rubus</i> spp.	Permitted in Rubus spp. (field & protected cropping) for <b>Promoting Uniform Maturity</b> . Apply as a foliar spray when 15-20% of berries are coloured. Maximum of 1 application per season.	7	A	NSW	-		

# **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 2019-20	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

### 5.2 Abbreviations and Definitions:

ΑΡΥΜΑ	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
ТВС	To be continued
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 Blackberries and Raspberries Appendix 2. Products available for control of insects, mites and other pests in Blackberries and Raspberries

Appendix 3. Products available for weed control in Blackberries and Raspberries

Appendix 4. Plant Growth Regulators available in Blackberries and Raspberries

Appendix 5. Current permits for use in Blackberries and Raspberries

Appendix 6. Blackberries and Raspberries Maximum Residue Limits (MRLs)

### Appendix 1. Products available for disease control in Blackberries and Raspberries

Active Ingredient (Trade Name)	Chemical group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
<i>Agrobacterium radiobacter</i> var. <i>radiobacter</i> (NoGall) PER13150		<i>Rubus</i> spp. / Pre-Plant Seedling Treatment	Crown Gall	NSW & TAS	NR	-
<i>Aureobasidium pullulans</i> Strain DSM 14940 & DSM 14941 (Botector)		Berries / Field & Protected Cropping	Botrytis Blight & Fruit Rot / Grey Mould ( <i>Botrytis cinerea</i> ) Suppression of: Anthracnose Fruit Rot ( <i>Colletotrichum</i> spp.) Phomopsis Fruit Rot ( <i>Phomopsis</i> spp.) Rhizopus Fruit Rot ( <i>Rhizopus</i> spp.)	ALL	NR	-
Azoxystrobin (Amistar)	11	Rubus	Anthracnose ( <i>Elsinoe veneta</i> ) Botrytis ( <i>Botrytis cinerea</i> ) Cladosporium ( <i>Cladosporium cladosporoides</i> )	ALL	1	-
Bacillus amyloquefaciens strain QST 713 (Serenade Opti Biofungicide) PER88058	44	Blackberries & Raspberries / Field & Protected Cropping	Botrytis Grey Mould ( <i>Botrytis cinerea</i> )	ALL (excl. VIC)	NR	-

Active Ingredient (Trade Name)	Chemical group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Boscalid + Pyraclostrobin (Pristine) PER82986	7+11	Rubus & Rubus Hybrids / Field & Protected Grown	Grey mould ( <i>Botrytis</i> spp.) Anthracnose ( <i>Colletotrichum</i> spp. or <i>Elsinoe</i> spp.) Alternaria Leaf Spot & Fruit rot ( <i>Alternaria</i> spp.) Leaf Spot & Blotch ( <i>Mycosphaerella</i> spp. or <i>Septoria</i> spp.) Monilinia Blight ( <i>Monilinia</i> spp.) Phomopsis ( <i>Phomopsis</i> spp.) Powdery Mildew ( <i>Sphaerotheca</i> spp., <i>Microsphaera</i> spp. or <i>Oidium</i> spp.) Suppression of Rust ( <i>Didymella</i> spp. or <i>Phoma</i> spp.)	ALL (excl. VIC)	1	-
Bromo Chloro Dimethyl Hydantoin (BCDMH)		Sanitiser / Post-Harvest Treatment	External Rot Causing Organisms	ALL	NR	-
Captan PER13958	M4	<i>Rubus</i> spp.	Cane Spot Spur Blights Botrytis Flower & Fruit Rot	ALL (excl. VIC)	1	-
Chlorine		Sanitiser / Post-Harvest Treatment	Bacteria and Fungi	ALL	NR	-
Chlorothalonil PER14449	M5	Rubus	Grey Mould Rusts Downy Mildew Septoria Leaf Spot	ALL (excl. VIC)	28	R2
Copper (Cu) present as Copper Hydroxide PER14443	M1	<i>Rubus</i> spp. including Raspberries & Blackberries	Rust Leaf Spot	ALL (excl. VIC)	NR	-
Copper (Cu) present as Copper Oxychloride	M1	Raspberry	Anthracnose Rust Spur Blight	ALL	NR	-

Active Ingredient (Trade Name)	Chemical group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Copper (Cu) present as Copper Oxychloride	M1	<i>Rubus</i> spp. including Raspberries & Blackberries	Rust Leaf Spot	ALL	NR	-
Cyprodinil + Fludioxinil (Switch) PER14422	9+12	Blackberries / Raspberries / Field & Protected Grown Crops	Grey Mould ( <i>Botrytis cinerea</i> )	ALL (excl. VIC)	7	-
Fenhexamid (Teldor) PER14424	17	Rubus & Rubus Hybrids / Blackberries / Raspberries / Field & Protected Cropping	Grey Mould ( <i>Botrytis cinerea</i> )	ALL (excl. VIC)	1	-
Iodine		Berries / Post-Harvest Sanitiser	Bacteria & Fungi	ALL	NR	-
Iprodione	2	Raspberries	Grey Mould ( <i>Botrytis cinerea</i> )	ALL	1	R2
Mancozeb PER13958	M3	<i>Rubus</i> spp.	Grey Mould Rust Mildew	ALL (excl. VIC)	7	R2
Metalaxyl-M (Ridomil Gold 25G) PER13958	4	<i>Rubus</i> spp.	Phytophthora spp.	ALL (excl. VIC)	48	-
Metalaxyl-M + Mancozeb (Ridomil Gold Mz) PER84973	4+M3	Rubus & Rubus Hybrids	Downy Mildew ( <i>Peronospora</i> spp.)	ALL (excl. VIC)	14	R2
Metham PER82024		Rubus / Soil Fumigant / Trickle Irrigation	Rhizoctonia Pythium Fusarium Phytophthora Verticillium Sclerotinia	ALL (excl. VIC)	NR	-
Peroxyacetic Acid		Sanitiser / Post-Harvest Treatment	Bacteria	ALL	NR	-

