



# **Celery**

Strategic Agrichemical Review Process  
(SARP)

April 2021

Hort Innovation  
Project – VG18004

**Hort Innovation Project Number:**

VG18004 – Vegetable Strategic Agrichemical Review Process (SARP) Report Updates

**SARP Service Provider:**

Vasanthe Vithanage T/A Hortigrow Consulting

**Purpose of the report:**

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

**Date of report:**

April 2021

**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 Celery 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 Celery 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 2019

Copyright subsists in the Celery SARP. Horticulture Innovation Australia Limited (Hort Innovation) owns the copyright, other than as permitted under the Copyright ACT 1968 (Cth). The Celery 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 Celery SARP should be addressed to:

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

**Hort  
Innovation**  
Strategic levy investment

**VEGETABLE  
FUND**

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit [horticulture.com.au](http://horticulture.com.au)

# Table of Contents

<b>1. Summary .....</b>	<b>4</b>
1.1 Diseases .....	5
1.2 Insects and mites .....	5
1.3 Weeds .....	5
<b>2. The Australian Celery Industry .....</b>	<b>6</b>
3.1 Background.....	7
3.2 Minor use permits and registration .....	8
3.3 Methods .....	9
3.4 Results and discussions .....	10
3.4.1 Detail.....	10
3.4.2 Appendices .....	10
<b>4. Diseases, Pests and Weeds of Celery .....</b>	<b>11</b>
4.1 Diseases of Celery .....	12
4.1.1 Disease priorities.....	12
4.1.2 Available and potential products for high priority diseases.....	14
4.2 Insect and mite pests of celery.....	27
4.2.1 Insect and mite pest priorities .....	27
4.2.2 Available and potential products for high priority insects and mites.....	29
4.3 Weeds in celery.....	65
4.3.1 Weed priorities .....	65
4.3.2 Available and potential products for weed control.....	66
<b>5. References.....</b>	<b>76</b>
5.1 Information: .....	76
5.2 Abbreviations and Definitions: .....	76
5.3 Acknowledgements: .....	76
<b>6. Appendices: .....</b>	<b>77</b>
Appendix 1. Products available for disease control in celery .....	78
Appendix 2. Products available for control of insects and mites in celery.....	80
Appendix 3. Products available for weed control in celery .....	85
Appendix 4. Current permits for use in celery .....	86
Appendix 5. Celery Maximum Residue Limits (MRLs) .....	88
Appendix 6. Celery Agrichemical Regulatory Risk Assessment .....	90

## **1. Summary**

The strategic levy investment project Vegetable Industry SARP Report Updates (VG18004) is part of the Hort Innovation Vegetable Fund. A Strategic Agrichemical Review Process (SARP), through the process of a desktop audit and industry liaison;

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

Alternative pesticides should ideally be selected for benefits of:

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

The results of this process will provide the Celery 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:

<b>Common name</b>	<b>Scientific name</b>
Early Blight / Cercospora Leaf Spot	<i>Cercospora apii</i>
Sclerotinia Rot	<i>Sclerotinia sclerotiorum, Sclerotinia minor</i>
Septoria Spot / Septoria Leaf Spot / Late Blight	<i>Septoria apiicola</i>
Celery Mosaic Virus (CeMV)	Potyvirus

## **1.2 Insects and mites**

The high priority insect and mite pests are:

<b>Common name</b>	<b>Scientific name</b>
Cotton/Melon Aphid	<i>Aphis gossypii</i>
Green Peach Aphid	<i>Myzus persicae,</i>
Cotton Bollworm / Corn Earworm	<i>Helicoverpa armigera</i>
Native Budworm	<i>Helicoverpa punctigera</i>

## **1.3 Weeds**

The high priority weeds are:

<b>Common name</b>	<b>Scientific name</b>
Marshmallow	<i>Malva parviflora</i>
Winter Grass	<i>Poa annua</i>
Groundsel	<i>Senecio vulgaris</i>
Nut Grass	<i>Cyperus rotundus</i>
Oxalis (Sour Sob)	<i>Oxalis pes-caprae</i>

## **2. The Australian Celery Industry**

The Australian Celery industry is a minor horticultural industry. Production of Celery has increased over recent years due to rising demand from the promotion of health benefits.

Celery is grown in most states of Australia, with most production occurring in Victoria. The major growing regions include the Dandenong region in Victoria; Perth region in Western Australia and Stanthorpe and the Darling Downs of Southern Queensland.

<sup>1</sup>Overall Australian production of Celery was 61,521 tonnes in 2020. The value of production was \$74.1m, with the majority of produce destined for fresh market.

The market of Celery for export has increased steadily since 2015-2016., due to increasingly lucrative prices in Malaysia and Singapore. For the year ending in June 2020, Australia exported 5,132 tonnes. Of this export, 41% was destined for Malaysia followed by Singapore (38%), Hong Kong (6%), UAE (5%) and Indonesia (4%).

Due to Australia's varying weather conditions, the Australian industry can supply domestic markets with fresh Celery throughout the year.

The species discussed in this report is 'Celery' (*Apium graveolens* var. dulce).

### Fresh Celery Seasonality by State

State	19/20 t	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
New South Wales (1%)	440												
Victoria (58%)	35,498												
Queensland (24%)	15,095												
Western Australia (14%)	8,873												
South Australia (1%)	528												
Tasmania (2%)	1,097												
Availability legend			High		Medium		Low					None	

<sup>1</sup> Hort Innovation (2021). Australian Horticulture Statistics Handbook 2019/20. [online] Available at: <https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/ha18002-australian-horticulture-statistics-handbook-2019-20-vegetables.pdf>

## **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 Celery 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 Celery 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 Celery 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 Celery 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 Celery but attempts to prioritise the major problems.

Exotic plant pests, not present in Australia, are not addressed in this document. A biosecurity plan has been developed for the Vegetable Industry in consultation with industry, government and scientists. The Biosecurity Plan for the Vegetable Industry which covers Celery 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.

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

### **3.2 Minor use permits and registration**

From a pesticide access perspective, the APVMA classifies Celery as a minor crop. The crop fits within the APVMA crop group VS0078: Stalk and Stem Vegetables. Therefore, access to minor use permits can be relatively straight forward as long as a reasonable justification is provided in accordance to the APVMA's minor use guidance (<https://apvma.gov.au/node/10931>).

Possible justification for future permit applications could be based on:

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

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



### 3.3 Methods

The current update of the Celery Strategic Agrichemical Review Process (SARP), which was last updated in 2014, was conducted by desktop audit using industry information gathered during 2011-2014 under MT10029 – Managing pesticide access in horticulture and finalised under VG12081 - Review of vegetable SARP reports. The process included gathering, collating and confirming information:

<b>Hort Innovation Project Reference</b>	<b>Process of Review - Activity</b>
VG16060 - Vegetable Agrichemical Pest Management Needs and Priorities (AUSVEG) - Commenced: 2 May 2017	<p>Engagement and consultation with growers and other relevant stakeholders. Including; Online crop specific surveys, workshops and one on one consultation Nationally.</p> <p>Collation of information collected by commodity on applicable pests, diseases and weeds in order of priority.</p>
MT17019 – Regulatory Support & Co-ordination (AKC)	<p><b>Celery Agrichemical Regulatory Risk Assessment Document</b></p> <p>To assist strategic planning, with respect to future pest management options, this document was developed as part of the Hort Innovation funded project MT17019 to highlight the regulatory threats to agrichemicals currently approved for the management of the pests and diseases in Celery as well as current initiatives aimed at addressing identified pest management deficiencies.</p>
VG18004 – Vegetable Strategic Agrichemical Review Process (SARP) Report Updates	<p><b>SARP updated via a desktop audit:</b></p> <ul style="list-style-type: none"> <li>• Review list of priorities ranked as high, moderate and low for each plant pest groups (disease, insects and weeds) – provided by VG16060</li> <li>• Identify industries pest priority gaps in order of importance</li> <li>• Update current pesticides available via label registrations or minor use permits</li> <li>• Update available pesticide use patterns, IPM ranking/compatibility, mode of action and chemical group.</li> <li>• Identify pesticides at risk (under review and/or limited uses) via MT17019 Regulatory Support &amp; Co-ordination – AKC consulting.</li> <li>• Identify any appropriate solutions through the outcomes of the AgChem Forum’s or similar market intelligence and their overall suitability (IPM compatibility, Chemical group to manage resistance, risk profile, existing domestic MRL’s or global MRL’s including any potential trade barriers, efficacy, OH&amp;S, environmental safety and sustainability).</li> <li>• Include known pesticide solutions that are currently under development with registrants for new uses in the nominated crops or in current Hort Innovation projects.</li> <li>• Update MRL tables to include Australian MRL’s, Codex and any applicable export market MRL’s</li> </ul>

## **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 celery
- Appendix 2. Products available for control of insects and mites in celery
- Appendix 3. Products available for weed control in celery
- Appendix 4. Current permits for use in celery
- Appendix 5. Celery Maximum Residue Limits (MRLs)
- Appendix 6. Celery Agrichemical Regulatory Risk Assessment

## **4. Diseases, Pests and Weeds of Celery**

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/>

In chapter 4, information on regulatory risk derived from project MT17019 - Regulatory support and coordination (Appendix 6) has been incorporated.

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

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

## **4.1 Diseases of Celery**

### **4.1.1 Disease priorities**

<b>Common name</b>	<b>Scientific name</b>
<b>High</b>	
Early Blight / Cercospora Leaf Spot	<i>Cercospora apii</i>
Sclerotinia Rot	<i>Sclerotinia sclerotiorum, Sclerotinia minor</i>
Septoria Spot / Septoria Leaf Spot / Late Blight	<i>Septoria apiicola</i>
Celery Mosaic Virus (CeMV)	Potyvirus
<b>Moderate</b>	
Bacterial Soft Rot	<i>Erwinia</i> spp.
<b>Low</b>	
Bacterial Blight	<i>Pseudomonas syringae pv. apii</i>
Botrytis Rot	<i>Botrytis cinerea</i>
Leaf Curl (Celery Anthracnose)	<i>Colletotrichum acutatum</i> and <i>C. orbiculare</i>
Fusarium Root Rot	<i>Fusarium oxysporum</i>

The Celery Mosaic Virus is transmitted by several aphid species in a non-persistent manner and is limited only to umbelliferous plants (Celery, Carrot, Parsley, etc.). Because of the limited host range, destruction of umbelliferous weeds is one of the proven control measures. Along with good aphid control, viral problems can be managed.

Bacterial soft rot is often caused by *Pseudomonas* and *Erwinia* species and is a common disease on many vegetables. The causal organisms may be carried on cutting knives or on residue in produce bins. Therefore, good farm hygiene is also important in preventing such occurrences. Some of the fungal and bacterial diseases that have received moderate to low priority have few options to suppress or control but should be supplemented by management practices that would increase airflow and minimise moisture in the plant canopy. Soil fumigation also helps in preventing some diseases.

Management methods that promote clean seeds and transplant material, early detection and disposal of infected seedlings would keep most of these diseases in check whilst eliminating alternative hosts, crop rotation, cover crops, bio fumigation and farm hygiene are also important to prevent spread of these between sites. Taking precautions to prevent spread of disease from nursery to field would also help in this effort.

### **Resistance Management**

In controlling fungal and bacterial diseases, the industry should be mindful of resistance management. CropLife Australia has a resistance management strategy<sup>2</sup> and users should refer to it before using any product.

---

<sup>2</sup> <http://www.croplife.org.au/industry-stewardship/resistance-management>

#### 4.1.2 Available and potential products for high priority diseases

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

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

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<b>Early Blight / Cercospora Leaf Spot (<i>Cercospora apii</i>)</b>							
<b>Priority: High</b>							
Cercospora Leaf Spot was ranked as a high priority in VIC, QLD, WA, NSW & TAS. This disease is seed borne and can survive in crop trash. Disease free seeds and seedlings are essential for preventing the spread of this disease.							
Chlorothalonil (Bravo)	M5	Protective	1	A	NSW & WA	Registered in celery for control of Septoria Leaf Spot (all states) and <b>Cercospora Early Blight</b> (ACT, NSW & WA only). [Max. no. of applications not specified; re-treatment interval 10-14 d]	R3
Copper Oxychloride	M1	Protective	1	A	NSW, ACT, VIC, SA & WA	Registered in celery for control of Septoria Leaf Spot and <b>Cercospora Early Blight</b> . [Max. no. of applications not specified; re-treatment interval 7-14 d]	-
Difenoconazole	3	Protective & Curative	7	A	ALL	Registered in celery for control of Cercospora Leaf Spot & Septoria Spots. [Max. no. of applications 4 per season; re-treatment interval 10-14 d]	-
Hydrogen Peroxide + Peroxyacetic Acid (Peratec Plus)	M	Non-selective surface sterilant	1	A	ALL	Registered in celery for control of <b>Cercospora Leaf Spot</b> . [Max. 4 applications per crop; re-treatment interval 5-7 d]	-
Metiram (Polyram) BASF	M3	Protective	2	A	ALL (excl. SA)	Registered in celery for control of <b>Cercospora Early Blight</b> . Begin application when disease first becomes apparent. [Max. no. of applications not specified; re-treatment interval 7 d]	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Propiconazole (Tilt) PER14479	3	Protective & Curative	14	A	ALL	Permitted for use in celery for control of <b>Cercospora Early Blight</b> and Septoria Leaf Spot. [Max. 3 applications per crop; re-treatment interval 7 d]	R3
Trifloxystrobin (Flint) PER14494	11	Protective & Curative	3	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Cercospora Early Blight</b> and Septoria Leaf Spot. [Max. 3 applications per crop; re-treatment interval 10 d].	-
Zineb	M3	Protective	7	A	ALL (excl. QLD)	Registered in celery for control of <b>Cercospora Leaf Spot</b> . [Max. no. of applications not specified; re-treatment interval 7-10 d].	R2
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protective & Curative		P		Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in celery for Early Blight / <b>Cercospora</b> Leaf Spot. First Registration pending in Australia for control of Botrytis, Alternaria, Powdery Mildew & Anthracnose in berries. US registration for control of <b>Cercospora</b> in brassicas, carrots, cucurbits, stalk vegetables and root and tuber vegetables.	R3
<i>Bacillus amyloliquefaciens</i> (strain QST 713) (Serenade Opti) Bayer	BM 02	Biological		P		Registered for control of various leaf diseases in avocado, fruiting vegetables, grapes, mango and strawberry. US registration for control of Pink Rot and Sclerotinia Head and Leaf Drop in celery.	-
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of <i>Botrytis</i> in grapes and strawberries. US registration for control of Bacterial Leaf Spot, <i>Botrytis</i> , <b>Cercospora</b> , Downy Mildew, Head and Leaf Drop, Pink Rot, Powdery Mildew, White Mould, White Rust, Bottom Rot and Verticillium Wilt in celery.	-
Florypicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New Mode of Action fungicide being developed for AU with activity on Powdery Mildew, <i>Botrytis</i> spp., <i>Septoria</i> spp., Anthracnose, <i>Alternaria</i> spp., Scab, <i>Monilinia</i> spp. and <i>Mycosphaerella</i> spp. Due for registration in 2023.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, <i>Botrytis</i> , <i>Cladosporium</i> , <b><i>Cercospora</i></b> , <i>Sclerotinia</i> and Anthracnose in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protective & Curative		P		Registered for control of various leaf diseases in almonds, pome fruit, stone fruit and tropical and sub-tropical fruit (inedible peel). US registration for control of <b><i>Cercospora</i></b> in peanuts and sugarbeet.	-
Mefentrifluconazole (Belanty) BASF	3	Protective & Curative		P		Registered for control of Black Spot in apples and Powdery Mildew in grapes. US registration for control of <b><i>Cercospora</i></b> in corn, legume vegetables, peanuts, sorghum, millet, soybean and sugar beet.	-
Tebuconazole + Azoxystrobin (Veritas) Adama	3+11	Protective		P		Registered for control of <b><i>Cercospora</i> Leaf Spot</b> in Faba beans and Broad beans.	-
<b>Sclerotinia Rot</b> ( <i>Sclerotinia sclerotiorum</i> , <i>Sclerotinia minor</i> )							
<b>Priority: High</b>							
Sclerotinia Rot was ranked as a high priority in VIC, QLD, WA, NSW & TAS. Sclerotinia tends to be a problem at canopy closure, particularly if plants have sustained mechanical injuries. Crop rotation is critical to minimise the disease.							
Boscalid (Filan) BASF PER11127	7	Protective	14	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Sclerotinia Rot</b> . [Max. 2 applications per crop; re-treatment interval 7-14 d]	-
Iprodione	2	Protective	1	A	ALL	Registered in celery for control of <b>Sclerotinia Rot</b> . Commence spray 1-2 weeks post-transplanting. [Max. 5 applications per crop; re-treatment interval 14-21 d]	R3



Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Azoxystrobin + Oxathiapiprolin (Orondis) Syngenta	11+49	Protective & Curative		P		Registered in Brassica vegetables for the suppression of <b>Sclerotinia Rot</b> , Alternaria, White Blister and control of Downy Mildew.	-
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of <i>Botrytis</i> in grapes and strawberries. US registration for control of Bacterial Leaf Spot, <i>Botrytis</i> , Cercospora, Downy Mildew, Head and Leaf Drop, <b>Pink Rot (<i>Sclerotinia sclerotiorum</i>)</b> , Powdery Mildew, <b>White Mould (<i>Sclerotinia sclerotiorum</i>)</b> , White Rust, Bottom Rot and Verticillium Wilt in celery.	-
Cyprodinil + Fludioxonil (Switch) Syngenta	9+12	Protective & Curative		P		Registered for control of <b>Sclerotinia</b> , Botrytis and other diseases in several vegetable crops including leafy vegetables, peas, beans, leafy vegetables and lettuce. US registration for control of Alternaria, Septoria, Botrytis, <b>Sclerotinia</b> , Basal Rot and suppression of Powdery Mildew in celery.	R3
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, <i>Botrytis</i> , <i>Cladosporium</i> , <i>Cercospora</i> , <b>Sclerotinia</b> and Anthracnose in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
NUL3446 Nufarm	TBC			P		New active in development from Nufarm with activity on <b>Sclerotinia</b> .	-
<b>Septoria Spot / Septoria Leaf Spot / Late Blight (<i>Septoria apicola</i>)</b>							
<b>Priority: High</b>							
Septoria Spot was ranked as a high priority in VIC, QLD & TAS and as a moderate in WA and NSW. Septoria Spot is weather dependent, and it is an issue when cool and wet conditions set in. It is considered more of an autumn and winter issue.							
Chlorothalonil (Bravo)	M5	Protective	1	A	ALL	Registered in celery for control of <b>Septoria Leaf Spot</b> (all states) and Cercospora Early Blight (ACT, NSW & WA only). Apply also to seed beds. [Max. no. of applications not specified; re-treatment interval 7-14 d]	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Copper	M1	Protective	1	A	ALL	Registered in celery for control of <b>Septoria Leaf Spot</b> and Bacterial Soft Rot. [Max. no. of applications not specified; re-treatment interval 7-14 d]	-
Copper Oxychloride	M1	Protective	1	A	ALL	Registered in celery for control of <b>Septoria Leaf Spot</b> and Early Blight. [Max. no. of applications not specified; re-treatment interval 7-14 d]	-
Difenoconazole (Score) Syngenta	3	Protective & Curative	7	A	ALL	Registered in celery for control of <b>Septoria Leaf Spot</b> . [Max. 4 applications per season; only 2 consecutive; re-treatment interval 10 -14 d]	R3
Mancozeb	M3	Protective	7	A	ALL	Registered in celery for control of <b>Septoria Leaf Spot</b> . Spray at first sign of disease. [Max. no. of applications not specified; re-treatment interval 7 -10 d]	R2
Metalaxyl-M + Mancozeb (Ridomil Gold MZ) Syngenta PER13673	4+M3	Protective & Curative	14	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Septoria Leaf Spot (Late Blight)</b> . [Max. 2 applications per crop; re-treatment interval 7-10 d]	R2
Metiram (Polyram) BASF	M3	Protective	2	A	ALL (excl. SA)	Registered in celery for control of <b>Septoria Late Blight</b> . Begin application when disease first becomes apparent. [Max. no. of applications not specified; re-treatment interval 7 d]	R2
Propiconazole (Tilt) PER14479	3	Protective & Curative	14	A	ALL	Permitted for use in celery for control of Cercospora Early Blight and <b>Septoria Leaf Spot</b> . [Max. 3 applications per crop; re-treatment interval 7 d]	R3
Propineb (Antracol)	M3	Protective	7	A	VIC, TAS & WA	Registered in celery for control of <b>Septoria Leaf Spot</b> . [Max. no. of applications not specified; re-treatment interval 7-10 d]	R2
Thiram	M3	Protective	7	A	ALL	Registered in celery for control of <b>Septoria Leaf Spot</b> . [Max. no. of applications not specified; re-treatment interval 7 -10 d]	R2
Trifloxystrobin (Flint) BASF PER14494	11	Protective & Curative	3	A	ALL (excl. VIC)	Permitted for use in celery for control of Cercospora Early Blight and <b>Septoria Leaf Spot</b> . [Max. 3 applications per crop; re-treatment interval 10 d]	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Zineb	M3	Protective	7	A	QLD	Registered in celery for control of <b>Septoria Leaf Spot</b> . [Max. no. of applications not specified; re-treatment interval 7 - 10 d]	R2
Ziram	M3	Protective	7	A	ALL	Registered in celery for control of <b>Septoria Leaf Spot</b> . [Max. no. of applications not specified; re-treatment interval 7 - 10 d]	R2
Cyprodinil + Fludioxinil (Switch) Syngenta	9+12	Protective & Curative		P		Registered for control of Anthracnose, <i>Botrytis</i> and Sclerotinia in various crops. US registration for control of Alternaria, <b>Septoria</b> , <i>Botrytis</i> , Sclerotinia, Basal Rot and suppression of Powdery Mildew in celery.	R3
Dimethomorph (Acrobat) BASF	40	Protective & Curative		P		Registered in cucurbits for control of Downy Mildew, Anthracnose, Gummy Stem Blight, Alternaria Leaf Spot and <b>Septoria Spot</b> .	-
Florypicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New Mode of Action fungicide being developed for AU with activity on Powdery Mildew, <i>Botrytis</i> spp., <b>Septoria</b> spp., Anthracnose, <i>Alternaria</i> spp., Scab, <i>Monilinia</i> spp. and <i>Mycosphaerella</i> spp. Due for registration in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, <b>Septoria</b> , <i>Botrytis</i> , <i>Cladosporium</i> , <i>Cercospora</i> , <i>Sclerotinia</i> and Anthracnose in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3

### Celery Mosaic Virus

#### Priority: High

Celery Mosaic Virus (CeMV) was ranked as a high priority in VIC and as a moderate priority in QLD, WA, NSW & TAS. The virus is transmitted by several aphid species in a nonpersistent manner and is limited only to umbelliferous plants (Celery, Carrot, Parsley, etc.). Because of the limited host range, destruction of umbelliferous weeds is one of the proven control measures. Growers also commented on the importance of mulching in celery crop debris as soon as possible and controlling other weeds or volunteer host plants as they can serve as a reservoir for CeMV.

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<b>Bacterial Soft Rot</b> ( <i>Erwinia</i> spp.)							
<b>Priority: Moderate</b>							
Bacterial Soft Rot was ranked as a moderate priority in VIC & QLD and as a low priority in WA, NSW & TAS. The causal organisms may be carried on cutting knives or on residue in produce bins. Good farm hygiene would help manage this problem.							
Copper	M1	Protective	1	A	ALL	Registered in celery for control of Leaf Spot and <b>Bacterial Soft Rot</b> . [Max. no. of applications not specified; re-treatment interval 10 -14 d]	-
Chlorine	-	Sanitiser / Post-harvest treatment	NR	A	ALL	Registered in vegetables as a post-harvest treatment for bacteria and fungi. Post-harvest spray. Minimum contact 30 seconds. Can also be used as a general disinfectant for equipment.	-
<i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM 02	Biological Fungicide	NR	P-A	ALL	Registered in vegetable crops for application to soil to improve bioavailability of soil resources to horticultural crops. Provides suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane and is also registered for control of Yellow Sigatoka in bananas as a foliar spray.	-
<i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer	BM 02	Biological		P		Registered for control Botrytis in strawberries and grapes, suppression of Bacterial Spot in tomato, chili and capsicum and control of Anthracnose and suppression of Stem End Rot in tropical fruits. US registration for control of Pink Rot and Sclerotinia Head and Leaf Drop in celery and for control of Botrytis, Sclerotinia, Xanthomonas and <b>Erwinia</b> in grapes, strawberries, pome fruits, tree nuts and leafy vegetables and suppression of <b>Erwinia carotovora</b> in root and leafy vegetables.	-
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of <i>Botrytis</i> in grapes and strawberries. US registration for control of Bacterial Leaf Spot, <i>Botrytis</i> , <i>Cercospora</i> , Downy Mildew, Head and Leaf Drop, Pink Rot, Powdery Mildew, White Mould, White Rust, Bottom Rot and Verticillium Wilt in celery and control of Fire Blight ( <i>Erwinia amylovora</i> ) in pome fruit and Aerial Stem Rot ( <i>Erwinia carotovora</i> ) in root/tuber vegetables.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
BLAD (Problad Plus)	BM 01	Biological		P		Registered for control of Brown Rot and Blossom Blight in stone fruit. US registration for control of Fire Blight ( <i>Erwinia amylovora</i> ) in pome fruit.	-
<b>Bacterial Blight</b> ( <i>Pseudomonas syringae</i> pv. <i>apii</i> ) <b>Priority: Low</b> Bacterial Blight was ranked as a low priority in VIC, QLD, WA, NSW & TAS. <i>P. syringae</i> can be moved by wind, rain, and transportation via nursery material. Mechanical equipment and pruning tools may be a frequently overlooked means of dispersal. Cultural management, host resistance, biological control with microbial antagonists would help in controlling this disease.							
Copper	M1	Protective	28	P-A	ALL	Registered in celery for control of Leaf Spot and Bacterial Soft Rot.	-
<i>Bacillus amyloliquefaciens</i> (strain QST 713) (Serenade Opti) Bayer	BM 02	Biological	NR	P		Registered for suppression of Bacterial Spot in capsicum, chilli and tomato. US registration for control of Pink Rot and Sclerotinia Head and Leaf Drop in celery and for control of <i>Pseudomonas</i> spp. in berries, cucurbits, fruiting vegetables and stone fruit.	-
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological	NR	P		Registered for control of <i>Botrytis</i> in grapes and strawberries. US registration for control of Bacterial Leaf Spot ( <i>Xanthomonas</i> and <b><i>Pseudomonas</i> spp.</b> ), <i>Botrytis</i> , Cercospora, Downy Mildew, Head and Leaf Drop, Pink Rot, Powdery Mildew, White Mould, White Rust, Bottom Rot and Verticillium Wilt in celery and control of <b><i>Pseudomonas syringae</i></b> in berries, fruiting vegetables, stone fruit, tobacco and tree nuts.	-
<b>Botrytis Rot</b> ( <i>Botrytis cinerea</i> ) <b>Priority: Low</b> Botrytis Rot was ranked as a low priority in VIC, QLD, WA, NSW & TAS. <i>Botrytis</i> spp. which causes Grey Mould can affect plants at most stages of production. Affected parts get rapidly covered with a thick grey mould. <i>Botrytis</i> also causes secondary rots on fruit and vegetables in storage or transit and in the marketplace.							
Thiram	M3	Protective	7	A	ALL	Registered in celery for control of <b>Botrytis Rot</b> . [Max. no. of applications not specified; re-treatment interval 7 -10 d]	R2

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<i>Aureobasidium pullulans</i> (Botector) Nufarm	UN	Biological		P		Registered for control of <b>Botrytis</b> in berries and grapes. US registration for the control of <b>Grey Mould</b> and Anthracnose in celery.	-
<i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer	BM 02	Biological		P		Registered for control of <b>Botrytis</b> in tomato, capsicum, chilli & several fruits. Registered in US for control of various fungal diseases in a range of fruits and vegetables.	-
<i>Bacillus amyloliquefaciens strain MBI 600</i> (Serifel) BASF	BM 02	Biological		P		Registered for control of <b>Botrytis</b> in grapes and strawberries. US registration for control of Bacterial Leaf Spot, <b>Botrytis</b> , Cercospora, Downy Mildew, Head and Leaf Drop, Pink Rot, Powdery Mildew, White Mould, White Rust, Bottom Rot and Verticillium Wilt in celery.	-
BLAD (Problad Plus)	BM 01	Biological		P		Registered for control of Brown Rot and Blossom Blight in stone fruit. US registration for control of <b>Botrytis</b> in fruiting vegetables, grapes, strawberries and ornamentals.	-
Cyprodinil + Fludioxinil (Switch) Syngenta	9+12	Protective & Curative		P		Registered for control of <b>Botrytis</b> in alliums, fruiting vegetables, cucurbits, cut flowers, grapes, legume vegetables, lettuce, nursery stock, ornamentals and strawberries. US registration for control of Alternaria, Septoria, <b>Botrytis</b> , Sclerotinia, Basal Rot and suppression of Powdery Mildew in celery.	R3
DC-126 Bayer	TBC			P		New product from Bayer with <b>Botrytis</b> activity.	-
Fenpyrazamine (Prolectus) Sumitomo	17	Protective & Curative		P		Registered for <b>Botrytis</b> control in grapes. US registration for control of <b>Botrytis</b> in almond, berries, ginseng, lettuce, pistachio, small fruit vine climbing (except fuzzy kiwifruit) and ornamentals.	-
Florypicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New Mode of Action fungicide being developed in Australia. Corteva claims activity on <b>Botrytis</b> . 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	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, <b>Botrytis</b> , <i>Cladosporium</i> , <i>Cercospora</i> , <i>Sclerotinia</i> and Anthracnose in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3
Isofetamid (Kenja) ISK	7	Protective & Curative		P		Registered in berries for control of <b>Botrytis</b> .	-
NUL3195 Nufarm	TBC			P		New product from Nufarm with <b>Botrytis</b> activity.	-
Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta	7+12	Protective & Curative		P		Registration pending in Australia for control of <b>Botrytis</b> , Alternaria, Powdery Mildew & Anthracnose in berries. US registration for control of <b>Grey Mould</b> in celery.	R3
SYNCUF29 Syngenta	NEW	TBC		P		New product from Syngenta with <b>Botrytis</b> activity.	-
<b>Leaf Curl (Celery Anthracnose) (<i>Colletotrichum acutatum</i> and <i>C. orbiculare</i>)</b>							
<b>Priority: Low</b>							
Leaf CURL was ranked as a low priority in VIC, QLD, WA, NSW & TAS. It requires both pre- and post-harvest treatments. This fungus can be seed-borne and carry over on crop residue in the soil. It is spread in water droplets and worse in warm, humid weather. It is thought that protectants that target Downy Mildew and <i>Botrytis</i> will have some effect and post-harvest treatments would afford protection as well. Regular spraying and orchard hygiene are important to prevent crop damage.							
Thiram	M3	Protective	7	A	ALL	Registered in celery for control of <b>Anthracnose</b> . [Max. no. of applications not specified; re-treatment interval 7 -10 d]	R2
Mancozeb	M3	Protective		P-A		Registered in celery for control of Septoria leaf spot. Registered for control of <b>Anthracnose</b> in brassica vegetables and cucurbits.	R2
<i>Aureobasidium pullulans</i> (Botector) Nufarm	UN	Biological		P		Registered for control of <b>Anthracnose</b> in berries and grapes. US registration for the control of Grey Mould and <b>Anthracnose</b> in celery.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
<i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer	44	Biological		P		Registered for control <i>Botrytis</i> in strawberries and grapes, suppression of Bacterial Spot in tomato, chili and capsicum and control of <b>Anthracnose</b> and suppression of Stem End Rot in tropical fruits. US registration for control of Pink Rot and Sclerotinia Head and Leaf Drop in celery and for control of <b>Colletotrichum spp.</b> in berries, citrus, fruiting vegetables, herbs/spices, pome fruit, stone fruit, strawberries and tree nuts.	-
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of <i>Botrytis</i> in grapes and strawberries. US registration for control of Bacterial Leaf Spot, <i>Botrytis</i> , Cercospora, Downy Mildew, Head and Leaf Drop, Pink Rot, Powdery Mildew, White Mould, White Rust, Bottom Rot and Verticillium Wilt in celery and for control of <b>Colletotrichum spp.</b> in artichoke, asparagus, berries, cucurbits, fruiting vegetables, pome fruit, stone fruit, strawberries, tobacco and tree nuts.	-
BLAD (Problad Plus)	BM 01	Biological		P		Registered for control of Brown Rot and Blossom Blight in stone fruit. US registration for control of <b>Anthracnose</b> in grapes.	-
Cyprodinil + Fludioxinil (Switch) Syngenta	9+12	Protective & Curative		P		Registered for control of <b>Anthracnose</b> in lettuce, nursery stock, ornamentals and strawberries. US registration for control of Alternaria, Septoria, Botrytis, Sclerotinia, Basal Rot and suppression of Powdery Mildew in celery.	R3
Florypicoxamid (Adavelt) Corteva	21	Protective & Curative		P		New Mode of Action fungicide being developed for AU with activity on Powdery Mildew, <i>Botrytis</i> spp., <i>Septoria</i> spp., <b>Anthracnose</b> , <i>Alternaria</i> spp., Scab, <i>Monilinia</i> spp. and <i>Mycosphaerella</i> spp. Due for registration in 2023.	-
Fluopyram + Tebuconazole (Luna Experience) Bayer	7+3	Protective		P		Registered for control of Yellow Sigatoka, Leaf Speckle and Cordana Leaf Spot in bananas. US registration for control of a variety of diseases including Powdery Mildew, Alternaria Leaf Spot, Gummy Stem Blight, Septoria, <i>Botrytis</i> , <i>Cladosporium</i> , <i>Cercospora</i> , <i>Sclerotinia</i> and <b>Anthracnose</b> in almond, Brassica leafy vegetables, legume vegetables, melons and various fruit crops.	R3



Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fluopyram + Trifloxystrobin (Luna Sensation) Bayer	7+11	Protective & Curative		P		Registered for control of <b>Anthracnose</b> in various crops.	-
Mefentrifluconazole (Belanty) BASF	3	Protective & Curative		P		Registered for control of Black Spot in apples and Powdery Mildew in grapes. US registration for control of <b>Anthracnose</b> in citrus, corn and tuberous and corm vegetables.	-
<b>Fusarium</b> ( <i>Fusarium oxysporum</i> )							
<b>Priority: Low</b>							
Fusarium was ranked as a low priority in VIC. A soil-borne disease that is widespread in most regions. Infected roots are dark brown and flattened, and the leaves of affected plants show yellowing, curling and eventually wither and decay because of the compromised root system. Cultural controls recommended including crop rotation and the use of resistant varieties. Damping off - disease attacks seedlings at the 1-2 leaf stage, causing water-soaked lesions on the stem and roots. Good on-farm sanitation is recommended.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Fumigant	NR	A	ALL	Registered in vegetables for pre-planting control of soil borne diseases including <b>Fusarium</b> , <i>Verticillium</i> Wilts, <i>Rhizoctonia</i> and <i>Pythium</i> . <b>For use by professional and registered fumigators only.</b>	-
<i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime) Bayer	BM02	Biological	NR	P-A	ALL	Registered in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Provides suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.	-
<i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF	BM 02	Biological		P		Registered for control of <i>Botrytis</i> in grapes and strawberries. US registration for control of Bacterial Leaf Spot, <i>Botrytis</i> , <i>Cercospora</i> , Downy Mildew, Head and Leaf Drop, Pink Rot, Powdery Mildew, White Mould, White Rust, Bottom Rot and <i>Verticillium</i> Wilt in celery and control of <b>Fusarium Wilt</b> in artichoke, asparagus, brassica leafy vegetables, bulb vegetables, cucurbits, corn, fruiting vegetables, legume vegetables, oilseeds, soybeans, strawberry and root/tuber vegetables.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Fludioxonil + Sedaxane (Vibrance Premium) Syngenta	12+7	Protective & Curative		P		Registered for control of Black Scurf, Silver Surf, Black Rot, Gangrene and <b>Fusarium</b> and suppression of Scab in potatoes.	
NUL3163 Nufarm	TBC			P		New active in development from Nufarm with activity on <b>Fusarium, Pythium &amp; Rhizoctonia</b> .	-
<i>Streptomyces lydicus</i> WYEC108 (Actinovate) Novozymes Bioag	BM02	Biological		P		Registered for control of Phytophthora in strawberries and tomato and as a seed treatment for control of Pythium, <b>Fusarium</b> and Rhizoctonia in vegetables.	-

## **4.2 Insect and mite pests of celery**

### **4.2.1 Insect and mite pest priorities**

<b>Common name</b>	<b>Scientific name</b>
<b>High</b>	
Cotton / Melon Aphid	<i>Aphis gossypii</i>
Green Peach Aphid	<i>Myzus persicae</i>
Cotton Bollworm / Corn Earworm	<i>Helicoverpa armigera</i>
Native Budworm	<i>Helicoverpa punctigera</i>
<b>Moderate</b>	
Light Brown Apple Moth	<i>Epiphyas postvittana</i>
Plague Thrips	<i>Thrips imaginis</i>
Western Flower Thrips	<i>Frankliniella occidentalis</i>
Cutworms	<i>Agrotis spp.</i>
Rutherglen Bug	<i>Nysius vinitor</i>
Root-Knot Nematodes	<i>Meloidogyne spp.</i>
Slugs & Snails	Gastropoda
<b>Low</b>	
Green Vegetable Bug	<i>Nezara viridula</i>
Common Armyworm	<i>Mythimna convecta</i>
Southern Armyworm	<i>Persectania ewingii</i>
Cluster Caterpillar	<i>Spodoptera litura</i>
Looper Caterpillars	<i>Chrysodeixis spp.</i>
Webworm	Lepidoptera
Greenhouse Whitefly	<i>Trialeurodes spp.</i>
Leafhoppers	Cicadellidae
Bryobia Mite	<i>Bryobia rubrioculus</i>
European Red Mite	<i>Panonychus ulmi</i>
Rust Mite	<i>Eriophyidae</i>
Tomato Russet Mite	<i>Aculops lycopersici</i>
Two-Spotted Mite	<i>Tetranychus urticae</i>
Spotted Vegetable Weevil	<i>Desiantha diversipes (Syn Steriphus diversipes)</i>
Vegetable Weevil	<i>Listroderes difficilis</i>
African Black Beetle	<i>Heteronychus arator</i>
Black Field Cricket	<i>Teleogryllus commodus</i>
Mole Cricket	<i>Gryllotalpidae</i>
Wireworm	<i>Elateridae</i>
False Wireworm	<i>Gonocephalum spp.</i>
Red Legged Earth Mite	<i>Halotydeus destructor</i>

New incursions of an exotic pest which poses a potential threat and other non-ranked pests.

