



Department of  
Primary Industries and  
Regional Development

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Western Australia.*

# Pome and summer fruit

## Orchard spray guide 2020/2021

**Bulletin 4918**

Replaces Bulletin 4861



### **Pome fruit:**

Apple  
Nashi  
Pear

### **Summer fruit:**

Apricot  
Cherry  
Nectarine  
Peach  
Plum

# **Pome and summer fruit orchard spray guide 2020-21**

## **Pome fruit**

apple, nashi, pear

## **Summer fruit**

apricot, cherry, nectarine, peach, plum

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## **Photographs**

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Development stages of fruit: Shane Hetherington NSW Department of Primary Industries

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Recommendations were current at the time of preparation of this material.

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## 1. Introduction

This spray guide provides orchardists with a list of active ingredients, products for chemical thinning and the control of insect pests, diseases and weeds in Western Australian pome and summer fruit orchards.

There has been a change in the format and content for this revision. The spray guide has been streamlined to focus on the pesticide information tables. More information has also been included on chemical thinning options. Other information, such as that on quarantine, organics and pesticide application has been reduced or removed with information more directly related to spraying retained.

Several new products have been added since the previous version.

## 2 How to use this guide

The information in this guide is aligned with crop development stages and the timing of sprays to these stages. The spray tables are split into two sections, the first covers apples and pears and the second summer fruit. For each section there is a pictorial guide to blossom/fruit development stages and calendars listing all the major pests and diseases for those crops and the timing for monitoring and treatment if required.

Following this are spray option tables. The tables list each pest and disease that is likely to impact on different crop stages, starting at dormancy and going through the various development stages to harvest. For each pest at each development stage, the spray options are listed as active ingredients and product names along with information on chemical class, withholding period and relevant comments.

Note: In the spray option tables, if an active ingredient has five or more trade names for a registered use then the Common trade names listing defaults to 'Various'. Check with your chemical supplier for a registered product.



### 3 Pome Fruit

#### 3.1 Development stages of apple blossom

Photographs by Shane Hetherington, NSW Department of Primary Industries



Dormant



Green tip



Early spurburst



Pink bud



King bloom



Full bloom



Complete petal fall

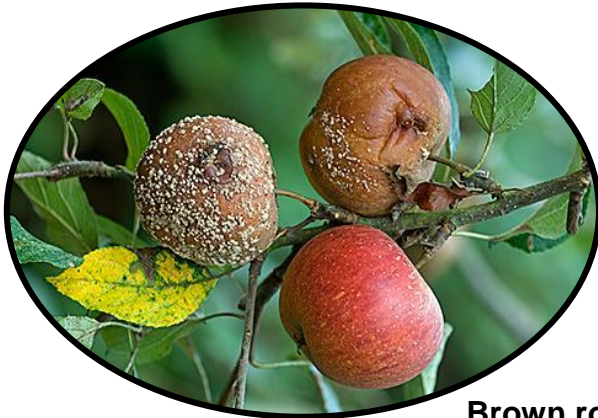
**3.2 Exotic pests of pome fruit**



**Codling moth**



**Fireblight**



**Brown rot of apples**

### 3.3 Apple pest and disease monitoring and treatment calendar

**Not all these pests will occur in your orchard**

**NOTE:** The pest status of each pest varies across fruit growing districts; monitor to avoid unnecessary or poorly timed spraying.

