



The Spruce / K. Dave

# **Persimmons**

Strategic Agrichemical Review Process  
(SARP)

April 2022

Hort Innovation  
Project – MT21005

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MT21005 –Strategic Agrichemical Review Process (SARP) Updates

**SARP Service Provider:**

AGK Services

**Purpose of the report:**

This report was funded by Hort Innovation to investigate the pest problem, agrichemical usage and pest management alternatives for the persimmon 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 2022

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**Hort  
Innovation**  
Strategic levy investment

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## **1. Summary**

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

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

Alternative pesticides should ideally be selected for benefits of:

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

The results of this process will provide the persimmon 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>       |
|--------------------|------------------------------|
| Angular Leaf Spot  | <i>Pseudocercospora</i> spp. |

## **1.2 Insects and mites**

The high priority insect and mite pests are:

| <b>Common Name</b>     | <b>Scientific Name</b>          |
|------------------------|---------------------------------|
| Clearwing Moth / Borer | <i>Carmenta chrysophanes</i>    |
| Queensland Fruit Fly   | <i>Bactrocera tryoni</i>        |
| Long-Tailed Mealybug   | <i>Pseudococcus longispinus</i> |
| Citrus Mealybug        | <i>Planococcus citri</i>        |
| Citrophilous Mealybug  | <i>Pseudococcus calcolariae</i> |

## **1.3 Weeds**

There were no high priority weeds identified but the following were rated as a moderate priority:

| <b>Common name</b>    | <b>Scientific name</b>    |
|-----------------------|---------------------------|
| Couch Grass           | <i>Cynodon dactylon</i>   |
| Flaxleaf Fleabane     | <i>Conyza bonariensis</i> |
| Flannel Weed          | <i>Sida cordifolia</i>    |
| Blackberry Nightshade | <i>Solanum nigrum</i>     |
| Fat Hen               | <i>Chenopodium album</i>  |
| Marshmallow           | <i>Malva parviflora</i>   |

## **1.4 Plant Growth Regulators**

The high priority Plant Growth Regulator issues are:

| <b>Issue</b>      |
|-------------------|
| Extend Shelf Life |

## **2. The Australian Persimmon Industry**

Persimmons are a tree fruit that can be grown in a wide range of climatic conditions as well as a wide range of soil types. Persimmons grown in Australia are predominantly Japanese persimmons (*Diospyros kaki*). American persimmon (*Diospyros virginiana*) is still be grown on a small scale in Australia.

Total production for the year ending June 2021 was 2,767 tonnes<sup>1</sup>. Wholesale value of fresh supply was \$13.0 m, with \$11.5 m distributed into retail and \$1.5 m into food service.

Persimmons are grown in most states of Australia, with the largest volume of production occurring in Queensland.

### Persimmon Seasonality by State

| State               | 20/21 t | Jul  | Aug    | Sep | Oct | Nov | Dec | Jan | Feb  | Mar  | Apr    | May  | Jun |
|---------------------|---------|------|--------|-----|-----|-----|-----|-----|------|------|--------|------|-----|
| New South Wales     | 553     |      |        |     |     |     |     |     |      | Low  | Medium | High | Low |
| Victoria            | 692     |      |        |     |     |     |     |     |      | Low  | Medium | High | Low |
| Queensland          | 968     |      |        |     |     |     |     |     | Low  | High | Medium | Low  |     |
| Western Australia   | 138     |      |        |     |     |     |     |     |      | Low  | Medium | High | Low |
| South Australia     | 415     |      |        |     |     |     |     |     |      | Low  | Medium | High | Low |
| Imported            | 325     | Low  | Low    | Low | Low | Low |     |     |      |      |        |      | Low |
| Availability legend |         | High | Medium |     |     | Low |     |     | None |      |        |      |     |

Australia is a net importer of persimmons, and our total exports only account for 6% of annual production. Singapore and Malaysia represent over 70% of Australia's export volume, with lesser amounts going to Honk King, Qatar and Indonesia.

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

## **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 persimmon 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 persimmon industry regarding pesticide access, Hort Innovation undertook a review of the pesticide requirements via a Strategic Agrichemical Review Process (SARP) in 2013. The current project is to update the SARP with the latest information and progress.

The SARP process identifies diseases, insect pests and weeds of major concern to the persimmon 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 persimmon 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 persimmons but attempts to prioritise the major problems.

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

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

From a pesticide access perspective, the APVMA classifies Persimmons as a minor crop. Therefore, access to minor use permits can be relatively straight forward as long as a reasonable justification is provided in accordance with the APVMA's minor use guidance<sup>2</sup>.

The APVMA understands that the American persimmon (*Diospyros virginiana*) may still be grown on a small scale in Australia and therefore the APVMA have been establishing Maximum Residue Limits (MRLs) for both types when the use is for 'Persimmons' generally. When the crop is specified as 'Persimmons (*Diospyros kaki*)' however an MRL for American persimmons will not be set.

APVMA Crop Group Classifications:

- Japanese persimmon (*Diospyros kaki*) – Crop Group 002: Pome fruits
- American persimmon (*Diospyros virginiana*) – Crop Group 006: Tropical fruit, inedible peel, Sub-group 006B - Inedible Smooth Peel - Large

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 Persimmon industry is for manufacturers to register new pesticides uses in the crop.

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<sup>2</sup> <https://apvma.gov.au/node/10931>



### **3.3 Methods**

The current update of the Persimmon Strategic Agrichemical Review Process (SARP), which was last updated in 2013, was conducted by desktop audit using industry information gathered during 2021-2022. The process included gathering, collating and confirming information:

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

## **3.4 Results and discussions**

### **3.4.1 Detail**

Results and discussions are presented in the body of this document.

### **3.4.2 Appendices**

Refer to additional information in the appendices:

Appendix 1. Products available for disease control in persimmons

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

Appendix 3. Products available for weed control in persimmons

Appendix 4. Plant growth regulators available in persimmons

Appendix 5. Current permits for use in persimmons

Appendix 6. Persimmons Maximum Residue Limits (MRLs)

Appendix 7. Persimmons Agrichemical Regulatory Risk Assessment

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

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<sup>3</sup>.

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

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

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

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<sup>3</sup> <https://www.croplife.org.au/resources/programs/resistance-management/>

## **4.1 Diseases of persimmons**

### **4.1.1 Disease priorities**

| <b>Common name</b>                 | <b>Scientific name</b>   |
|------------------------------------|--|
| <b>High</b>                        |  |
| Angular Leaf Spot                  | <i>Pseudocercospora</i> spp.                                   |
| <b>Moderate</b>                    |  |
| Twig Blight                        | <i>Phomopsis</i> spp.  |
| Anthracnose / Pepper Spot          | <i>Colletotrichum</i> spp.                                     |
| Circular Leaf Spot                 | <i>Mycosphaerella</i> spp.                                     |
| Sooty Mould                        | <i>Capnodium</i> spp., <i>Fumago</i> spp., <i>Scorias</i> spp. |
| Bacterial Wilt Disease /Collar Rot | <i>Pseudomonas solanacearum</i>                                |
| Phytophthora Root Rot              | <i>Phytophthora cinnamomi</i>                                  |
| <b>Low</b>                         |  |
| Botrytis                           | <i>Botrytis cinerea</i>  |
| Pestalotiopsis Spot                | <i>Pestalotiopsis diospyri</i> , <i>Pestalotiopsis theae</i>   |
| Blue Mould                         | <i>Penicillium</i> spp.  |
| Black Spot                         | <i>Alternaria alternata</i>                                    |
| Transit Rot / Post Harvest         | <i>Rhizopus</i> spp.   |
| Armillaria Root Rot                | <i>Armillaria luteobubalina</i>                                |
| Fusarium Root Rot                  | <i>Fusarium solani</i>   |
| Crown Gall                         | <i>Agrobacterium tumefaciens</i>                               |

The most important disease issue based on the feedback received was Angular Leaf Spot. Angular Leaf Spot has previously been referred to as Cercospora Leaf Spot. Available and potential products for control of diseases are listed in Section 4.1.2.

Many diseases of persimmon require orchard management strategies as there are no known chemical solutions. Transplant potted plants into the field as soon as possible. Young trees left too long in pots commonly have twisted root systems that do not grow normally after transplanting. In less severe cases, water and nutrient uptake are reduced; in severe cases, trees die.

In poorly drained areas, mound rows and install drains to improve drainage. Mulch trees at least annually to maintain a favourable root environment. Irrigation and nutrient management are important to maintain healthy trees, as well as general farm hygiene to reduce carry-over of infections on crop residues and controlling weeds.

Avoid establishing orchards in heavy clay loam soils that are prone to waterlogging. The optimum pH for tree health is 6.0-7.5. Trees grown in alkaline soils will be more susceptible to disease.

Dieback in persimmons is an emerging disease issue for the industry. A new project has been recently contracted by Hort Innovation (PR21000) to determine the casual organisms responsible for dieback in Persimmons and develop/provide appropriate management strategies.

Persimmon growers have reported crop losses of up to 50% associated with dieback symptoms across regions of Australia. This has included impacts on the longevity of trees and death in some instances. The varieties of Jiro and Yang Fang appear to be more susceptible to dieback than Fuyu. To date fungi belonging to *Diaporthe* spp., *Botryosphaeriaceae* spp., *Diatrypaceae* spp. and *Pestalotiopsis* spp. have been isolated from symptomatic samples sent for diagnostic testing. *Diaporthe* spp. have also been isolated from asymptomatic tissues. Clarification is required on what species are present across Australia, pathogenicity and how to manage the dieback to ensure the sustainability and longevity.

## **Resistance Management**

Resistance by fungal pathogens to fungicides usually evolves following the intensive use of fungicides for disease control. In any fungal population there are likely to be individuals that have some degree of natural resistance, and which are less susceptible to fungicides, even before the chemicals are used. Resistance arises mainly through the incorrect use of fungicides, which selects for the resistant individuals. Continued use of a fungicide or fungicide chemical group can result in a significant build-up of resistant individuals in the fungal population – to the point where that particular product, or other products from the same chemical group, is no longer effective. In some cases, removal of the selection pressure can result in the fungal population regaining its sensitivity to the fungicide group, but this is not always the case. The risk of fungicide resistance developing varies between different chemical groups and different fungal pathogens, such that specific strategies are recommended for those situations considered to carry the highest risk<sup>4</sup>.

Botrytis is considered to have a high risk of resistance development. In Australia there are confirmed cases of Botrytis resistance to Groups 2, 11, 9 and 17.

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<sup>4</sup> <https://www.croplife.org.au/resources/programs/resistance-management/fungicide-resistance-management-strategies1-draft-draft-3/>

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

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

| Availability  |   | Regulatory risk (refer to Appendix 7) |   |
|---|---|---------------------------------------|---|
| A   | Available via either registration or permit approval                  | R1                                    | Short-term: Critical concern over retaining access                    |
| P   | Potential - a possible candidate to pursue for registration or permit | R2                                    | Medium-term: Maintaining access of significant concern                |
| P-A   | Potential, already approved in the crop for another use               | R3                                    | Long-term: Potential issues associated with use - Monitoring required |
| Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G) |   |                                       |   |
| Harvest   | H   | Not Required when used as directed    | NR  |
| Grazing   | G   | No Grazing Permitted                  | NG  |

| Disease / Active Ingredient (Trade Name)  | Chemical group | Activity              | WHP, days | Availability | States          | Comments   | Regulatory Risk |
|---|----------------|-----------------------|-----------|--------------|-----------------|--|-----------------|
| <b>Angular Leaf Spot</b> ( <i>Pseudocercospora</i> spp.)  |                |                       |           |              |                 |  |                 |
| <b>Priority: High</b>   |                |                       |           |              |                 |  |                 |
| Rated as a high priority in NSW and QLD, and as a low priority in SA, VIC and WA. Angular Leaf Spot has previously been referred to as Cercospora Leaf Spot. The disease can lead to leaf drop and will reduce fruit yield due to loss of photosynthetic capacity. The variety Izu appears to be more susceptible than other varieties. Orchard management strategies are critical for reducing disease incidence, including canopy management, removing, or mulching pruning's as soon as possible and using regular monitoring to ensure that fungicide applications can start before the disease becomes too severe. |                |                       |           |              |                 |  |                 |
| Chlorothalonil<br>PER13445  | M5             | Protectant            | 7         | A            | ALL (excl. VIC) | Permitted in persimmon for control of <b>Cercospora Leaf Spot</b> . Apply from 3-4 weeks after bud break to 14 days before harvest at intervals of not less than 14 days. Do not apply more than 4 times per season. Do not apply less than 3 times after shuck fall.  | R3              |
| Difenoconazole (Score)<br>PER87599  | 3              | Protectant & Curative | 28        | A            | ALL (excl. VIC) | Permitted in persimmon for control of <b>Cercospora Leaf Spot</b> and Leaf Spot. Apply at first sign of disease. Do not apply more than 4 applications per crop, with a minimum retreatment interval of 7-10 days.   | R3              |
| Mancozeb<br>PER12488  | M3             | Protectant            | 14        | A            | ALL (excl. VIC) | Permitted in persimmon for control of <b>Cercospora</b> or <b>Angular Leaf Spot</b> ( <i>Cercospora kaki</i> ). Cover sprays every 2-4 weeks from bud break to harvest at intervals of not less than 14 days. Do not apply more than 14 times in one season. Do not apply more than 6 applications after shuck fall. | R2              |

| Disease / Active Ingredient (Trade Name)                        | Chemical group | Activity              | WHP, days | Availability | States | Comments  | Regulatory Risk |
|---|----------------|-----------------------|-----------|--------------|--------|---|-----------------|
| Fluopyram + Trifloxystrobin (Luna Sensation) Bayer              | 7+11           | Protectant & Curative |           | P-A          |        | Registered in Tropical and sub-tropical fruits, inedible peel (which includes <b>American persimmons</b> ) for control of Anthracnose. ST16006 generated data to support a label registration in tropical and subtropical fruit (inedible peel) group for control of Anthracnose, Pepper Spot and Leaf Spot. Registered in Apples and Pears and there are Australian MRLS established for Pome fruit Crop Group and Assorted tropical and sub-tropical fruits – inedible peel Crop Group.   | -               |
| Fluopyram + Tebuconazole (Luna Experience) Bayer                | 7+3            | Protectant & Curative |           | P            |        | Hort Innovation project ST16006 generated data to support a label registration in persimmons for control of Anthracnose. Bayer label extension was submitted to the APVMA on 15-Sep-21 and expected registration last quarter of 2022. 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              |
| <i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer         | BM 02          | Biological            | NR        | P            |        | Registered in grapes and strawberries for control of Botrytis, in tomatoes, capsicums and chillies for suppression of Bacterial Spot and in avocado, other tropical fruit crops (excluding banana) and mango for control of Anthracnose and suppression of Stem End Rot.  | -               |
| <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.   | -               |
| Azoxystrobin + Difenconazole (Amistar Top) Syngenta             | 3+11           | Protectant & Curative |           | P            |        | Registered for control of various diseases in carrots, potatoes and tomatoes.   | R3              |

| Disease / Active Ingredient (Trade Name)              | Chemical group | Activity              | WHP, days | Availability | States | Comments   | Regulatory Risk |
|---|----------------|-----------------------|-----------|--------------|--------|--|-----------------|
| Florylpicoxamid (Telbek Adavelt) Corteva              | 21             | Protectant & Curative |           | P            |        | Registered in Australia for Septoria tritici blotch in wheat. Activity on Septoria, Powdery Mildew, Botrytis, Anthracnose, Alternaria, Scab, Monilinia, Rust and Mycosphaerella spp. Cucurbits and fruiting vegetables are the initial focus for horticulture registrations and other crops are likely to be added to the label in future. | -               |
| Hydrogen Peroxide + Peroxyacetic Acid (Peratec Plus)  | M              | Protectant            |           | P            |        | Registered for control of <b>Cercospora spp.</b> in celery.  | -               |
| Isotianil (Routine 200SC) Bayer                       | P03            | Protectant & Curative |           | P            |        | Registered for control of Yellow Sigatoka and Common Leaf Speckle in bananas.  | -               |
| Mefentrifluconazole (Belanty) BASF                    | 3              | Protectant & Curative |           | P            |        | Registered for control of Black Spot in apples and Powdery Mildew in grapes. US registration for control of <b>Cercospora</b> in corn, legume vegetables, peanuts, sorghum, millet, soybean and sugar beet.  | -               |
| Pydiflumetofen + Fludioxonil (Miravis Prime) Syngenta | 7+12           | Protectant & Curative |           | P            |        | Registered for control of various diseases in grapes, berries, leafy vegetables, lettuce and potato. US registration for control of Leaf Blight ( <b>Pseudocercospora vitis</b> ) in grapes and small fruit vine climbing (except Fuzzy Kiwifruit). APVMA MRLs for pome fruit: Pydiflumetofen T0.2 mg/kg; Fludioxonil 5 mg/kg.             | R3              |
| Tebuconazole + Azoxystrobin (Veritas) Adama           | 3+11           | Protectant            |           | P            |        | Registered for control of <b>Cercospora Leaf Spot</b> in Faba beans and Broad beans.   | R3              |
| Trifloxystrobin (Flint) BASF                          | 11             | Protectant & Curative |           | P            |        | Permitted for control of <b>Cercospora Leaf Spot</b> in beetroot. APVMA MRLs for pome fruit: Trifloxystrobin 0.7 mg/kg.  | -               |



| Disease / Active Ingredient (Trade Name)   | Chemical group | Activity              | WHP, days | Availability | States | Comments  | Regulatory Risk |
|--|----------------|-----------------------|-----------|--------------|--------|---|-----------------|
| <b>Twig Blight</b> ( <i>Phomopsis</i> spp., <i>Diplodia</i> spp.)<br><b>Priority: Moderate</b><br>Rated as a high priority in QLD, a moderate priority in NSW, SA and WA, and as a low priority in VIC. Causes sporadic, delayed budbreak after trees break dormancy in spring. Symptoms include wilt and death of leaves on new shoots. Wilt and death of blossoms and young fruit also occur. Jiro variety is less susceptible to the disease.   |                |                       |           |              |        |   |                 |
| <i>Aureobasidium pullulans</i> (Botector) Nufarm   | BM 02          | Biological            | NR        | P            |        | Registered in blackberries and raspberries for suppression of <b>Phomopsis Fruit Rot</b> .  | -               |
| Fluopyram + Tebuconazole (Luna Experience) Bayer   | 7+3            | Protectant & Curative |           | P            |        | Hort Innovation project ST16006 generated data to support a label registration in persimmons for control of Anthracnose. Bayer label extension was submitted to the APVMA on 15-Sep-21 and expected registration last quarter of 2022. US registration for suppression of <b>Phomopsis</b> Cane and Leaf Spot in small fruit vine climbing (except Fuzzy Kiwifruit).  | R3              |
| Mancozeb + Metalaxyl-M (Ridomil Gold MZ) Syngenta  | M3+4           | Protectant            |           | P            |        | Registered for control of <b>Phomopsis</b> Leaf Blight in strawberries. APVMA MRLs for pome fruit: Mancozeb 0.3 mg/kg; Metalaxyl 0.2 mg/kg.   | R2              |
| <b>Anthracnose / Pepper Spot</b> ( <i>Colletotrichum</i> spp.)<br><b>Priority: Moderate</b><br>Rated as a moderate priority in NSW, QLD and WA, and as a low priority in SA and VIC. Anthracnose is a problem in wet seasons, particularly in the more humid growing regions. Fruit is susceptible to infection from fruit set to harvest. The fungus penetrates the peel of the fruit where it normally remains dormant until the fruit ripens. Anthracnose should be managed by regular Orchard Management Practices, such as canopy management, removing prunings and regular monitoring for the disease. |                |                       |           |              |        |   |                 |
| Fluopyram + Trifloxystrobin (Luna Sensation) Bayer   | 7+11           | Protectant & Curative |           | P-A          |        | Registered in Tropical and sub-tropical fruits, inedible peel (which includes <b>American persimmons</b> ) for control of <b>Anthracnose</b> . ST16006 generated data to support a label registration in tropical and subtropical fruit (inedible peel) group for control of <b>Anthracnose</b> , Pepper Spot and Leaf Spot. Registered in Apples and Pears and there are Australian MRLs established for Pome fruit Crop Group and Assorted tropical and sub-tropical fruits – inedible peel Crop Group. | -               |

| Disease / Active Ingredient (Trade Name)                      | Chemical group | Activity              | WHP, days | Availability | States          | Comments   | Regulatory Risk |
|---|----------------|-----------------------|-----------|--------------|-----------------|--|-----------------|
| Chlorothalonil<br>PER13445                                    | M5             | Protectant            | 7         | P-A          | ALL (excl. VIC) | Permitted in persimmon for control of Cercospora Leaf Spot. Registered for control of <b>Anthracnose</b> in capsicum, peppers, cucurbits and grapes.   | R3              |
| Fluopyram + Tebuconazole<br>(Luna Experience)<br>Bayer        | 7+3            | Protectant & Curative |           | P            |                 | Hort Innovation project ST16006 generated data to support a label registration in persimmons for control of <b>Anthracnose</b> . Bayer label extension was submitted to the APVMA on 15-Sep-21 and expected registration last quarter of 2022.   | R3              |
| <i>Aureobasidium pullulans</i><br>(Botector)<br>Nufarm        | BM 02          | Biological            | NR        | P            |                 | Registered for suppression of <b>Anthracnose</b> in berries.   | -               |
| <i>Bacillus amyloliquefaciens</i><br>(Serenade Opti)<br>Bayer | BM 02          | Biological            | NR        | P            |                 | Registered for control of <b>Anthracnose</b> in avocado and several tropical fruits.   | -               |
| BLAD<br>(Problad Plus)  | BM 01          | Biological            | NR        | P            |                 | Registered in stone fruit for suppression of Brown Rot. US registration for control of <b>Anthracnose</b> , Grey Mould and Powdery Mildew in grapes strawberries and tomato.   | -               |
| Florylpicoxamid<br>(Telbek Adavelt)<br>Corteva                | 21             | Protectant & Curative |           | P            |                 | Registered in Australia for Septoria tritici blotch in wheat. Activity on Septoria, Powdery Mildew, Botrytis, <b>Anthracnose</b> , Alternaria, Scab, Monilinia, Rust and Mycosphaerella spp. Cucurbits and fruiting vegetables are the initial focus for horticulture registrations and other crops are likely to be added to the label in future. | -               |
| Isofetamid<br>(Kenja)<br>ISK / AgNova                         | 7              | Protectant & Curative |           | P            |                 | Registered for control of Botrytis Grey Mould in berries. US registration for control of <b>Anthracnose</b> in low-growing berries.  | -               |
| Isotianil<br>(Routine 200SC)<br>Bayer                         | P03            | Protectant & Curative |           | P            |                 | Registered for control of Yellow Sigatoka and Common Leaf Speckle in bananas.  | -               |

| Disease / Active Ingredient (Trade Name)  | Chemical group | Activity              | WHP, days | Availability | States | Comments  | Regulatory Risk |
|---|----------------|-----------------------|-----------|--------------|--------|---|-----------------|
| Mefentrifluconazole (Belanty)<br>BASF   | 3              | Protectant & 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.  | -               |
| Pydiflumetofen + Fludioxonil (Miravis Prime)<br>Syngenta  | 7+12           | Protectant & Curative |           | P            |        | Registered for control of <i>Botrytis</i> in berries, grapes and strawberries and control of <i>Botrytis</i> and <i>Sclerotinia</i> in leafy vegetables, lettuce and potatoes. US registration for control of <b>Anthracnose</b> in berries and grape and small fruit vine climbing (except Fuzzy Kiwifruit) and suppression of Anthracnose in lemon and lime. APVMA MRLs for pome fruit: Pydiflumetofen T0.2 mg/kg; Fludioxonil 5 mg/kg. | R3              |
| <p><b>Circular Leaf Spot</b> (<i>Mycosphaerella</i> spp.)<br/> <b>Priority: Moderate</b></p> <p>Rated as a high priority in NSW, a moderate priority in QLD, and a low priority in SA, VIC and WA. Symptoms are similar to Angular Leaf Spot, although the occurrence of the disease is more sporadic. There appears to be a varietal difference in the susceptibility to the disease. It can be a major problem especially in wet seasons in northern NSW and western Sydney. There are no fungicides registered or permitted but those used to control Angular Leaf Spot will provide protection from Circular Leaf Spot as well. The disease should be managed by regular Orchard Management Practices, such as canopy management, removing prunings, pruning tree skirts to minimise humidity in the canopy and regular monitoring for the disease.</p> |                |                       |           |              |        |   |                 |
| Florypicoxamid (Telbek Adavelt)<br>Corteva  | 21             | Protectant & Curative |           | P            |        | Registered in Australia for Septoria tritici blotch in wheat. Activity on Septoria, Powdery Mildew, Botrytis, Anthracnose, Alternaria, Scab, Monilinia, Rust and <b>Mycosphaerella spp.</b> Cucurbits and fruiting vegetables are the initial focus for horticulture registrations and other crops are likely to be added to the label in future.   | -               |
| Isotianil (Routine 200SC)<br>Bayer  | P03            | Protectant & Curative |           | P            |        | Registered for control of Yellow Sigatoka and Common Leaf Speckle in bananas.   | -               |
| Mefentrifluconazole (Belanty)<br>BASF   | 3              | Protectant & Curative |           | P            |        | Registered for control of Black Spot in apples and Powdery Mildew in grapes. US registration for control of <b>Mycosphaerella Blight</b> in legume vegetables.  | R3              |
| Pydiflumetofen + Fludioxonil (Miravis Prime)<br>Syngenta  | 7+12           | Protectant & Curative |           | P            |        | Registered for control of Botrytis in berries, grapes, and Botrytis and Sclerotinia in leafy vegetables and potato. US registration for control of <b>Mycosphaerella sp</b> in brassicas. APVMA MRLs for pome fruit: Pydiflumetofen T0.2 mg/kg; Fludioxonil 5 mg/kg.  | R3              |