Active Ingredient (Trade Name)	Chemical group	Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Peroxyacetic Acid + Hydrogen Peroxide (Peratec Plus) PER86947		Raspberries / Preventative Foliar Fungicide	Leptospira Bacteria	ALL	1	-
Phosphorous Acid PER13958	33	<i>Rubus</i> spp.	Phytophthora spp.	ALL (excl. VIC)	NR	-
Pyrimethanil (Scala) PER13958	9	<i>Rubus</i> spp.	Grey Mould ( <i>Botrytis cinerea</i> )	ALL (excl. VIC)	1	-
Triadimenol (Bayfidan) PER13958	3	<i>Rubus</i> spp.	Powdery Mildew	ALL (excl. VIC)	7	R3

### Appendix 2. Products available for control of insects, mites and other pests in Blackberries and Raspberries

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
3-Methyl-1-Butanol   2- Methyl-1-Butanol   Ethyl Acetate   Acetaldehyde   Sec Butanol   Ethanol   Carpophilus Aggregation Pheromones (Carpophilus Catcha Trapping System)		Berry Fruit	Carpophilus Beetles	ALL	NR	-
Abamectin	6	Blackberry / Raspberry	Two Spotted Mite ( <i>Tetranychus urticae</i> ) Queensland Fruit Fly ( <i>Bactrocera tryoni</i> )	ALL	7	-
Abamectin PER14423	6	Blackberries / Raspberries / Field & Protected Use	Queensland Fruit Fly ( <i>Bactocera tryoni</i> )	ALL	7	-
Abamectin PER13956	6	Blackberries / Raspberries	Two-Spotted Mite (Tetranychus urticae)	ALL (excl. VIC)	7	-
Bifenazate (Acramite) PER14425	20	Blackberries / Raspberries (Red & Black)	Two-Spotted Mite ( <i>Tetranychus urticae</i> ) European Red Spider Mite ( <i>Panonychus citri</i> )	ALL (excl. VIC)	H:1 G:28	-
Bifenthrin (Talstar) PER84972	3A	<i>Rubus</i> spp.	Monolepta Beetle ( <i>Monolepta australis</i> ) Plague Thrips ( <i>Thrips imaginis</i> )	ALL (excl. VIC)	1	R3
Botanical Oil (Eco-Oil) PER14234		<i>Rubus</i> spp.	Two-Spotted Mite (Tetranychus urticae)	ALL (excl. VIC)	NR	-

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Carbaryl (Bugmaster)	1A	Raspberries	Grasshoppers Heliothis Mealy Bug Rutherglen Bug Weevils Armyworm Light Brown Apple Moth Raspberry Fruit Caterpillar Wingless Grasshopper	ALL	7	R3
Chlorantraniliprole (Coragen) PER89353	28	<i>Rubus</i> spp. / Field & Protected	Fall Armyworm ( <i>Spodoptera frugiperda</i> )	ALL (excl. VIC)	H:3 NG	-
Copper (Cu) present as Buffered Copper Complex	M1	Berry Fruit	Slug Snail	ALL	1	-
Dimethoate	1B	Blackberry / Raspberry	Spider Mites Thrips Jassids Aphids Red Legged Earth Mite Strawberry Bug Rutherglen Bug	ALL QLD, VIC, TAS, SA & WA	7	R1
Etoxazole (Paramite) PER89406	10B	Blackberries / Raspberries / Field & Protected	Two-Spotted Mite ( <i>Tetranychus urticae</i> ) Bean Spider Mite ( <i>Tetranychus ludeni</i> )	ALL (excl. VIC)	H:1 NG	-
Fenbutatin Oxide (Torque) PER89407	12B	Blackberries / Raspberries / Field & Protected	Two-Spotted Mite ( <i>Tetranychus urticae</i> ) European Red Mite ( <i>Pananychus ulmi</i> ) Broad Mite ( <i>Polyphagotarsonemus latus</i> ) Bean Spider Mite ( <i>Tetranychus ludeni</i> ) Red Berry Mite ( <i>Acalitus essigi</i> )	ALL (excl. VIC)	H:1 NG	R3
Fipronil PER86492	2B	Berry Crops / Bait	European Wasp ( <i>Vespula germanica</i> ) Common Wasp ( <i>Vespula vulgaris</i> )	ALL	NR	R3