| Pest / quality issue                 | Aug | Sept | Oct | Nov | Dec | Jan | Feb | March | April | May | June | July |
|--------------------------------------|-----|------|-----|-----|-----|-----|-----|-------|-------|-----|------|------|
| Dormancy release                     | ■   | ■    |     |     |     |     |     |       |       |     |      |      |
| Snails                               |     |      |     |     |     |     |     |       | ■     | ■   |      |      |
| Bryobia mite and European red mite   | ■   | ■    | ■   | ■   | ■   | ■   | ■   |       |       |     |      |      |
| San Jose scale and other scale       | ■   |      |     |     |     | ■   | ■   |       |       |     | ■    | ■    |
| Mealybug                             | ■   | ■    | ■   | ■   | ■   | ■   | ■   |       |       |     |      |      |
| Woolly aphid                         |     | ■    |     |     | ■   | ■   | ■   |       | ■     | ■   | ■    | ■    |
| Apple scab                           |     | ■    | ■   | ■   | ■   | ■   | ■   | ■     | ■     | ■   | ■    | ■    |
| Powdery mildew                       |     | ■    | ■   | ■   | ■   | ■   | ■   |       |       |     |      |      |
| Apple dimpling bug                   |     | ■    | ■   | ■   | ■   |     |     |       |       |     |      |      |
| Plague thrips, Western flower thrips |     | ■    | ■   | ■   | ■   |     |     |       |       |     |      |      |
| Wingless grasshopper                 |     |      | ■   | ■   | ■   | ■   | ■   |       |       |     |      |      |
| Fungal surface infections, see below |     |      | ■   | ■   | ■   | ■   | ■   | ■     | ■     | ■   | ■    | ■    |
| Garden weevil                        |     |      | ■   | ■   | ■   |     |     |       |       |     |      |      |
| Lightbrown apple moth                |     |      | ■   | ■   | ■   | ■   | ■   | ■     | ■     | ■   |      |      |
| Apple looper                         |     |      | ■   | ■   | ■   | ■   | ■   |       |       |     |      |      |
| Collar rot                           |     |      |     | ■   | ■   | ■   | ■   |       |       |     |      |      |
| Heliothis caterpillar                |     |      |     | ■   | ■   | ■   | ■   |       |       |     |      |      |
| Apple weevil                         |     |      |     |     | ■   | ■   | ■   | ■     | ■     | ■   |      |      |
| Fuller's rose weevil                 |     |      |     |     | ■   | ■   | ■   | ■     | ■     | ■   |      |      |
| Two-spotted mite                     |     |      |     |     | ■   | ■   | ■   | ■     | ■     | ■   |      |      |
| Mediterranean fruit fly              |     |      |     |     |     | ■   | ■   | ■     | ■     | ■   | ■    | ■    |
| Bitter pit                           |     |      |     |     | ■   | ■   | ■   | ■     | ■     | ■   |      |      |

■ Timing for monitoring and treatment if required.

Fungal surface infections include *Alternaria*, bitter rot, fly speck, sooty blotch and target spot



### 3.4 Apple spray options

Reference: Infopest online

| Spray timing                      | Pest or disease                   | Active ingredient          | Chemical class                 | Common trade names                            | WHP (days) | Comments   |
|-----------------------------------|-----------------------------------|----------------------------|--------------------------------|---|------------|--|
| <b>Dormant</b>                    | <b>Snails</b>                     | copper sulphate            | unspecified                    | Bluestone + wetting agent                     | N/A        | Soil and butt spray only.  |
|                                   |                                   | copper                     | molluscicide                   | Escar-Go                                      | 1          | Go to DPIRD website: 'Snail and slug control.'   |
|                                   |                                   | iron EDTA complex          |                                | Multiguard Snail and Slug Killer<br>Eradicate | N/A        | Apply after rain or irrigation. Do not place pellets in heaps.   |
|                                   |                                   | methiocarb                 | 1A                             | Mesurol Snail and Slug Bait                   | 7          | Apply to ground only, place bait close to tree trunk.  |
|                                   |                                   | metaldehyde                | molluscicide                   | Various                                       |            |  |
|                                   |                                   | silicate salts + copper    | unspecified                    | Socusil Snail Repellent                       | N/A        |  |
|                                   | <b>Dormancy break</b>             | cyanamide                  | unspecified                    | Dormex  | N/A        |  |
|                                   |                                   | fatty acid esters          | unspecified                    | Waiken™                                       | N/A        | Apply 35-50 days before budbreak would normally occur.<br>Useful as a pre-treatment to chemical thinning in apples as it will compact flowering. |
|                                   |                                   | nitrogen + calcium         | unspecified                    | Erger   | N/A        | Activ-Erger must be combined with Erger.   |
| <b>Late dormancy to green tip</b> | <b>Apple scab</b><br>(black spot) | lime sulphur               | M2                             | Various                                       | N/A        | Do not apply after green tip.  |
|                                   | <b>Bryobia mite</b>               | paraffinic / petroleum oil | insecticide,<br>spray adjuvant | Various                                       | 1          | Go to DPIRD website: 'Management of European red mite in WA' and 'Managing mites in WA deciduous fruit trees.'                                   |
|                                   | <b>European red mite</b>          |                            |                                |   |            |  |