| Disease / Active Ingredient (Trade Name)   | Chemical group | Activity   | WHP, days | Availability | States | Comments   | Regulatory Risk |
|--|----------------|------------|-----------|--------------|--------|--|-----------------|
| <b>Sooty Mould</b> ( <i>Capnodium</i> spp., <i>Fumago</i> spp., <i>Scorias</i> spp.)<br><b>Priority: Moderate</b><br>Rated as a moderate priority in NSW and QLD, and as a low priority in SA, VIC and WA. Sooty Mould develops as a result of honeydew excreted by sucking insect pests, such as aphids. Control of the disease is achieved by controlling the insects producing the honeydew. Although sooty moulds do not infect plants, they can impact on production by coating the leaves and calyces such that photosynthetic capacity is impacted.<br>No Fungicide control measures recommended.   |                |            |           |              |        |  |                 |
| <b>Bacterial Wilt Disease/Collar Rot</b> ( <i>Pseudomonas solanacearum</i> )<br><b>Priority: Moderate</b><br>Rated as a moderate priority in NSW, VIC and WA, and as a low priority in QLD and SA. This is a soil borne disease that cause rapid wilting in younger trees and a more gradual decline in health for older trees. Site selection for new orchards is important to avoid problems with Bacterial Wilt. Avoid growing persimmons immediately following vegetables that are susceptible, such as tomatoes, capsicum, eggplant and potatoes. Control weeds in and around the orchard, ensure good drainage, select less susceptible rootstocks and use mulching to promote tree and soil health. |                |            |           |              |        |  |                 |
| Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta   | P01            | Protectant |           | P            |        | Registered for control of Powdery Mildew and Bacterial Spot in tomatoes.   | -               |
| <i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer  | BM 02          | Biological | NR        | P            |        | Registered in grapes and strawberries for control of Botrytis, in tomatoes, capsicums and chillies for suppression of Bacterial Spot and in avocado, other tropical fruit crops (excluding banana) and mango for control of Anthracnose and suppression of Stem End Rot. US registration for control of <i>Pseudomonas syringae</i> in berries, cucurbits 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.  | -               |
| Copper   | M1             | Protectant | 1         | P            | ALL    | Registered for control of Bacterial Blight ( <i>Pseudomonas syringae</i> ) in peas.  | -               |

| Disease / Active Ingredient (Trade Name)  | Chemical group | Activity                   | WHP, days | Availability | States          | Comments  | Regulatory Risk |
|---|----------------|----------------------------|-----------|--------------|-----------------|---|-----------------|
| <b>Phytophthora Root Rot</b> ( <i>Phytophthora cinnamomi</i> )  |                |                            |           |              |                 |   |                 |
| <b>Priority: Moderate</b>   |                |                            |           |              |                 |   |                 |
| Rated as a moderate priority in NSW, QLD, SA and WA, and as low priority in VIC. Phytophthora Root Rot can have devastating impacts on sub-tropical fruit trees including death in severe cases. Ensure good drainage and irrigation management to reduce the risk of infection. Phytophthora spp. have rarely been isolated from persimmon roots in Australia.   |                |                            |           |              |                 |   |                 |
| <i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime)<br>Bayer  | BM 02          | Biological Soil Ameliorant | NR        | P-A          | ALL             | Available in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Registered for suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.                    | -               |
| Mandipropamid (Revus)<br>Syngenta   | 40             | Protectant                 |           | P            |                 | Registered for control of Downy Mildew in grapes, lettuce, leafy vegetables and oilseed poppies. US registration for control of Phytophthora in various crops, including as a foliar application for protection of citrus from <b>Phytophthora Root Rot</b> . | -               |
| Metalaxyl M (Ridomil Gold)<br>Syngenta  | 4              | Protectant & Curative      |           | P            |                 | Registered for control of <b>Phytophthora Root Rot</b> in avocados and macadamia nuts. APVMA MRLs for pome fruit: Metalaxyl 0.2 mg/kg.  | -               |
| Oxathiapiprolin (Zorvec Enicade)<br>Corteva   | 49             | Protectant                 |           | P            |                 | Registered for control of Downy Mildew in bulb vegetables, brassicas, cucurbits, leafy vegetables and poppies. US registration for control of <b>Phytophthora Canker</b> and Brown Rot in citrus.   | -               |
| Phosphorous Acid  | 33             | Protectant & Curative      |           | P            |                 | Registered for control of <b>Phytophthora Root Rot</b> in avocados, citrus, walnuts and macadamia nuts.   | -               |
| <b>Botrytis</b> ( <i>Botrytis cinerea</i> )   |                |                            |           |              |                 |   |                 |
| <b>Priority: Low</b>  |                |                            |           |              |                 |   |                 |
| Rated as a low priority in NSW, QLD, SA and VIC, and as a moderate priority in WA. Favoured by humid conditions after rain. Spores survive on plant debris and in the soil. There are no specific fungicides available for control of Botrytis although incidental protection will be provided by those targeting other foliar diseases. Use good orchard strategies including canopy management, removing pruning's and general orchard hygiene. |                |                            |           |              |                 |   |                 |
| Chlorothalonil PER13445   | M5             | Protectant                 | 7         | P-A          | ALL (excl. VIC) | Permitted in persimmon for control of Cercospora Leaf Spot. Registered for control of <b>Botrytis</b> in artichokes, capsicum, peppers, endive, radish, tomatoes, beans, lentils, ornamentals and grapes.   | R3              |

| Disease / Active Ingredient (Trade Name)                        | Chemical group | Activity              | WHP, days | Availability | States | Comments   | Regulatory Risk |
|---|----------------|-----------------------|-----------|--------------|--------|--|-----------------|
| Fluopyram + Tebuconazole (Luna Experience) Bayer                | 7+3            | Protectant & Curative |           | P            |        | Hort Innovation project ST16006 generated data to support a label registration in persimmons for control of Anthracnose. Bayer label extension was submitted to the APVMA on 15-Sep-21 and expected registration last quarter of 2022.   | R3              |
| <i>Aureobasidium pullulans</i> (Botector) Nufarm                | BM 02          | Biological            | NR        | P            |        | Registered for control of <b>Botrytis</b> in grapes and berries. US registration for control of <i>Botrytis</i> spp. in berries, grapes, pome fruit, stone fruit, almonds, fruiting vegetables, cucurbits, leafy vegetables, ornamentals and hops.   | -               |
| <i>Bacillus amyloliquefaciens</i> strain MBI 600 (Serifel) BASF | BM 02          | Biological            | NR        | P            |        | Registered for control of <b>Botrytis</b> in grapes and strawberries.  | -               |
| <i>Bacillus amyloliquefaciens</i> (Serenade Opti) Bayer         | BM 02          | Biological            |           | P            |        | Registered for control of <b>Botrytis</b> in grapes and strawberries.  | -               |
| BLAD (Problad Plus)   | BM 01          | Biological            | NR        | 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 + Fludioxonil (Switch) Syngenta                      | 9+12           | Protectant            |           | P            |        | Registered for control of <b>Botrytis</b> in capsicum, cucumber, cut flowers, grapes, green beans, green peas, lettuce, onions, alliums and strawberries. APVMA MRLs for pome fruit: Cyprodinil 0.05 mg/kg; Fludioxonil 5 mg/kg.   | R3              |
| Florylpicoxamid (Telbek Adavelt) Corteva                        | 21             | Protectant & Curative |           | P            |        | Registered in Australia for Septoria tritici blotch in wheat. Activity on Septoria, Powdery Mildew, <b>Botrytis</b> , Anthracnose, Alternaria, Scab, Monilinia, Rust and Mycosphaerella spp. Cucurbits and fruiting vegetables are the initial focus for horticulture registrations and other crops are likely to be added to the label in future. | -               |

| Disease / Active Ingredient (Trade Name)  | Chemical group | Activity                           | WHP, days | Availability | States          | Comments  | Regulatory Risk |
|---|----------------|------------------------------------|-----------|--------------|-----------------|---|-----------------|
| Pydiflumetofen + Fludioxonil (Miravis Prime)<br>Syngenta  | 7+12           | Protectant & Curative              |           | P            |                 | Registered for control of <b>Botrytis</b> in berries, leafy vegetables, lettuce, potatoes, grapes and strawberries. APVMA MRLs for pome fruit: Pydiflumetofen T0.2 mg/kg; Fludioxonil 5 mg/kg.                                  | R3              |
| <b>Pestalotiopsis Spot</b> ( <i>Pestalotiopsis diospyri</i> , <i>Pestalotiopsis theae</i> )<br><b>Priority: Low</b><br>Rated as a low priority in NSW, QLD, VIC and WA, and as a moderate priority in SA. Pestalotiopsis is favoured by wet seasons, particularly in QLD and NSW regions. There is limited information about the control of <i>Pestalotiopsis sp.</i> although macadamia growers report some impact on Dry Flower (caused by a similar pathogen) from their existing fungicide programs. Management strategies are similar to those used for other foliar diseases. |                |                                    |           |              |                 |   |                 |
| Difenoconazole (Score)<br>PER87599  | 3              | Protectant & Curative              | 28        | P-A          | ALL (excl. VIC) | Permitted in persimmon for control of Cercospora Leaf Spot and Leaf Spot.   | R3              |
| Penthiopyrad (Fontelis)<br>Corteva  | 7              | Protectant                         |           | P            |                 | Registered for control of various fungal diseases in various fruit, tree nut and vegetables crops. APVMA MRLs for pome fruit: Penthiopyrad 0.5 mg/kg.   | -               |
| Pyraclostrobin (Cabrio)<br>BASF   | 11             | Protectant & Curative              |           | P            |                 | Registered for control of Leaf Speckle, Leaf Spot and Black Sigatoka in bananas, Downy Mildew and Powdery Mildew in grapevines, Husk Spot in macadamias and Rust in almonds. APVMA MRLs for pome fruit: Pyraclostrobin 1 mg/kg. | -               |
| <b>Blue Mould / Post Harvest Rot</b> ( <i>Penicillium spp.</i> )<br><b>Priority: Low</b><br>Rated as a low priority in all states. Favoured by warm, humid weather. Harvest equipment, packing line and packing boxes should all be sanitised regularly. Rapid post-harvest cooling of fruit is essential for disease control. Wet surfaces should be dried promptly before packing. Avoid fruit injury during harvest and packing and cull infected and injured fruit during packing.  |                |                                    |           |              |                 |   |                 |
| Bromo Chloro Dimethyl Hydantoin (BCDMH)   | -              | Sanitiser / Post-Harvest Treatment | NR        | A            | ALL             | Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.            | -               |

| Disease / Active Ingredient (Trade Name)   | Chemical group | Activity   | WHP, days | Availability | States | Comments   | Regulatory Risk |
|--|----------------|--|-----------|--------------|--------|--|-----------------|
| Chlorine   | -              | Sanitiser / Post-Harvest Treatment                 | NR        | A            | ALL    | Registered in fruit as a post-harvest treatment for control of bacteria and fungi. Post-harvest spray. Must make contact with the fruit for at least 30 seconds. Can also be used as a general disinfectant for equipment. | -               |
| Fludioxonil (Scholar) Syngenta   | 12             | Pome Fruit / Post-Harvest Dip or Drench            | NR        | A            | ALL    | Registered in pome fruit as a post-harvest dip or drench for control of <b>Blue Mould</b> and Grey Mould. Maintain contact with spray solution for 30-60 seconds.  | R3              |
| Iodine (AIS Iodine Granules)   | M              | Tropical and Sub-Tropical Fruit / Post Harvest Dip | NR        | A            | ALL    | Registered in tropical and sub-tropical fruit as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.  | -               |
| Peroxyacetic Acid  | M              | Sanitiser / Post-Harvest Treatment                 | NR        | A            | ALL    | Registered in fruit as a post-harvest treatment for bacteria. Post-harvest spray or dip. Ensure a minimum of 45 seconds contact time.  | -               |
| <b>Black Spot / Post Harvest Rot (<i>Alternaria alternata</i>)</b>   |                |  |           |              |        |  |                 |
| <b>Priority: Low</b>   |                |  |           |              |        |  |                 |
| Rated as a low priority in QLD, SA, VIC and WA, and as a moderate priority in NSW. Favoured by warm, humid weather. Harvest equipment, packing line and packing boxes should all be sanitised regularly. Rapid post-harvest cooling of fruit is essential for disease control. Wet surfaces should be dried promptly before packing. Avoid fruit injury during harvest and packing and cull infected and injured fruit during packing. |                |  |           |              |        |  |                 |
| Bromo Chloro Dimethyl Hydantoin (BCDMH)  | -              | Sanitiser / Post-Harvest Treatment                 | NR        | A            | ALL    | Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.       | -               |
| Chlorine   | -              | Sanitiser / Post-Harvest Treatment                 | NR        | A            | ALL    | Registered in fruit as a post-harvest treatment for control of bacteria and fungi. Post-harvest spray. Must make contact with the fruit for at least 30 seconds. Can also be used as a general disinfectant for equipment. | -               |



| Disease / Active Ingredient (Trade Name)   | Chemical group | Activity   | WHP, days | Availability | States | Comments   | Regulatory Risk |
|--|----------------|--|-----------|--------------|--------|--|-----------------|
| Iodine (AIS Iodine Granules)   | M              | Tropical and Sub-Tropical Fruit / Post Harvest Dip | NR        | A            | ALL    | Registered in tropical and sub-tropical fruit as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.  | -               |
| <b>Transit Rot / Post Harvest Rot (<i>Rhizopus</i> spp.)</b>   |                |  |           |              |        |  |                 |
| <b>Priority: Low</b>   |                |  |           |              |        |  |                 |
| Rated as a low priority in all states. Favoured by warm, humid weather. Harvest equipment, packing line and packing boxes should all be sanitised regularly. Rapid post-harvest cooling of fruit is essential for disease control. Wet surfaces should be dried promptly before packing. Avoid fruit injury during harvest and packing and cull infected and injured fruit during packing. |                |  |           |              |        |  |                 |
| Bromo Chloro Dimethyl Hydantoin (BCDMH)  | -              | Sanitiser / Post-Harvest Treatment                 | NR        | A            | ALL    | Registered in fruit as a post-harvest treatment for control of External Rot Causing Organisms. Post-harvest spray or dip. Minimum contact time 60 seconds. Can also be used as a general disinfectant for equipment.       | -               |
| Chlorine   | -              | Sanitiser / Post-Harvest Treatment                 | NR        | A            | ALL    | Registered in fruit as a post-harvest treatment for control of bacteria and fungi. Post-harvest spray. Must make contact with the fruit for at least 30 seconds. Can also be used as a general disinfectant for equipment. | -               |
| Iodine (AIS Iodine Granules)   | M              | Tropical and Sub-Tropical Fruit / Post Harvest Dip | NR        | A            | ALL    | Registered in tropical and sub-tropical fruit as a post-harvest dip for control of bacteria and fungi. Dip the fruit for a minimum of 1 minute.  | -               |

| Disease / Active Ingredient (Trade Name)  | Chemical group | Activity                         | WHP, days | Availability | States | Comments   | Regulatory Risk |
|---|----------------|----------------------------------|-----------|--------------|--------|--|-----------------|
| <b>Armillaria Root Rot (<i>Armillaria luteobubalina</i>)</b>  |                |                                  |           |              |        |  |                 |
| <b>Priority: Low</b>  |                |                                  |           |              |        |  |                 |
| Rated as a low priority in QLD, SA, VIC and WA, and as a moderate priority in NSW. Rarely seen in persimmons orchards. Deep ripping land that is going to be planted to persimmons can help increase the rate of breakdown of remaining roots. This may lessen the susceptibility of newly planted trees to <i>Armillaria</i> spp. and other root rot organisms.  |                |                                  |           |              |        |  |                 |
| <i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime)<br>Bayer  | BM 02          | Biological<br>Soil<br>Ameliorant | NR        | P-A          | ALL    | Available in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Registered for suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane. | -               |
| <b>Fusarium Root Rot (<i>Fusarium solani</i>)</b>   |                |                                  |           |              |        |  |                 |
| <b>Priority: Low</b>  |                |                                  |           |              |        |  |                 |
| Rated as a low priority in QLD, SA, VIC and WA, and as a moderate priority in NSW. Rarely seen in persimmons orchards. To minimise the potential impacts of Fusarium root rot, manage orchards as for other root rot diseases, ensuring good drainage for soils, providing adequate irrigation without over watering, transplanting new potted plants as soon as possible, in addition to application of mulch and organic fertiliser to provide a favourable root environment for healthy tree growth. |                |                                  |           |              |        |  |                 |
| <i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime)<br>Bayer  | BM 02          | Biological<br>Soil<br>Ameliorant | NR        | P-A          | ALL    | Available in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Registered for suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane. | -               |
| Cyclobutrifluram (Tymirium)<br>Syngenta   | TBC            |                                  |           | P            |        | Under development as a nematicide but also has activity on <b><i>Fusarium</i> spp.</b>   | -               |

| Disease / Active Ingredient (Trade Name)  | Chemical group | Activity                                     | WHP, days | Availability | States | Comments   | Regulatory Risk |
|---|----------------|--|-----------|--------------|--------|--|-----------------|
| <b>Crown Gall (<i>Agrobacterium tumefaciens</i>)</b>  |                |  |           |              |        |  |                 |
| <b>Priority: Low</b>  |                |  |           |              |        |  |                 |
| Rated as a low priority in all states. Rarely seen in persimmons orchards. <i>Agrobacterium</i> can lie dormant in soil for two years or more awaiting a suitable host and will germinate when soil is moist and warm. Good site preparation will help in reducing Crown Gall infections in new orchards. Plant resistant rootstocks and use grasses as non-host rotation crops in orchards with a history of Crown Gall for up to three years. Destroy young trees that are infected with Crown Gall. Infections spread to open wounds on trees, so avoid additional damage to mature trees. |                |  |           |              |        |  |                 |
| <i>Bacillus amyloliquefaciens</i> Strain QST 713 (Serenade Prime)<br>Bayer  | BM 02          | Biological<br>Soil<br>Ameliorant             | NR        | P-A          | ALL    | Available in tree crops for application to soil to improve bioavailability of soil resources to horticultural crops. Registered for suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane. | -               |
| <i>Agrobacterium radiobacter</i> var. <i>radiobacter</i> (NoGall)<br>BASF   | -              | Biological /<br>Protectant /<br>Pre-Planting | NR        | P            |        | Registered in stone fruit for control of Crown Gall.   | -               |

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

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

| <b>Common name</b>        | <b>Scientific name</b>             |
|---------------------------|------------------------------------|
| <b>High</b>               |                                    |
| Clearwing Moth / Borer    | <i>Carmenta chrysophanes</i>       |
| Queensland Fruit Fly      | <i>Bactrocera tryoni</i>           |
| Long-Tailed Mealybug      | <i>Pseudococcus longispinus</i>    |
| Citrus Mealybug           | <i>Planococcus citri</i>           |
| Citrophilous Mealybug     | <i>Pseudococcus calciolariae</i>   |
| <b>Moderate</b>           |                                    |
| Mediterranean Fruit Fly   | <i>Ceratitis capitata</i>          |
| Tuber Mealybug            | <i>Pseudococcus viburni</i>        |
| Fruit Piercing Moth       | <i>Eudocima salamina</i>           |
| Fruit Spotting Bug        | <i>Amblypelta nitida</i>           |
| Banana Spotting Bug       | <i>Amblypelta lutescens</i>        |
| Plague Thrips             | <i>Thrips imaginis</i>             |
| Western Flower Thrips     | <i>Frankliniella occidentalis</i>  |
| European Earwig           | <i>Forficula auricularia</i>       |
| Pink Wax Scale            | <i>Ceroplastes rubens</i>          |
| White Wax Scale           | <i>Ceroplastes destructor</i>      |
| San Jose Scale            | <i>Diaspidiotus perniciosus</i>    |
| Persimmon Bud Mite        | <i>Aceria diospyri</i>             |
| Elephant Weevil           | <i>Orthorhinus cylindrirostris</i> |
| Longicorn Trunk Borer     | <i>Acalolepta mixtus</i>           |
| <b>Low</b>                |                                    |
| Red Banded Thrips         | <i>Selenothrips rubrocinctus</i>   |
| Greenhouse Thrips         | <i>Heliethrips haemorrhoidalis</i> |
| Cluster Caterpillar       | <i>Spodoptera litura</i>           |
| Flowereating Caterpillars | Lepidoptera                        |
| Orange Fruit Borer        | <i>Isotenes miserana</i>           |
| Yellow Peach Moth         | <i>Conogethes punctiferalis</i>    |

| Common name            | Scientific name                 |
|------------------------|---------------------------------|
| Light Brown Apple Moth | <i>Epiphyas postvittana</i>     |
| Twig Looper            | <i>Ectropis excursaria</i>      |
| Avocado Leaf Roller    | <i>Homona spargotis</i>         |
| Macadamia Nut Borer    | <i>Cryptophlebia ombrodelta</i> |
| Fall Armyworm          | <i>Spodoptera frugiperda</i>    |
| Ants                   | Formicidae                      |

The high priority insect pests identified by the survey were Clearwing Moth / Borer, Queensland Fruit Fly, Long-tailed Mealybug, Citrus Mealybug and Citrophilous Mealybug. Available and potential products for insect, mite and other pests are listed in Section 4.2.2.

Mating disruption is the most common method of control for Clearwing Moth. The efficacy of alternative control measures is not clearly understood at this time.

Biological control involving other insects or fungal organisms in insect pest control is another option that need to be further evaluated. There are several identified biological control agents commercially available for pests in Australia.

### **Resistance Management**

Insecticide resistance is a risk to effective control for some insect groups, particularly if there is an over-reliance on a limited number of insecticides. Growers should adhere to the resistance management strategies outlined on the CropLife website<sup>5</sup>. Growers should not exceed the maximum number of applications permitted on the insecticide label.

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<sup>5</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 priority insects and mites

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

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

| Pest / Active Ingredient (Trade Name)  | Chemical group | Activity          | WHP, days | Availability | States    | Comments   | Impact on beneficials | Regulatory Risk |
|--|----------------|-------------------|-----------|--------------|-----------|--|-----------------------|-----------------|
| <b>Clearwing Borer Moth</b> ( <i>Carmentia chrysophanes</i> ) / ( <i>Ichneumenoptera chrysophanes</i> )  |                |                   |           |              |           |  |                       |                 |
| <b>Priority: High</b>  |                |                   |           |              |           |  |                       |                 |
| Rated as a high priority in QLD and SA, a moderate priority in NSW, and as a low priority in VIC and WA. Adults lay eggs in cracks in the bark. The borer is the larval stage of the Clearwing Moth. On hatching, the larvae tunnel through the bark and the top layer of wood. Infestation can lead to sudden death of branches. There are varietal differences with the incidence and severity of Clearwing Moth damage. Izu is highly susceptible to Clearwing Moth, Fuyu moderately susceptible and Jiro mildly susceptible. Izu may be more susceptible because of its rough bark. The pest can be controlled naturally by beneficial insects (Parasitic Wasps) in the absence of disruptive chemicals. |                |                   |           |              |           |  |                       |                 |
| Garlic + Chilli + Pyrethrins + Piperonyl Butoxide  | 3A             | Contact           | 1         | A            | ALL       | Registered in fruit trees for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhopper. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.   | VH<br>Bee:H           | -               |
| Octadecadien (Clearwing Borer Mating Disruption Agent)<br>Insense<br>PER88722  | -              | Mating Disruption | NR        | A            | NSW & QLD | Permitted in Persimmons for management of <b>Clearwing Borer</b> . Tie dispensers to branches in the lower canopy prior to first moth emergence in spring. A repeat application may be required approximately 90 days after the first application, depending on moth activity in the orchard.<br><a href="https://www.insense.com.au/uploads/2/3/4/0/23409202/pcwb_mating_disruption_manual_april_2020.pdf">https://www.insense.com.au/uploads/2/3/4/0/23409202/pcwb_mating_disruption_manual_april_2020.pdf</a> | VL<br>Bee:VL          | -               |

| Pest / Active Ingredient (Trade Name)                   | Chemical group | Activity            | WHP, days | Availability | States             | Comments  | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|--------------------|---|-----------------------|-----------------|
| Octadecadien (Shin Etsu MD Carmenta Pheromone) PER13176 | -              | Mating Disruption   | NR        | A            | ALL                | Permitted in Persimmons (field grown) for management of Clearwing Borer. Tie dispensers to branches in the lower canopy prior to first moth emergence in spring. A repeat application may be required approximately 90 days after the first application, depending on moth activity in the orchard.                   | VL<br>Bee:VL          | -               |
| Tetraniliprole (Vayego) Bayer                           | 28             | Ingestion           | 7<br>NG   | P-A          | ALL                | Hort Innovation project ST17000 generated data in persimmons to support a label registration for control of Clearwing Moths /Borer.<br>Registered in pome fruit crop group (including Japanese Persimmons) for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil. | M<br>Bee:VH           | -               |
| Indoxacarb (Avatar eVo) FMC                             | 22A            | Ingestion           | 14<br>NG  | P-A          | ALL                | Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Cotton Bollworm, Native Budworm, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.  | L<br>Bee:H            | R3              |
| Methoxyfenozide (Venturi Max) Adama                     | 18             | Ingestion           | 7<br>NG   | P-A          | ALL<br>(excl. VIC) | Registered in persimmons for control of Leaf Roller, Yellow Peach Moth, Light Brown Apple Moth and Orange Fruitborer. Registered in Pome fruit crop group for Light Brown Apple Moth and Loopers.   | VL<br>Bee:VL          | -               |
| Spinosad (Entrust Organic) Corteva                      | 5              | Ingestion           | NR        | P-A          | ALL                | Registered in persimmons for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, Red-Banded Thrips and Sorghum Head Caterpillar.  | L<br>Bee:L            | -               |
| Broflanilide (Vedira) BASF                              | 30             | Contact & Ingestion |           | P            |                    | Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.   | -                     | -               |
| Isocycloseram (Simodis) Syngenta                        | 30             | Ingestion           |           | P            |                    | First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.  | -                     | -               |