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Indoxacarb (Avatar Evo)	22A	<i>Rubus</i> spp. / Field Grown Only	Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )	ALL	H:3 NG	R3
Indoxacarb (Avatar) PER89278	22A	<i>Rubus</i> spp.	Fall Armyworm ( <i>Spodoptera frugiperda</i> )	ALL (excl. VIC)	H:3 NG	R3
Indoxacarb (Avatar) PER13289	22A	<i>Rubus</i> spp. / Field & Protected Grown	Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ) Elephant Weevil Borer ( <i>Orthorhinus cylindrirostris</i> )	ALL	3	R3
Iron Powder		Berry Fruit	Slug Snail	ALL	NR	-
Maldison (Fyfanon)	1B	<i>Rubus</i> spp.	Fruit Fly	ALL	3	
Metham (PER82024)		Rubus / Soil Fumigant / Trickle Irrigation	Nematodes Symphylids	ALL (excl. VIC)	NR	-
Nuclear Polyhedrosis Virus (Vivus)		Blackberry / Raspberry	Cotton Bollworm ( <i>Helicoverpa armigera</i> ) Native Budworm ( <i>Helicoverpa punctigera</i> )	ALL	NR	-
Petroleum Oil PER13957		<i>Rubus</i> spp.	Two-Spotted Mite ( <i>Tetranychus urticae</i> ) Scale Insects	ALL (excl. VIC)	1	-
Pirimicarb (Pirimor) PER87439	1A	Blackberries / Field & Protected Grown Crops	Green Peach Aphid ( <i>Myzus persicae</i> )	TAS	7	R3
Pyriproxyfen (Distance Ant Bait)	7C	Fruit Crops / Ant Bait	Invasive and Nuisance Ants	ALL	NR	-
Spinetoram (Success Neo)	5	Blackberry / Raspberry	Loopers Light Brown Apple Moth Helicoverpa Western Flower Thrips	ALL	1	-

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory risk
Spinetoram (Success Neo) PER87408	5	Rubus & Rubus Hybrids	Suppression of: Queensland Fruit Fly ( <i>Bactrocera tryoni</i> ) Lesser Queensland Fruit Fly ( <i>Bactrocera neohumeralis</i> ) Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> )	ALL (excl. VIC)	1	-
Spinosad (Entrust Organic)	5	Blackberry / Raspberry	Loopers Light Brown Apple Moth Heliothis Western Flower Thrips	ALL	1	-
Spinosad (Entrust Organic) PER89870	5	Berry Fruit	Fall Armyworm	ALL (excl. VIC)	1	-
Spinosad (Naturalure)	5	Tree, Fruit, Nut, Vine & Vegetable Crops / Fruit Fly Bait	Queensland Fruit Fly <i>(Bactrocera tryoni)</i> Mediterranean Fruit Fly <i>(Ceratitis capitata)</i>	ALL	NR	-
Sulfoxaflor (Transform) PER87441	4C	Blackberries / Field & Protected Grown Crops	Green Peach Aphid ( <i>Myzus persicae</i> )	TAS	1	-
Sulfoxaflor (Transform) PER87141	4C	Blackberries / Raspberries / Field & Protected Grown Crops	Cottonseed Bug (Oxycarenus luctuosus)	NSW, QLD	1	-
Sulphur PER87245	M2	Blackberries	Broad Mite ( <i>Polyphagotarsonemus latus</i> ) Two-Spotted Mite ( <i>Tetranychus urticae</i> ) Bean Spider Mite ( <i>Tetranychus ludeni</i> ) Red Berry Mite ( <i>Acalitus essigi</i> )	ALL	NR	-
Trichlorfon	1B	Fruit Fly Foliage Bait	Fruit Fly	QLD, NSW. VIC, WA & NT	2	R2

Active ingredient (Trade Name)	Chemical Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory risk
Carfentrazone-Ethyl (Spotlight) PER14233	G**	<i>Rubus</i> spp. / Sucker Control	Sucker Control (Cane Burning)	NR G:14	ALL	-
Dichlobenil (Casoran)	0**	Raspberries	Annual Grasses & Broadleaf Weeds	NR	TAS	-
Glufosinate	N**	Blackberry / Raspberry	Primocane & Sucker Control	NR G:56	NSW, ACT, VIC & TAS	R3
Glufosinate	N**	Caneberry Fruits / Directed or Shielded Spray	Do not allow spray to contact any part of the bush. Grass and broadleaf weeds	H:NR G:56	ALL	R3
Glyphosate (Roundup)	M**	Berries / Directed Spray, Shielded Spray or Wick Wiper	Do not allow spray to contact any part of the bush. Grass and broadleaf weeds.	NR	ALL	R3
Metham (PER82024)		Rubus / Soil Fumigant / Trickle Irrigation	Germinating Weed Seeds including, Winter Grass Prince of Wales Feather Fat Hen	NR	ALL (excl. VIC)	-
Oryzalin	D**	Blackberry / Raspberry / Non-Bearing Fruit / Directed Spray	Grass and broadleaf weeds	NR	ALL	-
Paraquat (Gramoxone) Syngenta	L**	Orchards / Directed Spray or Spot Spray	Annual Grass and Broadleaf Weeds	H:1 G:7	ALL	R3
Paraquat + Diquat (SpraySeed) Syngenta	L**	Orchards / Directed Spray	Grass and Broadleaf Weeds	G:7	ALL	R3
Simazine	C**	Berry Fruits	Grass and Broadleaf Weeds	NR	ALL	R3

### Appendix 3. Products available for weed control in Blackberries and Raspberries

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

### Appendix 4. Plant Growth Regulators available in Blackberries and Raspberries

Active ingredient (Trade Name)	Chemical Group	Situation	Comment / Use / Weed		States	Regulatory risk
Ethephon	Plant	Rubus spp. / Field	Aid harvesting by promoting uniform maturity of berries	7	NSW	-
PER86213	Growth	and Protected				
	Regulator					