Common name	Scientific name
<b>Priority: New Pest to Australia (unknown priority)</b>	
Fall Armyworm	<i>Spodoptera frugiperda</i>
Vegetable Leaf Miner	<i>Liriomyza sativae</i>
Serpentine Leaf Miner	<i>Liriomyza huidobrensis</i>
American Serpentine Leaf Miner	<i>Liriomyza trifolii</i>

Helicoverpa and Aphids (Green Peach Aphid and Cotton Aphid) have been ranked as high priority insect pests in celery. Available and potential products for these high priority insects and mites are in Section 4.2.2.

Resistance to some insect groups has reduced control options despite a range of actives registered. Growers should not exceed the maximum number of applications permitted on the insecticide label.

### **Resistance Management**

There are several insecticide management strategies that apply to many vegetable crops on the CropLife website<sup>3</sup>, including Helicoverpa, Diamondback Moth and Aphids.

Further development and extension of IPM strategies and best management practices that can be implemented in the management of sucking insects and mites in celery may be warranted.

---

<sup>3</sup> [www.croplife.org.au/resources/programs/resistance-management/](http://www.croplife.org.au/resources/programs/resistance-management/)

## 4.2.2 Available and potential products for high priority insects and mites

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

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

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<b>Cotton/Melon Aphid</b> ( <i>Aphis gossypii</i> )								
<b>Priority: High</b>								
Aphids were ranked as a high priority in VIC, QLD, WA, NSW & TAS. Aphids suck on sap, causing loss of vigour, and in some cases yellowing, stunting or distortion of plant parts. Honeydew secreted by the insects can cause sooty mould to develop on leaves. Aphids can also be vectors for viruses and need to be controlled to manage the spread of Celery Mosaic Virus.								
Afidopyropen (Versys) BASF	9D	Ingestion	1	A	ALL	Registered in celery for control of Cabbage Aphid, Lettuce Aphid, Green Peach Aphid and <b>Cotton/Melon Aphid</b> and suppression of Silverleaf Whitefly. [Max. 2 applications per crop; re-treatment interval 14 d]	L L-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, <b>Aphids</b> , Caterpillars, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Imidacloprid (Confidor) PER12489	4A	Contact & Ingestion	3	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Aphids</b> and suppression of Plague Thrips and Onion Thrips. [Max 2 applications per crop]	M M-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Maldison	1B	Contact	3	A	ALL	Registered in celery for control of <b>Aphids</b> , Green Vegetable Bug, Jassids, Leaf Hoppers, Rutherglen Bug and Thrips. [Apply at first sight of infestation: max no. of applications not specified]	H H-Bees	-
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Aphids</b> , Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and Thrips. [Max. no. of applications and re-treatment intervals not specified]	VL L-Bees	-
Pirimicarb (Aphidex) Adama	1A	Contact	2	A	ALL	Registered in celery for control of aphids including Green Peach Aphid and <b>Cotton Aphid</b> . Apply before aphid population reaches high levels. [Max. 2 applications per crop; re-treatment interval 10-14 d]	VL VL-Bees	R3
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of <b>Aphids</b> , Thrips, Mealybug, Two-Spotted Mite, Spider Mite and Whitefly. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Pymetrozine (Chess) Syngenta	9B	Systemic	14	A	ALL	Registered in celery for control of <b>Aphids</b> . [Max 2 applications per season; re-treatment interval 14 d]	L VL-Bees	R3
Spirotetramat (Movento) Bayer	23	Ingestion	7	A	ALL	Registered in celery for control of Green Peach Aphid, <b>Cotton Aphid</b> , Western Flower Thrips, Tomato Thrips and Plague Thrips. [Max 2 applications per crop; re-treatment interval 7 d]	M VL-Bees	-
<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	-	P-A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites.	L L-Bees	-
Flonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of <b>Cotton Aphid</b> in cotton and cucurbits. US registration for control of <b>Aphids</b> , Plant Bugs and Greenhouse Whitefly in celery.	M Bee VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flupyradifurone (Sivanto) Bayer	4D	Contact & Ingestion		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. Label extension submitted in October 2020 to include whitefly in cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits, potatoes.	L VL-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of <b>Cotton Aphid</b> in cotton and cucurbits.	M Bee VH	-
Dimpropridaz (Axalion™ Insecticide) BASF	Novel			P		BASF applied in January to register a new insecticide Axalion™ Insecticide (dimpropridaz), a pyrazole carboxamide with a novel mode of action, for the control of whitefly, aphid, and thrips in leafy vegetables, brassica vegetables, fruiting vegetables, including cucurbits. Pending regulatory approvals, BASF expects first market introductions in Australia of Axalion-based products by late 2022 or early 2023.		

**Green Peach Aphid** (*Myzus persicae*)

**Priority: High**

Aphids were ranked as a high priority in VIC, QLD, WA, NSW & TAS. Green Peach Aphids suck on sap, causing loss of vigour, and in some cases yellowing, stunting or distortion of plant parts. Honeydew secreted by the insects can cause sooty mould to develop on leaves. Aphids can also be vectors for viruses and need to be controlled to manage the spread of Celery Mosaic Virus.

Afidopyropen (Versys) BASF	9D	Ingestion	1	A	ALL	Registered in celery for control of Cabbage Aphid, Lettuce Aphid, <b>Green Peach Aphid</b> and Cotton/Melon Aphid and suppression of Silverleaf Whitefly. [Max. 2 applications per crop; re-treatment interval 14 d]	L L-Bees	-
<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, <b>Green Peach Aphid</b> & Two-Spotted Spider Mites. [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, <b>Aphids</b> , Caterpillars, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Imidacloprid (Confidor) Bayer PER12489	4A	Contact & Ingestion	3	A	ALL	Permitted for use in celery for control of <b>Aphids</b> and suppression of Plague Thrips and Onion Thrips. [Max 2 applications per crop]	M M-Bees	R2
Maldison	1B	Contact	3	A	ALL	Registered in celery for control of <b>Aphids</b> , Green Vegetable Bug, Jassids, Leaf Hoppers, Rutherglen Bug and Thrips. [Apply at first sight of infestation: max no. of applications not specified]	H H-Bees	-
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Aphids</b> , Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and Thrips. [Max. no. of applications and re-treatment intervals not specified]	VL L-Bees	-
Pirimicarb (Aphidex) Adama	1A	Contact	2	A	ALL	Registered in celery for control of aphids including <b>Green peach aphid</b> and Cotton aphid. Apply before aphid population reaches high levels. [Max. 2 applications per crop; re-treatment interval 10-14 d]	VL VL-Bees	R3
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of <b>Aphids</b> , Thrips, Mealybug, Two-Spotted Mite, Spider Mite and Whitefly. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Pymetrozine (Chess) Syngenta	9B	Ingestion	14	A	ALL	Registered in celery for control of <b>Aphids</b> . [Max 2 applications per season; re-treatment interval 14 d]	L VL-Bees	R3
Spirotetramat (Movento) Bayer	23	Ingestion	7	A	ALL	Registered in celery for control of <b>Green Peach Aphid</b> , Cotton Aphid, Western Flower Thrips, Tomato Thrips and Plague Thrips. [Max 2 applications per crop; re-treatment interval 7 d]	M VL-Bees	-



Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of <b>Green Peach Aphid</b> in cucurbits and potatoes. US registration for control of <b>Aphids</b> , Plant Bugs and Greenhouse Whitefly in celery.	M Bee VL	-
Flupyradifurone (Sivanto) Bayer	4D	Contact & Ingestion		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. Label extension submitted in October 2020 to include whitefly in cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits, potatoes.	L VL-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of <b>Green Peach Aphid</b> in pulse crops, barley, brassica – Asian, brassica vegetables, canola, fruiting vegetables, tree nuts, fruiting vegetables, cotton, cucurbits, lettuce, root vegetables, stone fruit, strawberries, sweet corn and wheat.	M Bee VH	-
Dimpropridaz (Axalion™ Insecticide) BASF	TBC			P		BASF applied in January to register a new insecticide Axalion™ Insecticide (dimpropridaz), a pyrazole carboxamide with a novel mode of action, for the control of whitefly, aphid, and thrips in leafy vegetables, brassica vegetables, fruiting vegetables, including cucurbits. Pending regulatory approvals, BASF expects first market introductions in Australia of Axalion-based products by late 2022 or early 2023.		
<p><b>Cotton Bollworm / Corn Earworm</b> (<i>Helicoverpa armigera</i>)  <b>Native Budworm</b> (<i>Helicoverpa punctigera</i>)  <b>Priority: High</b></p> <p>Helicoverpa were ranked as a high priority in VIC, QLD &amp; WA and as a moderate priority in NSW &amp; TAS. <i>Helicoverpa armigera</i> is regarded as the more serious pest because of its greater capacity to develop resistance to insecticides, broader host range, and persistence in cropping areas from year to year. Larvae feed on leaves but are most damaging when feeding on growing terminals.</p>								
<i>Bacillus thuringiensis subsp. kurstaki</i> (DiPel)	11A	Biological	NR	A	ALL	Registered for control of <b>Helicoverpa</b> in vegetables. [Apply a minimum of 2 sprays, 3 d apart; re-treatment interval 3-5 d]	VL L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	A	ALL	Registered in celery for control of <b>Helicoverpa</b> . Spray during egg laying/hatching. [Max of 3 sprays per crop; max 2 consecutive; Re-treatment interval 7 d]	L VL-Bees	-
Diazinon	1B	Contact	14	A	ALL	Registered in celery for control of <b>Caterpillars</b> and Cutworms. [Max no. of applications and re-treatment interval not specified]	H VH-Bees	R3
Emamectin (Proclaim Opti) Syngenta PER88066	6	Contact	3	A	ALL	Permitted for use in celery for control of <b>Helicoverpa</b> , Light Brown Apple Moth and Cluster Caterpillar. [Max of 4 sprays per crop; re-treatment interval 7 d]	M H-Bees	-
Esfenvalerate (Sumi-Alpha) Sumitomo PER82358	3A	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Helicoverpa</b> . Apply at first sign of infestation and repeat as required by in-crop monitoring to maintain control of pests.	VH H-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	A	ALL	Registered in celery for control of <b>Helicoverpa</b> . [Max of 3 sprays per crop; re-treatment interval 7-14 d]	L-M L-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Helicoverpa Nuclear Polyhedrosis Virus (Vivus) AgBiTech	31	Biological	-	A	ALL	Registered in celery for control of <b>Helicoverpa</b> . [Max no. of applications not specified; re-treatment interval 2-3 d]	VL L-Bees	-
Indoxacarb (Avatar eVo) FMC PER14843	22A	Ingestion	7	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Helicoverpa</b> , Lightbrown Apple Moth, Lucerne Leaf Roller and Vegetable Weevil. [Max. 3 applications per crop; re-treatment interval 7 d]	L H-Bees	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Methomyl (Lannate) PER82428	1A	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Helicoverpa</b> spp. Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug and Thrips including Western Flower Thrips. [Max. 3 applications per crop; re-treatment 7 d for larval treatment]	H H-Bees	R2
Permethrin (Ambush)	3A	Contact	1	A	ALL	Registered in celery for control of <b>Helicoverpa</b> , Lucerne Leafroller and Loopers. Delay the use of permethrin which is disruptive to beneficial insects if <b>Helicoverpa</b> is the target pest. [ Max. no. of applications not specified; re-treatment interval 7 d]	VH H-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	3	A	ALL	Registered in celery for the control of <b>Helicoverpa</b> . [Max no. of applications not specified; re-treatment interval: 7-14 d]	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1 G:14	A	ALL	Registered in stalk & stem vegetables including celery and rhubarb for control of <b>Helicoverpa</b> . [Max. 4 applications per season; re-treatment interval 7-14 d]	L L-Bees	-
Tetraniliprole (Vayego 200 SC) Bayer	28			P		Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light Brown Apple Moth, <b>Helicoverpa spp.</b> , Green Looper and other pests.	L-M Bee VH	-
Chlorfenapyr (Secure) BASF	13A	Ingestion / IGR		P		Registered for control of <b>Helicoverpa</b> and Carmine Mite in cotton, Diamondback Moth and Cabbage White Butterfly in Brassica vegetables and Two-Spotted Mite in pome fruit.	H H-Bees	-
<i>Clitorea ternatia</i> extract (Sero-X) Innovate Ag	UN	Biological		P		Registered for control of <i>Helicoverpa</i> spp., Green Mirids and Silverleaf Whitefly in cotton and Diamondback moth in Brassicas. Innovate Ag applied in January 2021 to the APVMA seeking to add new uses against Silverleaf whitefly and thrips in brassicas and cucurbits to its Sero-X Insecticide label.	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Contact & Ingestion		P		Registered in brassica vegetables, leafy vegetables and fruiting vegetables for the control of various Lepidoptera, including <b>Helicoverpa spp.</b>	M Bee H	R3
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on <b>Lepidoptera</b> , Bugs, Beetles/Weevils, Fruit Fly and Thrips.	-	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and <b>Caterpillars</b> . Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-

**Light Brown Apple Moth** *Epiphyas postvittana*

**Priority: Moderate**

Light Brown Apple Moth was ranked as a moderate priority in VIC and as a low priority in QLD, WA, NSW & TAS. Larvae feed by tying terminal leaves together with webbing.

<i>Bacillus thuringiensis subsp. kurstaki</i> (DiPel)	11A	Biological	NR	A	ALL	Registered for control of Caterpillars, including <b>Light Brown Apple Moth</b> in vegetables. [Apply a minimum of 2 sprays, 3 d apart; re-treatment interval 3-5 d]	VL L-Bees	-
Diazinon	1B	Contact	14 G:14	A	ALL	Registered in celery for control of <b>Caterpillars</b> and Cutworms. [Max no. of applications and re-treatment interval not specified]	H VH-Bees	R3
Emamectin (Proclaim Opti) Syngenta PER88066	6	Ingestion	3	A	ALL	Permitted for use in celery for control of Helicoverpa, <b>Light Brown Apple Moth</b> and Cluster Caterpillar. [Max of 4 sprays per crop; re-treatment interval 7 d]	M H-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Indoxacarb (Avatar eVo) FMC PER14843	22A	Ingestion	7	A	ALL (excl. VIC)	Permitted for use in celery for the control of <i>Heliothis/Helicoverpa</i> , <b>Light Brown Apple Moth</b> , Lucerne Leaf Roller and Vegetable Weevil. [Max. 3 applications per crop; re-treatment interval 7 d]	L H-Bees	R3
Tetraniliprole (Vayego 200 SC) Bayer	28			P		Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for <b>Light Brown Apple Moth</b> , <i>Helicoverpa</i> spp., Green Looper and other pests.	L-M Bee VH	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> . Registered for control of <b>Light Brown Apple Moth</b> in grapes, pome fruit and stone fruit.	L VL-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> .	L-M L-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	3	P-A	ALL	Registered in celery for the control of <i>Helicoverpa</i> . Registered for control of <b>Light Brown Apple Moth</b> in berries, celeriac, citrus, culinary herbs, grapes, kiwi fruit, root and tuber vegetables and stone fruit.	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables including celery and rhubarb for control of <i>Helicoverpa</i> . Registered for control of <b>Light Brown Apple Moth</b> in berries, celeriac, citrus, culinary herbs, kiwi fruit, root and tuber vegetables and stone fruit.	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on <b>Lepidoptera</b> , 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			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and <b>Caterpillars</b> . Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-
<b>Plague Thrips</b> ( <i>Thrips imaginis</i> )								
<b>Priority: Moderate</b>								
Thrips were ranked as a moderate priority in VIC, QLD, WA, NSW & TAS. MT16009 IPM Project Recommends: The use of predatory thrips, mites & bug releases, control flowering weeds, mulch & use of certified seed.								
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, <b>Thrips</b> and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Imidacloprid (Confidor) PER12489	4A	Contact & Ingestion	3	A	ALL (excl. VIC)	Permitted for use in celery for control of Aphids and suppression of <b>Plague Thrips</b> and Onion Thrips. [Max 2 applications per crop]	M M-Bees	R2
Maldison	1B	Contact	3	A	SA, NSW, VIC, TAS, WA & NT	Registered in celery for control of Aphids, Green Vegetable Bug, Jassids, Leaf Hoppers, Rutherglen Bug and <b>Thrips</b> . [Apply at first sight of infestation: max no. of applications not specified]	H H-Bees	-
Methomyl (Lannate) PER82428	1A	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <i>Helicoverpa</i> spp. Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug and <b>Thrips</b> including Western Flower Thrips. [Max. 3 applications per crop; re-treatment 7 d for larval treatment]	H H-Bees	R2
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and <b>Thrips</b> . [Max. no. of applications and re-treatment intervals not specified]	VL L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of Aphids, <b>Thrips</b> , Mealybug, Two-Spotted Mite, Spider Mite and Whitefly. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Spirotetramat (Movento) Bayer	23	Ingestion	3	A	ALL	Registered in celery for control of Green Peach Aphid, Cotton Aphid, Western Flower Thrips, Tomato Thrips and <b>Plague Thrips</b> . [Max 2 sprays per crop; re-treatment interval: 7 d]	M VL-Bees	-
<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	P-A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites.	L L-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	3	P-A	ALL	Registered in celery for the control of Helicoverpa. Registered for control of Western Flower Thrips in beans, berries, brassica leafy vegetables, cotton, cucurbits, fruiting vegetables, leafy vegetables, legume vegetables, ornamentals, pome fruit, stone fruit, swede, sweet corn and turnip.	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables including celery and rhubarb for control of Helicoverpa. Registered for control of Western Flower Thrips in berries, brassica leafy vegetables, brassica vegetables, cucurbits, fruiting vegetables, leafy vegetables, legume vegetables, ornamentals, pome fruit, stone fruit, swede, sweet corn and turnip.	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and <b>Thrips</b> .	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for <b>Thrips</b> , Bugs, Mites and Caterpillars. Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, <b>Plague Thrips</b> & Western Flower Thrips.	-	-
Dimpropridaz (Axalion™ Insecticide) BASF	TBC			P		BASF applied in January to register a new insecticide Axalion™ Insecticide (dimpropridaz), a pyrazole carboxamide with a novel mode of action, for the control of whitefly, aphid, and thrips in leafy vegetables, brassica vegetables, fruiting vegetables, including cucurbits. Pending regulatory approvals, BASF expects first market introductions in Australia of Axalion-based products by late 2022 or early 2023.		