| Pest / Active Ingredient (Trade Name)   | Chemical group | Activity            | WHP, days | Availability | States          | Comments  | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|-----------------|---|-----------------------|-----------------|
| <b>Queensland Fruit Fly (<i>Bactrocera tryoni</i>)</b><br><b>Mediterranean Fruit Fly (<i>Ceratitis capitata</i>)</b><br><b>Priority: High</b><br>Queensland Fruit Fly is rated as a high priority in all states except WA, where it is rated as a moderate priority. Mediterranean Fruit Fly is rates as a high priority in QLD, a moderate priority in NSW, SA and WA, and as a low priority in VIC. Queensland Fruit Fly lay eggs in ripening fruit, subsequently hatching maggots that cause feeding damage to the flesh. A range of control measures should be implemented in order to control the pest and avoid fruit damage. |                |                     |           |              |                 |   |                       |                 |
| 4-(P-Acetoxyphenyl)-2-Butanone + Malathion  | 1B             | Contact             | NR        | A            | ALL             | Registered as a Lure Trap for control of <b>Queensland Fruit Fly</b> . For use as a monitoring tool in conjunction with a routine baiting program or cover sprays.  | H<br>Bee:H            | R3              |
| Acetamiprid + Pyriproxyfen (Trivor) Adama PER89943  | 4A+7C          | Contact & Ingestion | 28<br>NG  | A            | ALL (excl. VIC) | Pending Label Registration with ADAMA (Hort Innovation project ST16006). Permitted in persimmons for control of Fruit Spotting Bugs ( <i>Amblypelta nitida</i> , <i>A.lutescens</i> ), Mealybugs (Pseudococcidae), Scale Insects (Coccoidea), Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ), and suppression of <b>Queensland Fruit Fly (<i>Bactrocera tryoni</i>)</b> and <b>Mediterranean Fruit Fly (<i>Ceratitis capitata</i>)</b> . Do not apply during flowering. Do not apply more than 2 applications per season. Do not apply less than 14 days after the initial treatment. | M<br>Bee:M            | R2              |
| Alpha-Cypermethrin PER85550   | 3A             | Contact             | 14<br>NG  | A            | ALL             | Permitted in persimmons for control of <b>Fruit Fly</b> . Apply a maximum of 6 applications per crop, with a minimum retreatment interval of 7 days. Do not apply more than 2 consecutive applications before rotating with another mode of action.   | VH<br>Bee:H           | -               |
| Clothianidin (Samurai)  | 4A             | Contact & Ingestion | 7<br>NG   | A            | ALL             | Registered in persimmons for control of <b>Queensland Fruit Fly</b> and <b>Mediterranean Fruit Fly</b> . Apply 3 consecutive foliar sprays 7 days apart when monitoring indicates fruit fly activity.   | M<br>Bee:VH           | R2              |
| Dimethoate PER13859   | 1B             | Contact             | NR        | A            | ALL             | Permitted in non-bearing fruit fly host crops for control of <b>Fruit Fly</b> . Apply as a foliar and/or ground cover spray to both fallen and retained fruit after final harvest. Do not use more than 2 applications per season.  | H<br>Bee:H            | R1              |



| Pest / Active Ingredient (Trade Name)    | Chemical group | Activity            | WHP, days | Availability | States               | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|----------------------|---|-----------------------|-----------------|
| Malathion (Fyfanon)                      | 1B             | Contact             | 3         | A            | ALL                  | Registered in persimmons for control of <b>Fruit Fly</b> . Apply a maximum of 4 applications per season, with a minimum of 7 days between consecutive sprays.   | H<br>Bee:H            | R3              |
| Spinosad (Naturalure) Corteva            | 5              | Ingestion           | NR        | A            | ALL                  | Registered in tree crops as a bait application for the control of <b>Queensland Fruit Fly</b> and <b>Mediterranean Fruit Fly</b> . Apply as a band or a spot spray every 7 days. Maximum number of applications not specified.  | L<br>Bee:L            | -               |
| Trichlorfon (Lepidex) PER12450           | 1B             | Contact             | 7<br>G:7  | A            | ALL (excl. VIC, TAS) | Permitted in persimmons for control of <b>Queensland Fruit Fly</b> and <b>Mediterranean Fruit Fly</b> . Apply a maximum of 4 applications per season with a retreatment interval of 7-10 days.  | H<br>Bee:H            | R2              |
| Tetraniliprole (Vayego) Bayer            | 28             | Ingestion           | 7<br>NG   | P-A          | ALL                  | Hort Innovation project ST17000 generated data in persimmons to support a label registration for control of Clearwing Moths /Borer. Registered in pome fruit crop group (including Japanese Persimmons) for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil. Registered for control of <b>Mediterranean Fruit Fly</b> in stone fruit. | M<br>Bee:VH           | -               |
| Abamectin                                | 6              | Contact & Ingestion |           | P            |                      | Registered for control of <b>Queensland Fruit Fly</b> in blackberries, raspberries and citrus. APVMA MRLs for pome fruit: Abamectin 0.01 mg/kg.   | M<br>Bee:H            | -               |
| Acetamiprid + Novaluron (Cormoran) Adama | 4A+15          | Contact & Ingestion |           | P            |                      | Registered for suppression of <b>Mediterranean Fruit Fly</b> and <b>Queensland Fruit Fly</b> in stone fruit.  | M<br>Bee:M            | R2              |

| Pest / Active Ingredient (Trade Name)  | Chemical group | Activity            | WHP, days | Availability | States          | Comments   | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|-----------------|--|-----------------------|-----------------|
| Flupyradifurone (Sivanto Prime) Bayer  | 4D             | Contact & Ingestion |           | P            |                 | Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. Possible activity against fruit fly. Registration pending in Tropical and Sub-Tropical Fruit (Inedible Peel) including for persimmons for control of Banana Spotting Bug, Fruit Spotting Bug, Green Planthopper and Mango Planthopper. Pending Label Registration with Bayer (submitted Dec-21) for the tropical inedible peel crop group for control of Fruit spotting bugs (Hort Innovation project ST19020) | L<br>Bee:L            | -               |
| <p><b>Long-Tailed Mealybug</b> (<i>Pseudococcus longispinus</i>)<br/> <b>Citrus Mealybug</b> (<i>Planococcus citri</i>)<br/> <b>Citrophilous Mealybug</b> (<i>Pseudococcus calciolariae</i>)<br/> <b>Tuber Mealybug</b> (<i>Pseudococcus viburni</i>)<br/> <b>Priority: High</b></p> <p>Mealybug are rated as a high priority in NSW, QLD and SA, a moderate priority in WA, and as a low priority in VIC. Mealybug can cause cosmetic damage to trees and will excrete honeydew which promotes sooty mould outbreaks. Preserving beneficials will assist with management. Citrus Mealybug occurs throughout Australia but is much more common in coastal districts and in the areas north of Sydney in the eastern states. Longtail Mealybugs are more prevalent in Victoria and South Australia. Mealybugs are normally found from mid-November with reasonable populations tending to build up by mid-December.</p> |                |                     |           |              |                 |  |                       |                 |
| Acetamiprid + Pyriproxyfen (Trivor) Adama PER89943   | 4A+7C          | Contact & Ingestion | 28 NG     | A            | ALL (excl. VIC) | Pending Label Registration with ADAMA (Hort Innovation project ST16006). Permitted in persimmons for control of Fruit Spotting Bugs ( <i>Amblypelta nitida</i> , <i>A. lutescens</i> ), <b>Mealybugs</b> (Pseudococcidae), Scale Insects (Coccoidea), Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ), and suppression of Queensland Fruit Fly ( <i>Bactrocera tryoni</i> ) and Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> ). Do not apply during flowering. Do not apply more than 2 applications per season. Do not apply less than 14 days after the initial treatment. | M<br>Bee:M            | R2              |

| Pest / Active Ingredient (Trade Name)     | Chemical group | Activity            | WHP, days | Availability | States          | Comments  | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|-----------------|---|-----------------------|-----------------|
| Buprofezin (Applaud) Corteva              | 16             | Ingestion           | 14        | A            | ALL             | Registered in persimmons for control of <b>Mealybug</b> and Scale Insects. Apply when the first batch of scale or mealybug crawlers appear after winter. Apply a maximum of 2 sprays per season, 14 days apart.   | L<br>Bee:L            | -               |
| Chlorpyrifos PER14547                     | 1B             | Contact             | 14        | A            | ALL (excl. VIC) | Permitted in persimmons for control of <b>Mealybug</b> . Apply initially at petal fall and then 10-14 days later. Apply a follow-up application if necessary 2-3 weeks prior to harvest. Do not use more than 3 applications per growing season.  | H<br>Bee:H            | R1              |
| Clothianidin (Samurai) PER14779           | 4A             | Contact & Ingestion | NR<br>NG  | A            | ALL (excl. VIC) | Permitted in persimmons for control of <b>Mealybug</b> . Apply as a soil drench between the green tip and flowering stage only. Do not use more than 1 application per persimmon block per season.  | M<br>Bee:VH           | R2              |
| Ethyl Formate                             | 8A             | Fumigant            | NR        | A            | ALL             | Registered in persimmons as a post-harvest fumigant for control of Light Brown Apple Moth, Red Back Spiders, Two Spotted Mite, <b>Long Tailed Mealybug</b> , Western Flower Thrips and Plague Thrips. For use by persons trained in the proper use of application equipment, required detection devices, safe use and handling of the fumigant. | -                     | -               |
| Fonicamid (Mainman) UPL PER89215          | 29             | Ingestion           | 21<br>NG  | A            | ALL (excl. VIC) | Permitted in Japanese persimmons for control of <b>Mealybug</b> and suppression of thrips, including Plague Thrips, Redbanded Thrips, Greenhouse Thrips and Western Flower Thrips. Do not apply more than 3 applications per crop. Do not apply less than 14 days after the initial treatment.  | M<br>Bee:VL           | -               |
| Potassium Salts of Fatty Acid (Natrasoap) | -              | Contact             | NR        | A            | ALL             | Registered in fruit trees for control of Aphids, Thrips, <b>Mealybug</b> , Two Spotted Mites, Spider Mite, and Whitefly. Do not use during the hot part of the day. Use a retreatment interval of 5-7 days. Maximum number of applications not specified.   | L<br>Bee:L            | -               |

| Pest / Active Ingredient (Trade Name)    | Chemical group | Activity  | WHP, days | Availability | States          | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|-----------|-----------|--------------|-----------------|---|-----------------------|-----------------|
| Spirotetramat (Movento) Bayer            | 23             | Ingestion | 21        | A            | ALL             | Registered in pome fruit for control of <b>Long Tailed Mealybug</b> ( <i>Pseudococcus longispinus</i> ), <b>Tuber Mealybug</b> ( <i>Pseudococcus virburni</i> ), San Jose Scale ( <i>Quadraspidiotus perniciosus</i> ), and suppression of Woolly Apple Aphid ( <i>Eriosoma lanigerum</i> ). Do not apply more than 3 applications per crop, with a minimum 14 days between applications.   | M<br>Bee:L            | -               |
| Sulfoxaflor (Transform) Corteva          | 4C             | Ingestion | 7         | A            | ALL             | Registered in pome fruit for control of Apple Dimpling Bug, Long Tailed Mealybug, Tuber Mealybug, Woolly Apple Aphid and San Jose Scale. Apply a maximum of 2 applications per season, with a re-treatment interval of 14 days. Pending label extension submission variation of Transform label to include new crops, assorted tropical and subtropical fruit (inedible peel) (except banana), cane berries, carob, forage brassicas, herbs and spices, lucerne, persimmons and pineapple, and new pests in canola, pulses and strawberries in addition to several changes to existing label claims.  | M<br>Bee:H            | -               |
| Sulfoxaflor (Transform) Corteva PER87067 | 4C             | Ingestion | 7         | A            | ALL (excl. VIC) | Pending Label Registration (submitted Jul-21) with Corteva for Persimmons (Hort Innovation project ST16006) Permitted in persimmons for control of <b>Mealybugs</b> . Apply a maximum of 2 foliar applications per persimmon block per season, with a minimum retreatment interval of 14 days. Pending label extension submission variation of Transform label to include new crops, assorted tropical and subtropical fruit (inedible peel) (except banana), cane berries, carob, forage brassicas, herbs and spices, lucerne, persimmons and pineapple, and new pests in canola, pulses and strawberries in addition to several changes to existing label claims. | M<br>Bee:H            | -               |

| Pest / Active Ingredient (Trade Name)  | Chemical group | Activity            | WHP, days | Availability | States | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|--------|---|-----------------------|-----------------|
| Flupyradifurone (Sivanto Prime) Bayer  | 4D             | Contact & Ingestion |           | P            |        | Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of mealybug in citrus and small fruit vine climbing (except Fuzzy Kiwifruit). Registration pending in Tropical and Sub-Tropical Fruit (Inedible Peel) including for persimmons for control of Banana Spotting Bug, Fruit Spotting Bug, Green Planthopper and Mango Planthopper. Pending Label Registration with Bayer (submitted Dec-21) for the tropical inedible peel crop group for control of Fruit spotting bugs (Hort Innovation project ST19020) | L<br>Bee:L            | -               |
| NUL3145 Nufarm   | TBC            | Biological          | NR        | P            |        | New insecticide in development from Nufarm with activity on Scale, Nematodes, Mealybug and Whitefly.  |                       | -               |
| <b>Fruit Piercing Moth (<i>Eudocima salamina</i>)</b><br><b>Priority: Moderate</b><br>Rated as a moderate priority in NSW and QLD, and as a low priority in SA, VIC and WA. A sporadic pest that will cause substantial damage when present. Adults feed by penetrating the skin of ripe or ripening fruit causing internal injury and secondary rots. |                |                     |           |              |        |   |                       |                 |
| Garlic + Chilli + Pyrethrins + Piperonyl Butoxide  | 3A             | Contact             | 1         | A            | ALL    | Registered in fruit trees for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhopper. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.  | VH<br>Bee:H           | -               |
| Tetraniliprole (Vayego) Bayer  | 28             | Ingestion           | 7<br>NG   | P-A          | ALL    | Hort Innovation project ST17000 generated data in persimmons to support a label registration for control of Clearwing Moths /Borer. Registered in pome fruit crop group (including Japanese Persimmons) for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.  |                       |                 |

| Pest / Active Ingredient (Trade Name)                      | Chemical group | Activity            | WHP, days | Availability | States             | Comments   | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|--------------------|--|-----------------------|-----------------|
| Abamectin + Chlorantraniliprole (Voliam Targo)<br>Syngenta | 6+28           | Contact & Ingestion | 7<br>G:28 | P-A          | ALL                | Registered in pome fruit for control of Codling Moth ( <i>Cydia pomonella</i> ), Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ), Cotton Bollworm ( <i>Helicoverpa armigera</i> ), Native Budworm ( <i>Helicoverpa punctigera</i> ), Oriental Fruit Moth ( <i>Grapholita molesta</i> ), Two Spotted Mite ( <i>Tetranychus urticae</i> ) and European Red Mite ( <i>Panonychus ulmi</i> ). | M<br>Bee:H            | -               |
| Chlorantraniliprole (Altacor Hort)<br>FMC                  | 28             | Ingestion           | 14<br>NG  | P-A          | ALL                | Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Cotton Bollworm, Native Budworm and Oriental Fruit Moth.   | L<br>Bee:VL           | -               |
| Indoxacarb (Avatar eVo)<br>FMC                             | 22A            | Ingestion           | 14<br>NG  | P-A          | ALL                | Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Cotton Bollworm, Native Budworm, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.   | L<br>Bee:H            | R3              |
| Methoxyfenozide (Venturi Max)<br>Adama                     | 18             | Ingestion           | 7<br>NG   | P-A          | ALL<br>(excl. VIC) | Registered in n persimmons for control of Leaf Roller, Yellow Peach Moth, Light Brown Apple Moth and Orange Fruitborer. Registered in Pome fruit crop group for Light Brown Apple Moth and Loopers.  | VL<br>Bee:VL          | -               |
| Spinetoram (Success Neo)<br>Corteva                        | 5              | Ingestion           | NR        | P-A          | ALL                | Registered in persimmons for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, Red-Banded Thrips and Sorghum Head Caterpillar.   | M<br>Bee:H            | -               |
| Spinosad (Entrust Organic)<br>Corteva                      | 5              | Ingestion           | NR        | P-A          | ALL                | Registered in persimmons for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, Red-Banded Thrips and Sorghum Head Caterpillar.   | L<br>Bee:L            | -               |
| Broflanilide (Vedira)<br>BASF                              | 30             | Contact & Ingestion |           | P            |                    | Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.  | -                     | -               |
| Chlorfenapyr (Phantom)<br>BASF                             | 13             | Contact / IGR       |           | P            |                    | Registered for control of Diamondback Moth and Cabbage White Butterfly in Brassica vegetables. APVMA MRLs for pome fruit: Chlorfenapyr 0.5 mg/kg.  | H<br>Bee:H            | -               |
| Isocycloseram (Simodis)<br>Syngenta                        | 30             | Ingestion           |           | P            |                    | First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.   | -                     | -               |

| Pest / Active Ingredient (Trade Name)   | Chemical group | Activity            | WHP, days | Availability | States                | Comments  | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|-----------------------|---|-----------------------|-----------------|
| <b>Fruit Spotting Bug</b> ( <i>Amblypelta nitida</i> )<br><b>Banana Spotting Bug</b> ( <i>Amblypelta lutescens</i> )<br><b>Priority: Moderate</b><br>Rated as a moderate priority in NSW and QLD, and as a low priority in SA, VIC and WA. These are serious pests which sting the fruit at all stages from fruit set until picking. Damage caused affects the marketability of fruit. An insecticide program is required to protect the developing fruit. It may be possible to identify and treat hot-spots in the orchard. |                |                     |           |              |                       |   |                       |                 |
| Acetamiprid + Pyriproxyfen (Trivor) Adama PER89943  | 4A+7C          | Contact & Ingestion | 28 NG     | A            | ALL (excl. VIC)       | Pending Label Registration with ADAMA (Hort Innovation project ST16006). Permitted in persimmons for control of <b>Fruit Spotting Bugs</b> ( <i>Amblypelta nitida</i> , <i>A.lutescens</i> ), Mealybugs (Pseudococcidae), Scale Insects (Coccoidea), Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ), and suppression of Queensland Fruit Fly ( <i>Bactrocera tryoni</i> ) and Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> ). Do not apply during flowering. Do not apply more than 2 applications per season. Do not apply less than 14 days after the initial treatment. | M<br>Bee:M            | R2              |
| Beta-Cyfluthrin (Bulldock) PER80374   | 3A             | Contact             | 7         | A            | NSW, NT, QLD, SA & WA | Permitted in persimmons (field-grown) for control of <b>Fruit-Spotting Bug, Banana-Spotting Bug</b> , Elephant or Rhino Beetle, Red-Shouldered Leaf Beetle, Swarming Leaf Beetle, Longicorn Trunk Borer, Macadamia Nut Borer, Mango Tip Borer, Flatid Planthopper, Green Vegetable Bug, Lychee Stink Bug and Yellow Peach Moth. Do not use at flowering. Do not apply more than 4 applications per year with a minimum of 21 days between consecutive sprays.   | VH<br>Bee:H           | R3              |
| Trichlorfon (Lepidex) PER14743  | 1B             | Contact             | 7         | A            | ALL (excl. VIC)       | Permitted in persimmons for control of Flatid Planthopper Flower-Eating Caterpillar, Loopers, Yellow Peach Moth, and suppression of <b>Fruit-Spotting Bug</b> , Banana-Spotting Bug, Green Vegetable Bug and Lychee Stink Bug. Do not apply more than 6 applications per crop with a minimum re-treatment interval of 7-10 days between consecutive applications.   | H<br>Bee:H            | R2              |

| Pest / Active Ingredient (Trade Name) | Chemical group | Activity            | WHP, days | Availability | States | Comments  | Impact on beneficials | Regulatory Risk |
|---------------------------------------|----------------|---------------------|-----------|--------------|--------|---|-----------------------|-----------------|
| Sulfoxaflor (Transform) Corteva       | 4C             | Ingestion           | 7         | P-A          | ALL    | Pending Label Registration (submitted Jul-21) with Corteva for Persimmons (Hort Innovation project ST16006) Registered in pome fruit for control of Apple Dimpling Bug, Long Tailed Mealybug, Tuber Mealybug, Woolly Apple Aphid and San Jose Scale. Registered for control of Fruit Spotting Bug in citrus. Pending label extension submission variation of Transform label to include new crops, assorted tropical and subtropical fruit (inedible peel) (except banana), cane berries, carob, forage brassicas, herbs and spices, lucerne, persimmons and pineapple, and new pests in canola, pulses and strawberries in addition to several changes to existing label claims. | M<br>Bee:H            | -               |
| Flupyradifurone (Sivanto Prime) Bayer | 4D             | Contact & Ingestion |           | P            |        | Registered for control of <b>Fruit Spotting Bug</b> in macadamias, avocados, mangoes and papaya. Registration pending in Tropical and Sub-Tropical Fruit (Inedible Peel) including for persimmons for control of Banana Spotting Bug, <b>Fruit Spotting Bug</b> , Green Planthopper and Mango Planthopper. Pending Label Registration with Bayer (submitted Dec-21) for the tropical inedible peel crop group for control of Fruit spotting bugs (Hort Innovation project ST19020)  | L<br>Bee:L            | -               |



| Pest / Active Ingredient (Trade Name)  | Chemical group | Activity  | WHP, days | Availability | States          | Comments   | Impact on beneficials | Regulatory Risk |
|--|----------------|-----------|-----------|--------------|-----------------|--|-----------------------|-----------------|
| <p><b>Plague Thrips</b> (<i>Tetranychus urticae</i>)<br/> <b>Western Flower Thrips</b> (<i>Frankliniella occidentalis</i>)<br/> <b>Red Banded Thrips</b> (<i>Selenothrips rubrocinctus</i>)<br/> <b>Greenhouse Thrips</b> (<i>Heliethrips haemorrhoidalis</i>)<br/> <b>Priority: Moderate</b></p> <p>Thrips are rated as a high priority in QLD, and a low priority in NSW, SA, VIC and WA. Thrips will cause damage from flowering onwards. The nymphs cause scarring and dimpling damage through feeding on the flowers and developing fruit. Late season damage can be seen as silvering on the fruit as it ripens.</p> |                |           |           |              |                 |  |                       |                 |
| Ethyl Formate  | 8A             | Fumigant  | NR        | A            | ALL             | Registered in persimmons as a post-harvest fumigant for control of Light Brown Apple Moth, Red Back Spiders, Two Spotted Mite, Long Tailed Mealybug, <b>Western Flower Thrips</b> and <b>Plague Thrips</b> . For use by persons trained in the proper use of application equipment, required detection devices, safe use and handling of the fumigant. | -                     | -               |
| Fonicamid (Mainman) UPL PER89215   | 29             | Ingestion | 21 NG     | A            | ALL (excl. VIC) | Permitted in Japanese persimmons for control of Mealybug and suppression of thrips, including Plague Thrips, <b>Redbanded Thrips</b> , <b>Greenhouse Thrips</b> and <b>Western Flower Thrips</b> . Do not apply more than 3 applications per crop. Do not apply less than 14 days after the initial treatment.   | M<br>Bee:VL           | -               |
| Garlic + Chilli + Pyrethrins + Piperonyl Butoxide  | 3A             | Contact   | 1         | A            | ALL             | Registered in fruit trees for control of Ants, Aphids, Caterpillars, Earwigs, Whitefly, <b>Thrips</b> and Leafhopper. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.  | VH<br>Bee:H           | -               |
| Methomyl (Lannate) PER14548  | 1A             | Contact   | NR        | A            | ALL             | Permitted in persimmons for control of <b>Thrips</b> . Do not apply more than 3 applications per season. Apply consecutive sprays at 10-14 day interval between applications.  | H<br>Bee:H            | R2              |
| Potassium Salts of Fatty Acid (Natrasoap)  | -              | Contact   | NR        | A            | ALL             | Registered in fruit trees for control of Aphids, <b>Thrips</b> , Mealybug, Two Spotted Mites, Spider Mite, and Whitefly. Do not use during the hot part of the day. Use a retreatment interval of 5-7 days. Maximum number of applications not specified.  | L<br>Bee:L            | -               |

| Pest / Active Ingredient (Trade Name)    | Chemical group | Activity            | WHP, days | Availability | States | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|--------|---|-----------------------|-----------------|
| Spinetoram (Success Neo) Corteva         | 5              | Ingestion           | NR        | A            | ALL    | Registered in persimmons for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, <b>Red-Banded Thrips</b> and Sorghum Head Caterpillar. Do not apply more than 4 applications per season. Apply repeat applications at 7-14 day intervals.  | M<br>Bee:H            | -               |
| Spinosad (Entrust Organic) Corteva       | 5              | Ingestion           | NR        | A            | ALL    | Registered in persimmons for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, <b>Red-Banded Thrips</b> and Sorghum Head Caterpillar. Do not apply more than 4 applications per season. Apply repeat applications at 7-14 day intervals.  | L<br>Bee:L            | -               |
| Spirotetramat (Movento) Bayer            | 23             | Ingestion           | 21        | P-A          | ALL    | Registered in pome fruit for control of Long Tailed Mealybug, Tuber Mealybug, San Jose Scale, and suppression of Woolly Apple Aphid. Registered for control of Thrips in green beans, celery, rhubarb, eggplant, peppers, tomatoes, herbs, lettuce, bulb vegetables, citrus and grapes.   | M<br>Bee:L            | -               |
| <i>Beauveria bassiana</i> (Velifer) BASF | UN             | Biological          | NR        | P            |        | Registered for suppression of Western Flower Thrips in protected vegetables.  | L<br>Bee:L            | -               |
| Flupyradifurone (Sivanto Prime) Bayer    | 4D             | Contact & Ingestion |           | P            |        | Registered for control of Scirtothrips in macadamias. Registration pending in Tropical and Sub-Tropical Fruit (Inedible Peel) including for persimmons for control of Banana Spotting Bug, Fruit Spotting Bug, Green Planthopper and Mango Planthopper. Pending Label Registration with Bayer (submitted Dec-21) for the tropical inedible peel crop group for control of Fruit spotting bugs (Hort Innovation project ST19020) | L<br>Bee:L            | -               |
| Isocycloseram (Simodis) Syngenta         | 30             | Ingestion           |           | P            |        | First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.  | -                     | -               |