# Appendix 5. Current permits for use in Blackberries and Raspberries

Permit ID	Description	Date Issued	Expiry Date	Permit holder
PER89870	Spinosad (Entrust Organic) / Various including Berry Fruit / Fall Armyworm Emergency Use Permit	21-Jul-20	31-Jul-23	Hort Innovation
PER89407	Fenbutatin Oxide / Blackberries and Raspberries / Various Mites Emergency Use Permit	14-May-20	31-May-23	Hort Innovation
PER89353 Version 2	Chlorantraniliprole / Various Crops/Fall Armyworm Emergency Use Permit	5-May-20	31-May-23	Hort Innovation
PER89406	Etoxazole / Raspberries and Blackberries / Two-Spotted Mites, Bean Spider Mite Emergency Use Permit	30-Apr-20	30-Apr-23	Hort Innovation
PER89278	Indoxacarb / Various Crops / Fall Armyworm Emergency Use Permit	13-Mar-20	31-Mar-23	Hort Innovation
PER89241	Spinetoram / Berry fruit / Fall Armyworm Emergency Use Permit	06-Mar-20	31-Mar-23	Hort Innovation
PER88058	Serenade Opti Biofungicide <i>(Bacillus amyloquefaciens)</i> / Blackberries & Raspberries/ Grey Mould	15-Oct-19	31-Oct-22	Hort Innovation
PER87408	Spinetoram (Success Neo) / Blueberries, Strawberries, Rubus And Rubus Hybrids / Fruit Fly	15-Apr-19	30-Apr-24	Hort Innovation
PER87245	Sulphur (Sulfur 800 WG Fungicide and Miticide) / Blackberries / Broad Mites, Two-Spotted Mites, Bean Spider Mites and Red Berry	25-Mar-19	31-Mar-24	Hort Innovation
PER87464	Colecalciferol (Selontra Soft Bait Rodenticide) / Rubus, Rubus Hybrid & Blueberry / Rats and Mice Emergency Use Permit	17-Dec-18	31-Dec-20	Hort Innovation
PER86213	Ethephon / Blueberry, Rubus & Ribe spp. / Promoting Uniform Maturity (NSW only)	05-Dec-18	31-Dec-21	Australian Blueberry Growers Assocation C/- Wollongbar
PER87439	Pirimicarb / Aphids / Blackberries Emergency Use Permit (TAS only)	4-Dec-18	31-Dec-21	Hort Innovation
PER87441	Sulfoxaflor (Transform) / Blackberries Emergency Use Permit (TAS only)	4-Dec-18	31-Dec-21	Hort Innovation
PER87141 Version 2	Sulfoxaflor (Transform) / Blueberries, Blackberries, Raspberries / Cotton Seed Bug (NSW & QLD)	18-Oct-18	31-Aug-22	Hort Innovation
PER86492 Version 3	Fipronil / Orchards, Vineyards and Berry Farms / European Wasp	14-Sep-18	30-Sep-23	NSW Dept of Primary Industries
PER84973 Version 2	Metalaxyl-M + Mancozeb (Ridomil Gold MZ) / Rubus Spp & Rubus Hybrids / Downy Mildew	16-Feb-18	31-Mar-23	Raspberries & Blackberries Australia c/- Hort Innovation

Permit	Description	Date	Expiry	Permit
PFR84972	Bifenthrin / Rubus Spn Ribes Spn /	12-Feb-18	28-Feb-23	Raspherries &
	Monolepta Beetle & Plague Thrips	12 1 00 10	2010020	Blackberries
				Australia
				c/- Hort
				Innovation
PER82986	Boscalid + Pyraclostrobin (Pristine) /	25-Aug-17	31-Aug-24	Hort
Version 2	Rubus And Rubus Hybrids / Various			Innovation
	Diseases			
PER82024	Metham Soil Fumigant / Blueberry and	1-Feb-16	31-Mar-21	Australian
	Rubus / Germinating Weed Seeds and			Blueberry
	Soil Borne Pathogens			Growers
				Association
				C/- HUIL
PFR13859	Dimethoate / Orchard Cleanup - Fruit Fly	09-Feb-15	31-10-24	Growcom
Version 2	Host Crops Following Harvest / Fruit Fly	0910015	51 501 21	Growcom
PER14449	Chlorothalonil / Rubus Crops / Various	1-Oct-14	31-Mav-22	Raspberries &
Version 2	Fungal Diseases			Blackberries
	5			Australia
PER14423	Abamectin / Blackberries, Blueberries	23-May-14	31-Mar-24	Raspberries &
Version 3	and Raspberries / Fruit Fly			Blackberries
	To be surrendered, use now registered			Australia
PER14422	Cyprodinil + Fludioxonil (Switch) / Rubus	28-Feb-14	31-Dec-23	Raspberries &
Version 2	And Rubus Hybrids / Grey Mould			Blackberries
				Australia
				C/- Hort
DED14425	Bifenazate (Acramite) / Pubus And	28-Eab-14	30-Sen-23	Pasaberries &
Version 2	Rubus Hybrids / Two Spotted Mite &	20-1 60-14	30-3ep-23	Rlackherries
VCISION 2	European Red Spider Mite			Australia
PER14443	Copper Hydroxide / Rubus Spp (Incl.	28-Feb-14	31-Jan-24	Hort
Version 2	Raspberries & Blackberries) / Rust &			Innovation
	Leaf Spot			
PER14424	Fenhexamid (Teldor 500SC) / Rubus And	28-Jan-14	30-Sep-23	Raspberries &
Version 2	Rubus Hybrids / Grey Mould			Blackberries
				Australia
PER14234	Emulsifiable Botanical Oil (Eco-Oil) /	10-Sep-13	31-Aug-23	Raspberries &
Version 2	Rubus / Two Spotted Mite			Blackberries
DED14222	Carfontrazono / Dubus Con & Dibos	20 Aug 12	20 Nov 24	Australia
Version 3	Spp. / Sucker Control	29-Aug-13	30-INOV-24	TOPL
PER13956	Abamectin / Raspberry Blackberry and	31-May-13	31-May-23	Raspherries &
Version 3	Blackcurrant / Two-Spotted Mites	51 May 15	51 May 25	Blackberries
Version 5	To be surrendered, use now registered			Australia
				c/- Hort
				Innovation
PER13957	Petroleum Oil (Incl. Paraffinic and	1-Apr-13	31-Mar-23	Raspberries &
Version 2	Mineral Oil) / Rubus And Ribes / Two			Blackberries
	Spotted Mite and Scale Insects			Australia
				c/- Hort
	During the 10 Color March 1	1 4 1 2	21 4 25	Innovation
PERI3958	Pyrimetnanii, Captan, Metalaxyl,	1-Apr-13	31-Aug-25	Hort
version 5	Phosphorous Acid / Public Pibos %			IIIIOVACIÓN
	Blueberries / Various Fundal Blights			