**Western Flower Thrips – *Frankliniella occidentalis***

**Priority: Moderate**

Western Flower Thrips were ranked as a moderate priority in VIC, QLD, WA & NSW and as a low priority in TAS. The pest is a vector for many viruses including Tomato Spotted Wilt Virus. Identification of the correct species is important prior to treatment. Resistance is an ongoing issue and virus transmission with thrip infestations are a concern for industry. IPM Recommendations include: The use of predatory thrips, mites & bug releases, control flowering weeds, mulch and use of certified seed.

<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: <b>Western Flower Thrips</b> , Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites. [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, <b>Thrips</b> and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-



Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Fipronil (Regent) PER83203	2C	Contact	7	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Western Flower Thrips</b> . [Max 3 applications per crop; re-treatment interval 3 d]	M VH-Bees	-
Maldison	1B	Contact	3	A	SA, NSW, VIC, TAS, WA & NT	Registered in celery for control of <b>Aphids</b> , Green Vegetable Bug, Jassids, Leaf Hoppers, Rutherglen Bug and Thrips. [Apply at first sight of infestation: max no. of applications not specified]	H H-Bees	-
Methomyl (Lannate) PER82428	1A	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <i>Helicoverpa</i> spp. Cucumber moth, Cluster caterpillar, Loopers, Webworm, Rutherglen bug and Thrips including <b>Western Flower Thrips</b> . [Max. 3 applications per crop; re-treatment 7 d for larval treatment]	H H-Bees	R2
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and <b>Thrips</b> . [Max. no. of applications and re-treatment intervals not specified]	VL L-Bees	-
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of Aphids, <b>Thrips</b> , Mealybug, Two-Spotted Mite, Spider Mite and Whitefly. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Spirotetramat (Movento) Bayer	23	Ingestion	7	A	ALL	Registered in celery for control of <b>Western Flower Thrips</b> , Thrips and Plague thrips. Uses subject to CroPLife resistance management strategies. [Max 2 applications per crop; re-treatment interval 7 d]	M VL-Bees	-
Imidacloprid (Confidor) Bayer PER12489	4A	Contact & Ingestion	3	P-A	ALL (excl. VIC)	Permitted for use in celery for control of Aphids and suppression of <b>Plague Thrips</b> and <b>Onion Thrips</b> . [Max 2 applications per crop]	M M-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spinetoram (Success Neo) Corteva	5	Ingestion	3	P-A	ALL	Registered in celery for the control of Helicoverpa. Registered for control of <b>Western Flower Thrips</b> in beans, berries, brassica leafy vegetables, cotton, cucurbits, fruiting vegetables, leafy vegetables, legume vegetables, ornamentals, pome fruit, stone fruit, swede, sweet corn and turnip.	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables including celery and rhubarb for control of Helicoverpa. Registered for control of <b>Western Flower Thrips</b> in berries, brassica leafy vegetables, brassica vegetables, cucurbits, fruiting vegetables, leafy vegetables, legume vegetables, ornamentals, pome fruit, stone fruit, swede, sweet corn and turnip.	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, Beetles/Weevils, Fruit Fly and <b>Thrips</b> .	-	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for <b>Thrips</b> , Bugs, Mites and Caterpillars. Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & <b>Western Flower Thrips</b> .	-	-
Dimpropridaz (Axalion™ Insecticide) BASF	TBC			P		BASF applied in January to register a new insecticide Axalion™ Insecticide (dimpropridaz), a pyrazole carboxamide with a novel mode of action, for the control of whitefly, aphid, and thrips in leafy vegetables, brassica vegetables, fruiting vegetables, including cucurbits. Pending regulatory approvals, BASF expects first market introductions in Australia of Axalion-based products by late 2022 or early 2023.		

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<b>Cutworms - <i>Agrotis</i> spp.</b>								
<b>Priority: Moderate</b>								
Cutworms were ranked as a moderate priority in VIC, QLD, WA, NSW & TAS. Cutworms are caterpillars that attack seedling crops by chewing through leaves and stems at ground level. This frequently results in loss of whole plants which has a significant impact on production. If insecticide control is required, application should be made late afternoon to evening to coincide with when the larvae are feeding.								
Chlorpyrifos (Lorsban)	1B	Contact	14	A	ALL	Registered in celery for control of Wingless Grasshopper, <b>Cutworms</b> , Field Crickets, Mole Crickets and Vegetable Weevil. [Max no. of applications per crop and re-treatment interval not specified]	H H-Bees	R1
Diazinon	1B	Contact	14 G:14	A	ALL	Registered in celery for control of Caterpillars and <b>Cutworms</b> . [Max no. of applications and re-treatment interval not specified]	H VH-Bees	R3
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in celery for control of <b>Cutworm</b> . [Max no. of applications and re-treatment interval not specified]	H H-Bees	R2
<b>Rutherglen Bug (<i>Nysius vinitor</i>)</b>								
<b>Priority: Moderate</b>								
Rutherglen Bug were ranked as a moderate priority in VIC, QLD, WA & NSW and as a low priority in TAS. It is important to monitor crops for eggs and nymphs by regular field scouting. Repeated influxes of migrating adults can make repeat insecticide applications necessary. Large numbers can cause significant feeding damage to foliage by sucking the sap and depleting the crop of nutrients.								
Maldison	1B	Contact	3	A	SA, NSW, VIC, TAS, WA & NT	Registered in celery for control of Aphids, Green Vegetable Bug, Jassids, Leaf Hoppers, <b>Rutherglen Bug</b> and Thrips. [Apply at first sight of infestation: max no. of applications not specified]	H H-Bees	-
Methomyl (Lannate) PER82428	1A	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <i>Helicoverpa</i> spp. Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, <b>Rutherglen Bug</b> and Thrips including Western Flower Thrips. [Max. 3 applications per crop; re-treatment 7 d for larval treatment]	H H-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leafhoppers, Mites, <b>Rutherglen Bug</b> and Thrips. [Max. no. of applications and re-treatment intervals not specified]	VL L-Bees	-
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in vegetables for control of Cabbage White Butterfly, Cabbage Moth, <b>Rutherglen Bug</b> and Green Vegetable Bug. [Max no. of applications not specified; re-treatment: 7-10 d]	H H-Bees	R2
Fonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of Aphids, Mirids, Mealybug and Whitefly in pome fruit, cotton and cucurbits. US registration for control of Aphids, Plant Bugs and Greenhouse Whitefly in celery.	M Bee VL	-
Flupyradifurone (Sivanto) Bayer	4D	Contact & Ingestion		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. Label extension submitted in October 2020 to include whitefly in cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits, potatoes.	L VL-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, <b>Bugs</b> , Beetles/Weevils, Fruit Fly and Thrips.	-	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of <b>Rutherglen Bug</b> in brassica vegetables, cotton, cucurbits, fruiting vegetables and root and tuber vegetables.	M Bee VH	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2020/21 for Thrips, <b>Bugs</b> and Caterpillars. Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.		

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<b>Root-Knot Nematode</b> ( <i>Meloidogyne</i> spp.)								
<b>Priority: Moderate</b>								
Root-Knot Nematode was ranked as a moderate priority in VIC & WA and as a low priority in QLD, NSW & TAS. Management practices include soil fumigation and use of nematode free transplants.								
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Fumigant	NR	A	ALL (Restricted use TAS, VIC & SA)	Registered as a soil fumigant for plant parasitic <b>Nematodes</b> as a pre-plant treatment only. <b><i>For use by professional and registered fumigators only.</i></b>	-	-
Dazomet (Basamid, Cerlong)	8F	Soil Fumigant	NR	A	ALL	Registered in various situations for control of soil fungi, <b>nematodes</b> , soil insects and weeds. Soil moisture is essential for release of gas and plastic cover brings optimum results.	-	-
Metham Sodium	-	Fumigant	NR	A	Variable. Refer to label.	Registered as a soil fumigant for <b>plant parasitic nematodes</b> , weed seeds, and various fungal diseases as a pre-plant treatment only.	-	-
Abamectin (Tervigo) Syngenta	6	Contact		P		Registered for control of <b>Root-Knot Nematodes</b> in tomato, capsicum, chilli, eggplant and cucurbits.	M H-Bees	-
Fluazaindolizine (Reklemel, Salibro) Corteva	New	Contact		P		New MOA nematicide under development in AU by Corteva, to be launched globally in 2021.		-
Fluensulfone (Nimitz) Adama	-	Contact		P		Registered for control of <b>Root-Knot Nematode</b> and Root Lesion Nematode in fruiting vegetables, carrots, cucurbits, potato, sugarcane and sweet potato.		-
Fluopyram (Velum) Bayer	7	Contact		P		Pending registration as a <b>nematicide</b> by Bayer. Registered in US for control of nematodes in a range of vegetables.	L L-Bees	
NUL3145 Nufarm	TBC			P		New nematicide under development from Nufarm.		-
SYNSTN1 Syngenta	TBC			P		New nematicide under development from Syngenta.		-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<b>Slugs and Snails</b> Gastropoda								
<b>Priority: Moderate</b>								
Slugs and Snails were ranked as moderate priority in VIC.								
Iron EDTA Complex	-	Contact & Ingestion	NR	A	ALL	Registered in all plants for the control of <b>Snails and Slugs</b> . Spread pellets evenly on ground. [Max no. of applications and re-treatment not specified]	-	-
Metaldehyde	-	Contact & Ingestion	7	A	ALL	Registered in vegetables for the control of <b>Snails and Slugs</b> . Spread pellets evenly on ground. [Max no. of applications and re-treatment not specified]	-	-
<b>Green Vegetable Bug - <i>Nezara viridula</i></b>								
<b>Priority: Low</b>								
Green Vegetable Bugs were ranked as a lower priority than Rutherglen Bugs in VIC, QLD, WA & NSW and as a low priority in TAS. These bugs use their long, thin mouthpart to suck nutrients from the aerial parts of the plant and they emit a foul smell when disturbed to deter predators. The nymphs are attacked by ants, spiders & predatory bugs.								
Maldison	1B	Contact	3	A	SA, NSW, VIC, TAS, WA & NT	Registered in celery for control of Aphids, <b>Green Vegetable Bug</b> , Jassids, Leaf Hoppers, Rutherglen Bug and Thrips. [Apply at first sight of infestation: max no. of applications not specified]	H H-Bees	-
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of Aphids, Green Mirid, <b>Green Vegetable Bug</b> , Grey Cluster Bug, Leafhoppers, Mites, Rutherglen Bug and Thrips. [Max. no. of applications and re-treatment intervals not specified]	VL L-Bees	-
Trichlorfon (Lepidex)	1B	Contact	2	A	ALL	Registered in vegetables for control of Cabbage White Butterfly, Cabbage Moth, Rutherglen Bug and <b>Green Vegetable Bug</b> . [Max no. of applications not specified; re-treatment: 7-10 d]	H H-Bees	R2
Fonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of Aphids, Mirids, Mealybug and Whitefly in pome fruit, cotton and cucurbits. US registration for control of Aphids, Plant Bugs and Greenhouse Whitefly in celery.	M Bee VL	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flupyradifurone (Sivanto) Bayer	4D	Contact & Ingestion		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. Label extension submitted in October 2020 to include whitefly in cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits, potatoes.	L VL-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, <b>Bugs</b> , Beetles/Weevils, Fruit Fly and Thrips.	-	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, <b>Bugs</b> , Mites and Caterpillars. Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-
<p><b>Common Armyworm</b> (<i>Mythimna convecta</i>)  <b>Southern Armyworm</b> (<i>Persectania ewingii</i>)  <b>Priority: Low</b></p> <p>Armyworm was ranked as a low priority in VIC, QLD, WA, NSW &amp; TAS. The larvae march in large numbers away from sites where their food has run out. They shelter during the day and emerge after sunset to feed.</p>								
<i>Bacillus thuringiensis subsp. kurstaki</i> (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of caterpillars, including <b>Armyworm</b> . [Apply a minimum of 2 sprays, 3 d apart; re-treatment interval 3-5 d]	VL L-Bees	-
Diazinon	1B	Contact	14 G:14	A	ALL	Registered in celery for control of <b>Caterpillars</b> and Cutworms. [Max no. of applications and re-treatment interval not specified]	H VH-Bees	R3
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Tetraniliprole (Vayego 200 SC) Bayer	28			P		Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light Brown Apple Moth, <i>Helicoverpa</i> spp., Green Looper and other pests.	L-M Bee VH	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> .	L VL-Bees	-
Emamectin (Proclaim Opti) Syngenta PER88066	6	Ingestion	3	P-A	ALL	Permitted for use in celery for control of Lepidopteran Pests such as <i>Helicoverpa</i> , Light Brown Apple Moth & Cluster Caterpillar.	M H-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> . [Max of 3 sprays per crop; re-treatment interval 7-14 d]	L-M L-Bees	-
Permethrin (Ambush)	3A	Contact	1	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> , Lucerne Leafroller and Loopers.	VH H-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in celery for the control of <i>Helicoverpa</i> .	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables including celery and rhubarb for control of <i>Helicoverpa</i> .	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on <b>Lepidoptera</b> , 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			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and <b>Caterpillars</b> . Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-
<b>Cluster Caterpillar (<i>Spodoptera litura</i>)</b>								
<b>Priority: Low</b>								
Cluster Caterpillar was ranked as a low priority in VIC, QLD, WA, NSW & TAS. Larvae predominantly feed on the leaves and can cause substantial loss of plant vigour when present in large numbers.								
<i>Bacillus thuringiensis subsp. kurstaki</i> (DiPel)	11A	Biological	NR	A	ALL	Registered in vegetables for control of <b>Caterpillars</b> . [Apply a minimum of 2 sprays, 3 d apart; re-treatment interval 3-5 d]	VL L-Bees	-
Diazinon	1B	Contact	14 G:14	A	ALL	Registered in celery for control of <b>Caterpillars</b> and Cutworms. [Max no. of applications and re-treatment interval not specified]	H VH-Bees	R3
Emamectin (Proclaim Opti) Syngenta PER88066	6	Contact	3	A	ALL	Permitted for use in celery for control of Helicoverpa, Light Brown Apple Moth & <b>Cluster Caterpillar</b> . [Max of 4 sprays per crop; re-treatment interval 7 d]	M H-Bees	-
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Methomyl (Lannate) PER82428	1A	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <i>Helicoverpa</i> spp. Cucumber Moth, <b>Cluster Caterpillar</b> , Loopers, Webworm, Rutherglen Bug and Thrips including Western Flower Thrips. [Max. 3 applications per crop; re-treatment 7 d for larval treatment]	H H-Bees	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Tetraniliprole (Vayego 200 SC) Bayer	28			P		Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light Brown Apple Moth, <i>Helicoverpa</i> spp., Green Looper and other pests.	L-M Bee VH	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> . Spray during egg laying/hatching.	L VL-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> .	L-M L-Bees	-
Permethrin (Ambush)	3A	Contact	1	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> , Looper and Lucerne Leafroller.	VH H-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in celery for the control of <i>Helicoverpa</i> .	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables including celery and rhubarb for control of <i>Helicoverpa</i> .	L L-Bees	-
Indoxacarb + Novaluron (Plemax) Adama	22A+15	Contact & Ingestion		P		Registered in brassica vegetables, leafy vegetables and fruiting vegetables for the control of various Lepidoptera, including <b>Cluster Caterpillar</b> .	M Bee H	R3
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on <b>Lepidoptera</b> , 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			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and <b>Caterpillars</b> . Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-
<p><b>Looper Caterpillars</b> <i>Chrysodeixis</i> spp.  <b>Priority: Low</b>  Looper Caterpillars were ranked as a low priority in VIC, QLD, WA, NSW &amp; TAS. The last two larval instars are the most voracious feeders and will usually eat the entire leaf but may avoid the midrib or other large veins. It is important to monitor crops for eggs and larvae by regular field scouting. Target sprays against mature eggs and larvae before pests become entrenched.</p>								
Diazinon	1B	Contact	14 G:14	A	ALL	Registered in celery for control of <b>Caterpillars</b> and Cutworms. [Max no. of applications and re-treatment interval not specified]	H VH-Bees	R3
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Methomyl (Lannate) PER82428	1A	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <i>Helicoverpa</i> spp. Cucumber Moth, Cluster Caterpillar, <b>Loopers</b> , Webworm, Rutherglen Bug and Thrips including Western Flower Thrips. [Max. 3 applications per crop; re-treatment 7 d for larval treatment]	H H-Bees	R2
Permethrin (Ambush)	3A	Contact	1	A	ALL	Registered in celery for control of <i>Helicoverpa</i> , <b>Loopers</b> and Lucerne Leafroller.	VH H-Bees	-
Tetraniliprole (Vayego 200 SC) Bayer	28			P		Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light Brown Apple Moth, <i>Helicoverpa</i> spp., Green Looper and other pests.	L-M Bee VH	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in celery for control of Helicoverpa.	L VL-Bees	-
Emamectin (Proclaim Opti) Syngenta PER88066	6	Ingestion	3	P-A	ALL	Permitted for use in celery for control of Lepidopteran Pests such as Helicoverpa, Light Brown Apple Moth & Cluster Caterpillar.	M H-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in celery for control of Helicoverpa.	L-M L-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in celery for the control of Helicoverpa. Registered for control of <b>Loopers</b> in beans, berries, brassica leafy vegetables, brassica vegetables, kiwi fruit, leafy vegetables, legume vegetables, tropical fruits, pome fruit, and root and tuber vegetables.	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables including celery and rhubarb for control of Helicoverpa. Registered for control of <b>Loopers</b> in beetroot, berries, brassica leafy vegetables, brassica vegetables, carrot, celeriac, kiwi fruit, leafy vegetables, legume vegetables, tropical fruits, pome fruit, and root and tuber vegetables.	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on <b>Lepidoptera</b> , Bugs, Beetles/Weevils, Fruit Fly and Thrips.	-	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and <b>Caterpillars</b> . Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<b>Webworm (<i>Lepidoptera</i>)</b>								
<b>Priority: Low</b>								
Webworm was ranked as a low priority in VIC, QLD, WA, NSW & TAS. Webworm larvae are leaf-chewing pests of seedlings. It is important to monitor crops for eggs and larvae by regular field scouting. Target sprays against mature eggs and larvae before pests become entrenched.								
Diazinon	1B	Contact	14 G:14	A	ALL	Registered in celery for control of <b>Caterpillars</b> and Cutworms. [Max no. of applications and re-treatment interval not specified]	H VH-Bees	R3
Methomyl (Lannate) PER82428	1A	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of <i>Helicoverpa</i> spp. Cucumber Moth, Cluster Caterpillar, Loopers, <b>Webworm</b> , Rutherglen Bug and Thrips including Western Flower Thrips. [Max. 3 applications per crop; re-treatment 7 d for larval treatment]	H H-Bees	R2
Tetraniliprole (Vayego 200 SC) Bayer	28			P		Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light brown apple moth, <i>Helicoverpa</i> spp., Green Looper and other pests.	L-M Bee VH	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> .	L VL-Bees	-
Emamectin (Proclaim Opti) Syngenta PER88066	6	Ingestion	3	P-A	ALL	Permitted for use in celery for control of Lepidopteran Pests such as <i>Helicoverpa</i> , Light Brown Apple Moth & Cluster Caterpillar.	M H-Bees	-
Flubendiamide (Belt) Bayer	28	Ingestion	1	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> .	L-M L-Bees	-
Permethrin (Ambush)	3A	Contact	1	P-A	ALL	Registered in celery for control of <b>Helicoverpa</b> , Lucerne leafroller and Loopers. Only used to get 'back in control' of grubs. Delay the use of permethrin which is disruptive to beneficial insects if <i>Helicoverpa</i> is the target pest.	VH H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in celery for the control of Helicoverpa.	M H-Bees	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	1	P-A	ALL	Registered in stalk & stem vegetables including celery and rhubarb for control of Helicoverpa.	L L-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on <b>Lepidoptera</b> , Bugs, Beetles/Weevils, Fruit Fly and Thrips.	-	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and <b>Caterpillars</b> . Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-