| Pest / Active Ingredient (Trade Name)  | Chemical group | Activity            | WHP, days | Availability | States          | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|-----------------|---|-----------------------|-----------------|
| <b>European Earwig</b> ( <i>Forficula auricularia</i> )  |                |                     |           |              |                 |   |                       |                 |
| <b>Priority: Moderate</b>  |                |                     |           |              |                 |   |                       |                 |
| Ranked as a moderate priority in NSW, SA and WA, and as a low priority in QLD and VIC. European Earwigs can damage plants and fruit if present in large numbers.   |                |                     |           |              |                 |   |                       |                 |
| Garlic + Chilli + Pyrethrins + Piperonyl Butoxide  | 3A             | Contact             | 1         | A            | ALL             | Registered in fruit trees for control of Ants, Aphids, Caterpillars, <b>Earwigs</b> , Whitefly, Thrips and Leafhopper. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.  | VH<br>Bee:H           | -               |
| Indoxacarb (Avatar eVo) FMC  | 22A            | Ingestion           | 14<br>NG  | P-A          | ALL             | Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Cotton Bollworm, Native Budworm, Apple Weevil, Fuller's Rose Weevil and Garden Weevil. Registered for control of Earwigs in stone fruit and strawberries.   | L<br>Bee:H            | R3              |
| Broflanilide (Vedira) BASF   | 30             | Contact & Ingestion |           | P            |                 | Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms and other soil pests, and a foliar treatment for the control of chewing pests in various crops.  | -                     | -               |
| <b>Pink Wax Scale</b> ( <i>Ceroplastes rubens</i> )  |                |                     |           |              |                 |   |                       |                 |
| <b>White Wax Scale</b> ( <i>Ceroplastes destructor</i> )   |                |                     |           |              |                 |   |                       |                 |
| <b>San Jose Scale</b> ( <i>Diaspidiotus perniciosus</i> )  |                |                     |           |              |                 |   |                       |                 |
| <b>Priority: Moderate</b>  |                |                     |           |              |                 |   |                       |                 |
| Scale insects are rated as a moderate priority in NSW, QLD and WA, and as a low priority in SA and VIC. Management of Scale should focus on preventing infestations and managing populations before they build up. Strategies include the promotion or introduction of beneficials along with judicious use of insecticides. |                |                     |           |              |                 |   |                       |                 |
| Acetamiprid + Pyriproxyfen (Trivor) Adama PER89943   | 4A+7C          | Contact & Ingestion | 28<br>NG  | A            | ALL (excl. VIC) | Pending Label Registration with ADAMA (Hort Innovation project ST16006). Permitted in persimmons for control of Fruit Spotting Bugs ( <i>Amblypelta nitida</i> , <i>A.lutescens</i> ), Mealybugs (Pseudococcidae), <b>Scale Insects</b> (Coccoidea), Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ), and suppression of Queensland Fruit Fly ( <i>Bactrocera tryoni</i> ) and Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> ). Do not apply during flowering. Do not apply more than 2 applications per season. Do not apply less than 14 days after the initial treatment. | M<br>Bee:M            | R2              |

| Pest / Active Ingredient (Trade Name) | Chemical group | Activity            | WHP, days | Availability | States          | Comments  | Impact on beneficials | Regulatory Risk |
|---------------------------------------|----------------|---------------------|-----------|--------------|-----------------|---|-----------------------|-----------------|
| Buprofezin (Applaud) Corteva          | 16             | Ingestion           | 14        | A            | ALL             | Registered in persimmons for control of Mealybug and <b>Scale Insects</b> . Apply when the first batch of scale or mealybug crawlers appear after winter. Apply a maximum of 2 sprays per season, 14 days apart.  | L<br>Bee:L            | -               |
| Petroleum Oil                         | UN             | Contact             | 1         | A            | ALL             | Registered in pome fruit for control of <b>San Jose Scale</b> , Oyster Shell Scale, Bryobia Mite Eggs and European Mite Eggs. Maximum number of treatments and retreatment interval not specified.  | VL<br>Bee:L           | -               |
| Petroleum Oil PER13933                | UN             | Contact             | 1         | A            | ALL (excl. VIC) | Permitted in persimmons for control of <b>Scale Insects</b> . Apply during dormant period up to green tip or bud swell. Maximum number of treatments and retreatment interval not specified.  | VL<br>Bee:L           | -               |
| Spirotetramat (Movento) Bayer         | 23             | Ingestion           | 21        | A            | ALL             | Registered in pome fruit for control of Long Tailed Mealybug ( <i>Pseudococcus longispinus</i> ), Tuber Mealybug ( <i>Pseudococcus virburni</i> ), <b>San Jose Scale</b> ( <i>Quadraspidiotus perniciosus</i> ), and suppression of Woolly Apple Aphid ( <i>Eriosoma lanigerum</i> ). Do not apply more than 3 applications per crop, with a minimum 14 days between applications.  | M<br>Bee:L            | -               |
| Sulfoxaflor (Transform) Corteva       | 4C             | Ingestion           | 7         | A            | ALL             | Pending Label Registration (submitted Jul-21) with Corteva for Persimmons (Hort Innovation project ST16006). Registered in pome fruit for control of Apple Dimpling Bug, Long Tailed Mealybug, Tuber Mealybug, Woolly Apple Aphid and <b>San Jose Scale</b> . Apply a maximum of 2 applications per season, with a re-treatment interval of 14 days. Pending label extension submission variation of Transform label to include new crops, assorted tropical and subtropical fruit (inedible peel) (except banana), cane berries, carob, forage brassicas, herbs and spices, lucerne, persimmons and pineapple, and new pests in canola, pulses and strawberries in addition to several changes to existing label claims. | M<br>Bee:H            | -               |
| Fenoxycarb (Insegar) Syngenta         | 7B             | Contact & Ingestion |           | P            |                 | Registered for control of Scale in apples, pears and olives. APVMA MRLs for pome fruit: Fenoxycarb 2 mg/kg.   | L<br>Bee:VL           | -               |

| Pest / Active Ingredient (Trade Name)   | Chemical group | Activity            | WHP, days | Availability | States | Comments  | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|--------|---|-----------------------|-----------------|
| Flupyradifurone (Sivanto Prime)<br>Bayer  | 4D             | Contact & Ingestion |           | P            |        | Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of Scale Insects in citrus, pome fruit and stone fruit. Registration pending in Tropical and Sub-Tropical Fruit (Inedible Peel) including for persimmons for control of Banana Spotting Bug, Fruit Spotting Bug, Green Planthopper and Mango Planthopper. Pending Label Registration with Bayer (submitted Dec-21) for the tropical inedible peel crop group for control of Fruit spotting bugs (Hort Innovation project ST19020) | L<br>Bee:L            | -               |
| NUL3145<br>Nufarm   | TBC            | Biological          | NR        | P            |        | New insecticide in development from Nufarm with activity on Scale, Nematodes, Mealybug and Whitefly.  | -                     | -               |
| Pyriproxyfen (Admiral)<br>Sumitomo  | 7C             | IGR / Ingestion     |           | P            |        | Registered for control of Scale in citrus, mango and olives. APVMA MRLs for Japanese persimmons: Pyriproxyfen T0.2 mg/kg.   | VL<br>Bee:L           | -               |
| <b>Persimmon Bud Mite (<i>Aceria diospyri</i>)</b>  |                |                     |           |              |        |   |                       |                 |
| <b>Priority: Moderate</b>   |                |                     |           |              |        |   |                       |                 |
| Rated as a moderate priority in NSW, QLD and SA, and as a low priority in VIC and WA. Sporadic pest that rarely warrants control. |                |                     |           |              |        |   |                       |                 |
| Abamectin + Chlorantraniliprole (Voliam Targo)<br>Syngenta  | 6+28           | Contact & Ingestion | 7<br>G:28 | P-A          | ALL    | Registered in pome fruit for control of Codling Moth ( <i>Cydia pomonella</i> ), Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ), Cotton Bollworm ( <i>Helicoverpa armigera</i> ), Native Budworm ( <i>Helicoverpa punctigera</i> ), Oriental Fruit Moth ( <i>Grapholita molesta</i> ), Two Spotted Mite ( <i>Tetranychus urticae</i> ) and European Red Mite ( <i>Panonychus ulmi</i> ).  | M<br>Bee:H            | -               |
| Clofentezine (Apollo)   | 10A            | IGR / Contact       | 21        | P-A          | ALL    | Registered in pome fruit for control of Two Spotted Mite ( <i>Tetranychus urticae</i> ), European Red Mite ( <i>Panonychus ulmi</i> ) and Bryobia Mite ( <i>Bryobia rubrioculus</i> ).  | L<br>Bee:L            | -               |
| Etoxazole (Paramite)<br>Sumitomo  | 10B            | Contact & Ingestion | 7<br>NG   | P-A          | ALL    | Registered in pome fruit for control of Two Spotted Mite ( <i>Tetranychus urticae</i> ), European Red Mite ( <i>Panonychus ulmi</i> ) and Bryobia Mite ( <i>Bryobia rubrioculus</i> ).  | L<br>Bee:VL           | -               |

| Pest / Active Ingredient (Trade Name)       | Chemical group | Activity            | WHP, days | Availability | States    | Comments  | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|-----------|---|-----------------------|-----------------|
| Milbemectin (Milbeknock)                    | 6              | Contact & Ingestion | 14 NG     | P-A          | ALL       | Registered in pome fruit for control of European Red Mite and Two Spotted Mite.   | M<br>Bee:VH           | -               |
| Petroleum Oil                               | UN             | Contact             | 1         | P-A          | NSW & QLD | Registered in pome fruit for control of Two Spotted Mite.   | VL<br>Bee:L           | -               |
| Abamectin                                   | 6              | Contact             |           | P            |           | Registered for the control of various Mites in almonds, apples, pears, avocados, blackcurrants, blackberries, raspberries, citrus, cucurbits, custard apple, duboisia, fruiting vegetables, hops, lettuce, lychees, mushrooms, papaya, passionfruit, rhubarb, spring onions, snow peas, sugar snap peas, sweet corn, strawberries and ornamentals. APVMA MRLs for pome fruit: Abamectin 0.01 mg/kg. | M<br>Bee:H            | -               |
| <i>Beauveria bassiana</i> (Velifer)<br>BASF | UN             | Biological          | NR        | P            |           | Registered for suppression of Two Spotted Spider Mite in protected vegetables.  | L<br>Bee:L            | -               |
| Bifenazate (Acramite)<br>UPL                | 20D            | Contact & Ingestion |           | P            |           | Registered for control of various mites in almonds, pome fruit, stone fruit, fruiting vegetables, cucurbits, pawpaw and strawberries. APVMA MRLs for pome fruit: Bifenazate 2 mg/kg.  | L<br>Bee:H            | -               |
| Isocycloseram (Simodis)<br>Syngenta         | 30             | Ingestion           |           | P            |           | First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.  | -                     | -               |
| Spiromesifen (Oberon)<br>Bayer              | 23             | Ingestion           |           | P            |           | Hort Innovation Data Generation Project ST19020 is undertaking trials to support a new Australian label registration for control of various mite species in multiple crops. Project is due for completion by 2023/24.   | M<br>Bee:VL           | -               |

| Pest / Active Ingredient (Trade Name)  | Chemical group | Activity            | WHP, days | Availability | States                | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|-----------------------|---|-----------------------|-----------------|
| <b>Elephant Weevil</b> ( <i>Orthorhinus cylindrirostris</i> )<br><b>Priority: Moderate</b><br>Rated as a moderate priority in NSW and SA, and as a low priority in QLD, VIC and WA. Adult weevils bore holes into the stem to lay eggs. The larvae hatch and feed by boring tunnels through the stem, crown and roots of the bush. The best time to control the pest is when the adults emerge during spring / summer, usually a few weeks after pruning. Cultural controls include removing and destroying infested plant material, growing less susceptible varieties and reducing plant stresses. |                |                     |           |              |                       |   |                       |                 |
| Beta-Cyfluthrin (Bulldock) PER80374  | 3A             | Contact             | 7         | A            | NSW, NT, QLD, SA & WA | Permitted in persimmons (field-grown) for control of Fruit-Spotting Bug, Banana-Spotting Bug, <b>Elephant or Rhino Beetle</b> , Red-Shouldered Leaf Beetle, Swarming Leaf Beetle, Longicorn Trunk Borer, Macadamia Nut Borer, Mango Tip Borer, Flatid Planthopper, Green Vegetable Bug, Lychee Stink Bug and Yellow Peach Moth. Do not use at flowering. Do not apply more than 4 applications per year with a minimum of 21 days between consecutive sprays. | VH<br>Bee:H           | R3              |
| Clothianidin (Samurai)   | 4A             | Contact & Ingestion | 7<br>NG   | P-A          | ALL                   | Registered in persimmons for control of Queensland Fruit Fly and Mediterranean Fruit Fly. Registered for control of Fullers Rose Weevil in citrus.  | M<br>Bee:VH           | R2              |
| Indoxacarb (Avatar eVo) FMC  | 22A            | Ingestion           | 14<br>NG  | P-A          | ALL                   | Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Cotton Bollworm, Native Budworm, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.  | L<br>Bee:H            | R3              |
| Tetraniliprole (Vayego) Bayer  | 28             | Ingestion           | 7<br>NG   | P-A          | ALL                   | Hort Innovation project ST17000 generated data in persimmons to support a label registration for control of Clearwing Moths /Borer.<br>Registered in pome fruit crop group (including Japanese Persimmons) for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.   | M<br>Bee:VH           | -               |

| Pest / Active Ingredient (Trade Name)  | Chemical group | Activity            | WHP, days | Availability | States                | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|-----------------------|---|-----------------------|-----------------|
| <b>Longicorn Trunk Borer</b> ( <i>Acalolepta mixtus</i> )  |                |                     |           |              |                       |   |                       |                 |
| <b>Priority: Moderate</b>  |                |                     |           |              |                       |   |                       |                 |
| Rated as a moderate priority in NSW and QLD, and as a low priority in SA, VIC and WA. Damaged or stressed trees are more prone to attack. The pest lays its eggs into splits in the bark, and when hatched the larvae tunnel and feed beneath the bark. Can be difficult to detect, especially as the entry points often close over after infestation. |                |                     |           |              |                       |   |                       |                 |
| Beta-Cyfluthrin (Bulldock) PER80374  | 3A             | Contact             | 7         | A            | NSW, NT, QLD, SA & WA | Permitted in persimmons (field-grown) for control of Fruit-Spotting Bug, Banana-Spotting Bug, Elephant or Rhino Beetle, Red-Shouldered Leaf Beetle, Swarming Leaf Beetle, <b>Longicorn Trunk Borer</b> , Macadamia Nut Borer, Mango Tip Borer, Flatid Planthopper, Green Vegetable Bug, Lychee Stink Bug and Yellow Peach Moth. Do not use at flowering. Do not apply more than 4 applications per year with a minimum of 21 days between consecutive sprays. | VH<br>Bee:H           | R3              |
| Clothianidin (Samurai)   | 4A             | Contact & Ingestion | 7<br>NG   | P-A          | ALL                   | Registered in persimmons for control of Queensland Fruit Fly and Mediterranean Fruit Fly. Registered for control of Carpophilus Beetle in almonds and stone fruit.  | M<br>Bee:VH           | R2              |
| Indoxacarb (Avatar eVo) FMC  | 22A            | Ingestion           | 14<br>NG  | P-A          | ALL                   | Registered in pome fruit for control of Codling Moth, Light Brown Apple Moth, Cotton Bollworm, Native Budworm, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.  | L<br>Bee:H            | R3              |
| Tetraniliprole (Vayego) Bayer  | 28             | Ingestion           | 7<br>NG   | P-A          | ALL                   | Hort Innovation project ST17000 generated data in persimmons to support a label registration for control of Clearwing Moths /Borer.<br>Registered in pome fruit crop group (including Japanese Persimmons) for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil.   | M<br>Bee:VH           | -               |



| Pest / Active Ingredient (Trade Name)  | Chemical group | Activity            | WHP, days | Availability | States          | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|---------------------|-----------|--------------|-----------------|---|-----------------------|-----------------|
| <b>Flowereating Caterpillars</b> (Lepidoptera)<br><b>Cluster Caterpillar</b> ( <i>Spodoptera litura</i> )<br><b>Twig Looper</b> ( <i>Ectropis excursaria</i> )<br><b>Orange Fruit Borer</b> ( <i>Isotenes miserana</i> )<br><b>Light Brown Apple Moth</b> ( <i>Epiphyas postvittana</i> )<br><b>Macadamia Nut Borer</b> ( <i>Cryptophlebia ombrodelta</i> )<br><b>Yellow Peach Moth</b> ( <i>Conogethes punctiferalis</i> )<br><b>Avocado Leaf Roller</b> ( <i>Homona spargotis</i> )<br><b>Priority: Low</b><br>Caterpillar pests were rated as a low priority in all states. |                |                     |           |              |                 |   |                       |                 |
| Abamectin + Chlorantraniliprole (Voliam Targo) Syngenta  | 6+28           | Contact & Ingestion | 7 G:28    | A            | ALL             | Registered in pome fruit for control of Codling Moth ( <i>Cydia pomonella</i> ), <b>Light Brown Apple Moth</b> ( <i>Epiphyas postvittana</i> ), Cotton Bollworm ( <i>Helicoverpa armigera</i> ), Native Budworm ( <i>Helicoverpa punctigera</i> ), Oriental Fruit Moth ( <i>Grapholita molesta</i> ), Two Spotted Mite ( <i>Tetranychus urticae</i> ) and European Red Mite ( <i>Panonychus ulmi</i> ). Do not make more than 1 application per season.   | M<br>Bee:H            | -               |
| Acetamiprid + Pyriproxyfen (Trivor) Adama PER89943   | 4A+7C          | Contact & Ingestion | 28 NG     | A            | ALL (excl. VIC) | Pending Label Registration with ADAMA (Hort Innovation project ST16006). Permitted in persimmons for control of Fruit Spotting Bugs ( <i>Amblypelta nitida</i> , <i>A.lutescens</i> ), Mealybugs (Pseudococcidae), Scale Insects (Coccoidea), <b>Light Brown Apple Moth</b> ( <i>Epiphyas postvittana</i> ), and suppression of Queensland Fruit Fly ( <i>Bactrocera tryoni</i> ) and Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> ). Do not apply during flowering. Do not apply more than 2 applications per season. Do not apply less than 14 days after the initial treatment. | M<br>Bee:M            | R2              |

| Pest / Active Ingredient (Trade Name)                    | Chemical group | Activity  | WHP, days | Availability | States                      | Comments  | Impact on beneficials | Regulatory Risk |
|--|----------------|-----------|-----------|--------------|-----------------------------|---|-----------------------|-----------------|
| <i>Bacillus thuringiensis subsp Kurstaki</i> Strain HD-1 | 11             | Ingestion | NR        | A            | ALL                         | Registered in fruit for control of <b>Armyworm</b> , Cotton Bollworm, Native Budworm, Cabbage Moth, Cabbage White Butterfly, <b>Loopers</b> , <b>Light Brown Apple Moth</b> and Vine Moth. Apply to newly hatched larvae, late in the afternoon or early evening. Apply a minimum of 2 sprays separated by no more than 3 days initially, and then reapply at 3-5 day intervals. Maximum number of applications not specified.                                | VL<br>Bee:L           | -               |
| Beta-Cyfluthrin (Bulldock) PER80374                      | 3A             | Contact   | 7         | A            | NSW, NT, QLD, SA & WA       | Permitted in persimmons (field-grown) for control of Fruit-Spotting Bug, Banana-Spotting Bug, Elephant or Rhino Beetle, Red-Shouldered Leaf Beetle, Swarming Leaf Beetle, Longicorn Trunk Borer, Macadamia Nut Borer, Mango Tip Borer, Flatid Planthopper, Green Vegetable Bug, Lychee Stink Bug and <b>Yellow Peach Moth</b> . Do not use at flowering. Do not apply more than 4 applications per year with a minimum of 21 days between consecutive sprays. | VH<br>Bee:H           | R3              |
| Chlorantraniliprole (Altacor) FMC                        | 28             | Ingestion | 14<br>NG  | A            | ALL                         | Registered in pome fruit for control of Codling Moth, <b>Light Brown Apple Moth</b> , Cotton Bollworm, Native Budworm and Oriental Fruit Moth. Do not make more than 3 applications per crop per season.  | L<br>Bee:VL           | -               |
| Chlorpyrifos PER13932                                    | 1B             | Contact   | 14        | A            | ACT, NSW, QLD, TAS, NT & WA | Permitted in persimmons for control of <b>Cluster Grub</b> . Apply a maximum of 3 sprays per season with a minimum re-treatment interval of 14 days.  | H<br>Bee:H            | R1              |
| Ethyl Formate  | 8A             | Fumigant  | NR        | A            | ALL                         | Registered in persimmons as a post-harvest fumigant for control of <b>Light Brown Apple Moth</b> , Red Back Spiders, Two Spotted Mite, Long Tailed Mealybug, Western Flower Thrips and Plague Thrips. For use by persons trained in the proper use of application equipment, required detection devices, safe use and handling of the fumigant.   | -                     | -               |
| Garlic + Chilli + Pyrethrins + Piperonyl Butoxide        | 3A             | Contact   | 1         | A            | ALL                         | Registered in fruit trees for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhopper. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.  | VH<br>Bee:H           | -               |

| Pest / Active Ingredient (Trade Name) | Chemical group | Activity  | WHP, days | Availability | States          | Comments   | Impact on beneficials | Regulatory Risk |
|---------------------------------------|----------------|-----------|-----------|--------------|-----------------|--|-----------------------|-----------------|
| Indoxacarb (Avatar eVo) FMC           | 22A            | Ingestion | 14 NG     | A            | ALL             | Registered in pome fruit for control of Codling Moth ( <i>Cydia pomonella</i> ), <b>Light Brown Apple Moth</b> ( <i>Epiphyas postvittana</i> ), Cotton Bollworm ( <i>Helicoverpa armigera</i> ), Native Budworm ( <i>Helicoverpa punctigera</i> ), Apple Weevil ( <i>Otiorhynchus cribicollis</i> ), Fuller's Rose Weevil ( <i>Asynonychus cervinus</i> ) and Garden Weevil ( <i>Phlyctinus callosus</i> ). Do not use more than 6 applications per season, with a re-treatment interval of 10 days. | L<br>Bee:H            | R3              |
| Methoxyfenozide (Venturi Max) Adama   | 18             | Ingestion | 7 NG      | A            | ALL (excl. VIC) | Registered in n persimmons for control of Leaf Roller, Yellow Peach Moth, Light Brown Apple Moth and Orange Fruitborer. Registered in Pome fruit crop group for Light Brown Apple Moth and Loopers.  | VL<br>Bee:VL          | -               |
| Spinetoram (Success Neo) Corteva      | 5              | Ingestion | NR        | A            | ALL             | Registered in persimmons for control of <b>Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, Red-Banded Thrips and Sorghum Head Caterpillar</b> . Do not apply more than 4 applications per season. Apply repeat applications at 7-14 day intervals.  | M<br>Bee:H            | -               |
| Spinosad (Entrust Organic) Corteva    | 5              | Ingestion | NR        | A            | ALL             | Registered in persimmons for control of <b>Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, Red-Banded Thrips and Sorghum Head Caterpillar</b> . Do not apply more than 4 applications per season. Apply repeat applications at 7-14 day intervals.  | L<br>Bee:L            | -               |
| Tetraniliprole (Vayego) Bayer         | 28             | Ingestion | 7 NG      | A            | ALL             | Hort Innovation project ST17000 generated data in persimmons to support a label registration for control of Clearwing Moths /Borer. Registered in pome fruit crop group (including Japanese Persimmons) for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil. Do not apply more than 3 applications per season per crop, with 14-21 day intervals between applications.   | M<br>Bee:VH           | -               |

| Pest / Active Ingredient (Trade Name)   | Chemical group | Activity            | WHP, days | Availability | States          | Comments  | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|-----------------|---|-----------------------|-----------------|
| Trichlorfon (Lepidex) PER14743  | 1B             | Contact             | 7         | A            | ALL (excl. VIC) | Permitted in persimmons for control of Flatid Planthopper <b>Flower-Eating Caterpillar, Loopers, Yellow Peach Moth</b> , and suppression of Fruit-Spotting Bug, Banana-Spotting Bug, Green Vegetable Bug and Lychee Stink Bug. Do not apply more than 6 applications per crop with a minimum re-treatment interval of 7-10 days between consecutive applications. | H<br>Bee:H            | R2              |
| Broflanilide (Vedira) BASF  | 30             | Contact & Ingestion |           | P            |                 | Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.   | -                     | -               |
| Isocycloseram (Simodis) Syngenta  | 30             | Ingestion           |           | P            |                 | First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.  | -                     | -               |
| <b>Fall Armyworm</b> ( <i>Spodoptera frugiperda</i> )   |                |                     |           |              |                 |   |                       |                 |
| <b>Priority: Low</b>  |                |                     |           |              |                 |   |                       |                 |
| Rated as a moderate priority in NSW and WA, and as a low priority in QLD, SA and VIC. Fall Armyworm is an exotic pest that can reproduce prolifically, especially in warm weather. It is important to monitor crops for eggs and larvae of pest species by regular field scouting. Target sprays against mature eggs and newly hatched larvae before pests become entrenched. |                |                     |           |              |                 |   |                       |                 |
| Chlorantraniliprole (Altacor) FMC PER89259  | 28             | Ingestion           | 14 NG     | A            | ALL (excl. VIC) | Permitted in pome fruit for control of Fall Armyworm. Do not make any more than 3 applications per crop per season.   | L<br>Bee:VL           | -               |
| Garlic + Chilli + Pyrethrins + Piperonyl Butoxide   | 3A             | Contact             | 1         | A            | ALL             | Registered in fruit trees for control of Ants, Aphids, <b>Caterpillars</b> , Earwigs, Whitefly, Thrips and Leafhopper. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks.  | VH<br>Bee:H           | -               |
| Methomyl (Lannate) PER89293   | 1A             | Contact             | NR        | A            | ALL             | Permitted in persimmons for control of <b>Fall Armyworm</b> . Do not use more than 3 applications, with a retreatment interval of 10-14 days.   | H<br>Bee:H            | R2              |