Permit ID	Description	Date Issued	Expiry Date	Permit holder
PER13289 Version 4	Indoxacarb (Avatar) / Blueberries & Rubus Spp. / Light Brown Apple Moth	31-Oct-12	31-Aug-23	Raspberries & Blackberries Australia c/- Hort Innovation
PER13150 Version 2	Agrobacterium radiobacter (Nogall) / Rubus Root Systems / Crown Gall (NSW, TAS)	23-Mar-12	31-Oct-22	Growcom
PER12486 Version 5	Trichlorfon / Strawberries, Blueberries and Rubus spp. / Fruit Fly (ACT, NSW, NT, QLD, SA, WA)	06-Oct-11	31-May-21	Australian Blueberry Growers Association C/- Hort Innovation

#### Appendix 6. Blackberries and Raspberries Maximum Residue Limits (MRLs)

CODEX commodity groupings of Blackberries and Raspberries and subgroups:

	Fruits
FB 0018	Berries and other small fruits
FB 0264	Blackberries
FB 0272	Raspberries, red, black
FB 2005	Cane berries

Note: There is very limited international trade of Blackberries and Raspberries. Australian export volumes are very small, with the two major destinations being India and Fiji. 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	Description	APVMA	Codex
	Code		MRL	MRL
2.4.2			mg/kg	mg/kg
2,4-D	FB 0018	Berries and other small fruits	-	0.1
Abamectin	FB 0264	Blackberries	T0.1	-
Abamectin	FB 0272	Raspberries, red, black	T0.1	-
Abamectin	FB 2005	Cane berries	-	0.2
Acetamiprid	FB 0018	Berries and other small fruits	-	2
Aldrin and Dieldrin		Fruits	E0.05	-
Azoxystrobin	FB 0018	Berries and other small fruits	-	5
Azoxystrobin	FB 0264	Blackberries	Т5	-
Azoxystrobin	FB 0272	Raspberries, red, black	T5	-
Bifenazate	FB 0264	Blackberries	T7	7
Bifenazate	FB 0272	Raspberries, red, black	T7	7
Bifenthrin	FB 0264	Blackberries	Т3	1
Bifenthrin	FB 0272	Raspberries, red, black	Т3	1
Boscalid	FB 0264	Blackberries	T10	-
Boscalid	FB 0272	Raspberries, red, black	T10	-
Boscalid	FB 0018	Berries and other small fruits	-	10
Bromide Ion		Fruits		20
Cadusafos	FB 0018	Berries and other small fruits	Т30	-
Captan	FB 0272	Raspberries, red, black	-	20
Captan	FB 0018	Berries and other small fruits	T30	-
Carbaryl	FB 0272	Raspberries, red, black	15	-
Carbendazim	FB 0018	Berries and other small fruits	-	1
Carfentrazone-ethyl	FB 0018	Berries and other small fruits	T*0.05	-
Chlorantraniliprole	FB 2005	Cane berries	T1	-
Chlorantraniliprole	FB 0018	Berries and other small fruits	-	1
Chlorothalonil	FB 0018	Berries and other small fruits	T10	-
Clothianidin	FB 0018	Berries and other small fruits	-	0.07
Cyhalothrin	FB 0018	Berries and other small fruits	-	0.2
Cyprodinil	FB 0264	Blackberries	Т3	-
Cyprodinil	FB 0272	Raspberries, red, black	Т3	-