**Greenhouse Whitefly** *Trialeurodes* spp.

**Priority: Low**

Whitefly was ranked as a low priority in VIC, QLD, WA, NSW & TAS. Populations can build rapidly with high reproduction rates and short generation time. Nymphs and adults feed on the sap of the plant, causing loss of vigour. The excretion of honeydew reduces produce quality and encourages growth of sooty mould.

<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, <b>Greenhouse Whitefly</b> , Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites. [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-
Buprofezin (Applaud) PER82467	16	Ingestion / IGR	3	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Greenhouse Whitefly</b> in field & protected situations. [Max 2 applications per crop; re-treatment interval 14 d].	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars, Earwigs, <b>Whitefly</b> , Thrips and Leafhoppers. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of Aphids, Thrips, Mealybug, Two-Spotted Mite, Spider Mite and <b>Whitefly</b> . [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-
Afidopyropen (Versys) BASF	9D	Ingestion	1	P-A	ALL	Registered in celery for control of Cabbage Aphid, Lettuce Aphid, Green Peach Aphid and Cotton/Melon Aphid and suppression of Silverleaf Whitefly.	L L-Bees	-
<i>Clitorea ternatia</i> extract (Sero-X) Innovate Ag	UN	Biological		P		Registered for control of <i>Helicoverpa</i> spp., Green Mirids and Silverleaf Whitefly in cotton and Diamondback moth in Brassicas. Innovate Ag applied in January 2021 to the APVMA seeking to add new uses against Silverleaf whitefly and thrips in brassicas and cucurbits to its Sero-X Insecticide label.	L Bee VL	-
Fonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of Aphids, Mirids, Mealybug and <b>Whitefly</b> in pome fruit, cotton and cucurbits. US registration for control of Aphids, Plant Bugs and <b>Greenhouse Whitefly</b> in celery.	M Bee VL	-
Flupyradifurone (Sivanto) Bayer	4D	Contact & Ingestion		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. Label extension submitted in October 2020 to include whitefly in cucurbits, eggplant, peppers, green beans, potatoes, sweet potatoes, and aphids in cucurbits, potatoes.	L VL-Bees	-
NUL3145 Nufarm	TBC			P		New product from Nufarm with <b>Whitefly</b> activity.	-	-
Pyriproxyfen (Admiral) Sumitomo	7C	Ingestion / IGR		P		Registered for control of <b>Greenhouse Whitefly</b> in fruiting vegetables and rockmelon.	VL Bee L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Spirotetramat (Movento) Bayer	23	Ingestion		P		Registered for control of Silverleaf Whitefly in beans, brassica leafy vegetables, brassica vegetables, fruiting vegetables, cotton, peas, potatoes and sweet potatoes.	M Bee L	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of <b>Greenhouse Whitefly</b> in Asian brassicas, brassica vegetables, fruiting vegetables, cotton, cucurbits, nursery stock, silver beet, soybean and spinach.	M Bee VH	-
Dimpropridaz (Axalion™ Insecticide) BASF	TBC			P		BASF applied in January to register a new insecticide Axalion™ Insecticide (dimpropridaz), a pyrazole carboxamide with a novel mode of action, for the control of whitefly, aphid, and thrips in leafy vegetables, brassica vegetables, fruiting vegetables, including cucurbits. Pending regulatory approvals, BASF expects first market introductions in Australia of Axalion-based products by late 2022 or early 2023.		

### Leafhoppers (*Cicadellidae*)

#### Priority: Low

Leafhoppers were ranked as a low priority in VIC, QLD, WA, NSW & TAS. Adults and nymphs feed on plant sap and inject toxins. Some species transmit diseases such as viruses and phytoplasmas.

Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Contact	1	A	ALL	Registered in vegetables for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, Thrips and <b>Leafhoppers</b> . Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.	VH H-Bees	-
Maldison	1B	Contact	3	A	SA, NSW, VIC, TAS, WA & NT	Registered in celery for control of Aphids, Green Vegetable Bug, Jassids, <b>Leaf Hoppers</b> , Rutherglen Bug and Thrips. [Apply at first sight of infestation: max no. of applications not specified]	H H-Bees	-
Petroleum Oil PER12221	UN	Contact	1	A	ALL (excl. VIC)	Permitted for use in celery for control of Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, <b>Leafhoppers</b> , Mites, Rutherglen Bug and Thrips. [Max. no. of applications and re-treatment intervals not specified]	VL L-Bees	-



Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Flupyradifurone (Sivanto) Bayer	4D	Contact & Ingestion		P		Registered in macadamia for control of Macadamia Lace Bug, Banana Spotting Bug, Fruit Spotting Bug and suppression of Scirtothrips. US registration for control of <b>Leafhoppers</b> , Aphids and Whiteflies in Brassica vegetables.	L VL-Bees	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion		P		Registered for control of in various broadacre and vegetables crops. US registration for control of Leafhoppers in berries, root and tuber vegetables, pome fruit, potatoes and small fruit vine climbing (except fuzzy kiwifruit).	M Bee VH	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-
<p><b>Bryobia Mite</b> (<i>Bryobia rubrioculus</i>)  <b>European Red Mite</b> (<i>Panonychus ulmi</i>)  <b>Rust Mite</b> (<i>Eriophyidae</i>)  <b>Tomato Russet Mite</b> (<i>Aculops lycopersici</i>)  <b>Two-Spotted Mite</b> (<i>Tetranychus urticae</i>)  <b>Priority: Low</b></p>								
<p>Mites were ranked as a low priority in VIC, QLD, WA, NSW &amp; TAS. Mites feed on aerial parts of the plant with the damage caused providing entry points for soil-borne disease. Avoid planting new crops downwind from those infested with mites, as the mites will spread with the wind.</p>								
Potassium Salts of Fatty Acids (Natrasoap)	-	Contact	NR	A	ALL	Registered in vegetables for control of Aphids, Thrips, Mealybug, <b>Two-Spotted Mite</b> , Spider Mite and Whitefly. [Max no. of applications not specified; re-treatment interval 5-7 d]	L L-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<i>Beauveria bassiana</i> (Velifer) BASF	UN	Biological	NR	A	ALL	Registered in protected vegetables and ornamentals for suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & <b>Two-Spotted Spider Mites</b> . [Max. 3 application per crop; re-treatment interval 3-14 d]	L L-Bees	-
Chlorfenapyr (Secure) BASF	13A	Ingestion / IGR		P		Registered for control of <i>Helicoverpa</i> and Carmine Mite in cotton, Diamondback Moth and Cabbage White Butterfly in Brassica vegetables and <b>Two-Spotted Mite</b> in pome fruit.	H H-Bees	-
Etoxazole (Paramite) Sumitomo	10B	Contact		P		Registered for control of <b>Two-Spotted Mite</b> in pome and stone fruits, almonds and grapes.	L VL-Bees	
Spiromesifen (Oberon) Bayer	23	Ingestion		P		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.	M VL-Bees	
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, <b>Mites</b> and Caterpillars. Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<b>Spotted Vegetable Weevil</b> ( <i>Desiantha diversipes</i> ) <b>Vegetable Weevil</b> ( <i>Listroderes difficilis</i> ) <b>Priority: Low</b> Weevils were ranked as a low priority in VIC, QLD, WA, NSW & TAS. They cause damage by tunnelling into leaves and reducing plant vigour. MT16009 IPM Project Recommends: Control broadleaf weed hosts (e.g. Marshmallow) in the season prior to planting								
Chlorpyrifos (Lorsban)	1B	Contact	14	A	ALL	Registered in celery for control of Wingless Grasshopper, Cutworms, Field Crickets, Mole Crickets and <b>Vegetable Weevil</b> . [Max no. of applications per crop and re-treatment interval not specified]	H H-Bees	R1
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of <b>Weevils</b> in pome and stone fruits.	M M-Bees	R3
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, <b>Beetles/Weevils</b> , Fruit Fly and Thrips.	-	-
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered in Australia in multiple crops for various insect pests such as Beetles, <b>Weevils</b> & Lepidoptera. Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light Brown Apple Moth, <i>Helicoverpa</i> spp., Green Looper and other pests.	L-M Bee VH	-
<b>African Black Beetle</b> ( <i>Heteronychus arator</i> ) <b>Priority: Low</b> African Black Beetle was ranked as a low priority in VIC, QLD, WA, NSW & TAS. Larvae are soil dwelling and adults have strong nocturnal flight activity. Adults chew plants at or just beneath ground level and may chew right through the stem. A nematode ( <i>Heterorhabditis zealandica</i> ) is commercially available for the biological control of African Black Beetle in turf and other high value crops.								
Chlorpyrifos (Lorsban) PER14583	1B	Contact	NR	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>African Black Beetle</b> and Wireworms. [Max no. of applications per crop and re-treatment interval not specified]	H H-Bees	R1

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on Lepidoptera, Bugs, <b>Beetles/Weevils</b> , Fruit Fly and Thrips.	-	-
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered in Australia in multiple crops for various insect pests such as <b>Beetles</b> , Weevils & Lepidoptera. Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light Brown Apple Moth, <i>Helicoverpa</i> spp., Green Looper and other pests.	L-M Bee VH	-
<b>Black Field Cricket</b> ( <i>Teleogryllus commodus</i> ) <b>Mole Cricket</b> ( <i>Gryllotalpidae</i> ) <b>Priority: Low</b> Crickets were ranked as a low priority in VIC, QLD, WA, NSW & TAS. They have a voracious appetite and can cause severe damage to foliage if the numbers get high. Damage is limited to feeding on newly established plants and reducing plant populations.								
Chlorpyrifos (Lorsban)	1B	Contact	14	A	ALL	Registered in celery for control of Wingless Grasshopper, <b>Cutworms</b> , Field Crickets, Mole Crickets and Vegetable Weevil. [Max no. of applications per crop and re-treatment interval not specified]	H H-Bees	R1
Fipronil (Regent)	2B	Contact		P		Registered for control of <b>Mole Crickets</b> in potatoes.	M H-Bees	R3
<b>Wireworm</b> ( <i>Elateridae</i> ) <b>False Wireworms</b> ( <i>Gonocephalum</i> spp.) <b>Priority: Low</b> Wireworm and False Wireworms were ranked as a low priority in VIC, QLD, WA, NSW & TAS. Wireworms are not a widespread pest. The larvae are soil-dwelling and will attack newly germinated seedlings by chewing the leaves and stems.								
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Fumigant	NR	A	ALL	Registered in vegetables for pre-planting control of soil borne insects including <b>Wireworms</b> . <b>For use by professional and registered fumigators only.</b>	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorpyrifos (Lorsban) PER14583	1B	Contact	NR	A	ALL (excl. VIC)	Permitted for use in celery for control of African Black Beetle and <b>Wireworms</b> . [Max no. of applications per crop and re-treatment interval not specified]	H H-Bees	R1
Fipronil (Regent) NUL3445 Nufarm	2B	Contact		P		Registered for control of <b>Wireworms</b> in potatoes.	M H-Bees	R3
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		New product in development from Nufarm with activity on Lepidoptera, Bugs, <b>Beetles/Weevils</b> , Fruit Fly and Thrips. Registered in Australia in multiple crops for various insect pests such as <b>Beetles</b> , Weevils & Lepidoptera. Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light Brown Apple Moth, <i>Helicoverpa</i> spp., Green Looper and other pests.	- L-M Bee VH	-
<b>Red Legged Earth Mite (<i>Halotydeus destructor</i>)</b>								
<b>Priority: Low</b>								
Red Legged Earth Mite was ranked as a low priority in VIC, QLD, WA, NSW & TAS. They cause minor leaf feeding damage to newly emerged crops. MT16009 IPM Project Recommends: Control broadleaf weed hosts (e.g. capeweed) in the season prior to planting.								
Bifenthrin (Talstar) PER86599	3A	Contact	NR	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Red Legged Earth Mite</b> . [Max 1 application per crop]	VH H-Bees	R3
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, <b>Mites</b> and Caterpillars. Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
<b>Fall Armyworm</b> ( <i>Spodoptera frugiperda</i> )								
<b>Priority: Unknown</b>								
Fall Armyworm was not ranked as a pest in celery. It is an exotic pest that is considered a potential threat that could affect most vegetable crops if allowed to spread. It is important to monitor crops for eggs and larvae of pest species by regular field scouting. Target sprays against mature eggs and newly hatched larvae before pests become entrenched.								
Chlorantraniliprole (Coragen) FMC PER89259	28	Ingestion	1	A	ALL (excl. VIC)	Permitted for use in stalk and stem vegetables for control of <b>Fall Armyworm</b> . [Max. 3 applications per crop; 2 consecutive; re-treatment interval 7 d]	L VL-Bees	-
Emamectin (Proclaim Opti) Syngenta PER89285	6	Ingestion	3 NG	A	ALL (excl. VIC)	Permitted for use in celery (field only) for control of <b>Fall Armyworm</b> . [Max 4 applications per crop; 2 consecutive; re-treatment interval: 7 d]	M H-Bees	-
Indoxacarb (Avatar eVo) FMC PER89278	22A	Ingestion	7	A	ALL (excl. VIC)	Permitted for use in celery for control of <b>Fall Armyworm</b> . [Max 4 applications per crop; re-treatment interval: 7 d]	L H-Bees	R3
Methomyl (Lannate) PER89293	1A	Contact	14	A	ALL	Permitted for use in celery (field only) for control of <b>Fall Armyworm</b> . [Max. 3 application per crop; re-treatment interval not specified]	H H-Bees	R2
Spinetoram (Delegate & Success Neo) Corteva PER89241	5	Ingestion	3	A	ALL (excl. VIC)	Permitted for use in stalk and stem vegetables for control of <b>Fall Armyworm</b> . [Max. 4 applications per crop; re-treatment interval 7-14 d]	M H-Bees	-
Spinosad (Entrust Organic) Corteva PER89870	5	Ingestion	1 G:14	A	ALL (excl. VIC)	Permitted for use in stalk and stem vegetables for control of <b>Fall Armyworm</b> . [Max. 4 applications per season; re-treatment interval 7-14 d]	L L-Bees	-
Amorphous Silica (Abrade) Grow Choice	-	Contact		P		Registered for control of <i>Spodoptera</i> in fruiting vegetables and permitted for control of <b>Fall Armyworm</b> in sweet corn.	L Bee:L	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Broflanilide (Vedira) BASF	30	Contact and ingestion		P		Registration submitted concurrently in Australia, Canada, USA, and Mexico as a soil application and seed treatment against chewing insects such as ants, cockroaches and <i>Spodoptera</i> spp. BASF are seeking registrations in amenity turf initially, then potential horticultural crops thereafter.	H VH-Bees	-
NUL3445 Nufarm	TBC			P		New product in development from Nufarm with activity on <b>Lepidoptera</b> , Bugs, Beetles/Weevils, Fruit Fly and Thrips.	-	-
SYNFOI21 Syngenta	TBC			P		SYNFOI21 is not registered but the first global application is proposed for 2023 for Thrips, Bugs, Mites and <b>Caterpillars</b> . Hort Innovation Project ST20003 will be contracted in June 2021 to undertake the required data package to support a label registration in celery for various thrips including, Plague Thrips & Western Flower Thrips.	-	-
Tetraniliprole (Vayego 200 SC) Bayer	28	Ingestion		P		Hort Innovation Project ST17000 contracted 2018 to undertake the required data package to support a label registration in stalk & stem vegetables, including celery for Light Brown Apple Moth, Helicoverpa spp., Green Looper and other pests.	L-M Bee VH	-
<b>Leafminers (<i>Liriomyza</i> spp.)</b>								
<b>Priority: Unknown</b>								
Leafminer was not ranked as a pest in celery. Dipteran leaf miners ( <i>Liriomyza</i> spp.) are exotic pests that have recently been detected and become problematic in Australia. For example, the Serpentine leaf miner was first detected in the Sydney area in October 2020 and has since been found in crops in SE Qld. As a group they are destructive pests and can cause significant economic loss through reduced yields and quality when uncontrolled.								
Abamectin PER81876	6	Contact	7 NG	A	ALL (excl. VIC)	Permitted for use in celery (field only) for control of <b>Liriomyza Leafminers</b> ( <i>Liriomyza</i> spp.) including Vegetable & Serpentine Leafminer. [Max. 2 applications per crop; re-treatment interval 7-14 d]	M H-Bees	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cyromazine (Diptex 150 WP) PER81867	17	Insect Growth Regulator	7 NG	A	ALL	Permitted for use in stalk and stem vegetables for control of <b>Liriomyza</b> species, including: <b>Vegetable Leafminer</b> ( <i>Liriomyza sativa</i> ) and <b>Serpentine Leafminer</b> ( <i>Liriomyza huidobrensis</i> ). [Max. 6 applications per crop; re-treatment interval 7 d]	-	
Spinosad (Entrust Organic) Corteva PER90928	5	Ingestion	1 G:14	A	ALL (excl. VIC)	Permitted for use in stalk and stem vegetables for control of <b>Liriomyza Leafminers</b> . [Max. 4 applications per crop; min. re-treatment interval 4 d]	L Bee:L	-
Spirotetramat (Movento 240 SC) PER88640	23	Ingestion	3	A	ALL (excl. VIC)	Permitted for use in celery (field only) for control of <b>Liriomyza Leafminers</b> ( <i>Liriomyza</i> spp.) [Max. 3 applications per crop; re-treatment interval 7 d]	M VL-Bees	-
Chlorantraniliprole (Coragen) FMC	28	Ingestion	3	P-A	ALL	Registered in celery for control of <i>Helicoverpa</i> . Permitted for control of <b>Liriomyza Leafminers</b> in spinach and silverbeet.	L VL-Bees	-
Spinetoram (Success Neo) Corteva	5	Ingestion	1	P-A	ALL	Registered in celery for the control of <i>Helicoverpa</i> . Permitted for control of <b>Liriomyza Leafminers</b> in snow peas, sugar snap peas and green beans.	M H-Bees	-
Cyantraniliprole (Benevia)	28	Ingestion		P		Permitted for control of <b>Liriomyza Leafminers</b> in bulb vegetables, fruiting vegetables and potatoes. Hort Innovation submitted and emergency use permit application to the APVMA in April 2021 that is pending a decision for approval.	M Bee:VH	-