| Pest / Active Ingredient (Trade Name)       | Chemical group | Activity            | WHP, days | Availability | States          | Comments   | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|-----------------|--|-----------------------|-----------------|
| Spinetoram (Success Neo) Corteva PER89241   | 5              | Ingestion           | NR        | A            | ALL (excl. VIC) | Permitted in pome fruit for control of <b>Fall Armyworm</b> . Do not apply more than 4 applications per season. Apply repeat applications at 7-14 day intervals.   | M<br>Bee:H            | -               |
| Spinosad (Entrust Organic) Corteva PER89870 | 5              | Ingestion           | NR        | A            | ALL (excl. VIC) | Permitted in pome fruit for control of <b>Fall Armyworm</b> . Do not apply more than 4 applications per season. Apply repeat applications at 7-14 day intervals.   | L<br>Bee:L            | -               |
| Indoxacarb (Avatar eVo) FMC                 | 22A            | Ingestion           | 14<br>NG  | P-A          | ALL             | Registered in pome fruit for control of Codling Moth ( <i>Cydia pomonella</i> ), Light Brown Apple Moth ( <i>Epiphyas postvittana</i> ), Cotton Bollworm ( <i>Helicoverpa armigera</i> ), Native Budworm ( <i>Helicoverpa punctigera</i> ), Apple Weevil ( <i>Otiorhynchus cribicollis</i> ), Fuller's Rose Weevil ( <i>Asynonychus cervinus</i> ) and Garden Weevil ( <i>Phlyctinus callosus</i> ).                         | L<br>Bee:H            | R3              |
| Methoxyfenozide (Venturi Max) Adama         | 18             | Ingestion           | 7<br>NG   | P-A          | ALL (excl. VIC) | Registered in n persimmons for control of Leaf Roller, Yellow Peach Moth, Light Brown Apple Moth and Orange Fruitborer. Registered in Pome fruit crop group for Light Brown Apple Moth and Loopers.  | VL<br>Bee:VL          | -               |
| Tetraniliprole (Vayego) Bayer               | 28             | Ingestion           | 7<br>NG   | P-A          | ALL             | Hort Innovation project ST17000 generated data in persimmons to support a label registration for control of Clearwing Moths /Borer. Registered in pome fruit crop group (including Japanese Persimmons) for control of Codling Moth, Light Brown Apple Moth, Apple Weevil, Fuller's Rose Weevil and Garden Weevil. Do not apply more than 3 applications per season per crop, with 14-21 day intervals between applications. | M<br>Bee:VH           | -               |
| Broflanilide (Vedira) BASF                  | 30             | Contact & Ingestion |           | P            |                 | Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.  | -                     | -               |

| Pest / Active Ingredient (Trade Name)   | Chemical group | Activity            | WHP, days | Availability | States | Comments   | Impact on beneficials | Regulatory Risk |
|---|----------------|---------------------|-----------|--------------|--------|--|-----------------------|-----------------|
| Isocycloseram (Simodis) Syngenta  | 30             | Ingestion           |           | P            |        | First global application is proposed for 2023 for Thrips, Bugs, Mites and Caterpillars. Registration submitted May 2021 for Simodis to control Mites, Thrips and Helicoverpa in fruiting vegetables.                   | -                     | -               |
| <b>Ants (Formicidae)</b>  |                |                     |           |              |        |  |                       |                 |
| <b>Priority: Low</b>  |                |                     |           |              |        |  |                       |                 |
| Rated as a low priority in all states. Ants rarely cause damage to the crop, but they can present nuisance value to workers in the orchard. |                |                     |           |              |        |  |                       |                 |
| Garlic + Chilli + Pyrethrins + Piperonyl Butoxide   | 3A             | Contact             | 1         | A            | ALL    | Registered in fruit trees for control of <b>Ants</b> , Aphids, Caterpillars, Earwigs, Whitefly, Thrips and Leafhopper. Suitable for organic growers. Apply as a cover spray and re-apply as necessary every 2-3 weeks. | VH<br>Bee:H           | -               |
| Pyriproxifen (Distance Ant Bait)  | 7C             | Ingestion           | NR        | A            | ALL    | Registered in tropical fruit plantations as a bait for control of <b>Invasive and Nuisance Ants</b> . Do not exceed 3 applications per year and a minimum of 3 months between each treatment.                          | VL<br>Bee:L           | -               |
| Broflanilide (Vedira) BASF  | 30             | Contact & Ingestion |           | P            |        | Pending registration as an ant bait. It also has potential uses as a seed treatment for the control of Wireworms, and a foliar treatment for the control of chewing pests in various crops.                            | -                     | -               |
| Metaflumizone (Siesta Ant Bait) BASF  | 22B            | Ingestion           |           | P            |        | Pending registration as an <b>Ant</b> bait.  | M<br>Bee:M            | -               |

## **4.3 Weeds in persimmons**

### **4.3.1 Weed priorities**

| <b>Common Name</b>       | <b>Scientific Name</b>     |
|--------------------------|----------------------------|
| <b>Moderate</b>          |                            |
| Couch Grass              | <i>Cynodon dactylon</i>    |
| Flaxleaf Fleabane        | <i>Conyza bonariensis</i>  |
| Flannel Weed             | <i>Sida cordifolia</i>     |
| Blackberry Nightshade    | <i>Solanum nigrum</i>      |
| Fat Hen                  | <i>Chenopodium album</i>   |
| Marshmallow              | <i>Malva parviflora</i>    |
| Stinging Nettle          | <i>Urtica</i> spp.         |
| <b>Low</b>               |                            |
| Feather Top Rhodes Grass | <i>Chloris virgata</i>     |
| Ryegrass                 | <i>Lolium</i> spp.         |
| Dock                     | <i>Rumex</i> spp.          |
| Willow Weed              | <i>Persicaria maculosa</i> |

There were no high priority weeds identified but Couch Grass, Flaxleaf Fleabane, Flannel Weed, Blackberry Nightshade, Fat Hen and Marshmallow were identified as a moderate priority based on the feedback received.

### **Resistance management**

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

Specific resistance management strategies for high resistance risk (1 and 2) and moderate resistance risk (0, 3, 4, 5, 9, 10, 12, 14, 15, 22, 27 and 34) herbicide modes of action are available on the CropLife Australia webpage<sup>6</sup>.

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<sup>6</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  |   |                                       |   |
|---|---|---------------------------------------|---|
| A   | Available via either registration or permit approval                  |                                       |   |
| P   | Potential – a possible candidate to pursue for registration or permit |                                       |   |
| P-A   | Potential, already approved in the crop for another use               |                                       |   |
| Resistance risk   |   | Regulatory risk (refer to Appendix 7) |   |
|   |   | R1                                    | Short-term: Critical concern over retaining access                    |
| **  | Moderate resistance risk  | R2                                    | Medium-term: Maintaining access of significant concern                |
| ***   | High resistance risk  | R3                                    | Long-term: Potential issues associated with use - Monitoring required |
| Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G) |   |                                       |   |
| Harvest   | H   | Not Required when used as directed    | NR  |
| Grazing   | G   | No Grazing Permitted                  | NG  |

| Active Ingredient (Trade Name)   | Chemical Group | Crop / Situation                                     | Comment / Use / Weed   | WHP (days) | Availability | States            | Regulatory Risk |
|--|----------------|--|--|------------|--------------|-------------------|-----------------|
| <b>Couch Grass (<i>Cynodon dactylon</i>)</b>   |                |  |  |            |              |                   |                 |
| <b>Priority: Moderate</b>  |                |  |  |            |              |                   |                 |
| Rated as a high priority in NSW and VIC, a moderate priority in WA, and as a low priority in QLD and SA. Couch Grass is an aggressive and highly competitive perennial grass that grows year-round in most areas. Herbicide control is effectively provided it is targeted to young, actively growing weeds. Multiple applications are usually required. |                |  |  |            |              |                   |                 |
| Amitrole   | 34**           | Orchards / Directed Spray                            | Registered in orchards as a directed spray for the control of grass and broadleaf weeds, including <b>Couch Grass</b> .  | 56         | A            | ALL               | -               |
| Dichlobenil (Casoran)  | 29**           | Orchards / Residual Weed Control                     | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR         | A            | ALL               | -               |
| Fluazifop-P (Fusilade)   | 1***           | Persimmons / Directed Spray                          | Registered in persimmons as a directed spray for the control of grass weeds, including <b>Couch Grass</b> .  | 14         | A            | QLD, NSW, WA & NT | -               |
| Glufosinate (Basta)  | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Couch Grass</b> . Apply treatment along the sides of crops and between rows of crops. | NR<br>G:56 | A            | ALL               | R3              |



| Active Ingredient (Trade Name)   | Chemical Group | Crop / Situation  | Comment / Use / Weed   | WHP (days) | Availability | States | Regulatory Risk |
|--|----------------|---|--|------------|--------------|--------|-----------------|
| Glyphosate (Roundup)   | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Couch Grass</b> . Do not allow spray to contact any part of the tree, including the trunk. | NR         | A            | ALL    | R3              |
| Haloxypop (Verdict)  | 1***           | Persimmons / Directed Spray                                 | Registered in persimmons for control of grass weeds, including <b>Couch Grass</b> . Spray should be directed to the base of the tree, avoiding contact with fruit and foliage.                           | NR         | A            | ALL    | -               |
| 2,2-DPA  | 15**           |   | Registered for control of annual and perennial grasses, including Couch Grass, in citrus, vines, stone fruit, apples and pears. APVMA MRLs for pome fruit: 2,2-DPA *0.01 mg/kg.                          |            | P            |        | -               |
| Norflurazon (Zoliar)<br>Agnova Technologies  | 12**           |   | Registered for control of grass and broadleaf weeds, including Couch Grass in citrus, grapes, nuts, stone and pome fruits (apple, pear). APVMA MRLs for pome fruit: Norflurazon *0.2 mg/kg.              |            | P            |        | -               |
| S-Metolachlor (Dual Gold)<br>Syngenta  | 15**           |   | Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.  |            | P            |        | -               |
| S-Metolachlor + Prosulfocarb (Boxer Gold)<br>Syngenta  | 15**           |   | Registered for control of grass and broadleaf weeds including Blackberry Nightshade in cereal crops, pulse crops and potatoes. Hort Innovation is pursuing trials on onions and carrots.                 |            | P            |        | -               |
| <b>Flaxleaf Fleabane</b> ( <i>Conyza bonariensis</i> )   |                |   |  |            |              |        |                 |
| <b>Priority: Moderate</b>  |                |   |  |            |              |        |                 |
| Rated as a high priority in NSW and SA, a moderate priority in VIC, and as a low priority in QLD and WA. Flaxleaf Fleabane seeds prolifically and can germinate year-round. It is difficult to control with herbicides and a range of control measures are required to manage it in the orchard. |                |   |  |            |              |        |                 |
| Dichlobenil (Casoran)  | 29**           | Orchards / Residual Weed Control                            | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR         | A            | ALL    | -               |

| Active Ingredient (Trade Name)  | Chemical Group | Crop / Situation  | Comment / Use / Weed   | WHP (days)  | Availability | States | Regulatory Risk |
|---|----------------|---|--|-------------|--------------|--------|-----------------|
| Flumioxazin (Chateau)   | 14**           | Pome Fruit / Directed Spray / Residual Control              | Registered in pome fruit as a directed spray for residual control of grass and broadleaf weeds, including <b>Flaxleaf Fleabane</b> .   | 98<br>G:28  | A            | ALL    | -               |
| Glufosinate (Basta)   | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray        | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Flaxleaf Fleabane</b> . Apply treatment along the sides of crops and between rows of crops.               | NR<br>G:56  | A            | ALL    | R3              |
| Glyphosate (Roundup)  | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Flaxleaf Fleabane</b> . Do not allow spray to contact any part of the tree, including the trunk. | NR          | A            | ALL    | R3              |
| Paraquat (Gramoxone)  | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Flaxleaf Fleabane</b> . Do not allow spray to contact any part of the tree, including the trunk.                          | H:1<br>G:7  | A            | ALL    | R3              |
| Paraquat + Amitrole (Guerrilla)   | 22** + 34**    | Orchards / Directed Spray                                   | Registered in orchards for control of annual weeds, including <b>Flaxleaf Fleabane</b> . Avoid contact with crop foliage.  | H:NR<br>G:1 | A            | ALL    | R3              |
| Paraquat + Diquat (SpraySeed)   | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Flaxleaf Fleabane</b> . Do not allow spray to contact any part of the tree, including the trunk.                  | G:1         | A            | ALL    | R3              |
| <b>Flannel Weed</b> ( <i>Sida cordifolia</i> )  |                |   |  |             |              |        |                 |
| <b>Priority: High</b>   |                |   |  |             |              |        |                 |
| Rated as a moderate priority in NSW and QLD, and as a low priority in SA, VIC and WA. Perennial broadleaf weed that is difficult to control when plants become established. |                |   |  |             |              |        |                 |
| Dichlobenil (Casoran)   | 29**           | Orchards / Residual Weed Control                            | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR          | A            | ALL    | -               |

| Active Ingredient (Trade Name)   | Chemical Group | Crop / Situation  | Comment / Use / Weed  | WHP (days)  | Availability | States | Regulatory Risk |
|--|----------------|---|---|-------------|--------------|--------|-----------------|
| Glufosinate (Basta)  | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray        | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Flannel Weed</b> . Apply treatment along the sides of crops and between rows of crops.               | NR<br>G:56  | A            | ALL    | R3              |
| Glyphosate (Roundup)   | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Flannel Weed</b> . Do not allow spray to contact any part of the tree, including the trunk. | NR          | A            | ALL    | R3              |
| Paraquat (Gramoxone)   | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Flannel Weed</b> . Do not allow spray to contact any part of the tree, including the trunk.                          | H:1<br>G:7  | A            | ALL    | R3              |
| Paraquat + Amitrole (Guerrilla)  | 22** + 34**    | Orchards / Directed Spray                                   | Registered in orchards for control of annual weeds, including <b>Flannel Weed</b> . Avoid contact with crop foliage.  | H:NR<br>G:1 | A            | ALL    | R3              |
| Paraquat + Diquat (SpraySeed)  | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Flannel Weed</b> . Do not allow spray to contact any part of the tree, including the trunk.                  | G:1         | A            | ALL    | R3              |
| Norflurazon (Zoliar)<br>Agnova Technologies  | 12**           |   | Registered for control of grass and broadleaf weeds in citrus, grapes, nuts, stone and pome fruits (apple, pear). APVMA MRLs for pome fruit: Norflurazon *0.2 mg/kg.                                      |             | P            |        | -               |
| <b>Blackberry Nightshade (<i>Solanum nigrum</i>)</b>   |                |   |   |             |              |        |                 |
| <b>Priority: Moderate</b>  |                |   |   |             |              |        |                 |
| Rated as a moderate priority in NSW and QLD, and as a low priority in SA, VIC and WA. Prolific weed that is widely adapted and difficult to eradicate, mainly due to its long-term seed viability. |                |   |   |             |              |        |                 |
| Amitrole   | 34**           | Orchards / Directed Spray                                   | Registered in orchards as a directed spray for the control of grass and broadleaf weeds, including <b>Blackberry Nightshade</b> .   | 56          | A            | ALL    | -               |
| Dichlobenil (Casoran)  | 29**           | Orchards / Residual Weed Control                            | Registered in orchards for residual weed control of annual grass and broadleaf weeds.   | NR          | A            | ALL    | -               |

| Active Ingredient (Trade Name)  | Chemical Group | Crop / Situation   | Comment / Use / Weed   | WHP (days) | Availability | States | Regulatory Risk |
|---------------------------------|----------------|--|--|------------|--------------|--------|-----------------|
| Flumioxazin (Chateau)           | 14**           | Pome Fruit / Directed Spray / Residual Control                                     | Registered in pome fruit as a directed spray for residual control of grass and broadleaf weeds, including <b>Blackberry Nightshade</b> .   | 98 G:28    | A            | ALL    | -               |
| Glufosinate (Basta)             | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray                               | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Blackberry Nightshade</b> . Apply treatment along the sides of crops and between rows of crops.   | NR G:56    | A            | ALL    | R3              |
| Glyphosate (Roundup)            | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray                        | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Blackberry Nightshade</b> . Do not allow spray to contact any part of the tree, including the trunk.   | NR         | A            | ALL    | R3              |
| Isoxaben (Gallery) Corteva      | 29**           | Bearing & Non-Bearing Fruit Trees / Residual Weed Control                          | Registered in non-bearing fruit trees for control of broadleaf weeds, including <b>Blackberry Nightshade</b> . Apply as a directed spray to weed-free, well prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application. | NR         | A            | ALL    | -               |
| Oxyfluorfen (Goal)              | 14**           | Persimmon / Directed Spray / Tank Mix with Glyphosate, Paraquat or Paraquat/Diquat | Registered in persimmons for control of various grass and broadleaf weeds, including <b>Blackberry Nightshade</b> . If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.   | NR NG      | A            | ALL    | -               |
| Oryzalin                        | 3**            | Persimmon / Non-Bearing / Directed Spray   | Registered in non-bearing persimmon for control of various grass and broadleaf weeds, including <b>Blackberry Nightshade</b> . Apply as a directed spray.  | NR         | A            | ALL    | -               |
| Paraquat (Gramoxone)            | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Blackberry Nightshade</b> . Do not allow spray to contact any part of the tree, including the trunk.  | H:1 G:7    | A            | ALL    | R3              |
| Paraquat + Amitrole (Guerrilla) | 22** + 34**    | Orchards / Directed Spray  | Registered in orchards for control of annual weeds, including <b>Blackberry Nightshade</b> . Avoid contact with crop foliage.  | H:NR G:1   | A            | ALL    | R3              |

| Active Ingredient (Trade Name)   | Chemical Group | Crop / Situation  | Comment / Use / Weed   | WHP (days) | Availability | States | Regulatory Risk |
|--|----------------|---|--|------------|--------------|--------|-----------------|
| Paraquat + Diquat (SpraySeed)  | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Blackberry Nightshade</b> . Do not allow spray to contact any part of the tree, including the trunk.  | G:1        | A            | ALL    | R3              |
| Norflurazon (Zoliar) Agnova Technologies   | 12**           |   | Registered for control of grass and broadleaf weeds in citrus, grapes, nuts, stone and pome fruits (apple & pear). APVMA MRLs for pome fruit: Norflurazon *0.2 mg/kg.  |            | P            |        | -               |
| <b>Fat Hen</b> ( <i>Chenopodium album</i> )  |                |   |  |            |              |        |                 |
| <b>Priority: Moderate</b>  |                |   |  |            |              |        |                 |
| Rated as a high priority in SA, a moderate priority in NSW, VIC and WA, and as a low priority in QLD. Fat Hen is a fast-growing woody annual weed, which can germinate throughout most of the year. Timely herbicide control is critical for managing this weed. |                |   |  |            |              |        |                 |
| Dichlobenil (Casoran)  | 29**           | Orchards / Residual Weed Control                            | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR         | A            | ALL    | -               |
| Flumioxazin (Chateau)  | 14**           | Pome Fruit / Directed Spray / Residual Control              | Registered in pome fruit as a directed spray for residual control of grass and broadleaf weeds, including <b>Fat Hen</b> .   | 98 G:28    | A            | ALL    | -               |
| Glufosinate (Basta)  | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray        | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Fat Hen</b> . Apply treatment along the sides of crops and between rows of crops.   | NR G:56    | A            | ALL    | R3              |
| Glyphosate (Roundup)   | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Fat Hen</b> . Do not allow spray to contact any part of the tree, including the trunk.   | NR         | A            | ALL    | R3              |
| Isoxaben (Gallery) Corteva   | 29**           | Bearing & Non-Bearing Fruit Trees / Residual Weed Control   | Registered in non-bearing fruit trees for control of broadleaf weeds, including <b>Fat Hen</b> . Apply as a directed spray to weed-free, well prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application. | NR         | A            | ALL    | -               |

| Active Ingredient (Trade Name)              | Chemical Group | Crop / Situation   | Comment / Use / Weed  | WHP (days)  | Availability | States | Regulatory Risk |
|---|----------------|--|---|-------------|--------------|--------|-----------------|
| Oxyfluorfen (Goal)                          | 14**           | Persimmon / Directed Spray / Tank Mix with Glyphosate, Paraquat or Paraquat/Diquat | Registered in persimmons for control of various grass and broadleaf weeds, including <b>Fat Hen</b> . If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.                                      | NR<br>NG    | A            | ALL    | -               |
| Oryzalin                                    | 3**            | Persimmon / Non-Bearing / Directed Spray   | Registered in non-bearing persimmon for control of various grass and broadleaf weeds, including <b>Fat Hen</b> . Apply as a directed spray.   | NR          | A            | ALL    | -               |
| Paraquat (Gramoxone)                        | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Fat Hen</b> . Do not allow spray to contact any part of the tree, including the trunk.   | H:1<br>G:7  | A            | ALL    | R3              |
| Paraquat + Amitrole (Guerrilla)             | 22** + 34**    | Orchards / Directed Spray  | Registered in orchards for control of annual weeds, including <b>Fat Hen</b> . Avoid contact with crop foliage.   | H:NR<br>G:1 | A            | ALL    | R3              |
| Paraquat + Diquat (SpraySeed)               | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Fat Hen</b> . Do not allow spray to contact any part of the tree, including the trunk.   | G:1         | A            | ALL    | R3              |
| Norflurazon (Zoliar)<br>Agnova Technologies | 12**           |  | Registered for control of grass and broadleaf weeds in citrus, grapes, nuts, stone and pome fruits (apple & pear). APVMA MRLs for pome fruit: Norflurazon *0.2 mg/kg.   |             | P            |        | -               |
| S-Metolachlor (Dual Gold)<br>Syngenta       | 15**           |  | Registered for control of grass and broadleaf weeds, including <b>Fat Hen</b> in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans. |             | P            |        | -               |

| Active Ingredient (Trade Name)  | Chemical Group | Crop / Situation   | Comment / Use / Weed   | WHP (days) | Availability | States | Regulatory Risk |
|---|----------------|--|--|------------|--------------|--------|-----------------|
| <b>Marshmallow</b> ( <i>Malva parviflora</i> )  |                |  |  |            |              |        |                 |
| <b>Priority: Moderate</b>   |                |  |  |            |              |        |                 |
| Rated as a moderate priority in NSW, SA and VIC, and as a low priority in QLD and WA. Adapted to a wide variety of environments and highly competitive weed. Control with knockdown herbicides can be unreliable. |                |  |  |            |              |        |                 |
| Carfentrazone (Hammer)  | 14**           | Tropical & Sub-Tropical Fruits / Directed Spray or Spot Spray                      | Registered in tropical and sub-tropical fruits for control of various broadleaf weeds, including <b>Marshmallow</b> . If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.   | NR         | A            | ALL    | -               |
| Dichlobenil (Casoran)   | 29**           | Orchards / Residual Weed Control   | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR         | A            | ALL    | -               |
| Flumioxazin (Chateau)   | 14**           | Pome Fruit / Directed Spray / Residual Control                                     | Registered in pome fruit as a directed spray for residual control of grass and broadleaf weeds, including <b>Marshmallow</b> .   | 98 G:28    | A            | ALL    | -               |
| Glyphosate (Roundup)  | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray                        | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Marshmallow</b> . Do not allow spray to contact any part of the tree, including the trunk.   | NR         | A            | ALL    | R3              |
| Isoxaben (Gallery) Corteva  | 29**           | Bearing & Non-Bearing Fruit Trees / Residual Weed Control                          | Registered in non-bearing fruit trees for control of broadleaf weeds, including <b>Marshmallow</b> . Apply as a directed spray to weed-free, well prepared soil. Must be activated by at least 12.5mm of rainfall or sprinkler irrigation within 21 days of application. | NR         | A            | ALL    | -               |
| Oxyfluorfen (Goal)  | 14**           | Persimmon / Directed Spray / Tank Mix with Glyphosate, Paraquat or Paraquat/Diquat | Registered in persimmons for control of various grass and broadleaf weeds, including <b>Marshmallow</b> . If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.   | NR NG      | A            | ALL    | -               |
| Paraquat (Gramoxone)  | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Marshmallow</b> . Do not allow spray to contact any part of the tree, including the trunk.  | H:1 G:7    | A            | ALL    | R3              |