Chemical	Codex	Description		Codex
	Code		ma/ka	ma/ka
Cyprodinil	FB 0018	Berries and other small fruits	-	10
Diazinon		Fruit	0.5	-
Diazinon	FB 0264	Blackberries	-	0.1
Diazinon	FB 0272	Raspberries, red, black	-	0.2
DDT		Fruits	E1	-
Dichlobenil	FB 0272	Raspberries, red, black	T1	-
Dichlobenil	FB 2005	Cane berries	-	0.2
Dichlofluanid	FB 0018	Berries and other small fruits	T50	-
Dicofol		Fruits	5	-
Dimethoate	FB 0264	Blackberries	T5	-
Dimethoate	FB 0272	Raspberries, red, black	T5	-
Diquat		Fruits	*0.05	-
Dithianon		Fruits	2	-
Dithiocarbamates	FB 0018	Berries and other small fruits	T15	-
Etoxazole	FB 2005	Cane berries	T0.5	-
Fenbutatin oxide	FB 0018	Berries and other small fruits	1	-
Fenhexamid	FB 0264	Blackberries	T20	15
Fenhexamid	FB 0272	Raspberries, red, black	T20	15
Fenpyrazamine	FB 2005	Cane berries	-	5
Fenpyroximate	FB 0272	Raspberries, red, black	-	0.2
Flonicamid	FB 0264	Blackberries	T2	-
Flonicamid	FB 0272	Raspberries, red, black	T2	-
Fluazifop-p-butyl	FB 0018	Berries and other small fruits	0.2	-
Fluazifop-p-butyl	FB 2005	Cane berries	-	*0.01
Fludioxonil	FB 0264	Blackberries	T2	5
Fludioxonil	FB 0272	Raspberries, red, black	T2	5
Fluopyram	FB 2005	Cane berries	-	5
Fluxapyroxad	FB 0018	Berries and other small fruits	-	7
Glufosinate and	FB 0018	Berries and other small fruits	0.1	-
Glufosinate-ammonium		Deephormics and block		0.1
Glufosinate and	FB 0272	Raspberries, red, black	-	0.1
Glyphosate	FB 0018	Berries and other small fruits	*0.05	-
Haloxyfop	FB 0018	Berries and other small fruits	*0.05	-
Hexythiazox	FB 0018	Berries and other small fruits	1	-
Imidacloprid	FB 0018	Berries and other small fruits	-	5
Indoxacarb	FB 0018	Berries and other small fruits	1	-
Inorganic bromide		Fruits	20	-
Iprodione	FB 0018	Berries and other small fruits	12	-
Iprodione	FB 0264	Blackberries	-	30
Iprodione	FB 0272	Raspberries, red, black	-	30
Isofetamid	FB 2005	Cane berries	-	3
Lindane		Fruits	E0.5	-
Malathion / Maldison	FB 0018	Berries and other small fruits	10	-
Mesotrione	FB 2005	Cane berries	-	*0.01
Metalaxyl	FB 0018	Berries and other small fruits	T0.5	-

Blackberries and Raspberries SARP – August 2020 Version 2

Chemical	Codex	Description	APVMA MRI	Codex MRI
	Couc		ma/ka	ma/ka
Metalaxyl	FB 0272	Raspberries, red, black	-	0.2
Metaldehyde		Fruits	1	-
Methiocarb		Fruits	T0.1	-
Methyl bromide		Fruits	T*0.05	-
Napropamide	FB 0018	Berries and other small fruits	*0.1	-
Omethoate		Fruits	2	-
Oryzalin		Fruits	0.1	-
Oxathiapiprolin	FB 2005	Cane berries	-	0.5
Paraquat		Fruits	*0.05	-
Paraquat	FB 0018	Berries and other small fruits	-	*0.01
Pendimethalin	FB 0018	Berries and other small fruits	*0.05	-
Permethrin	FB 0264	Blackberries	-	1
Permethrin	FB 0272	Raspberries, red, black	-	1
Phosphine	FB 0018	Berries and other small fruits	T*0.01	-
Piperonyl butoxide		Fruits	8	-
Pirimicarb	FB 0264	Blackberries	T2	-
Pirimicarb		Fruit [except blackberries]	0.5	-
Pirimicarb	FB 0018	Berries and other small fruits	-	1
Pyraclostrobin	FB 0264	Blackberries	Т3	3
Pyraclostrobin	FB 0272	Raspberries, red, black	Т3	3
Pyrethrins		Fruits	1	-
Pyrimethanil	FB 0018	Berries and other small fruits	T5	-
Pyrimethanil	FB 0264	Blackberries	-	15
Pyrimethanil	FB 0272	Raspberries, red, black	-	15
Pyriofenone	FB 2005	Cane berries	-	0.9
Simazine		Fruits	*0.1	-
Spinetoram	FB 0018	Berries and other small fruits	0.5	-
Spinetoram	FB 0272	Raspberries, red, black	-	0.8
Spinosad	FB 0018	Berries and other small fruits	0.7	-
Spinosad	FB 0264	Blackberries	-	1
Spinosad	FB 0272	Raspberries, red, black	-	1
Sulfoxaflor	FB 0264	Blackberries	T0.7	-
Sulfoxaflor	FB 0272	Raspberries, red, black	T0.7	-
Tebufenozide	FB 0272	Raspberries, red, black	-	2
Thiacloprid	FB 0018	Berries and other small fruits	-	1
Thiamethoxam	FB 0018	Berries and other small fruits	-	0.5
Triadimenol	FB 0018	Berries and other small fruits	T0.5	-
Trichlorfon	FB 0018	Berries and other small fruits	T2	-
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.

**NOTE:** For the groups "Berries and other small fruits" listed above (Blackberries and Raspberries), crop group exclusions (if any) have not been specified.

Note: There is very limited international trade of Blackberries and Raspberries. Australian export volumes are very small, with the two major destinations being India and Fiji. Available information

indicates that in the absence of specific limits in legislation, 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.

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

T = Temporary MRL

E = The MRL is based on extraneous residues

Po = The MRL accommodates post-harvest treatment of the commodity

Sources:

APVMA MRLs: Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2019. Compilation 8. Prepared 9 July 2020.