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| Spray timing                      | Pest or disease                | Active ingredient           | Chemical class              | Common trade names                              | WHP (days) | Comments  |
|-----------------------------------|--------------------------------|-----------------------------|-----------------------------|---|------------|---|
| <b>Late dormancy to green tip</b> | <b>San Jose scale</b>          | paraffinic / petroleum oil  | insecticide, spray adjuvant | Various   | 1          | Rigorous agitation is required to maintain oil in suspension. Oil can be combined with one of the insecticides to improve control.  |
|                                   |                                | chlorpyrifos                | 1B                          | Various   | 14         | <b>Do not apply oil or insecticide</b> if any part of the tree is <b>more advanced than tight cluster</b> as the insecticide is toxic to bees and in combination with oil is phytotoxic to flowers. |
|                                   |                                | diazinon                    |                             | Diazinon<br>Diazinon 800<br>Diazol 800          |            |   |
|                                   |                                | lime sulphur                | M2                          | Lime Sulphur                                    | N/A        | Do not use on Delicious or Cox's Orange Pippin.   |
| <b>Green tip</b>                  | <b>Apple scab (black spot)</b> | copper ammonium complex     | M1                          | Cop-IT<br>Liquicop<br>Copperguard               | 1          | Go to DPIRD website: 'Managing apple scab in WA.'   |
|                                   |                                | copper oxychloride          |                             | Various   |            |   |
|                                   |                                | cupric hydroxide            | M1 + M3                     | ManKocide DF                                    | 14         |   |
|                                   |                                | cupric hydroxide + mancozeb |                             |   |            |   |
|                                   |                                | cuprous oxide               | M1                          | Nordox 750 WG<br>Ag Copp 750<br>Red Copper WG   | 1          |   |
|                                   |                                | isopyrazam                  | 7                           | Seguris Flexi                                   | 21         |   |
|                                   |                                | tri-basic copper sulphate   | M1                          | Tri-Base Blue<br>Tribasic Liquid<br>Bordeaux WG | 1          |   |
|                                   | <b>Powdery mildew</b>          | isopyrazam                  | 7                           | Seguris Flexi                                   | 21         |   |
|                                   |                                | lime sulphur                | M2                          | Lime Sulphur                                    | N/A        | Do not use on Delicious or Cox's Orange Pippin.   |
|                                   |                                | sulfur                      |                             | Various   |            |   |

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| Spray timing                    | Pest or disease                               | Active ingredient             | Chemical class | Common trade names                                  | WHP (days) | Comments   |
|---------------------------------|---|-------------------------------|----------------|---|------------|--|
| Green tip                       | Bitter rot                                    | copper oxychloride            | M1             | Various   | 1          | Oil can be combined with copper to improve control.  |
|                                 |   | zineb                         | M3             | Zineb   | 14         |  |
|                                 | Woolly aphid                                  | imidacloprid                  | 4A             | Various   | N/A        | Apply around the base of trees. Use on trees up to 7 years old. Do not treat more than once in any 2-year period. Use low rate if aphid wasp parasite is present.                                  |
|                                 |   | clothianidin                  |                | Samurai   | 7          | Soil drench. Check label before use.   |
|                                 | Target spot, sooty blotch and flyspeck        | mancozeb and copper hydroxide | M1 + M3        | ManKocide DF  | 14         | Do not spray after green tip, as the copper may be phytotoxic.   |
| Tight cluster to early pink bud | Apple dimpling bug                            | chlorpyrifos                  | 1B             | Strike-Out 500 WP<br>Cyren 500 WP<br>Lorsban 750 WG | 14         | <b>Chlorpyrifos and sulfoxaflor are extremely toxic to bees; apply before flowering.</b><br>If cover crop is flowering mow before application. Go to DPIRD website: 'Managing apple dimpling bug.' |
|                                 |   | sulfoxaflor                   | 4C             | Transform WG  | 7          |  |
|                                 | Apple scab (black spot) (continues next page) | boscalid + pyraclostrobin     | 7 +11          | Pristine<br>Lessick<br>Proxima                      | 14         | Go to DPIRD website: 'Managing apple scab in WA.'  |
|                                 |   | captan                        | M4             | Various   | 7          |  |
|                                 |   | cyprodinil                    | 9              | Chorus<br>Solaris 300 EC                            | N/A        |  |
|                                 |   | dithianon                     | M9             | Various   | 21         |  |
|                                 |   | fluopyram + trifloxystrobin   | 7 + 11         | Luna Sensation                                      | 14         |  |
|                                 |   | isopyrazam                    | 7              | Seguris Flexi                                       | 21         |  |
|                                 | mancozeb                                      | M3                            | Various        | 14  |            |  |