| Active Ingredient (Trade Name)  | Chemical Group | Crop / Situation  | Comment / Use / Weed   | WHP (days)  | Availability | States | Regulatory Risk |
|---|----------------|---|--|-------------|--------------|--------|-----------------|
| Paraquat + Amitrole (Guerrilla)   | 22** + 34**    | Orchards / Directed Spray                                     | Registered in orchards for control of annual weeds, including <b>Marshmallow</b> . Avoid contact with crop foliage.  | H:NR<br>G:1 | A            | ALL    | R3              |
| Paraquat + Diquat (SpraySeed)   | 22**           | Orchards / Directed Spray or Spot Spray                       | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Marshmallow</b> . Do not allow spray to contact any part of the tree, including the trunk.                          | G:1         | A            | ALL    | R3              |
| <b>Stinging Nettle</b> ( <i>Urtica</i> spp.)  |                |   |  |             |              |        |                 |
| <b>Priority: Moderate</b>   |                |   |  |             |              |        |                 |
| Rated as a moderate priority. Soft herb whose leaves are sparsely covered with rigid, stinging hairs. |                |   |  |             |              |        |                 |
| Carfentrazone (Hammer)  | 14**           | Tropical & Sub-Tropical Fruits / Directed Spray or Spot Spray | Registered in tropical and sub-tropical fruits for control of various broadleaf weeds, including <b>Stinging Nettle</b> . If weeds are already present, use as a spike in a mixture with glyphosate or paraquat. | NR          | A            | ALL    | -               |
| Dichlobenil (Casoran)   | 29**           | Orchards / Residual Weed Control                              | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR          | A            | ALL    | -               |
| Flumioxazin (Chateau)   | 14**           | Pome Fruit / Directed Spray / Residual Control                | Registered in pome fruit as a directed spray for residual control of grass and broadleaf weeds, including <b>Stinging Nettle</b> .   | 98<br>G:28  | A            | ALL    | -               |
| Glufosinate (Basta)   | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray          | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Stinging Nettle</b> . Apply treatment along the sides of crops and between rows of crops.                   | NR<br>G:56  | A            | ALL    | R3              |
| Glyphosate (Roundup)  | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray   | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Stinging Nettle</b> . Do not allow spray to contact any part of the tree, including the trunk.     | NR          | A            | ALL    | R3              |



| Active Ingredient (Trade Name)   | Chemical Group | Crop / Situation   | Comment / Use / Weed   | WHP (days)  | Availability | States | Regulatory Risk |
|--|----------------|--|--|-------------|--------------|--------|-----------------|
| Oxyfluorfen (Goal)   | 14**           | Persimmon / Directed Spray / Tank Mix with Glyphosate, Paraquat or Paraquat/Diquat | Registered in persimmons for control of various grass and broadleaf weeds, including <b>Stinging Nettle</b> . If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.   | NR<br>NG    | A            | ALL    | -               |
| Paraquat (Gramoxone)   | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Stinging Nettle</b> . Do not allow spray to contact any part of the tree, including the trunk.  | H:1<br>G:7  | A            | ALL    | R3              |
| Paraquat + Amitrole (Guerrilla)  | 22** + 34**    | Orchards / Directed Spray  | Registered in orchards for control of annual weeds, including <b>Stinging Nettle</b> . Avoid contact with crop foliage.  | H:NR<br>G:1 | A            | ALL    | R3              |
| Paraquat + Diquat (SpraySeed)  | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Stinging Nettle</b> . Do not allow spray to contact any part of the tree, including the trunk.  | G:1         | A            | ALL    | R3              |
| S-Metolachlor (Dual Gold) Syngenta   | 15**           |  | Registered for control of grass and broadleaf weeds, including Stinging Nettle in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.                               |             | P            |        | -               |
| <b>Feather Top Rhodes Grass</b> ( <i>Chloris virgata</i> )   |                |  |  |             |              |        |                 |
| <b>Priority: Low</b>   |                |  |  |             |              |        |                 |
| Rated as a moderate priority in SA, and as a low priority in NSW, QLD, VIC and WA. Feathertop Rhodes Grass is an aggressive grass weed that is difficult to control with herbicides. Multiple applications are required. |                |  |  |             |              |        |                 |
| Clethodim (Select)   | 1***           | Non-Bearing Fruit Trees  | Registered in non-bearing fruit trees for control of annual and perennial grass weeds, including <b>Feather Top Rhodes Grass</b> . Apply after trees have recovered from transplant shock and are showing signs of active growth. Do not apply to bearing trees. | NR          | A            | ALL    | R3              |
| Dichlobenil (Casoran)  | 29**           | Orchards / Residual Weed Control   | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR          | A            | ALL    | -               |

| Active Ingredient (Trade Name)  | Chemical Group | Crop / Situation  | Comment / Use / Weed  | WHP (days)  | Availability | States            | Regulatory Risk |
|---------------------------------|----------------|---|---|-------------|--------------|-------------------|-----------------|
| Fluazifop-P (Fusilade)          | 1***           | Persimmons / Directed Spray                                 | Registered in persimmons as a directed spray for the control of grass weeds, including <b>Feather Top Rhodes Grass</b> .  | 14          | A            | QLD, NSW, WA & NT | -               |
| Flumioxazin (Chateau)           | 14**           | Pome Fruit / Directed Spray / Residual Control              | Registered in pome fruit as a directed spray for residual control of grass and broadleaf weeds, including <b>Feather Top Rhodes Grass</b> .   | 98<br>G:28  | A            | ALL               | -               |
| Glufosinate (Basta)             | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray        | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Feather Top Rhodes Grass</b> . Apply treatment along the sides of crops and between rows of crops.               | NR<br>G:56  | A            | ALL               | R3              |
| Glyphosate (Roundup)            | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Feather Top Rhodes Grass</b> . Do not allow spray to contact any part of the tree, including the trunk. | NR          | A            | ALL               | R3              |
| Haloxfop (Verdict)              | 1***           | Persimmons / Directed Spray                                 | Registered in persimmons for control of grass weeds, including <b>Feather Top Rhodes Grass</b> . Spray should be directed to the base of the tree, avoiding contact with fruit and foliage.                           | NR          | A            | ALL               | -               |
| Paraquat (Gramoxone)            | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Feather Top Rhodes Grass</b> . Do not allow spray to contact any part of the tree, including the trunk.                          | H:1<br>G:7  | A            | ALL               | R3              |
| Paraquat + Amitrole (Guerrilla) | 22** + 34**    | Orchards / Directed Spray                                   | Registered in orchards for control of annual weeds, including <b>Feather Top Rhodes Grass</b> . Avoid contact with crop foliage.  | H:NR<br>G:1 | A            | ALL               | R3              |
| Paraquat + Diquat (SpraySeed)   | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Feather Top Rhodes Grass</b> . Do not allow spray to contact any part of the tree, including the trunk.                  | G:1         | A            | ALL               | R3              |

| Active Ingredient (Trade Name)  | Chemical Group | Crop / Situation  | Comment / Use / Weed   | WHP (days) | Availability | States            | Regulatory Risk |
|---|----------------|---|--|------------|--------------|-------------------|-----------------|
| <b>Ryegrass</b> ( <i>Lolium</i> spp.)   |                |   |  |            |              |                   |                 |
| <b>Priority: Low</b>  |                |   |  |            |              |                   |                 |
| Rated as a moderate priority in NSW and VIC, and as a low priority in QLD, SA and WA. The most serious grass weed of southern Australia with distribution that is gradually extending north. Populations are prone to herbicide resistance so integrated weed management and rotation of herbicide modes of action are important aspects of a long-term control strategy. |                |   |  |            |              |                   |                 |
| Amitrole  | 34**           | Orchards / Directed Spray                                   | Registered in orchards as a directed spray for the control of grass and broadleaf weeds, including <b>Ryegrass</b> .   | 56         | A            | ALL               | -               |
| Clethodim (Select)  | 1***           | Non-Bearing Fruit Trees                                     | Registered in non-bearing fruit trees for control of annual and perennial grass weeds, including <b>Ryegrass</b> . Apply after trees have recovered from transplant shock and are showing signs of active growth. Do not apply to bearing trees. | NR         | A            | ALL               | R3              |
| Dichlobenil (Casoran)   | 29**           | Orchards / Residual Weed Control                            | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR         | A            | ALL               | -               |
| Fluazifop-P (Fusilade)  | 1***           | Persimmons / Directed Spray                                 | Registered in persimmons as a directed spray for the control of grass weeds, including <b>Ryegrass</b> .   | 14         | A            | QLD, NSW, WA & NT | -               |
| Flumioxazin (Chateau)   | 14**           | Pome Fruit / Directed Spray / Residual Control              | Registered in pome fruit as a directed spray for residual control of grass and broadleaf weeds, including <b>Ryegrass</b> .  | 98<br>G:28 | A            | ALL               | -               |
| Glufosinate (Basta)   | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray        | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Ryegrass</b> . Apply treatment along the sides of crops and between rows of crops.  | NR<br>G:56 | A            | ALL               | R3              |
| Glyphosate (Roundup)  | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Ryegrass</b> . Do not allow spray to contact any part of the tree, including the trunk.  | NR         | A            | ALL               | R3              |
| Haloxypop (Verdict)   | 1***           | Persimmons / Directed Spray                                 | Registered in persimmons for control of grass weeds, including <b>Ryegrass</b> . Spray should be directed to the base of the tree, avoiding contact with fruit and foliage.  | NR         | A            | ALL               | -               |

| Active Ingredient (Trade Name)                       | Chemical Group | Crop / Situation   | Comment / Use / Weed   | WHP (days)  | Availability | States                 | Regulatory Risk |
|--|----------------|--|--|-------------|--------------|------------------------|-----------------|
| Oxyfluorfen (Goal)                                   | 14**           | Persimmon / Directed Spray / Tank Mix with Glyphosate, Paraquat or Paraquat/Diquat | Registered in persimmons for control of various grass and broadleaf weeds, including <b>Ryegrass</b> . If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.                                      | NR<br>NG    | A            | ALL                    | -               |
| Paraquat (Gramoxone)                                 | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Ryegrass</b> . Do not allow spray to contact any part of the tree, including the trunk.   | H:1<br>G:7  | A            | ALL                    | R3              |
| Paraquat + Amitrole (Guerrilla)                      | 22** + 34**    | Orchards / Directed Spray  | Registered in orchards for control of annual weeds, including <b>Ryegrass</b> . Avoid contact with crop foliage.   | H:NR<br>G:1 | A            | ALL                    | R3              |
| Paraquat + Diquat (SpraySeed)                        | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Ryegrass</b> . Do not allow spray to contact any part of the tree, including the trunk.   | G:1         | A            | ALL                    | R3              |
| Trifluralin  | 3**            | Orchards / Pre-Plant Residual  | Registered in orchards as a pre-plant residual for control of grass and broadleaf weeds, including <b>Ryegrass</b> .   | NR          | A            | QLD, SA, WA, VIC & TAS | -               |
| Norflurazon (Zoliar)<br>Agnova Technologies          | 12**           |  | Registered for control of grass and broadleaf weeds, including Annual Ryegrass in asparagus, citrus, grapes, nuts, stone and pome fruits (apple & pear). APVMA MRLs for pome fruit: Norflurazon *0.2 mg/kg.                        |             | P            |                        | -               |
| S-Metolachlor (Dual Gold)<br>Syngenta                | 15**           |  | Registered for control of grass and broadleaf weeds, including Annual Ryegrass in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans. |             | P            |                        | -               |
| S-Metolachlor+ Prosulfocarb (Boxer Gold)<br>Syngenta | 15**           |  | Registered for control of Ryegrass in potatoes.  |             | P            |                        | -               |

| Active Ingredient (Trade Name)   | Chemical Group | Crop / Situation   | Comment / Use / Weed  | WHP (days) | Availability | States | Regulatory Risk |
|--|----------------|--|---|------------|--------------|--------|-----------------|
| <b>Dock</b> ( <i>Rumex</i> spp.)   |                |  |   |            |              |        |                 |
| <b>Priority: Low</b>   |                |  |   |            |              |        |                 |
| Rated as a moderate priority in NSW, and as a low priority in all other states. Widespread species that is prolific and difficult to control when established. |                |  |   |            |              |        |                 |
| Dichlobenil (Casoran)  | 29**           | Orchards / Residual Weed Control   | Registered in orchards for residual weed control of annual grass and broadleaf weeds.   | NR         | A            | ALL    | -               |
| Glufosinate (Basta)  | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray                               | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Dock</b> . Apply treatment along the sides of crops and between rows of crops.               | NR G:56    | A            | ALL    | R3              |
| Glyphosate (Roundup)   | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray                        | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Dock</b> . Do not allow spray to contact any part of the tree, including the trunk. | NR         | A            | ALL    | R3              |
| Oxyfluorfen (Goal)   | 14**           | Persimmon / Directed Spray / Tank Mix with Glyphosate, Paraquat or Paraquat/Diquat | Registered in persimmons for control of various grass and broadleaf weeds, including <b>Dock</b> . If weeds are already present, use as a spike in a mixture with glyphosate or paraquat.         | NR NG      | A            | ALL    | -               |
| Paraquat (Gramoxone)   | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Dock</b> . Do not allow spray to contact any part of the tree, including the trunk.                          | H:1 G:7    | A            | ALL    | R3              |
| Paraquat + Amitrole (Guerrilla)  | 22** + 34**    | Orchards / Directed Spray  | Registered in orchards for control of annual weeds, including <b>Dock</b> . Avoid contact with crop foliage.  | H:NR G:1   | A            | ALL    | R3              |
| Paraquat + Diquat (SpraySeed)  | 22**           | Orchards / Directed Spray or Spot Spray  | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Dock</b> . Do not allow spray to contact any part of the tree, including the trunk.                  | G:1        | A            | ALL    | R3              |

| Active Ingredient (Trade Name)                    | Chemical Group | Crop / Situation  | Comment / Use / Weed   | WHP (days)  | Availability | States | Regulatory Risk |
|---|----------------|---|--|-------------|--------------|--------|-----------------|
| <b>Willow Weed</b> ( <i>Persicaria maculosa</i> ) |                |   |  |             |              |        |                 |
| <b>Priority: Low</b>                              |                |   |  |             |              |        |                 |
| Ranked as a low priority in all states.           |                |   |  |             |              |        |                 |
| Dichlobenil (Casoran)                             | 29**           | Orchards / Residual Weed Control                            | Registered in orchards for residual weed control of annual grass and broadleaf weeds.  | NR          | A            | ALL    | -               |
| Glufosinate (Basta)                               | 10**           | Non-Bearing Fruit Trees / Directed or Shielded Spray        | Registered in non-bearing fruit trees for control of various grass and broadleaf weeds, including <b>Willow Weed</b> . Apply treatment along the sides of crops and between rows of crops.               | NR<br>G:56  | A            | ALL    | R3              |
| Glyphosate (Roundup)                              | 9**            | Tropical & Sub-Tropical Fruits / Directed or Shielded Spray | Registered in tropical and sub-tropical fruits for control of various grass and broadleaf weeds, including <b>Willow Weed</b> . Do not allow spray to contact any part of the tree, including the trunk. | NR          | A            | ALL    | R3              |
| Paraquat (Gramoxone)                              | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of annual grass and broadleaf weeds, including <b>Willow Weed</b> . Do not allow spray to contact any part of the tree, including the trunk.                          | H:1<br>G:7  | A            | ALL    | R3              |
| Paraquat + Amitrole (Guerrilla)                   | 22** + 34**    | Orchards / Directed Spray                                   | Registered in orchards for control of annual weeds, including <b>Willow Weed</b> . Avoid contact with crop foliage.  | H:NR<br>G:1 | A            | ALL    | R3              |
| Paraquat + Diquat (SpraySeed)                     | 22**           | Orchards / Directed Spray or Spot Spray                     | Registered in orchards for control of various annual grass and broadleaf weeds, including <b>Willow Weed</b> . Do not allow spray to contact any part of the tree, including the trunk.                  | G:1         | A            | ALL    | R3              |

## **4.4 Plant Growth Regulators in persimmons**

### **4.4.1 Plant Growth Regulator priorities**

|                              |
|------------------------------|
| <b>PGR Issue</b>             |
| <b>High</b>                  |
| Extend Shelf Life            |
| <b>Moderate</b>              |
| Control of Vegetative Growth |
| Promotion of Early Flowering |
| <b>Low</b>                   |
| Ageing and Ripening Delay    |

### 4.3.2 Available and potential plant growth regulators

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

| Availability  |   |   |    |
|---|---|---|----|
| A   | Available via either registration or permit approval                  |   |    |
| P   | Potential – a possible candidate to pursue for registration or permit |   |    |
| P-A   | Potential, already approved in the crop for another use               |   |    |
| Regulatory risk (refer to Appendix 7)   |   |   |    |
|   | R1  | Short-term: Critical concern over retaining access                    |    |
|   | R2  | Medium-term: Maintaining access of significant concern                |    |
|   | R3  | Long-term: Potential issues associated with use - Monitoring required |    |
| Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G) |   |   |    |
| Harvest   | H   | Not Required when used as directed                                    | NR |
| Grazing   | G   | No Grazing Permitted  | NG |

| Active Ingredient (Trade Name)   | Chemical Group | Crop / Situation                   | Comment / Use  | WHP (days) | Availability | States | Regulatory Risk |
|--|----------------|------------------------------------|--|------------|--------------|--------|-----------------|
| <b>Extend Shelf Life</b>   |                |                                    |  |            |              |        |                 |
| <b>Priority: High</b>  |                |                                    |  |            |              |        |                 |
| Rated as a high priority in NSW and VIC, a moderate priority in QLD and SA, and as a low priority in WA. |                |                                    |  |            |              |        |                 |
| 1-Methylcyclopropene (Smartfresh)  | -              | Persimmon / Post-Harvest Treatment | Registered in persimmons as a post-harvest treatment to improve fruit quality after shipping, storage or handling. For use in enclosed areas. Should be added to the treatment area containing fruit immediately after harvest, upon entering storage or in transit. | NR         | A            | ALL    | -               |
| Amino Ethoxy Vinyl Glycine (Retain)  | -              |                                    | Registered for improved harvest management, fruit quality and enhanced storage potential in apples and stonefruit (except cherries)  |            | P            |        | -               |



| Active Ingredient<br>(Trade Name)  | Chemical<br>Group | Crop /<br>Situation | Comment / Use  | WHP<br>(days) | Availability | States | Regulatory<br>Risk |
|--|-------------------|---------------------|--|---------------|--------------|--------|--------------------|
| <b>Control of Vegetative Growth</b>  |                   |                     |  |               |              |        |                    |
| <b>Priority: Moderate</b>  |                   |                     |  |               |              |        |                    |
| Rated as a moderate priority in NSW, QLD, SA and VIC, and as a low priority in WA. |                   |                     |  |               |              |        |                    |
| Gibberellins A4 & A7 +<br>6-Benzyladenine<br>(Cytolin)                             | -                 |                     | Registered for stimulation of lateral growth in red delicious apples and non-bearing cherries. |               | P            |        | -                  |
| Ethephon   | -                 |                     | Registered for retarding vegetative growth and stimulating flowering of young apple trees.     |               | P            |        | -                  |
| Paclobutrazol  | -                 |                     | Registered for reduction of vegetative growth in mango, stone fruit and apples.                |               | P            |        | -                  |
| Prohexadione-Calcium   | -                 |                     | Registered for the reduction of shoot growth in apples.  |               | 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/F2021C00634">www.legislation.gov.au/Details/F2021C00634</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 2021-22                                  | <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>  |
| Hort Innovation Project PR13007 – IPDM Manual for Persimmon (DAF QLD) | <a href="https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/pr13007-integrated-pest-and-disease-mgmt-edition-2-pdf.pdf">https://www.horticulture.com.au/globalassets/hort-innovation/resource-assets/pr13007-integrated-pest-and-disease-mgmt-edition-2-pdf.pdf</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 persimmons

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

Appendix 3. Products available for weed control in persimmons

Appendix 4. Plant growth regulators available in persimmons

Appendix 5. Current permits for use in persimmons

Appendix 6. Persimmons Maximum Residue Limits (MRLs)

Appendix 7. Persimmons Agrichemical Regulatory Risk Assessment

## Appendix 1. Products available for disease control in persimmons

| Active Ingredient (Trade Name)          | Chem. group | Situation  | Diseases / Comments   | States             | WHP Days | Regulatory risk |
|---|-------------|--|---|--------------------|----------|-----------------|
| Bromo Chloro Dimethyl Hydantoin (BCDMH) | -           | Sanitiser / Post-Harvest Treatment                 | External Rot Causing Organisms  | ALL                | NR       | -               |
| Chlorine                                | -           | Sanitiser / Post-Harvest Treatment                 | Bacteria and Fungi  | ALL                | NR       | -               |
| Chlorothalonil<br>PER13445              | M5          | Persimmon  | Cercospora Leaf Spot  | ALL<br>(excl. VIC) | 7        | R3              |
| Copper                                  | M1          | Tropical Fruit                                     | Phytophthora Stem Canker  | QLD & NSW          | 1        | -               |
| Difenoconazole (Score)<br>PER87599      | 3           | Japanese Persimmons                                | Cercospora Leaf Spot ( <i>Cercospora</i> spp.)<br>Leaf Spot ( <i>Pseudocercospora</i> spp.)             | ALL<br>(excl. VIC) | 28       | R3              |
| Fludioxonil (Scholar)<br>Syngenta       | 12          | Pome Fruit / Post-Harvest Dip or Drench            | Blue Mould ( <i>Penicillium expansum</i> , <i>P.solitum</i> )<br>Grey Mould ( <i>Botrytis cinerea</i> ) | ALL                | NR       | R3              |
| Iodine (AIS Iodine Granules)            | M           | Tropical and Sub-Tropical Fruit / Post Harvest Dip | Bacteria & Fungi  | ALL                | NR       | -               |
| Mancozeb<br>PER12488                    | M3          | Persimmon  | Cercospora or Angular Leaf Spot ( <i>Cercospora kaki</i> )  | ALL<br>(excl. VIC) | 14       | R2              |
| Peroxyacetic Acid                       | M           | Sanitiser / Post-Harvest Treatment                 | Bacteria  | ALL                | NR       | -               |

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

| Active Ingredient (Trade Name)                           | Chem. group | Situation      | Pests / Comments   | States             | WHP Days  | Regulatory risk |
|--|-------------|----------------|--|--------------------|-----------|-----------------|
| 4-(P-Acetoxyphenyl)-2-Butanone + Malathion               | 1B          | Fruit Fly Trap | Queensland Fruit Fly   | ALL                | NR        | R3              |
| Abamectin + Chlorantraniliprole (Voliam Targo) Syngenta  | 6+28        | Pome Fruit     | Codling Moth ( <i>Cydia pomonella</i> )<br>Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Cotton Bollworm ( <i>Helicoverpa armigera</i> )<br>Native Budworm ( <i>Helicoverpa punctigera</i> )<br>Oriental Fruit Moth ( <i>Grapholita molesta</i> )<br>Two Spotted Mite ( <i>Tetranychus urticae</i> )<br>European Red Mite ( <i>Panonychus ulmi</i> ) | ALL                | 7<br>G:28 | -               |
| Acetamiprid + Pyriproxyfen (Trivor) Adama PER89943       | 4A+7C       | Persimmons     | Fruit Spotting Bugs ( <i>Amblypelta nitida</i> ,<br><i>A. lutescens</i> )<br>Mealybugs (Pseudococcidae)<br>Scale Insects (Coccoidea)<br>Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Suppression of:<br>Queensland Fruit Fly ( <i>Bactrocera tryoni</i> )<br>Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> )                                  | ALL<br>(excl. VIC) | 28<br>NG  | R2              |
| Alpha-Cypermethrin PER85550                              | 3A          | Persimmons     | Fruit Fly  | ALL                | 14<br>NG  | -               |
| <i>Bacillus thuringiensis subsp Kurstaki</i> Strain HD-1 | 11          | Fruit          | Armyworm ( <i>Spodoptera</i> spp.)<br>Cotton Bollworm ( <i>Helicoverpa armigera</i> )<br>Native Budworm ( <i>Helicoverpa punctigera</i> )<br>Cabbage Moth ( <i>Plutella xylostella</i> )<br>Cabbage White Butterfly ( <i>Pieris rapae</i> )<br>Loopers<br>Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Vine Moth ( <i>Agarista agricola</i> )       | ALL                | NR        | -               |

| Active Ingredient<br>(Trade Name)                   | Chem.<br>group | Situation                  | Pests / Comments  | States                            | WHP<br>Days | Regulatory<br>risk |
|---|----------------|----------------------------|---|-----------------------------------|-------------|--------------------|
| Beta-Cyfluthrin<br>(Bulldock)<br>PER80374           | 3A             | Persimmon / Field<br>Grown | Fruit-Spotting Bug ( <i>Amblypelta nitida</i> )<br>Banana-Spotting Bug ( <i>Amblypelta lutescens</i> )<br>Elephant or Rhino Beetle ( <i>Xylotrupes gideon</i> )<br>Red-Shouldered Leaf Beetle ( <i>Monolepta<br/>australis</i> )<br>Swarming Leaf Beetle ( <i>Rhyparida</i> spp.)<br>Longicorn Trunk Borer ( <i>Acalolepta vastator</i> )<br>Macadamia Nut Borer ( <i>Cryptophlebia<br/>ombrodelta</i> )<br>Mango Tip Borer ( <i>Penicillaria jocosatrix</i> )<br>Flatid Planthopper (Flatidae)<br>Green Vegetable Bug ( <i>Nezara viridula</i> )<br>Lychee Stink Bug ( <i>Tessarotoma papillosa</i> )<br>Yellow Peach Moth ( <i>Conogethes punctiferalis</i> ) | NSW, NT,<br>QLD, SA &<br>WA       | 7           | R3                 |
| Buprofezin<br>(Applaud)<br>Corteva                  | 16             | Persimmons                 | Mealybug<br>Scale Insects   | ALL                               | 14          | -                  |
| Chlorantraniliprole<br>(Altacor)<br>FMC             | 28             | Pome Fruit                 | Codling Moth ( <i>Cydia pomonella</i> )<br>Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Cotton Bollworm ( <i>Helicoverpa armigera</i> )<br>Native Budworm ( <i>Helicoverpa punctigera</i> )<br>Oriental Fruit Moth ( <i>Grapholita molesta</i> )   | ALL                               | 14<br>NG    | -                  |
| Chlorantraniliprole<br>(Altacor)<br>FMC<br>PER89259 | 28             | Pome Fruit                 | Fall Armyworm   | ALL<br>(excl. VIC)                | 14<br>NG    | -                  |
| Chlorpyrifos  | 1B             | Pome Fruit                 | Wingless Grasshopper  | VIC, TAS,<br>NSW, WA<br>& SA      | 14          | R1                 |
| Chlorpyrifos<br>PER13932                            | 1B             | Persimmons                 | Cluster Grub ( <i>Spodoptera litura</i> )   | ACT, NSW,<br>QLD, TAS,<br>NT & WA | 14          | R1                 |