## **4.3 Weeds in celery**

### **4.3.1 Weed priorities**

<b>Common name</b>	<b>Scientific name</b>
<b>High</b>	
Marshmallow	<i>Malva parviflora</i>
Winter Grass	<i>Poa annua</i>
Groundsel	<i>Senecio vulgaris</i>
Nut Grass	<i>Cyperus rotundus</i>
Oxalis / Sour Sob	<i>Oxalis pes-caprae</i>
<b>Moderate</b>	
Potato Weed	<i>Galinsoga</i> spp.
Stinging Nettles	<i>Urtica</i> spp.
Blackberry Nightshade	<i>Solanum nigrum</i>
Fat Hen	<i>Chenopodium album</i>
Slender Celery Grass	<i>Apium leptophyllum</i>

The feedback received from the different States ranked nutgrass and four broadleaf weeds as high priority weeds.

Weed control in many cases is aided by soil fumigation, which also helps in controlling some soil borne pests and pathogens.

### **Resistance management**

Of the weeds listed in the table above there are confirmed cases of resistance in Australia for Blackberry Nightshade (Group L at 2 sites).

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

### 4.3.2 Available and potential products for weed control

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

Availability		Regulatory risk (refer to Appendix 6)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – days from last treatment		Resistance risk	
Harvest	H	**	Moderate resistance risk
Not Required when used as directed	NR	***	High resistance risk

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
<b>Marshmallow</b> ( <i>Malva parviflora</i> )							
<b>Priority: High</b>							
Marshmallow was ranked as a high priority VIC, QLD, WA, NSW & TAS. It is adapted to a wide variety of environments and is a highly competitive weed. Control with knockdown herbicides can be unreliable.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Marshmallow</b> . Only used in field grown crops.	NR	A	ALL	R3
Linuron PER13496	C**	Celery /General knockdown / Post-emergent	Permitted for use in celery to control grass and broadleaf weeds, including <b>Marshmallow</b> . Do not apply after 5-leaf stage.	NR	A	ALL (exc. VIC)	R3
Paraquat + Diquat (Spray.Seed)	L***	Field crops/ Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Marshmallow</b> . Only used in field grown crops.	NR	A	Variable-Refer to label	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including <b>Marshmallow</b> in Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		
<b>Winter Grass</b> ( <i>Poa annua</i> )							
<b>Priority: High</b>							
Winter Grass was ranked as a high priority VIC, WA, NSW and TAS and as a moderate priority in QLD. Management practices for this weed include soil fumigation, pre-crop spraying, spot spraying or using mechanical devices.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Clethodim (Select)	A***	Celery / Selective post-emergent	Registered in celery for control of grass weeds including <b>Winter Grass</b> . [max no of applications not specified]	63 NG	A	ALL	R3
Fluazifop-P (Fusilade)	A***	Celery / Post emergent grass selective	Registered in celery for the control of various grass weeds, including <b>Winter Grass</b> . Only used in field grown crops. Used to spot spray grass weeds such as couch grass. [Max no of applications not specified]	56	A	ALL	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Winter Grass</b> . Only used in field grown crops.	NR	A	ALL	R3
Linuron PER13496	C**	Celery / General knockdown / Post-emergent	Permitted for use in celery to control weeds on label which include Blackberry Nightshade, Fat Hen, Marshmallow, Stinging Nettle & <b>Winter Grass</b> . Do not apply after 5-leaf stage.	NR	A	ALL (exc. VIC)	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Paraquat + Diquat (Spray.Seed)	L***	Field crops / Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Winter Grass</b> . Only used in field grown crops.	NR		Variable-Refer to label	R3
Chlorthal-Dimethyl (Dacthal)	D**		Registered for control of various grass and broadleaf weeds including <b>Winter Grass</b> , in lettuce.		P		-
Norflurazon (Zoliar) AgNova	F**		Registered for control of grass and broadleaf weeds including <b>Winter Grass</b> , in asparagus, citrus, grapes, nuts, stone & pome fruits.		P		-
Propachlor (Ramrod) Nufarm	K**		Registered for control of annual grasses and broadleaf weeds, including <b>Winter Grass</b> , in Brassica vegetables.		P		R3
Trifluralin	D**		Registered for control of broadleaf and grass weeds, including <b>Winter Grass</b> , in Brassica vegetables.		P		-
<b>Groundsel (<i>Senecio vulgaris</i>)</b>							
<b>Priority: High</b>							
Groundsel was ranked as a high priority VIC, and as a moderate priority in QLD, WA, NSW & TAS. It is highly invasive and produces numerous seeds which can disperse widely. Management practices include herbicides, soil fumigation, pre-crop spraying, spot spraying, or using mechanical devices.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Groundsel</b> . Only used in field grown crops.	NR	A	ALL	R3
Paraquat + Diquat (Spray.Seed)	L***	Field crops / Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Groundsel</b> . Only used in field grown crops.	NR		Variable-Refer to label	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Norflurazon (Zoliar) AgNova	F**		Registered for control of grass and broadleaf weeds, including <b>Groundsel</b> in asparagus, citrus, grapes, nuts, stone & pome fruits.		P		
NUL3438 Nufarm	NEW	TBC	New active in development, Nufarm claims activity on broadleaf weeds.		P		-
<b>Nutgrass</b> ( <i>Cyperus rotundus</i> )							
<b>Priority: High</b>							
Nutgrass was ranked as high priority in VIC. This sedge weed prefers damp, water-logged soils but can survive for years underground during dry times. Herbicide options are limited and unreliable. Improve soil drainage if possible.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Nutgrass</b> . Only used in field grown crops.	NR	A	ALL	R3
Norflurazon (Zoliar) AgNova	F**		Registered for control of grass and broadleaf weeds, including <b>Nutgrass</b> in asparagus, citrus, grapes, nuts, stone & pome fruits.		P		-
<b>Oxalis / Sour Sob</b> ( <i>Oxalis pes-caprae</i> )							
<b>Priority: High</b>							
Oxalis was ranked as high priority in VIC. It is a low growing weed that is highly competitive with the crop. Management practices include soil fumigation, pre-crop spraying & spot spraying.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Oxalis</b> . Only used in field grown crops.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Paraquat + Diquat (Spray.Seed)	L***	Field crops / Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Oxalis</b> . Only used in field grown crops.	NR		Variable-Refer to label	R3
Norflurazon (Zoliar) AgNova	F**		Registered for control of grass and broadleaf weeds, including <b>Sour Sob</b> in asparagus, citrus, grapes, nuts, stone & pome fruits.		P		
NUL3438 Nufarm	NEW	TBC	New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including <b>Sour Sob</b> in Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		-
<b>Blackberry Nightshade</b> ( <i>Solanum nigrum</i> )							
<b>Priority: Moderate</b>							
Blackberry Nightshade was ranked as moderate priority in VIC. It is a prolific weed that is widely adapted and difficult to eradicate, mainly due to its long-term seed viability. Management practices include soil fumigation, pre-crop spraying, spot spraying, or using mechanical devices.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphyllans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Blackberry Nightshade</b> . Only used in field grown crops.	NR	A	ALL	R3
Linuron PER13496	C**	Celery / General knockdown / Post-emergent	Permitted for use in celery to control weeds on label which include <b>Blackberry Nightshade</b> , Fat Hen, Marshmallow, Stinging Nettle & Winter Grass. Do not apply after 5-leaf stage.	NR	A	ALL (exc. VIC)	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Paraquat + Diquat (Spray.Seed)	L***	Field crops / Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Blackberry Nightshade</b> . Only used in field grown crops.	NR		Variable-Refer to label	R3
Prometryn (Gesagard)	C**	Celery / Up to 3-4 weeks of transplanting / Post-emergent, general knockdown	Registered in celery for control of broadleaf weeds including <b>Blackberry Nightshade</b> , Fat Hen and Stinging Nettles. [Max no of applications not specified]	NR	A	Variable-Refer to label	-
Chlorthal-Dimethyl (Dacthal)	D**		Registered for control of various grass and broadleaf weeds including <b>Blackberry Nightshade</b> , in lettuce.		P		-
Isoxaflutole (Balance) Bayer	H**		Registered for use in sugarcane, chickpeas & fallow situations for control of grass and broadleaf weeds including <b>Blackberry Nightshade</b> .		P		-
Norflurazon (Zoliar) AgNova	F**		Registered in asparagus, citrus, grapes, nuts, stone & pome fruits for control of grass and broadleaf weeds including Nutgrass, Fat Hen, <b>Blackberry Nightshade</b> , Chickweed, Pigweed, Sour Sob, Wild Radish & Turnip, Cape Weed & Sow Thistle.		P		-
NUL3438 Nufarm	NEW	TBC	New active in development, Nufarm claims activity on broadleaf weeds.		P		-
<b>Fat Hen</b> ( <i>Chenopodium album</i> )							
<b>Priority: Moderate</b>							
Fat Hen was ranked as moderate priority in VIC. Herbicide control can be difficult and targeting weeds at early growth stages is critical.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Fat Hen</b> . Only used in field grown crops.	NR	A	ALL	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Linuron PER13496	C**	Celery / General knockdown / Post-emergent	Permitted for use in celery to control weeds on label which include Blackberry Nightshade, <b>Fat Hen</b> , Marshmallow, Stinging Nettle & Winter Grass. Do not apply after 5-leaf stage.	NR	A	ALL (exc. VIC)	R3
Paraquat + Diquat (Spray.Seed)	L***	Field crops / Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Fat Hen</b> . Only used in field grown crops.	NR		Variable-Refer to label	R3
Prometryn (Gesagard)	C**	Celery / Up to 3-4 weeks of transplanting / Post-emergent, general knockdown	Registered in celery for control of broadleaf weeds including Blackberry Nightshade, <b>Fat Hen</b> and Stinging Nettles. [Max no of applications not specified]	NR	A	Variable-Refer to label	-
Dimethenamid-P (Outlook) BASF	K**		Registered in sweet corn for control of grass and broadleaf weeds, including <b>Fat hen</b> .		P		-
Norflurazon (Zoliar) AgNova	F**		Registered in asparagus, citrus, grapes, nuts, stone & pome fruits for control of grass and broadleaf weeds including Nutgrass, <b>Fat Hen</b> , Blackberry Nightshade, Chickweed, Pigweed, Sour Sob, Wild Radish & Turnip, Cape Weed & Sow Thistle.		P		
NUL3438 Nufarm	TBC		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including <b>Fat Hen</b> in Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		-

**Potato Weed** (*Galinsoga* spp.)

**Priority: Moderate**

Potato Weed was ranked as moderate in VIC, QLD, WA, NSW & TAS. Management practices include soil fumigation, pre-crop spraying, spot spraying, or using mechanical devices.



Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Potato Weed</b> . Only used in field grown crops.	NR	A	ALL	R3
Paraquat + Diquat (Spray.Seed)	L***	Field crops / Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Potato Weed</b> . Only used in field grown crops.	NR		Variable-Refer to label	R3
Chloridazon (Pyramin) BASF	C**		Registered in silverbeet for control of a range of weeds including, Blackberry nightshade, Cape weed, Chickweed, Milk thistle, Dead nettle, Dwarf nettle, Fat hen, Marshmallow, Pigweed, <b>Potato Weed</b> , Shepherd's purse, Wild radish and Winter grass.		P		-
Glufosinate-Ammonium (Basta) BASF	N**		Registered in green bean for control of grass and broadleaf weeds including <b>Potato weed</b> .		P		R3
NUL3438 Nufarm	NEW		New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including <b>Potato Weed</b> in Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		-
Propachlor (Ramrod) Nufarm	K**		Registered in Brassica vegetables for control of annual grasses and broadleaf weeds as per product label which includes Annual Ryegrass, Chickweed, Fat Hen, Fleabane, Milk Thistle, <b>Potato Weed</b> , Shepherd's Purse, Stinging Nettle & Winter Grass.		P		R3
<b>Slender Celery (<i>Apium leptophyllum</i>)</b> <b>Priority: Moderate</b>							

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Slender Celery was ranked as moderate priority in QLD. It is challenging to control as it belongs to the same family as celery. Management practices include soil fumigation, pre-crop spraying, spot spraying or using mechanical devices.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Slender Celery</b> . Only used in field grown crops.	NR	A	ALL	R3
Paraquat + Diquat (Spray.Seed)	L***	Field crops / Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Slender Celery</b> . Only used in field grown crops.	NR		Variable-Refer to label	R3
NUL3438 Nufarm	NEW	TBC	New active in development, Nufarm claims activity on broadleaf weeds.		P		-
<b>Stinging Nettle (<i>Urtica spp.</i>)</b>							
<b>Priority: Moderate</b>							
Stinging Nettle was ranked as moderate priority in VIC & Qld. This is a soft herb whose leaves are sparsely covered with rigid, stinging hairs. Management practices include soil fumigation, pre-crop spraying, spot spraying or using mechanical devices.							
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Registered in various crops including vegetables for control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases and suppression of weeds. Do not plant for 7 d after soil treatment.	NR	A	ALL (Restricted use TAS, VIC & SA)	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Stinging Nettle</b> . Only used in field grown crops.	NR	A	ALL	R3
Linuron PER13496	C**	Celery / General knockdown / Post-emergent	Permitted for use in celery to control weeds on label which include Blackberry Nightshade, Fat Hen, Marshmallow, <b>Stinging Nettle</b> & Winter Grass. Do not apply after 5-leaf stage.	NR	A	ALL (exc. VIC)	R3

Active Ingredient (Trade Name)	Chemical Group	Crop / Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Paraquat + Diquat (Spray.Seed)	L***	Field crops / Fallow / Direct drilling / General knockdown	Registered as a pre-crop spray in field crops for the control of grass and broadleaf weeds, including <b>Stinging Nettle</b> . Only used in field grown crops.	NR		Variable-Refer to label	R3
Prometryn (Gesagard)	C**	Celery / Up to 3-4 weeks of transplanting / Post-emergent, general knockdown	Registered in celery for control of broadleaf weeds including Blackberry Nightshade, Fat Hen and <b>Stinging Nettles</b> . [Max no of applications not specified]	NR	A	Variable-Refer to label	-
Chlorthal-Dimethyl (Dacthal)	D**		Registered for control of various grass and broadleaf weeds including <b>Stinging Nettle</b> , in lettuce.		P		-
S-Metolachlor (Dual Gold) Syngenta	K**		Registered for the control several broadleaf weeds including <b>Stinging Nettle</b> in Brassica vegetables.		P		-
NUL3438 Nufarm	NEW	TBC	New active in development, Nufarm claims activity on broadleaf weeds.		P		-
Oxyfluorfen (Goal)	G**		Registered for control of grass and broadleaf weeds, including <b>Stinging Nettle</b> in Brassica vegetables and fruit and nut trees. Compatible with glyphosate and diquat/paraquat.		P		-

## 5. References

### 5.1 Information:

AgChem Access Priority Access Forum	<a href="https://www.agrifutures.com.au/national-rural-issues/agvet-chemicals/">https://www.agrifutures.com.au/national-rural-issues/agvet-chemicals/</a>
Australian Pesticide and Veterinary Medicines Authority	<a href="http://www.apvma.gov.au">www.apvma.gov.au</a>
APVMA Chemical review	<a href="https://apvma.gov.au/chemicals-and-products/chemical-review/listing">https://apvma.gov.au/chemicals-and-products/chemical-review/listing</a>
APVMA MRLs	<a href="http://www.legislation.gov.au/Details/F2020C00713">www.legislation.gov.au/Details/F2020C00713</a>
APVMA Permit search	<a href="https://productsearch.apvma.gov.au/permits">https://productsearch.apvma.gov.au/permits</a>
APVMA Product search	<a href="https://productsearch.apvma.gov.au/products">https://productsearch.apvma.gov.au/products</a>
AUSVEG	<a href="https://ausveg.com.au">https://ausveg.com.au</a>
Codex MRL database	<a href="http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/">http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/</a>
Cotton Pest Management Guide 2018-19	<a href="https://www.cottoninfo.com.au/publications/cotton-pest-management-guide">https://www.cottoninfo.com.au/publications/cotton-pest-management-guide</a>
CropLife Australia (resistance management)	<a href="https://www.croplife.org.au/resources/programs/resistance-management/">https://www.croplife.org.au/resources/programs/resistance-management/</a>
Growcom – Infopest Database	<a href="http://www.infopest.com.au">www.infopest.com.au</a>
Hort Innovation	<a href="http://www.horticulture.com.au">www.horticulture.com.au</a>