CODEX MRLs: CODEX Alimentarius International Food Standards database (July 2020),

http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/

# Blackberry and Raspberry Agrichemical Regulatory Risk Assessment

#### August 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 so as to ensure compliance, as an 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 blackberries and raspberries 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 MIT	'E PESTS	I
		Aphids		
Aphids	Dimethoate	1B	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	ST17000 – Flonicamid ST18001 – Afidopyropen
Green peach aphid	Pirimicarb (Blackberries PER87439) Sulfoxaflor (Blackberries PER87441)	1A 4C	Codex - JMPR Periodic re-evaluation 2020 USA – Pollinator concerns	MT18018 – Sulfoxaflor Under development
		Beetles		
Elephant weevil	Indoxacarb	22A	EU: No authorisations	ST17000
Red-shouldered leaf beetle	Bifenthrin	3A	Canada: Subject to phase-out until 31/12/2020 EU: No authorisation in place	Bayer DC-163 under development with Hort
	Pyrethrins (PER80070 ABGC permit expired)	3A		Innovation
Weevils	Carbaryl	1A	Canada =: Review completed, retained but with a large number of uses deleted Codex: Toxicology review scheduled 2020 Europe: deregistered	
	Caterpil	lars/Lepi	doptera	
Armyworms	Carbaryl (Raspberries)	1A	Canada =: Review completed, retained but with a large number of uses deleted Codex: Toxicology review scheduled 2020 Europe: deregistered	ST17000 Bayer DC-163 under development with Hort Innovation
Cotton bollworm (H. armigera)	Helicoverpa NPV		-	
Native budworm (H. <i>punctigera</i> ) Helicoverpa spp.	Spinetoram	5		

Problem	Active Constituents	Chemical Group	Comment	Activities
Caterpillars	Spinetoram	5		Bayer DC-163 under
Fall armyworm	Chlorantraniliprole	28		development with Hort
	Indoxacarb	22A	EU: No authorisations	Innovation
	Spinetoram	5		
Lightbrown apple moth	Carbaryl (Raspberries)	1A	Canada =: Review completed, retained but with a large number of uses deleted Codex: Toxicology review scheduled 2020 Europe: deregistered	
	Indoxacarb	22A	EU: No authorisations	
	Spinetoram	5		
	Spinosad	5		
Loopers	Spinetoram	5		
	Spinosad	5		
Raspberry fruit caterpillar	Carbaryl	1A	Canada =: Review completed, retained but with a large number of uses deleted Codex: Toxicology review scheduled 2020 Europe: deregistered	
		Fruit fly		
Fruit flies	Maldison	1B	APVMA – Under review – chemistry	
Lesser Qld fruit fly	Spinetoram	5		
Mediterranean fruit fly	Spinetoram	5		
	Trichlorfon	18	APVMA – nominated for review Codex – No MRLs Europe – deregistered US – No MRLs	
Queensland fruit fly	Abamectin (Blackberry)	6		
	Spinetoram	5		
	Trichlorfon	18	APVMA – nominated for review Codex – No MRLs Europe – deregistered US – No MRLs	

Problem	Active Constituents	Chemical	Comment	Activities
		Group		
		Grasshoppers/L	ocusts	
Grasshoppers Wingless grasshopper	Carbaryl (Raspberries)		Canada =: Review completed, retained but with a large number of uses deleted	
		1A	Codex: Toxicology review scheduled 2020 Europe: deregistered	
		Jassids/Plant	bugs	
Cottonseed bug	Sulfoxaflor (PER87141)	4C		ST16000 - acetamiprid +
Green stink bug	Pyrethrins	3A		pyriproxyfen (Trivor)
Green vegetable bug	Pyrethrins	3A		ST17000 - Flonicamid
Jassids	Dimethoate	18	Codex: MRL deletion recommended. EU proposing to set all MRLs to < 0.01 mg/kg	ST18001 - Afidopyropen MT18018 - Sulfoxaflor
Rutherglen bug	Carbaryl (Raspberries)	1A	Canada =: Review completed, retained but with a large number of uses deleted Codex: Toxicology review scheduled 2020 Europe: deregistered	
	Dimethoate	1B	Codex: MRL deletion recommended.	
Strawberry bug	Dimethoate	1B	EU proposing to set all MRLs to < 0.01 mg/kg	
		Scale and Mea	lybug	
Mealybugs	Carbaryl (Raspberries)	1A	Canada =: Review completed, retained but with a large number of uses deleted Codex: Toxicology review scheduled 2020 Europe: deregistered	Trivor & Transform under development with Hort Innovation
Scale insects	Petroleum oil	-		

Problem	Active Constituents	Chemical	Comment	Activities
		Group		
		Mites		
Broad mite	Sulfur (Blackberries PER87245)	M2		ST19020
	Fenbutatin oxide (PER89407)	12B	APVMA – Nominated for review Codex - To be reviewed 2020/21. No supporting registrant EU: No authorisation in place	Spiromesifen (Oberon) Group 23 (Bayer) under development with Hort Innovation
Bean spider mite	Etoxazole (PER89406)	10B	EU: Being phased-out	-
	Sulfur (Blackberries PER87245)	M2		
	Fenbutatin oxide (PER89407)	128	APVMA – Nominated for review Codex - To be reviewed 2020/21. No supporting registrant EU: No authorisation in place	
European red mite	Bifenazate (PER14425)	20D		-
	Fenbutatin oxide (PER89407)	128	APVMA – Nominated for review Codex - To be reviewed 2020/21. No supporting registrant EU: No authorisation in place	
Red berry mite	Sulfur (Blackberries)	M2		
	Fenbutatin oxide (PER89407)	128	APVMA – Nominated for review Codex - To be reviewed 2020/21. No supporting registrant EU: No authorisation in place	
Redlegged earth mite	Dimethoate	1B	Codex: MRL deletion recommended.	
Spider mite	Dimethoate	1B	EU proposing to set all MRLs to < 0.01 mg/kg	
Two-spotted (Red spider) mite	Abamectin (PER13956)	6		
	Bifenazate (PER14425)	UN		
	Emulsifiable botanical oil (PER14234)	-		
	Etoxazole (PER89406)	10B	EU: Being phased-out	
	Fenbutatin oxide (PER89407)	128	APVMA – Nominated for review Codex - To be reviewed 2020/21. No supporting registrant EU: No authorisation in place	
	Petroleum oil	-		1