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| Spray timing                           | Pest or disease                              | Active ingredient       | Chemical class | Common trade names                                    | WHP (days)  | Comments  |
|--|--|-------------------------|----------------|---|---|---|
| <b>Tight cluster to early pink bud</b> | <b>Apple scab</b><br>(black spot)<br>(cont.) | mefentrifluconazole     | 3              | Belanty   | 7   |   |
|  |  | metiram                 | M3             | Polyram DF<br>Fruitcote                               | 14  |   |
|  |  | sulfur                  | M2             | Various   | Nil   |   |
|  |  | thiram                  | M3             | Thiragranz<br>Thiram WP<br>Thiram DG<br>Thiram 800 WG | 7   |   |
|  |  | trifloxystrobin         | 11             | Flint 500 WG  | 35  |   |
|  |  | ziram                   | M3             | Ziram Granuflo<br>Ziragranz<br>Ziram DG<br>Ziram WG   | 7   |   |
| <b>Pink bud to end of blossom</b>      | <b>Apple dimpling bug and plague thrips</b>  | acetamiprid + novaluron | 4A + 15        | Cormoran  | 70  |   |
|  |  | bifenthrin              | 3A             | Various   | 14  | Go to DPIRD website: 'Managing apple dimpling bug.'   |
|  |  | methomyl                | 1A             | Various   | 1   |   |
|  |  | tau-fluvalinate         | 3A             | Mavrik Aquaflo<br>Klartan                             | N/A   | Apply early blossom, from pink bud to 20% bloom. Do not apply outside bloom period. Apply a maximum of 2 non-consecutive sprays per season. |
|  | <b>Apple dimpling bug</b>                    | thiacloprid             | 4A             | Calypso 480 SC<br>Cobra 480 SC<br>Reggae 480 SC       | 21  |   |
| <b>Western flower thrips</b>           | spinetoram                                   | 5                       | Delegate       | 3   | Refer to label for important WFT resistance strategy.<br>Go to DPIRD website: 'Thrips pests in pome and stone fruit' and 'Chemical control of Western flower thrips.' |   |



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| Spray timing               | Pest or disease                      | Active ingredient           | Chemical class | Common trade names   | WHP (days)            | Comments  |
|----------------------------|--------------------------------------|-----------------------------|----------------|--|-----------------------|---|
| Pink bud to end of blossom | Powdery mildew (continues next page) | bupirimate                  | 8              | Nimrod<br>Nimrod 250 EC  | 7                     | Apply on a 14 day schedule over flowering and early fruit development.  |
|                            |                                      | boscalid + pyraclostrobin   | 7 + 11         | Pristine<br>Proxima<br>Lessick                                 | 14                    |   |
|                            |                                      | fluopyram + trifloxystrobin | 7 + 11         | Luna Sensation   | 14                    |   |
|                            |                                      | hexaconazole                | 3              | Various  | 7                     | Do not use on McIntosh apples or related varieties. May reduce fruit length under certain conditions.                     |
|                            |                                      | isopyrazam                  | 7              | Seguris Flexi  | 21                    |   |
|                            |                                      | kresoxim-methyl             | 11             | Stroby WG<br>Disco WG<br>Kresta WG<br>Clubber Strobilurin 500  | 42                    | Apply at 7–10 day intervals during rapid growth. Later applications can be at 10–14 days.                                 |
|                            |                                      | myclobutanil                | 3              | Butanil 400 WP<br>Domiclo 400 WP<br>Systhane 400 WP<br>Stamina | 21                    |   |
|                            |                                      | penconazole                 |                | Various  | 14                    |   |
|                            |                                      | penthiopyrad                | 7              | Fontelis   | 28                    |   |
|                            |                                      | sulfur                      | M2             | Various  |                       | Apply at 2–3 weekly intervals from pink bud to petal fall.<br>Do not apply to sulphur-sensitive varieties in hot weather. |
|                            |                                      | trifloxystrobin             | 11             | Flint 500 WG   | 35<br>(70 for Export) | Apply as a block of three treatments with 10 day intervals.<br>Do not apply more than 3 sprays per season.                |