### 5.2 Abbreviations and Definitions:

<b>APVMA</b>	Australian Pesticides and Veterinary Medicines Authority
<b>IPM</b>	Integrated pest management
<b>LOQ</b>	Limit of quantification
<b>MRL</b>	Maximum residue limit (mg/kg or ppm)
<b>Pesticides</b>	Plant protection products (fungicide, insecticide, herbicide, nematicides, rodenticides, etc.).
<b>Plant pests</b>	Diseases, insects, nematodes, rodents, viruses, weeds, etc.
<b>SARP</b>	Strategic Agrichemical Review Process
<b>TBC</b>	To be confirmed
<b>WHP</b>	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 celery
- Appendix 2. Products available for control of insects and mites in celery
- Appendix 3. Products available for weed control in celery
- Appendix 4. Current permits for use in celery
- Appendix 5. Celery Maximum Residue Limits (MRLs)
- Appendix 6. Celery Agrichemical Regulatory Risk Assessment

## **Appendix 1. Products available for disease control in celery**

<b>Active Ingredient (Trade Name)</b>	<b>Chem. group</b>	<b>Crop/Situation</b>	<b>Diseases / Comments</b>	<b>States</b>	<b>WHP Days</b>	<b>Regulatory risk</b>
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Soil fumigant / vegetables	Soil borne diseases.	ALL	NR	-
Boscalid (Filan) BASF PER11127	7	Celery / Protective (field & protected)	Sclerotinia	ALL (excl. VIC)	14	-
Chlorine	-	Fruit & Vegetables / Sanitiser / Post-Harvest Wash	Bacteria and Fungi	ALL	NR	-
Chlorothalonil (Bravo)	M5	Celery / Protective	Septoria Leaf Spot (all states) and Cercospora Early Blight.	NSW, WA	1	R3
Copper Oxychloride	M1	Celery / Protective	Septoria Leaf Spot and Cercospora Early Blight.	ALL	1	-
Copper	M1	Celery / Protective	Septoria Leaf Spot and Bacterial Soft Rot	ALL	1	-
Difenoconazole (Score) Syngenta	3	Celery / Protective and curative	Septoria Leaf Spot.	ALL	7	R3
Hydrogen Peroxide + Peroxyacetic Acid (Peratec Plus)	M	Celery / Non-selective surface sterilant	Cercospora Early Blight	ALL	1	-
Iprodione (Rovral)	2	Celery / Protective	Sclerotinia Rot.	ALL	1	R3
Mancozeb	M3	Celery / Protective	Septoria Leaf Spot	ALL	7	R2
Metalaxyl-M + Mancozeb (Ridomil Gold MZ) Syngenta PER13673	4 + M3	Celery / Systemic, protective & curative (field)	Septoria Leaf Spot	ALL (excl. VIC)	14	R2

Active Ingredient (Trade Name)	Chem. group	Crop/Situation	Diseases / Comments	States	WHP Days	Regulatory risk
Metiram (Polyram) BASF	M3	Celery / Protective	Early Blight and Late Blight.	QLD, NSW, VIC, TAS, WA	2	R2
Propiconazole (Tilt) PER14479	3	Celery / Protective & curative (field)	Cercospora Early Blight and Septoria Leaf Spot	ALL	14	R3
Propineb (Antracol)	M3	Celery / Protective	Septoria Leaf Spot	VIC, TAS & WA	7	R2
Thiram	M3	Celery / Protective	Septoria Leaf Spot (all states), Anthracnose, Microdochium species, and Botrytis (QLD, VIC, TAS, SA, WA & NT)	Variable	7	R2
Trifloxystrobin (Flint) BASF PER14494	11	Celery / Protective & curative / (field)	Cercospora Early Blight and Septoria Leaf Spot	ALL (excl. VIC)	3	-
Zineb	M3	Celery / Protective	Cercospora Early Blight (NSW, VIC, SA, WA, TAS) and Septoria Leaf Spot (QLD)	Variable	7	R2
Ziram	M3	Celery / Protective	Septoria Leaf Spot	ALL	7	R2

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

Active Ingredient (Trade Name)	Chem. group	Crop/Situation	Pests / Comments	States	WHP	Regulatory risk
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Control of plant parasitic Nematodes, Symphylans, Wireworms, soil borne diseases (including <i>Fusarium</i> and <i>Verticillium</i> wilts, <i>Rhizoctonia</i> , <i>Pythium</i> ) and suppression of weeds.	ALL	NR	-
Abamectin PER81876	6	Celery	Suppression of Leaf Miner including Vegetable & Serpentine Leafminer.	ALL (excl. VIC)	7 NG	-
Afidopyropen (Versys) BASF	9D	Celery	Cabbage Aphid, Lettuce Aphid, Green Peach Aphid and Cotton/Melon Aphid and suppression of Silverleaf Whitefly.	ALL	1	-
<i>Bacillus thuringiensis subsp.</i> <i>kurstaki</i> (DiPel)	11A	Vegetables	<i>Helicoverpa armigera</i> and <i>Helicoverpa</i> <i>punctigera</i> and various Lepidoptera.	ALL	NR	-
<i>Beauveria bassiana</i> (Velifer) BASF	UNF	Protected vegetables and ornamentals	Suppression of various pests including: Western Flower Thrips, Onion Thrips, Greenhouse Whitefly, Silverleaf Whitefly, Sweet Potato Whitefly, Green Peach Aphid & Two-Spotted Spider Mites.	ALL	NR	-
Bifenthrin (Talstar) PER86599	3A	Celery	Red Legged Earth Mite	ALL (excl. VIC)	NR	-
Buprofezin (Applaud) Corteva PER82467	16	Celery (field & protected)	Greenhouse Whitefly	ALL (excl. VIC)	3	-
Chlorantraniliprole (Coragen) FMC	28	Celery	<i>Helicoverpa armigera</i> and <i>Helicoverpa</i> <i>punctigera</i>	ALL	3	-



Active Ingredient (Trade Name)	Chem. group	Crop/Situation	Pests / Comments	States	WHP	Regulatory risk
Chlorantraniliprole (Coragen) FMC PER89259	28	Stalk and stem vegetables (field)	Fall Armyworm ( <i>Spodoptera frugiperda</i> )	ALL (excl. VIC)	1	-
Chlorpyrifos (Lorsban)	1B	Celery	Wingless Grasshopper, Cutworm, Field Crickets, Mole Crickets, Vegetable Weevil.	Variable. Refer to label.	14	R1
Chlorpyrifos (Lorsban) PER14583	1B	Celery	African Black Beetle and Wireworms.			R1
Cyromazine (Diptex 150 WP PER81867)	17	Stalk and stem vegetables	<i>Liriomyza</i> spp. including Vegetable & Serpentine Leafminer	ALL	7 NG	-
Dazomet (Basamid, Cerlong)	8F	Soil preparation for vegetables	Soil fungi, nematodes, soil insects & weeds	ALL	NR	-
Diazinon	1B	Celery	Caterpillars and Cutworms.	QLD, NSW, VIC, SA, WA	14 G:14	R3
Emamectin (Proclaim) Syngenta PER88066	6	Celery (field)	Helicoverpa, Light Brown Apple Moth and Cluster Caterpillar	ALL	3	-
Emamectin (Proclaim Opti) Syngenta PER89285	6	Celery (field)	Fall Armyworm ( <i>Spodoptera frugiperda</i> )	ALL (excl. VIC)	3	-
Esfenvalerate (Sumi-alpha) Sumitomo	A	Celery	Lucerne Leaf Roller.	WA only	1	-

Active Ingredient (Trade Name)	Chem. group	Crop/Situation	Pests / Comments	States	WHP	Regulatory risk
Esfenvalerate (Sumi-Alpha) PER82358	3A	Celery (field & protected)	<i>Helicoverpa</i> spp.	ALL (excl. VIC)	1	-
Flubendiamide (Belt) Bayer	28	Celery	<i>Helicoverpa</i> spp.	ALL	1	-
Fipronil (Regent) PER83203	2C	Celery (field & protected)	Western Flower Thrips	ALL (excl. VIC)	7	R3
Garlic + Chilli + Pyrethrins + Piperonyl Butoxide	3A	Vegetables	Ants, Aphids, Caterpillars, Earwigs, Whitefly, Thrips and Leafhoppers. Suitable for organic growers	ALL	1	-
Helicoverpa Nuclear Polyhedrosis Virus (Vivus) AgBiTech	31	Celery	<i>Helicoverpa armigera</i> and <i>Helicoverpa punctigera</i> .	ALL	NR	-
Imidacloprid (Confidor) PER12489	4A	Celery (field)	Aphids and suppression of Plague Thrips and Onion Thrips	ALL (excl. VIC)	3	R2
Indoxacarb (Avatar eVo) FMC PER14843	22A	Celery (field)	<i>Helicoverpa</i> , Light Brown Apple Moth, Lucerne Leaf Roller and Vegetable Weevil.	ALL (excl. VIC)	7	R3
Indoxocarb (Avatar) FMC PER89278	22A	Celery (field)	Fall Armyworm ( <i>Spodoptera frugiperda</i> )	ALL (excl. VIC)	7	R3
Iron EDTA Complex	-	All plants	Snails and Slugs.	ALL	NR	-
Maldison	1B	Celery	Aphid, Cabbage Moth, Cabbage White Butterfly, Green Vegetable Bug, Jassid, Leafhopper, Rutherglen Bug, Thrips	ALL	3	-

Active Ingredient (Trade Name)	Chem. group	Crop/Situation	Pests / Comments	States	WHP	Regulatory risk
Metaldehyde	-	Vegetables	Snails and Slugs.	ALL	7	-
Metham Sodium	-	Soil Fumigant	Control soil borne pests and diseases in food crops.	NSW, QLD, SA, VIC & WA	-	-
Methomyl (Lannate) PER82428	1A	Celery	<i>Helicoverpa</i> spp., Cucumber Moth, Cluster Caterpillar, Loopers, Webworm, Rutherglen Bug, Thrips including Western Flower Thrips	ALL	1	R2
Methomyl (Lannate) PER89293	1A	Celery	Fall Armyworm ( <i>Spodoptera frugiperda</i> )	ALL	1	R2
Permethrin (Ambush)	3A	Celery	<i>Helicoverpa</i> , Looper, Lucerne Leafroller	ALL	1	-
Petroleum Oil PER12221	UN	Celery (field & protected)	Aphids, Green Mirid, Green Vegetable Bug, Grey Cluster Bug, Leaf Hoppers, Mites, Rutherglen Bug & Thrips.	ALL (excl. VIC)	1	-
Pirimicarb (Aphidex) Adama	1A	Celery	Aphids, including Green Peach Aphid And Cotton Aphid	ALL	2	R3
Potassium Salts of Fatty Acids (Natrasoap)	-	Vegetables	Aphids, Thrips, Mealybug, Two-Spotted Mite, Spider Mite, Whitefly.	ALL	NR	-
Pymetrozine (Chess) Syngenta	9B	Celery	Aphids	ALL	14	R3
Spinetoram (Success Neo) Corteva	5	Celery	<i>Helicoverpa</i>	ALL	1	-
Spinetoram (Success Neo) Corteva PER89241	5	Stalk & Stem vegetables (field & protected)	Fall Armyworm ( <i>Spodoptera frugiperda</i> )	ALL (excl. VIC)	1	

Active Ingredient (Trade Name)	Chem. group	Crop/Situation	Pests / Comments	States	WHP	Regulatory risk
Spinosad (Entrust Organic) Corteva	5	Stalk & Stem vegetables	<i>Helicoverpa</i>	ALL	1 G:14	-
Spinosad (Entrust Organic) Corteva PER89870	5	Stalk & Stem vegetables (field & protected)	Fall Armyworm ( <i>Spodoptera frugiperda</i> )	ALL (excl. VIC)	1 G:14	-
Spinosad (Entrust Organic) Corteva PER90928	5	Stalk & Stem Vegetables (field & protected)	Vegetable Leaf Miner ( <i>Liriomyza sativae</i> ) Pea Leaf Miner / Serpentine Leaf Miner ( <i>Liriomyza huidobrensis</i> ) American Serpentine Leaf Miner ( <i>Liriomyza trifolii</i> )	ALL (excl. VIC)	1 G:14	-
Spirotetramat (Movento) Bayer	23	Celery	Western Flower Thrips, Tomato Thrips, Plague Thrips, Green Peach Aphid and Cotton Aphid	ALL	23	-
Spirotetramat (Movento) Bayer PER88640	23	Celery (field)	Liriomyza Leafminers ( <i>Liriomyza</i> spp.)	ALL (excl. VIC)	3	-
Trichlorfon (Lepidex)	1B	Celery	Cutworm	QLD & NT	2	R2
Trichlorfon (Lepidex)	1B	Vegetables	Cabbage White Butterfly, Cabbage Moth, Rutherglen Bug, Green Vegetable Bug	ALL	2	R2

### **Appendix 3. Products available for weed control in celery**

<b>Active ingredient (Trade Name)</b>	<b>Chem. Group</b>	<b>Situation / Crop</b>	<b>Comment / Use / Weed</b>	<b>WHP (days)</b>	<b>States</b>	<b>Regulatory risk</b>
1,3-Dichloropropene + Chloropicrin (Telone C-35)	8B	Vegetables / Soil fumigant	Plant parasitic nematodes, symphylans, wireworms, soil borne diseases and suppression of weeds.	NR	ALL (Restricted use TAS, VIC & SA)	-
Clethodim (Select)	A***	Celery / Selective post-emergent	Grass weeds, including Winter Grass.	63	ALL	R3
Fluazifop-P (Fusilade)	A***	Celery / Post- emergent selective herbicide	Grass weeds.	56	Variable. Refer to label.	-
Glyphosate (Roundup)	M**	Field crops / General seed bed preparation and knockdown	Grass and broadleaf weeds as a pre-crop spray.	NR	ALL	R3
Linuron PER13496	C**	Celery / General knockdown	Grass and broadleaf weeds.	NR	ALL (excl. VIC)	R3
Paraquat + Diquat (Spray.Seed)	L**	Field crops / Fallow / Direct drilling / General knockdown	Grass and broadleaf weeds as a pre-crop spray.	NR	Variable. Refer to label	R3
Prometryn (Gesagard)	C**	Celery / Pre- and post-emergent /General knockdown & residual. Soil application	Broadleaf and selected grass weeds.	NR	Variable. Refer to label	-

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

#### **Appendix 4. Current permits for use in celery**

<b>Permit No.</b>	<b>Description</b>	<b>Issued Date</b>	<b>Expiry Date</b>	<b>Permit Holder</b>
PER81876 Version 4	Abamectin / Celery / Leaf miner including Vegetable & Serpentine Leafminer	24-Jun-16	30-Apr-24	Hort Innovation
PER86599	Bifenthrin / Celery (field) / Red Legged Earth mite	13-Dec-18	31-Dec-23	Hort Innovation
PER11127 Version 3	Boscalid (Filan) / Celery (field & protected) / Sclerotinia	30-Jun-15	30-Jun-23	Hort Innovation
PER82467 Version 3	Buprofezin (Applaud) / Celery / Greenhouse whitefly	07-Jul-17	30-Jun-25	Hort Innovation
PER89259	Chlorantraniliprole (Coragen) / Various Crops including celery (field) / Fall Armyworm	06-Mar-20	31-Mar-23	Hort Innovation
PER14583 Version 4	Chlorpyrifos / Celery (field & protected) / African black beetle, Wireworms & False wire worms	1-Apr-14	31-Oct-21	Hort Innovation
PER81867 Version 2	Cyromazine (Diptex 150 WP) / Stalk and stem vegetables / Liriomyza spp. including Vegetable & Serpentine Leafminer	2-Dec-19	30-Nov-23	Hort Innovation
PER89285	Emamectin (Proclaim Opti) / Various crops including celery (field) / protected cropping / Fall Armyworm	16-Mar-20	31-Mar-23	Hort Innovation
PER88066	Emamectin (Proclaim) / Celery (field)/ Helicoverpa, Light brown apple moth & Cluster caterpillar	5-Aug-19	31-Aug-24	Hort Innovation
PER82358 Version 3	Esfenvalerate (Sumi-Alpha) / Celery (field & protected) / <i>Helicoverpa</i> spp.	05-Feb-16	31-Jan-26	Hort Innovation
PER83203 Version 2	Fipronil / Celery (field & protected) / Western flower thrips	16-Mar-17	31-Mar-22	Hort Innovation
PER12489 Version 3	Imidacloprid (Confidor) / Celery (field) / Aphids and suppression of plague thrips and onion thrips	30-Jun-15	31-May-25	Hort Innovation
PER14843 Version 3	Indoxacarb (Avatar) / Celery (field) / Helicoverpa, Lucerne leaf roller, vegetable weevil. Light brown apple moth	01-Oct-14	30-Sept-24	Hort Innovation
PER89278	Indoxacarb (Avatar) / Various Crops including celery (field) / Fall Armyworm	13-Mar-20	31-Mar-23	Hort Innovation

<b>Permit No.</b>	<b>Description</b>	<b>Issued Date</b>	<b>Expiry Date</b>	<b>Permit Holder</b>
PER13496 Version 2	Linuron / Celery (field) / Range of weeds	04-May-12	30-Apr-22	Hort Innovation
PER13673 Version 3	Metalaxyl-M + Mancozeb (Ridomil Gold MZ) / Celery (field) / Septoria leaf spot (late blight)	22-Apr-13	30-Sep-21	Hort Innovation
PER89293	Methomyl (Lannate) / Various crops including celery / Fall Armyworm	10-Apr-20	30-Apr-23	Hort Innovation
PER82428 Version 4	Methomyl (Lannate) / Celery (field) / Helicoverpa spp. Cucumber moth Cluster caterpillar Loopers Webworm Rutherglen bug & Thrips including WFT	22-Apr-16	31-Mar-24	Hort Innovation
PER12221 Version 4	Petroleum oil / Celery (field & protected) / Aphids, green mirid, green vegetable bug, grey cluster bug, leaf hoppers, mites, Rutherglen bug & thrips	29-Jun-12	30-Nov-22	Hort Innovation
PER14479 Version 4	Propiconazole (Tilt) / Celery (field) / Cercospora early blight & Septoria leaf spot	12-May-14	30-Nov-24	Hort Innovation
PER89241	Spinetoram (Success Neo and Delegate) / Various Crops including stalk & stem vegetables (field & protected) / Fall Armyworm	06-Mar-20	31-Mar-23	Hort Innovation
PER89870	Spinosad (Entrust Organic) / Various Crops including stalk & stem vegetables (field & protected) / Fall Armyworm	21-Jul-20	31-Jul-23	Hort Innovation
PER90928	Spinosad (Entrust Organic) / Various, including Stalk & Stem Vegetables / Liriomyza leafminers (Liriomyza spp.)	23-Apr-21	30-Apr-24	Hort Innovation
PER88640	Spirotetramat (Movento 240 SC) / Celery (field) / Liriomyza leafminers ( <i>Liriomyza</i> spp.)	18-May-20	31-May-23	Hort innovation
PER14494 Version 2	Trifloxystrobin (Flint) / Celery (field) / Cercospora early blight and Septoria leaf spot	01-Oct-14	31-Aug-22	Hort Innovation

## **Appendix 5. Celery Maximum Residue Limits (MRLs)**

CODEX commodity grouping of Stalk and Stem Vegetables:

VS 0624 Celery

VS 0078 Stalk and Stem Vegetables

Note: Major export markets for Celery include Singapore, Malaysia and UAE. Available information indicates that in the absence specific limits in legislation the most countries defers to Codex, followed by EU MRL standards or applies 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.