| Active Ingredient<br>(Trade Name)          | Chem.<br>group | Situation                                  | Pests / Comments   | States             | WHP<br>Days | Regulatory<br>risk |
|--|----------------|--|--|--------------------|-------------|--------------------|
| Chlorpyrifos<br>PER14547                   | 1B             | Persimmons                                 | Mealybug ( <i>Pseudococcus</i> spp.)   | ALL<br>(excl. VIC) | 14          | R1                 |
| Clofentezine<br>(Apollo)                   | 10A            | Pome Fruit                                 | Two Spotted Mite ( <i>Tetranychus urticae</i> )<br>European Red Mite ( <i>Panonychus ulmi</i> )<br>Bryobia Mite ( <i>Bryobia rubrioculus</i> )   | ALL                | 21          | -                  |
| Clothianidin<br>(Samurai)                  | 4A             | Persimmon                                  | Queensland Fruit Fly ( <i>Bactrocera tryoni</i> )<br>Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> )   | ALL                | 7<br>NG     | R2                 |
| Clothianidin<br>(Samurai)<br>PER14779      | 4A             | Persimmon                                  | Mealybug ( <i>Pseudococcus</i> spp.)   | ALL<br>(excl. VIC) | NR<br>NG    | R2                 |
| Dimethoate<br>PER13859                     | 1B             | Fruit Fly Host Crops /<br>Non-Bearing Only | Fruit Fly  | ALL                | NR          | R1                 |
| Ethyl Formate                              | 8A             | Persimmons / Post-<br>Harvest Fumigant     | Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Red Back Spiders ( <i>Latrodectus hasselti</i> )<br>Two Spotted Mite ( <i>Tetranychus urticae</i> )<br>Long Tailed Mealybug ( <i>Pseudococcus longispinus</i> )<br>Western Flower Thrips ( <i>Frankliniella occidentalis</i> )<br>Plague Thrips ( <i>Thrips imaginis</i> ) | ALL                | NR          | -                  |
| Etoxazole<br>(Paramite)                    | 10B            | Pome Fruit                                 | Two Spotted Mite ( <i>Tetranychus urticae</i> )<br>European Red Mite ( <i>Panonychus ulmi</i> )<br>Bryobia Mite ( <i>Bryobia rubrioculus</i> )   | ALL                | 7<br>NG     | -                  |
| Flonicamid<br>(Mainman)<br>UPL<br>PER89215 | 29             | Japanese Persimmons                        | Mealybug ( <i>Pseudococcus</i> spp.)<br>Suppression of thrips, including:<br>Plague Thrips ( <i>Thrips imaginis</i> )<br>Redbanded Thrips ( <i>Selenothrips rubrocinctus</i> )<br>Greenhouse Thrips ( <i>Heliethrips haemorrhoidalis</i> )<br>Western Flower Thrips ( <i>Frankliniella occidentalis</i> )                            | ALL<br>(excl. VIC) | 21<br>NG    | -                  |



| Active Ingredient<br>(Trade Name)                    | Chem.<br>group | Situation  | Pests / Comments   | States             | WHP<br>Days | Regulatory<br>risk |
|--|----------------|------------|--|--------------------|-------------|--------------------|
| Garlic + Chilli + Pyrethrins<br>+ Piperonyl Butoxide | 3A             | Fruit Tree | Suitable for organic growers. Broad spectrum activity including ants, aphids, caterpillars, earwigs, whitefly, thrips and leafhopper.  | ALL                | 1           | -                  |
| Helicoverpa NPV<br>(Vivus Max)<br>AgBiTech           | 31             | Pome Fruit | Cotton Bollworm ( <i>Helicoverpa armigera</i> )<br>Native Budworm ( <i>Helicoverpa punctigera</i> )  | ALL                | NR          | -                  |
| Indoxacarb<br>(Avatar eVo)<br>FMC                    | 22A            | Pome Fruit | Codling Moth ( <i>Cydia pomonella</i> )<br>Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Cotton Bollworm ( <i>Helicoverpa armigera</i> )<br>Native Budworm ( <i>Helicoverpa punctigera</i> )<br>Apple Weevil ( <i>Otiorhynchus cribicollis</i> )<br>Fuller's Rose Weevil ( <i>Asynonychus cervinus</i> )<br>Garden Weevil ( <i>Phlyctinus callosus</i> ) | ALL                | 14<br>NG    | R3                 |
| Malathion<br>(Fyfanon)                               | 1B             | Persimmons | Fruit Fly  | ALL                | 3           | R3                 |
| Methiocarb<br>(MesuroI)                              | 1A             | Pome Fruit | Common Garden Snail<br>Slugs<br>White Italian Snail<br>White Snail   | ALL                | 7<br>G:28   | -                  |
| Methomyl<br>(Lannate)<br>PER14548                    | 1A             | Persimmons | Thrips   | ALL                | NR          | R2                 |
| Methomyl<br>(Lannate)<br>PER89293                    | 1A             | Persimmons | Fall Armyworm ( <i>Spodoptera frugiperda</i> )   | ALL                | NR          | R2                 |
| Methoxyfenozide<br>(Prodigy)<br>Corteva<br>PER12591  | 18             | Persimmons | Leaf Roller (Tortricidae)<br>Yellow Peach Moth ( <i>Conogethes punctiferalis</i> )<br>Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Orange Fruitborer ( <i>Isotenes miserana</i> )   | ALL<br>(excl. VIC) | 7<br>NG     | -                  |
| Methoxyfenozide<br>(Venturi Max)<br>Adama            | 18             | Persimmons | Leaf Roller (Tortricidae)<br>Yellow Peach Moth ( <i>Conogethes punctiferalis</i> )<br>Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Orange Fruitborer ( <i>Isotenes miserana</i> )   | ALL                | 7<br>NG     | -                  |

| Active Ingredient<br>(Trade Name)   | Chem. group | Situation  | Pests / Comments  | States                  | WHP Days | Regulatory risk |
|---|-------------|--|---|-------------------------|----------|-----------------|
| Methoxyfenozide<br>(Venturi Max)<br>Adama   | 18          | Pome Fruit   | Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Loopers                                   | ALL                     | 7<br>NG  | -               |
| Milbemectin<br>(Milbeknock)   | 6           | Pome Fruit   | European Red Mite ( <i>Panonychus ulmi</i> )<br>Two Spotted Mite ( <i>Tetranychus urticae</i> )     | ALL                     | 14<br>NG | -               |
| Octadecadien<br>(Clearwing Borer Mating<br>Disruption Agent)<br>Insense<br>PER88722 | -           | Persimmons / Mating<br>Disruption                  | Clearwing Borer ( <i>Carmenta chrysophanes</i> )  | NSW &<br>QLD            | NR       | -               |
| Octadecadien<br>(Shin Etsu MD Carmenta<br>Pheromone)<br>PER13176                    | -           | Persimmons / Field<br>Grown / Mating<br>Disruption | Clearwing Borer ( <i>Carmenta chrysophanes</i> )  | ALL                     | NR       | -               |
| Petroleum Oil   | UN          | Pome Fruit   | San Jose Scale<br>Oyster Shell Scale<br>Bryobia Mite Eggs<br>European Mite Eggs<br>Two Spotted Mite | ALL<br><br>NSW &<br>QLD | 1        | -               |
| Petroleum Oil<br>PER13933   | UN          | Persimmon  | Scale Insects   | ALL<br>(excl. VIC)      | 1        | -               |
| Potassium Salts of Fatty<br>Acid (Natrasoap)  | -           | Fruit Trees  | Aphids<br>Thrips<br>Mealybug<br>Two-Spotted Mite<br>Spider Mite<br>Whitefly                         | ALL                     | NR       | -               |
| Pyriproxifen<br>(Distance Ant Bait)   | 7C          | Tropical Fruit<br>Plantations                      | Invasive and Nuisance Ants  | ALL                     | NR       | -               |

| Active Ingredient<br>(Trade Name)                    | Chem.<br>group | Situation   | Pests / Comments  | States             | WHP<br>Days | Regulatory<br>risk |
|--|----------------|---|---|--------------------|-------------|--------------------|
| Spinetoram<br>(Success Neo)<br>Corteva               | 5              | Persimmon   | Flower-Eating Caterpillars<br>Leafrollers<br>Loopers<br>Yellow Peach Moth<br>Red-Banded Thrips<br>Sorghum Head Caterpillar  | ALL                | NR          | -                  |
| Spinetoram<br>(Success Neo)<br>Corteva<br>PER89241   | 5              | Pome Fruit  | Fall Armyworm   | ALL<br>(excl. VIC) | NR          | -                  |
| Spinosad<br>(Entrust Organic)<br>Corteva             | 5              | Persimmon   | Flower-Eating Caterpillars<br>Leafrollers<br>Loopers<br>Yellow Peach Moth<br>Red-Banded Thrips<br>Sorghum Head Caterpillar  | ALL                | NR          | -                  |
| Spinosad<br>(Entrust Organic)<br>Corteva<br>PER89870 | 5              | Pome Fruit  | Fall Armyworm   | ALL<br>(excl. VIC) | NR          | -                  |
| Spinosad<br>(Naturalure)<br>Corteva                  | 5              | Tree, Fruit, Nut, Vine &<br>Vegetable Crops / Fruit<br>Fly Bait | Queensland Fruit Fly ( <i>Bactrocera tryoni</i> )<br>Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> )  | ALL                | NR          | -                  |
| Spirotetramat<br>(Movento)<br>Bayer                  | 23             | Pome fruit  | Long Tailed Mealybug ( <i>Pseudococcus longispinus</i> )<br>Tuber Mealybug ( <i>Pseudococcus virburni</i> )<br>San Jose Scale ( <i>Quadraspidiotus perniciosus</i> )<br>Suppression of:<br>Woolly Apple Aphid ( <i>Eriosoma lanigerum</i> ) | ALL                | 21          | -                  |

| Active Ingredient<br>(Trade Name)                 | Chem.<br>group | Situation                                     | Pests / Comments   | States                     | WHP<br>Days | Regulatory<br>risk |
|---|----------------|---|--|----------------------------|-------------|--------------------|
| Sulfoxaflor<br>(Transform)<br>Corteva             | 4C             | Pome Fruit                                    | Apple Dimpling Bug<br>Long Tailed Mealybug<br>Tuber Mealybug<br>Woolly Apple Aphid<br>San Jose Scale   | ALL                        | 7           | -                  |
| Sulfoxaflor<br>(Transform)<br>Corteva<br>PER87067 | 4C             | Persimmons                                    | Mealybugs (Pseudococcidae)   | ALL<br>(excl. VIC)         | 7           | -                  |
| Tetraniliprole<br>(Vayego)<br>Bayer               | 28             | Pome Fruit (including<br>Japanese Persimmons) | Codling Moth ( <i>Cydia pomonella</i> )<br>Light Brown Apple Moth ( <i>Epiphyas postvittana</i> )<br>Apple Weevil ( <i>Otiorhynchus cribicollis</i> )<br>Fuller's Rose Weevil ( <i>Asynonychus cervinus</i> )<br>Garden Weevil ( <i>Phlyctinus callosus</i> )  | ALL                        | 7<br>NG     | -                  |
| Thiacloprid<br>(Calypso)                          | 4A             | Pome Fruit (including<br>Japanese Persimmons) | Codling Moth<br>Oriental Fruit Moth  | ALL                        | 21<br>NG    | R2                 |
| Trichlorfon<br>(Lepidex)<br>PER12450              | 1B             | Persimmon                                     | Queensland Fruit Fly ( <i>Bactrocera tryoni</i> )<br>Mediterranean Fruit Fly ( <i>Ceratitis capitata</i> )   | ALL<br>(excl. VIC,<br>TAS) | 7<br>G:7    | R2                 |
| Trichlorfon<br>(Lepidex)<br>PER14743              | 1B             | Persimmon                                     | Flatid Planthopper<br>Flower-Eating Caterpillar<br>Loopers<br>Yellow Peach Moth ( <i>Conogethes punctiferalis</i> )<br>Suppression of:<br>Fruit-Spotting Bug ( <i>Amblypelta nitida</i> )<br>Banana-Spotting Bug ( <i>Amblypelta lutescens</i> )<br>Green Vegetable Bug ( <i>Nezara viridula</i> )<br>Lychee Stink Bug ( <i>Lyramorpha rosea</i> ) | ALL<br>(excl. VIC)         | 7           | R2                 |

### Appendix 3. Products available for weed control in persimmons

| Active ingredient<br>(Trade Name) | Chem.<br>Group | Situation  | Comment / Use / Weed   | WHP<br>(days) | States               | Regulatory<br>risk |
|-----------------------------------|----------------|--|--|---------------|----------------------|--------------------|
| Amitrole                          | 34**           | Orchards / Directed Spray                                    | Grass and Broadleaf Weeds  | 56            | ALL                  | -                  |
| Carfentrazone<br>(Hammer)         | 14**           | Tropical & Sub-Tropical Fruits<br>/ Tank Mix with Glyphosate | Broadleaf Weeds  | NR            | ALL                  | -                  |
| Clethodim<br>(Select)             | 1***           | Non-Bearing Fruit Tree                                       | Annual Ryegrass ( <i>Lolium rigidum</i> ), Annual Phalaris ( <i>Phalaris minor</i> ), Barley Grass ( <i>Hordeum leporinum</i> ), Barnyard Grass ( <i>Echinochloa</i> spp.), Blown Grass ( <i>Agrostis avenacea</i> ), Brome Grass ( <i>Bromus diandrus</i> ), Crowsfoot Grass ( <i>Eleusine indica</i> ), Feathertop Rhodes Grass ( <i>Chloris virgata</i> ), Liverseed Grass ( <i>Urochloa panicoides</i> ), Paradoxa Grass ( <i>Phalaris paradoxa</i> ), Red Sprangletop Grass ( <i>Leptochloa filiformis</i> ), Seedling Johnson Grass ( <i>Sorghum halepense</i> ), Summer Grass ( <i>Digitaria</i> spp.), Volunteer Sorghum ( <i>Sorghum</i> spp.), Volunteer Wheat ( <i>Triticum aestivum</i> ), Volunteer Oats ( <i>Avena sativa</i> ), Volunteer Barley ( <i>Hordeum vulgare</i> ), Winter Grass ( <i>Poa annua</i> )<br>Suppression of:<br>Silver Grass ( <i>Vulpia bromoides</i> ) (not QLD, WA) | NR            | ALL                  | R3                 |
| Dichlobenil<br>(Casoran)          | 29**           | Orchards / Residual Weed<br>Control                          | Annual Grass and Broadleaf Weeds   | NR            | ALL                  | -                  |
| Fluazifop-P<br>(Fusilade)         | 1***           | Persimmon / Directed Spray                                   | Grass Weeds  | 14            | QLD, NSW,<br>WA & NT | -                  |

| Active ingredient<br>(Trade Name)  | Chem.<br>Group | Situation  | Comment / Use / Weed             | WHP<br>(days) | States                        | Regulatory<br>risk |
|------------------------------------|----------------|--|----------------------------------|---------------|-------------------------------|--------------------|
| Flumioxazin<br>(Chateau)           | 14**           | Pome Fruit / Directed Spray /<br>Residual Control  | Grass and Broadleaf Weeds        | 98<br>G:28    | ALL                           | -                  |
| Glufosinate<br>(Basta)             | 10**           | Non-Bearing Fruit Tree   | Grass and Broadleaf Weeds        | NR<br>G:56    | ALL                           | R3                 |
| Glyphosate<br>(Roundup)            | 9**            | Tropical & Sub-Tropical Fruits<br>/ Directed or Shielded Spray                           | Grass and Broadleaf Weeds        | NR            | ALL                           | R3                 |
| Isoxaben<br>(Gallery)<br>Corteva   | 29**           | Bearing and Non-Bearing<br>Fruit Tree / Residual Weed<br>Control                         | Broadleaf Weeds.                 | NR            | ALL                           | -                  |
| Haloxypop<br>(Verdict)             | 1***           | Persimmon / Directed Spray   | Grass Weeds                      | NR            | ALL                           | -                  |
| Oryzalin                           | 3**            | Persimmon / Non-Bearing  | Grass and Broadleaf Weeds        | NR            | ALL                           | -                  |
| Oxyfluorfen<br>(Goal)              | 14**           | Persimmon / Directed Spray /<br>Tank Mix with Glyphosate,<br>Paraquat or Paraquat/Diquat | Grass and Broadleaf Weeds        | NR<br>NG      | ALL                           | -                  |
| Paraquat<br>(Gramoxone)            | 22**           | Orchards / Directed Spray or<br>Spot Spray   | Annual Grass and broadleaf weeds | H:1<br>G:7    | ALL                           | R3                 |
| Paraquat + Amitrole<br>(Guerrilla) | 22** +<br>34** | Orchards / Directed Spray  | Annual Weeds                     | H:NR<br>G:1   | QLD, VIC, SA,<br>WA, TAS & NT | R3                 |
|                                    |                |  | Capeweed or <i>Erodium</i> spp.  |               | NSW                           |                    |
|                                    |                |  | Annual Weeds, Fat Hen, Pigweed   |               | ALL                           |                    |
| Flaxleaf Fleabane                  |                |  |                                  |               |                               |                    |
| Paraquat + Diquat<br>(SpraySeed)   | 22**           | Orchards / Directed Spray  | Grass and Broadleaf Weeds        | G:1           | ALL                           | R3                 |
| Trifluralin                        | 3**            | Orchards / Pre-Plant Residual  | Grass and Broadleaf Weeds        | NR            | QLD, SA, WA,<br>VIC & TAS     | -                  |

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

#### **Appendix 4. Plant growth regulators available in persimmons**

| <b>Active ingredient<br/>(Trade Name)</b> | <b>Chem.<br/>Group</b> | <b>Situation</b>                       | <b>Comment / Use</b>                                     | <b>WHP<br/>(days)</b> | <b>States</b> | <b>Regulatory<br/>risk</b> |
|---|------------------------|--|--|-----------------------|---------------|----------------------------|
| 1-Methylcyclopropene<br>(Smartfresh)      |                        | Persimmon / Post-<br>Harvest Treatment | Improved quality after shipping, storage or<br>handling. | NR                    | ALL           | -                          |

## **Appendix 5. Current permits for use in persimmons**

| <b>Permit No.</b>  | <b>Description</b>   | <b>Issued Date</b> | <b>Expiry Date</b> | <b>Permit Holder</b>                  |
|--------------------|--|--------------------|--------------------|---------------------------------------|
| PER89943           | Acetamiprid + Pyriproxyfen (Trivor) / Persimmons / Fruit Spotting Bugs, Mediterranean Fruit Fly, Queensland Fruit Fly, Mealybug, Scale Insects, Light Brown Apple Moth | 29-Jan-21          | 31-Jan-24          | Hort Innovation                       |
| PER85550           | Alpha-Cypermethrin / Persimmons / Fruit Fly  | 14-Jun-18          | 30-Jun-23          | Hort Innovation                       |
| PER80374 Version 2 | Beta-cyfluthrin / Custard Apple, Lychee, Mango, Persimmon / Various Insect Pests   | 1-Oct-15           | 31-Aug-22          | Australian Lychee Growers Association |
| PER89259           | Chlorantraniliprole (Altacor) / Pome Fruit (includes Japanese Persimmons) / Fall Armyworm  | 6-Mar-20           | 31-Mar-23          | Hort Innovation                       |
| PER13445 Version 3 | Chlorothalonil / Persimmon / Cercospora Leaf Spot  | 22-Aug-12          | 31-Jul-25          | Hort Innovation                       |
| PER13932 Version 2 | Chlorpyrifos / Persimmons / Cluster Grub   | 1-May-13           | 31-Mar-23          | Hort Innovation                       |
| PER14547 Version 4 | Chlorpyrifos / Persimmons / Mealybug   | 13-Jul-14          | 31-Oct-23          | Hort Innovation                       |
| PER88722           | Clearwing Borer Mating Disruption Agent / Persimmons / Clearwing Borer   | 28-Mar-20          | 31-Mar-23          | Insense                               |
| PER14779 Version 2 | Clothianidin (Samurai) / Persimmons / Mealybug   | 13-Jul-14          | 30-Apr-23          | Hort Innovation                       |
| PER87599           | Difenoconazole (Score) / Japanese Persimmons / Cercospora Leaf Spot and Leaf Spot  | 7-Jun-19           | 30-Jun-24          | Hort Innovation                       |
| PER13859 Version 2 | Dimethoate/ Fruit Fly Host Crops Post-Harvest Clean-up / Fruit Fly   | 09-Feb-15          | 31-Jul-24          | Hort Innovation                       |
| PER89215           | Fonicamid (Mainman) / Japanese Persimmons / Mealybugs & Suppression of juvenile thrips   | 12-Aug-20          | 31-Aug-23          | Hort Innovation                       |
| PER12488 Version 3 | Mancozeb / Persimmon / Cercospora Leaf Spot  | 27-Oct-10          | 31-Mar-25          | Hort Innovation                       |
| PER14548 Version 2 | Methomyl / Persimmons / Thrips   | 13-Jul-14          | 31-Jul-23          | Hort Innovation                       |
| PER89293           | Methomyl (Lannate) / Persimmon / Fall Armyworm   | 10-Apr-20          | 30-Apr-23          | Hort Innovation                       |



| <b>Permit No.</b>     | <b>Description</b>   | <b>Issued Date</b> | <b>Expiry Date</b> | <b>Permit Holder</b> |
|-----------------------|--|--------------------|--------------------|----------------------|
| PER12591<br>Version 3 | Methoxyfenozide (Prodigy) / Persimmons / Leaf Roller, Yellow Peach Moth, Lightbrown Apple Moth & Orange Fruitborer<br><br><i>*Use Covered by Venturi Max Insecticide, Registered label and permit to be surrendered.</i>                   | 29-Jun-11          | 31-Jul-26          | Hort Innovation      |
| PER13933<br>Version 2 | Petroleum Oil / Persimmons / Scale Insects   | 1-Jan-13           | 30-Nov-22          | Hort Innovation      |
| PER13176<br>Version 3 | Shin Etsu MD Carmenta Pheromone / Persimmons / Clearwing Persimmon Borer   | 30-Nov-12          | 31-Jul-23          | Hort Innovation      |
| PER89241              | Spinetoram (Delegate) / Pome Fruit (including Japanese Persimmons) / Fall Armyworm   | 6-Mar-20           | 31-Mar-23          | Hort Innovation      |
| PER89870              | Spinosad (Entrust Organic) / Various including Pome fruit & Tropical and sub-tropical fruit crops (inedible peel) / Fall Armyworm  | 21-Jul-20          | 31-Jul-23          | Hort Innovation      |
| PER87067              | Sulfoxaflor (Transform) / Persimmons / Mealybugs   | 3-Apr-19           | 30-Apr-24          | Hort Innovation      |
| PER12450<br>Version 7 | Trichlorfon / Persimmon / Fruit Fly  | 6-Oct-11           | 30-Nov-25          | Hort Innovation      |
| PER14743<br>Version 3 | Trichlorfon / Custard Apple, Lychee, Mango & Persimmon / Flatid planthopper, Flower eating caterpillar, Looper & Yellow peach moth.<br><br>Suppression only: Fruit-spotting bug, Banana spotting bug, Green vegetable and Lychee stink bug | 1-Jun-14           | 30-Jun-25          | Hort Innovation      |

## **Appendix 6. Persimmon Maximum Residue Limits (MRLs)**

CODEX commodity groupings of pome fruits and subgroups:

|         |   |
|---------|---|
| FP 0009 | Pome fruits   |
| FP 0307 | Persimmon, Japanese   |
| FI 0030 | Assorted Tropical and Sub-Tropical Fruits – Inedible Peel         |
| FI 2022 | Assorted Tropical and Sub-Tropical Fruits – Inedible Peel – Large |
| FI 0352 | Persimmon, American<br>Fruit                                      |

Note: Australia is a net importer of persimmons, and our total exports only account for 6% of annual production. Singapore and Malaysia represent over 70% of Australia’s export volume, with lesser amounts going to Honk King, Qatar and Indonesia. Available information indicates that in the absence specific limits in legislation that most countries defer to Codex, followed by EU MRL standards or apply a 0.01 ppm default value. Food exported to New Zealand from Australia may be legally sold if it complies with Australian requirements. MRLs and legislation are subject to change; the values presented should not be relied on.