Problem	Active Constituents	Chemical	Comment	Activities				
		Group						
	Slugs/Snails							
Common garden snail	Methiocarb	1A	EU: No authorisation in place					
Slugs/Snails	Copper							
	Iron							
	Methiocarb	1A	EU: No authorisation in place					
White bradybaena (Oriental) snail	Methiocarb	1A	EU: No authorisation in place					
White Italian (Sand dune) snail	Methiocarb	1A	EU: No authorisation in place					
		Thrips						
Plague thrips	Bifenthrin	3A	Canada: Subject to phase-out until 31/12/2020	SYNFOI21 (Syngenta) a potential				
			EU: No authorisation in place	for a future project for thrips.				
Thrips	Dimethoate	1B	Codex: MRL deletion recommended.					
			EU proposing to set all MRLs to < 0.01 mg/kg					
Western flower thrips	Spinetoram	5						
	Other							
English wasp	Fipronil	2B	APVMA – Under review					
European wasp	Fipronil	2B	EU: No authorisation in place					
	Permethrin	3A						

Problem	Active Constituents	Chemical	Comment	Activities
		Group		
		DISEASES		
Alternaria leaf blotch	Boscalid +pyraclostrobin	7 + 11		ST16006
Anthracnose	A. pullulans	-		Bayer – Luna Experience
	Boscalid +pyraclostrobin	7 + 11		(Fluopyram + Tebuconazole)
Bactericide	Iodine	-		Group 7+3 for Botrytis Grey
Blossom blight	Azoxystrobin	11		mould & Anthracnose
	Boscalid +pyraclostrobin	7 + 11		Project underway with Hort
Botrytis flower and fruit rot	A. pullulans	-		Innovation
	Captan (PER13958)	M4		
Botrytis/Grey mould	A. pullulans			
	Azoxystrobin	11		
	Bacillus amyloquefaciens (PER88058)	-		
	Chlorothalonil (PER14449)	M5	APVMA - Nominated for review Canada – Review recently completed; continued use considered acceptable Europe - Deregistration proposed.	
	Cyprodinil +fludioxonil (PER14422)	9 + 12	Cyprodinil - Canada – Under review Fludioxonil - EU – Under review	
	Fenhexamid (PER14424)	17		
	Iprodione (Boysenberry, Raspberry,Youngberry) Mancozeb (PER13958)	2 	Europe – Deregistered Canada – Majority of food crop uses deleted Codex – Review scheduled for 2022 APVMA - Nominated for review Canada – Under review	
	Pyrimethanil (PER13958)	9	Codex - To be reviewed 2020/21	
Cane spot	Azoxystrohin	11		
	Boscalid +pyraclostrobin	7 + 11		-
	Captan (PER13958)	M4		-
Cladosporium rot	Azoxystrohin	11		
Crown gall	Agrobacterium radiobacter	-		

Problem	Active Constituents	Chemical	Comment	Activities
		Group		
Downy mildew	Chlorothalonil (PER14449)		APVMA - Nominated for review	ST17000
		ME	Canada – Review recently completed; continued	Bayer Propamocarb +
		IVIS	use considered acceptable	Fluopicolide (Infinito) Group
			Europe - Deregistration proposed	28 + 43 Project underway
	Copper	N/1	Europe: Candidates for substitution and their	with Hort Innovation.
			uses to be phased out	
	Mancozeb		APVMA - Nominated for review	
		M3	Canada – Under review	
			Codex - To be reviewed 2020/21	
	Metalaxyl	4		
Leaf diseases/spots	Copper (PER14443)	M1	Europe: Candidates for substitution and their	
			uses to be phased out	
Phoma blight	Boscalid +pyraclostrobin	7 + 11		
Phomopsis fruit rot	A. pullulans	-		
Phytophthora	Metalaxyl/Metalaxyl-M (PER13958)	4		
	Phosphorous acid (PER13958)	33		
Powdery mildew	Boscalid +pyraclostrobin	7 + 11		
	Triadimenol (PER13958)	2	APVMA - Nominated for review	
		5	EU: No authorisation in place	
Rhizopus fruit rot	A. pullulans			
Rust	Chlorothalonil (PER14449)	M5	APVMA - Nominated for review	
			Canada – Review recently completed; continued	
			use considered acceptable	
			Europe - Deregistration proposed	
	Copper (PER14443)	M1	Europe: Candidates for substitution - uses to be	
			phased out	
	Mancozeb (PER13958)		APVMA - Nominated for review	
		M3	Canada – Under review	
			Codex - To be reviewed 2020/21	
Septoria leaf spot	Boscalid +pyraclostrobin	7 + 11		
	Chlorothalonil (PER14449)		APVMA - Nominated for review	
		M5	Canada – Review recently completed; continued	
			use considered acceptable	
			Europe - Deregistration proposed	

Problem	Active Constituents	Chemical	Comment	Activities
		Group		
Spur blight	Captan (PER13958)	M4		
	Copper	M1		
Stem end rot	Boscalid +pyraclostrobin	7 + 11		

Problem	Active Constituents	Chemical	Comment	Activities
		Group		
		WEEDS		
Broadleaf weeds and grasses	Carfentrazone-ethyl (PER14233)	G		
	Glufosinate-ammonium	N	EU: No authorisation in place	
	Glyphosate	М	Ongoing issues internationally	
	Oryzalin	D		
	Simazine	С	APVMA – Nominated for review	
			EU: No authorisation in place	

MT17019 – Regulatory support and coordination. This multi-industry project has been funded by Hort Innovation using industry research and development levies and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.