<b>Chemical</b>	<b>Codex</b>	<b>Description</b>	<b>APVMA MRL mg/kg</b>	<b>Codex MRL mg/kg</b>
Abamectin	VS 0624	Celery	T0.05	0.03
Acetamiprid	VS 0624	Celery	-	1.5
Ametoctradin	VS 0624	Celery	-	20
Azoxystrobin	VS 0624	Celery	-	5
Bifenthrin	VS 0624	Celery	T*0.01	-
Boscalid	VS 0624	Celery	T15	-
Buprofezin	VS 0624	Celery	T5	-
Bromide Ion	VS 0624	Celery	-	300
Chlorantraniliprole	VS 0624	Celery	5	7
Chlorothalonil	VS 0624	Celery	10	20
Chlorpyrifos	VS 0624	Celery	T5	-
Clothianidin	VS 0624	Celery	-	0.04
Cyantraniliprole	VS 0624	Celery	-	15
Cypermethrin	VS 0624	Celery	T1	-
Cyromazine	VS 0624	Celery	-	4
Dichlobenil	VS 0624	Celery	-	0.07
Difenoconazole	VS 0624	Celery	3	3
Dimethoate	VS 0624	Celery	T0.5	0.5
Dimethomorph	VS 0624	Celery	-	15
Dinotefuran	VS 0624	Celery	-	0.6
Dithiocarbamates	VS 0624	Celery	5	-
Emamectin	VS 0624	Celery	T0.2	-
Fenamidone	VS 0624	Celery	-	40
Fentin	VS 0624	Celery	1	-
Fenvalerate	VS 0624	Celery	2	-
Fipronil	VS 0624	Celery	T0.3	-
Flonicamid	VS 0624	Celery	-	1.5
Flubendiamide	VS 0624	Celery	-	5
	VS 0078	Stalk and Stem Vegetables	5	-
Fluazifop-p-butyl	VS 0624	Celery	*0.02	-
Fluopicolide	VS 0624	Celery	-	20
Flutriafol	VS 0624	Celery	-	3
Fluxapyroxad	VS 0624	Celery	-	10
Glyphosate	VS 0078	Stalk and Stem Vegetables	*0.01	-
Imidacloprid	VS 0624	Celery	T0.3	6
Indoxacarb	VS 0624	Celery	T5	-



Chemical	Codex	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Iprodione	VS 0624	Celery	2	-
Linuron	VS 0624	Celery	*0.05	-
Maldison	VS 0624	Celery	2	-
Mandipropamid	VS 0624	Celery	-	20
Metalaxyl		Vegetables	T0.1	-
Metolachlor	VS 0624	Celery	T0.05	-
Methomyl	VS 0624	Celery	3	-
Methoxyfenozide	VS 0624	Celery	-	15
Paraquat		Vegetables	*0.05	-
Penthiopyrad	VS 0624	Celery	-	15
Permethrin	VS 0624	Celery	5	2
Phorate	VS 0624	Celery	T*0.01	-
Pirimicarb	VS 0624	Celery	15	-
Propiconazole	VS 0624	Celery	T5	-
Pymetrozine	VS 0624	Celery	0.2	-
Sethoxydim	VS 0624	Celery	0.1	-
Spinetoram	VS 0624	Celery	-	6
	VS 0078	Stalk and Stem Vegetables	2	-
Spinosad	VS 0624	Celery	2	2
Spirotetramat	VS 0624	Celery	5	4
Sulfoxaflor	VS 0624	Celery	-	1.5
Thiamethoxam	VS 0624	Celery	-	1
Trichlorfon	VS 0624	Celery	0.2	-
Trifloxystrobin	VS 0624	Celery	T5	1
Trifluralin		Vegetables	0.05	-

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

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

NR - Uses of substances where MRLs are not necessary / required.

T =Temporary MRL

Sources: APVMA MRLs: Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2019. Compilation 4. Prepared 15 January 2020. CODEX MRLs: CODEX Alimentarius International Food Standards database (February 2020), <http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/>

## **Appendix 6. Celery Agrichemical Regulatory Risk Assessment**

# **Celery Agrichemical Regulatory Risk Assessment**

**October 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 require the generation of new data. A consequence of which can be that many of these chemicals are not meeting contemporary risk assessment standards as the necessary data is unavailable, or where data is available, the risk posed is considered unacceptable.

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

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

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

## Celery Regulatory Risk Assessment

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

Problem	Active Constituents	Chemical Group	Comment	Actions
<b>Insect and mite pests</b>				
<b>Aphids</b>				
Aphids	Imidacloprid (PER12489)	<b>4A</b>	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
	Malathion/Maldison	<b>1B</b>	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
	Petroleum oil (PER12221)	-		
	Pirimicarb	<b>1A</b>	Codex: JMPR Periodic re-evaluation 2022/23 EU: Candidate for substitution	
	Pymetrozine	<b>9B</b>	EU: Being phased out Codex: No registrant support	
Cabbage aphid	Afidopyropen	<b>9D</b>		
Cotton aphid	Afidopyropen	<b>9D</b>		
	Pirimicarb	<b>1A</b>	Codex: JMPR Periodic re-evaluation 2022/23 EU: Candidate for substitution	
	Spirotetramat	<b>23</b>		
Currant lettuce aphid	Afidopyropen	<b>9D</b>		
Green peach aphid	Afidopyropen	<b>9D</b>		
	Pirimicarb	<b>1A</b>	Codex: JMPR Periodic re-evaluation 2022/23 EU: Candidate for substitution	

Problem	Active Constituents	Chemical Group	Comment	Actions
<b>Beetles/Weevils/Worms</b>				
28-spotted potato ladybird	Malathion/Maldison	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
African black beetle	Chlorpyrifos (PER14583)	1B	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR in 2021 Canada: Cancellation of most uses. EU: Cancellation of use USA:EPA decision to allow continued use	
False wire worm	Chlorpyrifos (PER14583)	1B		
Spotted vegetable weevil	Chlorpyrifos	1B		
Vegetable weevil	Chlorpyrifos	1B		
	Indoxacarb (PER14843)	22A		EU: Proposed non-renewal
Wireworm	Chlorpyrifos (PER14583)	1B	APVMA: Under review. Potential issues w.r.t. environmental loading and worker exposure. Codex: Scheduled for review by JMPR in 2021 Canada: Cancellation of most uses. EU: Cancellation of use USA:EPA decision to allow continued use	
Cutworms	Chlorpyrifos	1B		
	Diazinon	1B		EU: Deregistered Codex: To be reviewed by 2020/21.
	Trichlorfon	1B	APVMA: nominated for review Codex: No MRLs Europe: deregistered US: No MRLs	

Problem	Active Constituents	Chemical Group	Comment	Actions
<b>Caterpillars/Lepidoptera</b>				
Helicoverpa spp.	Chlorantraniliprole	<b>28</b>		
	Emamectin (PER88066)	<b>6</b>	EU: Candidate for substitution	
	Esfenvalerate	<b>3A</b>	EU: Candidate for substitution	
	Flubendiamide	<b>28</b>		
	Helicoverpa NPV	<b>31</b>		
	Indoxacarb (PER14843)	<b>22A</b>	EU: Proposed non-renewal	
	Methomyl (PER82428)	<b>1A</b>	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
	Permethrin	<b>3A</b>	Codex: Re-evaluation scheduled 2021/22. Support uncertain EU: No authorisation	
	Spinetoram	<b>5</b>		
	Spinosad	<b>5</b>		
Cabbage white butterfly	Malathion/Maldison	<b>1B</b>	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
Caterpillars	Diazinon	<b>1B</b>	EU: Deregistered Codex: To be reviewed by 2020/21.	
	Spinetoram	<b>5</b>		
Cluster caterpillar	Emamectin (PER88066)	<b>6</b>	EU: Candidate for substitution	
	Methomyl (PER82428)	<b>1A</b>	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	

Problem	Active Constituents	Chemical Group	Comment	Actions
Common armyworm	Permethrin (PER14049)	3A	Codex: Re-evaluation scheduled 2021/22. Support uncertain EU: No authorisation	
Cucumber moth	Methomyl (PER82428)	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
Diamondback moth	Malathion/Maldison	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
Fall armyworm	Chlorantraniliprole (PER89259)	28		
	Emamectin (PER89285)	6	EU: Candidate for substitution	
	Indoxacarb (PER89278)	22A	EU: Proposed non-renewal	
	Methomyl (PER89293)	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
	Spinetoram (PER89241)	5		
	Spinosad (PER89870)	5		
Lightbrown apple moth	Emamectin (PER88066)	6	EU: Candidate for substitution	
	Indoxacarb (PER14843)	22A	EU: No authorisations	
Loopers	Permethrin (PER14049)	3A	Codex: Re-evaluation scheduled 2021/22. Support uncertain EU: No authorisation	
	Methomyl (PER82428)	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	

Problem	Active Constituents	Chemical Group	Comment	Actions
Lucerne leaf roller	Esfenvalerate	3A	EU: Candidate for substitution	
	Indoxacarb	22A	EU: No authorisations	
	Permethrin	3A	Codex: Re-evaluation scheduled 2021/22. Support uncertain EU: No authorisation	
Southern armyworm	Permethrin (PER14049)	3A	Codex: Re-evaluation scheduled 2021/22. Support uncertain EU: No authorisation	
Webworms	Methomyl (PER82428)	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
<b>Mites</b>				
Mites	Petroleum oil (PER12221)	-		
Red-legged earth mite	Bifenthrin (PER86599)	3A	Canada: Subject to phase-out until 31/12/2020 EU: No authorisation in place	
	Malathion/Maldison	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
<b>Plant bugs and leafhoppers</b>				
Green mirid	Petroleum oil (PER12221)	-		
Green vegetable bug	Malathion/Maldison	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
	Petroleum oil (PER12221)	-		
Grey cluster bug	Petroleum oil (PER12221)	-		
Jassids/ leafhoppers	Malathion/Maldison	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
	Petroleum oil (PER12221)	-		

Problem	Active Constituents	Chemical Group	Comment	Actions
Rutherglen bugs	Malathion/Maldison	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
	Methomyl (PER82428)	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
	Petroleum oil (PER12221)			
<b>Grasshoppers and crickets</b>				
Australian plague locust	Malathion/Maldison	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	
Black field cricket	Chlorpyrifos	1B	APVMA: Currently under review, outcome uncertain. Potential issues w.r.t. environmental loading and dietary exposure. EU: Proposed cancellation of use Canada: proposed cancellation of most uses. USA: EPA decision to allow continued use	
Field crickets	Chlorpyrifos	1B		
Migratory locusts	Chlorpyrifos	1B		
Mole crickets	Chlorpyrifos	1B		
Spur throated locust	Chlorpyrifos	1B		
Wingless grasshopper	Chlorpyrifos	1B		
<b>Thrips</b>				
Onion thrips	Imidacloprid (PER81260)	4A	APVMA: Under review Canada: Under review EU: Removal of all field uses USA: Re-registration with new risk mitigation measures	
Plague thrips	Imidacloprid (PER81260)	4A		
	Spirotetramat	23		
Thrips	Malathion/Maldison	1B	APVMA: Under review: chemistry Codex: Re-evaluation scheduled for 2022/23	



Problem	Active Constituents	Chemical Group	Comment	Actions
Thrips	Methomyl	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
	Petroleum oil (PER12221)	-		
Tomato thrips	Spirotetramat	23		
Western flower thrips	Fipronil (PER83203)	2B	APVMA: Under review Codex: Re-evaluation scheduled for 2021/22 EU: No authorisation in place	
	Methomyl (PER82428)	1A	APVMA: nominated for review Canada: Re-evaluation completed (2018). Majority of uses removed EU: No authorisations	
	Spirotetramat	23		
<b>Other insect pests</b>				
Greenhouse whitefly	Buprofezin (PER82467)	16	Europe: In the process of deleting MRLs	
Silverleaf whitefly	Afidopyropen	9D		
Vegetable leafminers ( <i>Liriomyza spp.</i> )	Abamectin (PER81876)	6		
	Cyromazine (PER81867)	17		
	Spirotetramat (PER88640)	23		

Problem	Active Constituents	Chemical Group	Comment	Actions
<b>DISEASES</b>				
Anthracnose	Thiram	<b>M3</b>	APVMA: Nominated for review Canada: Proposed cancelling of all foliar uses Codex: To be reviewed 2022/23 Europe: No authorisation in place	
Bacterial soft rot	Copper	<b>M1</b>	EU: Candidate for substitution	
Botrytis rot	Thiram	<b>M3</b>	APVMA: Nominated for review Canada: Proposed cancelling of all foliar uses Codex: To be reviewed 2022/23 Europe: No authorisation in place	
Cercospora leaf spot / Early Blight	Hydrogen peroxide +peroxyacetic acid	<b>M</b>		
	Chlorothalonil	<b>M5</b>	APVMA: Nominated for review Canada: Review recently completed, continued use considered acceptable Europe: Deregistered <sup>i</sup> .	
	Copper	<b>M1</b>	EU: Candidate for substitution	
	Difenoconazole	<b>3</b>	APVMA: Nominated for review Canada: Currently being reviewed EU: Candidate for substitution	
	Mancozeb	<b>M3</b>	APVMA: Nominated for review Canada: Under review Codex: To be reviewed 2022/23 EU: Proposed non-renewal of authorisation	
	Metiram	<b>M3</b>	APVMA: Nominated for review Canada: Proposed cancelling of foliar uses Codex: To be reviewed 2022/23	
	Propiconazole (PER14479)	<b>3</b>	APVMA: Nominated for review Europe: Deregistered: being phased-out <sup>ii</sup>	
	Trifloxystrobin	11		
	Zineb	M3	APVMA: Nominated for review Codex: To be reviewed 2022/23 EU: No authorisation in place	

Problem	Active Constituents	Chemical Group	Comment	Actions
Leaf spots	Copper	<b>M1</b>	EU: Candidate for substitution	
	Mancozeb	<b>M3</b>	APVMA: Nominated for review	
Powdery mildew	Mancozeb	<b>M3</b>	Canada: Under review Codex: To be reviewed 2022/23 EU: Proposed non-renewal of authorisation	
Sclerotinia rot	Boscalid (PER11127)	<b>7</b>		
	Iprodione	<b>2</b>	Europe: Deregistered Canada: Majority of food crop uses deleted Codex: Review scheduled for 2022/23	
Septoria spot	Chlorothalonil	<b>M5</b>	APVMA: Nominated for review Canada: Review recently completed, continued use considered acceptable Europe: Deregistered.	
	Copper	<b>M1</b>	EU: Candidate for substitution	
	Difenoconazole	<b>3</b>	APVMA: Nominated for review Canada: Currently being reviewed EU: Candidate for substitution	
	Mancozeb	<b>M3</b>	Mancozeb:	
	Metalaxyl-M + Mancozeb (PER13673)	<b>4+M3</b>	APVMA: Nominated for review Canada: Under review Codex: To be reviewed 2022/23 EU: Proposed non-renewal of authorisation Metalaxyl-M EU: Restricted use approval	
	Metiram	<b>M3</b>	APVMA: Nominated for review Canada: Proposed cancelling of foliar uses Codex: To be reviewed 2022/23	

Problem	Active Constituents	Chemical Group	Comment	Actions
Septoria spot	Propiconazole (PER14479)	3	APVMA: Nominated for review Europe: Deregistered: being phased-out	
	Propineb	M3	APVMA: Nominated for review EU: No authorisation in place Codex: To be reviewed 2022/23	
	Thiram		APVMA: Nominated for review Canada: Proposed cancelling of all foliar uses Codex: To be reviewed 2022/23 Europe: No authorisation in place	
	Trifloxystrobin	11		
	Zineb	M3	APVMA: Nominated for review Codex: To be reviewed 2022/23 EU: No authorisation in place	
	Ziram	M3	APVMA: Nominated for review Canada: Proposed cancelling of all uses Codex: To be reviewed 2022/23	
Soft rot	Copper	M1	EU: Candidate for substitution	

Problem	Active Constituents	Chemical Group	Comment	Actions
<b>WEEDS</b>				
Broadleaf weeds and grasses	Clethodim	A	Codex: MRLs proposed for deletion	
	Diquat	L	APVMA: Currently under review EU: No authorisation in place	
	Fluazifop-P	A		
	Linuron (PER13496)	C	Canada: Proposed cancellation of majority of uses EU: No authorisation in place	
	Paraquat	L	APVMA: Currently under review EU: No authorisation in place Rotterdam Convention: nomination	
	Prometryn (PER13114)	C		

*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.*

<sup>i</sup> Chlorothalonil - Withdrawal authorisations by 20 November 2019. Max period of grace: 20 May 2020. Commission Implementing Regulation (EU) 2019/677 <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019R0677&from=EN>

<sup>ii</sup> Commission Implementing Regulation (EU) 2018/1865