| Spray timing                                 | Pest or disease                                      | Active ingredient                        | Chemical class | Common trade names   | WHP (days) | Comments   |  |
|--|--|--|----------------|--|------------|--|--|
| <b>Pink bud to end of blossom</b>            | <b>Powdery mildew</b> (cont.)                        | triforine                                | 3              | Saprol   | 1          | Do not apply to Golden Delicious or Cox's Orange Pippin. Apply at 10–14 day intervals. |  |
| <b>Petal fall to early fruit development</b> | <b>Apple scab</b> (black spot) (continues next page) | <b>Curative sprays (post-infection)</b>  |                |  |            |  | Go to DPIRD website: 'Managing apple scab in WA.'  |
|  |  | difenoconazole                           | 3              | Bogard 100 WG  | 3          |  |  |
|  |  | dodine                                   | M7             | Syllit 400 SC<br>Dodine  | 5          |  | If weather conditions favour secondary infections, sprays may be required up to harvest. |
|  |  | hexaconazole                             | 3              | Various  | 7          |  |  |
|  |  | mefentrifluconazole                      |                | Belanty  |            |  |  |
|  |  | myclobutanil                             |                | Butanil 400 WP<br>Domiclo 400 WP<br>Systhane 400 WP<br>Stamina | 21         |  |  |
|  |  | penconazole                              | 3              | Various  | 14         |  |  |
|  |  | triforine                                |                | Saprol   | 1          |  |  |
|  |  | <b>Protectant sprays (pre-infection)</b> |                |  |            |  |  |
|  |  | boscalid + pyraclostrobin                | 7 + 11         | Pristine<br>Proxima<br>Lessick                                 | 14         |  |  |
|  |  | captan                                   | M4             | Various  | 7          |  |  |
|  |  | cyprodinil                               | 9              | Chorus<br>Solaris 300 EC                                       | N/A        |  |  |
|  |  | dithianon                                | M9             | Various  | 21         |  |  |
|  |  | isopyrazam                               | 7              | Seguris Flexi  | 21         |  |  |
| fluopyram + trifloxystrobin                  | 7 + 11   | Luna Sensation                           | 14             |  |            |  |  |

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| Spray timing                                 | Pest or disease  | Active ingredient       | Chemical class | Common trade names  | WHP (days) | Comments  |
|--|--|-------------------------|----------------|---|------------|---|
| <b>Petal fall to early fruit development</b> | <b>Apple scab</b><br>(black spot)<br>(cont.)                           | kresoxim-methyl         | 11             | Stroby WG<br>Disco WG<br>Kresta WG<br>Clubber Strobilurin 500 | 42         |   |
|  |  | mancozeb                | M3             | Various   | 14         |   |
|  |  | metiram                 |                | Polyram DF<br>Fruitcote                                       | 14         |   |
|  |  | penthiopyrad            | 7              | Fontelis  | 28         |   |
|  |  | sulphur                 | M2             | Various   | Nil        |   |
|  |  | thiram                  | M3             | Thiram WP<br>Thiram DG<br>Thiragranz<br>Thiram 800 WG         | 7          |   |
|  |  | trifloxystrobin         | 11             | Flint 500 WG  | 35         | WHP = 70 for export.  |
|  |  | ziram                   | M3             | Ziram Granuflo<br>Ziragranz<br>Ziram DF<br>Ziram WG           | 7          |   |
|  | <b>Mealybugs</b>   | chlorpyrifos            | 1B             | Various   | 14         | Apply at petal fall and 10–14 days later. Mealybugs excrete honeydew which encourages sooty mould to grow on the fruit. |
|  | <b>Longtailed mealybug and tuber mealybug</b><br>(continues next page) | acetamiprid + novaluron | 4A + 15        | Cormoran  | 70         |   |
|  |  | clothianidin            | 1B             | Samurai   | 14         | Check label before using.   |
| flonicamid                                   |  | 29                      | Mainman 500 WG | 21  |            |   |