| <b>Chemical</b>     | <b>Codex</b> | <b>Description</b>  | <b>APVMA<br/>MRL<br/>mg/kg</b> | <b>Codex<br/>MRL<br/>mg/kg</b> |
|---------------------|--------------|---|--------------------------------|--------------------------------|
| 2,2-DPA             | FP 0009      | Pome Fruit  | *0.1                           | -                              |
| 2,4-D               | FP 0009      | Pome Fruit  | -                              | *0.01                          |
| Abamectin           | FP 0009      | Pome Fruit  | 0.01                           | 0.01                           |
| Acetamiprid         | FP 0307      | Persimmon, Japanese                                       | T0.3                           | -                              |
|                     | FP 0009      | Pome Fruit  | -                              | 0.8                            |
|                     | FI 0030      | Assorted tropical and sub-tropical fruits – inedible peel | 0.2                            | -                              |
| Acequinocyl         | FP 0009      | Pome Fruit  | 0.7                            | -                              |
| Aldrin and Dieldrin |              | Fruits  | E0.05                          | -                              |
|                     | FP 0009      | Pome Fruit  | E0.05                          | -                              |
| Amitraz             | FP 0009      | Pome Fruit  | -                              | 0.5                            |
| Amitrole            | FP 0009      | Pome Fruit  | *0.01                          | *0.05                          |
| Benzovindiflupyr    | FP 0009      | Pome Fruit  | -                              | 0.2                            |
| Bifenazate          | FP 0009      | Pome Fruit  | 2                              | 0.7                            |
| Bitertanol          | FP 0009      | Pome Fruit  | -                              | 2                              |
| Boscalid            | FP 0009      | Pome Fruit  | 2                              | -                              |
| Bromide Ion         |              | Fruits  | -                              | 20                             |
| Bromopropylate      | FP 0009      | Pome Fruit  | -                              | 2                              |
| Buprofezin          | FT 0307      | Persimmon, Japanese                                       | 1                              |                                |
| Captan              | FP 0009      | Pome Fruit  | 10                             | Po15                           |
| Carbaryl            | FP 0009      | Pome Fruit  | 0.2                            | -                              |
| Carbendazim         | FP 0009      | Pome Fruit  | -                              | 3                              |
| Carfentrazone-ethyl | FP 0009      | Pome Fruit  | *0.05                          | -                              |
|                     | FI 0030      | Assorted tropical and sub-tropical fruits – inedible peel | *0.05                          | -                              |
| Chlorantraniliprole | FP 0009      | Pome Fruit  | 0.3                            | 0.4                            |
| Chlordane           | FP 0009      | Pome Fruit  | E0.02                          | -                              |
| Chlorfenapyr        | FP 0009      | Pome Fruit  | 0.5                            | -                              |
| Chlorothalonil      | FP 0307      | Persimmon, Japanese                                       | T5                             |                                |
|                     | FI 0352      | Persimmon, American                                       | T5                             | -                              |

| Chemical                          | Codex   | Description  | APVMA MRL mg/kg | Codex MRL mg/kg |
|-----------------------------------|---------|--|-----------------|-----------------|
| Chlorpyrifos                      | FP 0307 | Persimmon, Japanese  | T1              | -               |
|                                   | FI 0352 | Persimmon, American  | T1              | -               |
|                                   | FP 0009 | Pome Fruit   | T0.5            | 1               |
| Chlorpyrifos-Methyl               | FP 0009 | Pome Fruit   | -               | 1               |
| Clofentezine                      | FP 0009 | Pome Fruit   | 0.1             | 0.5             |
| Clothianidin                      | FP 0307 | Persimmon, Japanese  | 2               | -               |
|                                   | FI 0352 | Persimmon, American  | 2               | -               |
|                                   | FP 0009 | Pome Fruit   | 2               | 0.4             |
| Cyantraniliprole                  | FP 0009 | Pome Fruit   | -               | 0.8             |
| Cycloxydim                        | FP 0009 | Pome Fruit   | -               | *0.09           |
| Cyflumetofen                      | FP 0009 | Pome Fruit   | -               | 0.4             |
| Cyfluthrin                        | FP 0307 | Persimmon, Japanese  | T0.1            | -               |
|                                   | FI 0352 | Persimmon, American  | T0.1            | -               |
| Cyhalothrin                       | FP 0009 | Pome Fruit   | -               | 0.2             |
| Cypermethrins                     | FP 0307 | Persimmon, Japanese  | T0.2            | -               |
|                                   | FI 0352 | Persimmon, American  | T0.2            | -               |
|                                   | FP 0009 | Pome Fruit   | 1               | 0.7             |
| Cyprodinil                        | FP 0009 | Pome Fruit   | 0.05            | 2               |
| DDT                               |         | Fruits   | E1              | -               |
| Diazinon                          |         | Fruits {except Citrus fruits; Grapes; Olives; Peach}   | 0.5             | -               |
|                                   | FP 0009 | Pome Fruit   | -               | 0.3             |
| Dichlobenil                       | FP 0009 | Pome Fruit   | 0.1             | -               |
| Dicofol                           |         | Fruits {except Strawberry}   | 5               | -               |
| Didecyldimethyl-ammonium chloride | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                                    | 20              | -               |
| Difenoconazole                    | FP 0009 | Pome Fruit   | 0.3             | Po4             |
| Diflubenzuron                     | FP 0009 | Pome Fruit   | -               | 5               |
| Dimethoate                        | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel {except Avocado; Mango; Pineapple} | 5               | -               |
| Diphenylamine                     |         | Fruits {except Apple; Pear}  | 0.5             | -               |
| Diquat                            |         | Fruits   | *0.05           | -               |
|                                   | FP 0009 | Pome Fruit   | -               | *0.02           |
| Dithianon                         |         | Fruits {except Blueberries}  | 2               | -               |
|                                   | FP 0009 | Pome Fruit   | -               | 1               |
| Dithiocarbamates                  | FT 0307 | Persimmon, Japanese  | 3               | -               |
|                                   | FP 0009 | Pome Fruit   | 0.3             | 5               |
| Dodine                            | FP 0009 | Pome Fruit   | 5               | 5               |
| Emamectin                         | FP 0009 | Pome Fruit   | -               | 0.02            |
| Endosulfan                        | FI 0352 | Persimmon, American  | -               | 2               |
| Ethion                            | FP 0009 | Pome Fruit   | 1               | -               |
| Etoxazole                         | FP 0009 | Pome Fruit   | 0.2             | 0.07            |
| Fenarimol                         | FP 0009 | Pome Fruit   | -               | 0.3             |
| Fenbuconazole                     | FP 0009 | Pome Fruit   | -               | 0.5             |
| Fenbutatin Oxide                  | FP 0009 | Pome Fruit   | 3               | 5               |
|                                   | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                                    | 5               | -               |

| Chemical          | Codex   | Description   | APVMA MRL mg/kg | Codex MRL mg/kg |
|-------------------|---------|---|-----------------|-----------------|
| Fenoxycarb        | FP 0009 | Pome Fruit  | 2               | -               |
| Flonicamid        | FP 0009 | Pome Fruit  | 0.7             | 0.8             |
| Fluazifop-p-butyl | FP 0009 | Pome Fruit  | *0.01           | *0.01           |
|                   | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel {except Avocado; Banana}      | 0.05            | -               |
| Fluazinam         | FP 0009 | Pome Fruit  | *0.01           | -               |
| Flubendiamide     | FP 0009 | Pome Fruit  | -               | 0.8             |
| Fludioxonil       | FP 0009 | Pome Fruit  | 5               | Po5             |
| Flumioxazin       | FP 0009 | Pome Fruit  | *0.02           | *0.02           |
| Fluopyram         | FP 0009 | Pome Fruit  | 1               | 0.5             |
|                   | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel {except Banana; Pineapple}    | 2               | -               |
| Flupyradifurone   | FP 0009 | Pome Fruit  | -               | 0.9             |
| Fluquinconazole   | FP 0009 | Pome Fruit  | 0.3             | -               |
| Flusilazole       | FP 0009 | Pome Fruit  | -               | 0.3             |
| Flutriafol        | FP 0009 | Pome Fruit  | -               | 0.4             |
| Fluxapyroxad      | FP 0009 | Pome Fruit  | -               | 0.9             |
| Fosetyl Al        | FP 0009 | Pome Fruit  | -               | 50              |
| Glufosinate       | FP 0009 | Pome Fruit  | *0.1            | 0.1             |
|                   | FT 0026 | Assorted Tropical and Sub-Tropical Fruits – Edible Peel                                 | -               | 0.1             |
|                   | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                               | 0.2             | 0.1             |
| Glyphosate        | FP 0307 | Persimmon, Japanese   | *0.05           | -               |
|                   | FI 0352 | Persimmon, American   | *0.05           | -               |
|                   | FP 0009 | Pome Fruit  | *0.05           | -               |
| Haloxypop         | FT 0307 | Persimmon, Japanese   | *0.05           | -               |
|                   | FP 0009 | Pome Fruit  | *0.05           | *0.02           |
|                   | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                               | *0.05           | -               |
| Hexythiazox       | FP 0009 | Pome Fruit  | 1               | 0.4             |
| Imazalil          | FP 0009 | Pome Fruit  | 5               | -               |
| Indoxacarb        | FP 0009 | Pome Fruit  | 2               | -               |
| Inorganic Bromide |         | Fruits {except Avocado; Citrus fruits; Dried fruits; Strawberry}                        | 20              | -               |
| Iprodione         | FP 0009 | Pome Fruit  | 3               | Po5             |
| Isofetamid        | FP 0009 | Pome Fruit  | -               | 0.6             |
| Isopyrazam        | FP 0009 | Pome Fruit  | 0.7             | 0.4             |
| Isoxaben          | FP 0009 | Pome Fruit  | *0.01           | -               |
|                   | FT 0026 | Assorted Tropical and Sub-Tropical Fruits – Edible Peel                                 | *0.01           | -               |
|                   | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                               | *0.01           | -               |
| Kresoxim-Methyl   | FP 0009 | Pome Fruit  | 0.1             | 0.2             |
| Lindane           |         | Fruits {except Apple; Cherries; Cranberry; Grapes; Peach; Pineapple; Plums; Strawberry} | E0.5            | -               |
| Lufenuron         | FP 0009 | Pome Fruit  | -               | 1               |

| Chemical           | Codex   | Description  | APVMA MRL mg/kg | Codex MRL mg/kg |
|--------------------|---------|--|-----------------|-----------------|
| Maldison           |         | Fruits {except Berries and other small fruits; Citrus fruits; Dried fruits; Stone fruits}    | 2               | -               |
| Metalaxyl          | FP 0009 | Pome Fruit   | 0.2             | Po1             |
| Metaldehyde        |         | Fruits   | 1               | -               |
| Metamitron         | FP 0009 | Pome Fruit   | 0.01            | -               |
| Methiocarb         |         | Fruits {except Citrus fruits; Grapes}  | T0.1            | -               |
| Methomyl           | FP 0307 | Persimmon, Japanese  | T0.5            | -               |
| Methoxyfenozide    | FP 0307 | Persimmon, Japanese  | 1               | -               |
|                    | FI 0352 | Persimmon, American  | 1               | -               |
|                    | FP 0009 | Pome Fruit   | 0.5             | 2               |
| Methyl Bromide     |         | Fruits {except Jackfruit; Litchi; Mango; Papaya [pawpaw]}                                    | T*0.05          | -               |
| Metrafenone        | FP 0009 | Pome Fruit   | -               | 1               |
| Milbemectin        | FP 0009 | Pome Fruit   | 0.03            | -               |
| Myclobutanil       | FP 0009 | Pome Fruit   | 0.5             | 0.6             |
| Norflurazon        | FP 0009 | Pome Fruit   | *0.2            | -               |
| Novaluron          | FP 0009 | Pome Fruit   | -               | 3               |
| Omethoate          | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel {except Avocado; Mango; Pineapple} | 2               | -               |
| Oryzalin           |         | Fruits   | 0.1             | -               |
| Oxyfluorfen        | FP 0009 | Pome Fruit   | 0.05            | -               |
|                    | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                                    | *0.01           | -               |
| Paclobutrazol      | FP 0009 | Pome Fruit   | 1               | -               |
|                    | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel {except Avocado; Mango}            | *0.01           | -               |
| Paraquat           |         | Fruits {except Olives}   | *0.05           | -               |
|                    | FP 0009 | Pome Fruit   | -               | *0.01           |
|                    | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                                    | -               | *0.01           |
| Penconazole        | FP 0009 | Pome Fruit   | 0.1             | -               |
| Pendimethalin      | FP 0009 | Pome Fruit   | *0.05           | -               |
|                    | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                                    | *0.05           | -               |
| Penthiopyrad       | FP 0009 | Pome Fruit   | 0.5             | 0.4             |
| Permethrin         | FP 0009 | Pome Fruit   | -               | 2               |
| Phosmet            | FP 0009 | Pome Fruit   | -               | 10              |
| Phosphine          | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                                    | T*0.01          | -               |
| Piperonyl Butoxide |         | Fruits   | 8               | -               |
| Pirimicarb         |         | Fruits {except Blackberries}   | 0.5             | -               |
|                    | FP 0009 | Pome Fruit   | -               | 1               |
| Prochloraz         | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                                    | -               | Po7             |
| Proquinazid        | FP 0009 | Pome Fruit   | 0.3             | -               |
| Pydiflumetofen     | FP 0009 | Pome Fruit   | T0.2            | -               |
| Pyraclostrobin     | FP 0009 | Pome Fruit   | 1               | 0.7             |

| Chemical        | Codex   | Description   | APVMA MRL mg/kg | Codex MRL mg/kg |
|-----------------|---------|---|-----------------|-----------------|
| Pyrethrins      |         | Fruits  | 1               | -               |
| Pyridaben       | FP 0009 | Pome Fruit  | 0.5             | -               |
| Pyrimethanil    | FP 0009 | Pome Fruit  | 15              | Po15            |
| Pyriproxifen    | FP 0307 | Persimmon, Japanese   | T0.2            | -               |
|                 | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                             | 0.3             | -               |
| Saflufenacil    | FP 0009 | Pome Fruit  | *0.03           | 0.01            |
| Simazine        |         | Fruits  | *0.1            | -               |
| Spinetoram      | FP 0009 | Pome Fruit  | 0.1             | 0.05            |
|                 | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                             | 0.3             | -               |
| Spinosad        | FP 0009 | Pome Fruit  | 0.5             | -               |
|                 | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                             | 0.3             | -               |
| Spirodiclofen   | FP 0009 | Pome Fruit  | -               | 0.8             |
| Spirotetramat   | FP 0009 | Pome Fruit  | 0.5             | 0.7             |
| Sulfoxaflor     | FT 0307 | Persimmon, Japanese   | T1              |                 |
|                 | FP 0009 | Pome Fruit  | 0.5             | 0.3             |
| Tebuconazole    | FP 0009 | Pome Fruit  | *0.01           | -               |
| Tebufenozide    | FP 0009 | Pome Fruit  | 1               | 1               |
| Tebufenpyrad    | FP 0009 | Pome Fruit  | 1               | -               |
| Tetraniliprole  | FP 0009 | Pome Fruit  | 0.5             | -               |
| Thiabendazole   | FP 0009 | Pome Fruit  | -               | 3               |
| Thiacloprid     | FP 0009 | Pome Fruit  | 1               | 0.7             |
| Thiamethoxam    | FP 0009 | Pome Fruit  | -               | 0.3             |
| Trichlorfon     | FT 0026 | Assorted Tropical and Sub-Tropical Fruits – Edible Peel                               | T3              | -               |
|                 | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel                             | T3              | -               |
| Trifloxystrobin | FP 0009 | Pome Fruit  | 0.7             | 0.7             |
|                 | FI 0030 | Assorted tropical and sub-tropical fruits – inedible peel {except Banana; Pineapple } | 2               | -               |
| Trifluralin     |         | Fruits  | *0.05           | -               |
| Triforine       | FP 0009 | Pome Fruit  | 1               | -               |

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

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

T =Temporary MRL

E = The MRL is based on extraneous residues

Sources: APVMA MRLs: Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2019. Compilation 23. Prepared 4 February 2022. CODEX MRLs: CODEX Alimentarius International Food Standards database (February 2022), <http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/>

## **Appendix 7. Persimmon Agrichemical Regulatory Risk Assessment**

### **Persimmon Agrichemical Regulatory Risk Assessment**

**March 2022**

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

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

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

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

## Persimmon Agrichemical Regulatory Risk Assessment

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

| Active Constituents             | Chemical group | Problem  | Comment  |
|---------------------------------|----------------|--|--|
| <b>INSECT AND OTHER PESTS</b>   |                |  |  |
| Abamectin                       | <b>6</b>       | Fruit flies (PER91073 – SA Biosecurity) (Bait spray) | EU: Restricted use to permanent greenhouses                    |
| Abamectin + chlorantraniliprole | <b>6 + 28</b>  | European red mite                                    | Abamectin  |
|                                 |                | Helicoverpa species                                  | EU: Restricted use to permanent greenhouses                    |
|                                 |                | Light brown apple moth                               |  |
|                                 |                | Two-spotted mite                                     |  |
| Acetamiprid + pyriproxyfen      | <b>4A + 7C</b> | Fruit flies (PER89943)                               | Acetamiprid<br><a href="#">APVMA: Under review</a>             |
|                                 |                | Fruit-spotting bugs (PER89943)                       |  |
|                                 |                | Mealybug (PER89943)                                  |  |
|                                 |                | Scale insect s(PER89943)                             |  |
| Alpha-cypermethrin (PER85550)   | <b>3A</b>      | Fruit flies  | EU: Withdrawal of approval, grace period expires December 2022 |
| Beta-cyfluthrin                 | <b>3A</b>      | Macadamia nut borer                                  | EU: No authorisation   |
|                                 |                | Elephant/Rhinoceros beetle (PER80374)                |  |
|                                 |                | Fig longicorn/ trunk borer (PER80374)                |  |
|                                 |                | Flatid planthoppers (PER80374)                       |  |
|                                 |                | Fruit-spotting bugs (PER80374)                       |  |
|                                 |                | Green vegetable bug (PER80374)                       |  |
|                                 |                | Litchi stink bug (PER80374)                          |  |
|                                 |                | Red shouldered leaf beetle (PER80374)                |  |
|                                 |                | Swarming leaf beetles (PER80374)                     |  |
|                                 |                | Yellow peach moth (PER80374)                         |  |



| Active Constituents | Chemical group | Problem   | Comment  |
|---------------------|----------------|---|--|
| Buprofezin          | 16             | Mealybug<br>Scale insects   | EU: MRLs set to limit of quantification  |
| Chlorantraniliprole | 28             | Helicoverpa species<br>Light brown apple moth<br>Oriental fruit moth<br>Fall armyworm (PER89259)                                |  |
| Chlorpyrifos        | 1B             | Wingless grasshopper<br>Queensland fruit fly(Bait spray)<br>Cluster caterpillar(PER13932)<br>Mealybug (PER14547)                | <a href="#">APVMA: Under review.</a><br>Codex: Scheduled for review by JMPR<br>Canada: Cancellation of all uses.<br>EU: No authorisation in place<br>USA: EPA decision to cancel use on food crops |
| Clothianidin        | 4A             | Fruit flies<br>Mealybug (PER14779)  | <a href="#">APVMA: Under review</a><br>Canada: Field uses cancelled or amended<br>EU: Not authorised<br>USA: Re-registration with new risk mitigation measures                                     |
| Dimethoate          | 1B             | Fruit flies(PER135859) (After harvest Orchard clean-up)   | Codex: MRL deletion recommended.<br>EU: Not authorised   |
| Ethyl formate (Po)  | 8A             | Light brown apple moth<br>Longtailed mealybug<br>Plague thrips<br>Red back spider<br>Western flower thrips<br>Two-spotted mites | EU: No authorisation   |
| Flonicamid          | 29             | Mealybug (PER89215)<br>Redbanded thrips (PER89215)<br>Thrips (PER89215)<br>Western flower thrips (PER89215)                     |  |
| Helicoverpa NPV     | 31             | Helicoverpa species   |  |

| Active Constituents       | Chemical group | Problem   | Comment  |
|---------------------------|----------------|---|--|
| Indoxacarb                | <b>22A</b>     | Apple weevil  | Canada: No authorisation<br>EU: Authorisation not renewed. Grace period expires 19/9/2022  |
|                           |                | Fuller's rose weevil                                  |  |
|                           |                | Garden weevil   |  |
|                           |                | Helicoverpa species                                   |  |
|                           |                | Light brown apple moth                                |  |
|                           |                | Wingless grasshopper                                  |  |
| Lambda-cyhalothrin        | <b>3A</b>      | Fruit flies (PER12961 – SA Biosecurity) (Soil drench) | EU: Candidate for substitution   |
| Malathion/maldison        | <b>1B</b>      | Wingless grasshopper                                  | <a href="#">APVMA: Under review</a><br>Codex: Re-evaluation scheduled for 2023/24<br>EU: Use restricted to permanent greenhouses           |
|                           |                | Fruit flies   |  |
| Methomyl                  | <b>1A</b>      | Thrips (PER14548)                                     | <a href="#">APVMA: nominated for review</a><br>Canada: Re-evaluation completed. Majority of uses removed<br>EU: No authorisations in place |
|                           |                | Fall armyworm (PER89293)                              |  |
| Methoxyfenozide           | <b>18</b>      | Loopers   | EU: Proposed restricted authorisation & Candidate for substitution   |
|                           |                | Leafroller caterpillars (PER12591)                    |  |
|                           |                | Light brown apple moth (PER12591)                     |  |
|                           |                | Orange fruit borer (PER12591)                         |  |
| Milbemectin               | <b>6</b>       | European red mite                                     |  |
|                           |                | Two-spotted mite                                      |  |
| Paraffinic/ petroleum oil | <b>UNM</b>     | Scale insects (PER13933)                              |  |
| Pyrethrins                | <b>3A</b>      | Fruit flies   |  |
| Pyriproxyfen              | <b>7C</b>      | Ants (Invasive and nuisance ants)                     |  |

| Active Constituents | Chemical group | Problem                        | Comment  |
|---------------------|----------------|--------------------------------|--|
| Spinetoram          | 5              | Flower eating caterpillars     |  |
|                     |                | Helicoverpa species            |  |
|                     |                | Leafroller caterpillars        |  |
|                     |                | Light brown apple moth         |  |
|                     |                | Loopers                        |  |
|                     |                | Redbanded thrips               |  |
|                     |                | Western flower thrips          |  |
|                     |                | Yellow peach moth              |  |
|                     |                | Fruit flies (PER12590)         |  |
|                     |                | Fall armyworm (PER89241)       |  |
| Spinosad            | 5              | Flower eating caterpillars     |  |
|                     |                | Helicoverpa species            |  |
|                     |                | Leafroller caterpillars        |  |
|                     |                | Light brown apple moth         |  |
|                     |                | Loopers                        |  |
|                     |                | Redbanded thrips               |  |
|                     |                | Western flower thrips          |  |
|                     |                | Yellow peach moth              |  |
|                     |                | Fall armyworm (PER89870)       |  |
| Spirotetramat       | 23             | Longtailed mealybug            |  |
|                     |                | Tuber mealybug                 |  |
| Sulfoxaflor         | 4C             | Apple dimpling bug             | USA: Pollinator concerns<br>EU: Restricted to permanent glasshouses only |
|                     |                | Longtailed mealybug            |  |
|                     |                | San Jose scale                 |  |
|                     |                | Tuber mealybug                 |  |
|                     |                | Fruit-spotting bugs (PER85397) |  |
|                     |                | Mealybug (PER87067)            |  |
| Tetraniliprole      | 28             | Apple weevil                   | EU: Not authorised   |
|                     |                | Fuller's rose weevil           |  |
|                     |                | Garden weevil                  |  |
|                     |                | Light brown apple moth         |  |

| Active Constituents | Chemical group | Problem                               | Comment  |
|---------------------|----------------|---------------------------------------|--|
| Thiacloprid         | 4A             | Oriental fruit moth                   | <a href="#">APVMA: Under review</a><br>EU: No authorisation in place<br>USA: No authorisation          |
|                     |                | Mediterranean fruit fly (PER14562)    |  |
| Trichlorfon         | 1B             | Fruit flies (PER12450)                | <a href="#">APVMA: nominated for review</a><br>Codex: No MRLs<br>EU: No authorisations<br>USA: No MRLs |
|                     |                | Flatid planthoppers (PER14743)        |  |
|                     |                | Flower eating caterpillars (PER14743) |  |
|                     |                | Fruit-spotting bugs (PER14743)        |  |
|                     |                | Green vegetable bug (PER14743)        |  |
|                     |                | Litchi stink bug (PER14743)           |  |
|                     |                | Loopers (PER14743)                    |  |
|                     |                | Yellow peach moth (PER14743)          |  |

| Active Constituents        | Chemical Group | Problem                         | Comment   |
|----------------------------|----------------|---------------------------------|---|
| <b>DISEASES</b>            |                |                                 |   |
| Chlorothalonil             | <b>M5</b>      | Cercospora leaf spot (PER13445) | <a href="#">APVMA: nominated for review</a><br>Canada: Proposed cancellation of uses<br>EU: Not authorised                                    |
| Difenoconazole             | <b>3</b>       | Cercospora leaf spot (PER87599) | <a href="#">APVMA: nominated for review</a><br>Canada: Currently being reviewed<br>EU: Candidate for substitution                             |
| Fludioxonil (Post-harvest) | <b>12</b>      | Blue mould                      | EU: Under review  |
|                            | <b>12</b>      | Grey mould/Storage rot          | EU: Candidate for substitution  |
| Mancozeb                   | <b>M3</b>      | Cercospora leaf spot (PER12488) | <a href="#">APVMA: nominated for review</a><br>Canada: Reviewed, many uses cancelled<br>Codex: To be reviewed 2023/24<br>EU: No authorisation |

| Active Constituents  | Chemical Group | Comment   |
|----------------------|----------------|---|
| <b>WEEDS</b>         |                |   |
| Carfentrazone-ethyl  | 14             |   |
| Diquat               | 22             | <a href="#">APVMA: Currently under review</a><br>EU: No authorisation                                     |
| Fluazifop-P          | 1              |   |
| Flumioxazin          | 14             | EU: Candidate for substitution  |
| Glyphosate           | 9              | Ongoing issues internationally  |
| Haloxifop-P          | 1              | EU: No authorisation  |
| Oryzalin             | 3              | EU: No authorisation  |
| Oxyfluorfen          | 14             | EU: Candidate for substitution<br>USA: Interim review decision Label amendments proposed                  |
| Paraquat             | 22             | <a href="#">APVMA: Currently under review</a><br>EU: No authorisation<br>Rotterdam Convention - nominated |
| <b>PGR</b>           |                |   |
| 1-Methylcyclopropene |                | Post-harvest  |

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