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| Spray timing                          | Pest or disease  | Active ingredient               | Chemical class      | Common trade names                                | WHP (days) | Comments   |
|---------------------------------------|--|---------------------------------|---------------------|---|------------|--|
| Petal fall to early fruit development | Longtailed mealybug and tuber mealybug (cont.)                         | sulfoxaflor                     | 4C                  | Transform WG                                      | 7          | Do not apply prior to petal fall. Apply with surfactant – refer to label for details.  |
|                                       |  | spirotetramat                   |                     | Movento 240 SC                                    |            |  |
|                                       | Heliothis caterpillar (native budworm)                                 | abamectin + chlorantraniliprole | 6 + 28              | Voliam Targo                                      | 7          | Do not apply to apples within 30 days AFTER full bloom if reduction in fruit set is not desired.   |
|                                       |  | <i>Bacillus thuringiensis</i>   | 11C                 | Various   | Nil        |  |
|                                       |  | carbaryl                        | 1A                  | Bugmaster Flowable Carbaryl 500 SC                | 77         |  |
|                                       |  | chlorantraniliprole             | 28                  | Altacor Altacor Hort                              | 14         |  |
|                                       |  | <i>Helicoverpa</i> NPV          | insecticide - virus | Vivus Gold Vivus Max Armigen Andermatt Biocontrol | N/A        |  |
|                                       |  | indoxacarb                      | 22A                 | Various   | 14         |  |
|                                       |  | methomyl                        | 1A                  | Various   | 1          |  |
|                                       |  | pyrethrins + piperonyl butoxide | 3A                  | Py-Bo   |            |  |
|                                       |  | spinetoram                      | 5A                  | Delegate  | 3          |  |
|                                       | Garden weevil and Apple weevil (curculio beetle) (continues next page) | alpha cypermethrin              | 3A                  | Various   | 14         | Trunk and butt spray only. Monitor weevil emergence using a single- sided cardboard trunk band. Continue monitoring after spraying. Summer oil can be added at 1–2% to help prolong residual activity. |



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| Spray timing            | Pest or disease   | Active ingredient                               | Chemical class          | Common trade names  | WHP (days) | Comments   |
|-------------------------|---|---|-------------------------|---|------------|--|
| Early fruit development | Garden weevil and Apple weevil ( <i>Curculio beetle</i> ) (cont.) | indoxacarb                                      | 22A                     | Various   | 14         | Foliar application.  |
|                         |   | tetraniliprole                                  | 28                      | Vayego 200SC  | 7          |  |
|                         | Wingless grasshopper  | chlorpyrifos                                    | 1B                      | Various   | 14         | Go to DPIRD website: 'Wingless grasshoppers and their control.' Baiting can also be used.                      |
|                         |   | carbaryl  | 1A                      | Bugmaster Flowable<br>Carbaryl 500 SC                         | 77         | Do not apply to apples within 30 days AFTER full bloom if reduction in fruit set is not desired.               |
|                         |   |   |                         | Cricket and Grasshopper Killer Bait                           | N/A        |  |
|                         |   | indoxacarb                                      | 22A                     | Various   | 14         |  |
|                         |   | maldison  | 1B                      | Fyfanon ULV   | 3          |  |
|                         |   | <i>Metarhizium anisopliae</i>                   | biological insecticide  | Green Guard SC<br>Green Guard ULV<br>Green Guard SC - Premium | N/A        | For best results, apply when grasshoppers are at early nymph stage. Refer to label for details of application. |
|                         |   | San Jose scale (crawlers) (continues next page) | acetamiprid + novaluron | 4A + 15   | Cormoran   | 70   |
|                         | chlorpyrifos  |   | 1B                      | Various   | 14         | This pest is most susceptible to chemical control methods when crawlers are active, in mid to late November.   |
|                         | diazinon  |   |                         | Diazinon<br>Diazinon 800<br>Diazol 800<br>Dizzy 800           |            | With diazinon add 1.2 L/100 L of summer oil.   |

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| Spray timing                 | Pest or disease  | Active ingredient | Chemical class                  | Common trade names       | WHP (days)                                    | Comments   |   |
|------------------------------|--|-------------------|---------------------------------|--------------------------|---|--|---|
| Early fruit development      | San Jose scale (crawlers) (cont.)  | fenoxycarb        | 7B                              | Insegar WG<br>Inhibit WG | 14  | Suppresses scale when used in a full season schedule against lightbrown apple moth.  |   |
|                              |  | spirotetramat     | 23                              | Movento 240 SC           |   | Do not apply prior to petal fall. Apply with surfactant – refer to label for details.  |   |
| Fruit development to harvest | Bitter pit (storage disorder)  | calcium nitrate   |                                 | Various                  | N/A   | Use calcium nitrate on green apples.   |   |
|                              |  | calcium chloride  |                                 | Various                  |   | Use calcium chloride on red apples. Apply 3–4 applications 3 to 4 weeks apart. Can be mixed with fungicides or insecticides. |   |
|                              | Two-spotted mite (continues next page)<br>Ovicides (O)<br>kill mite eggs and newly hatched mites.<br>Adulticides (A)<br>kill active stages of mites. |                   | abamectin (A) + summer oil      | 6                        | Various                                       | 14   | Apply 2-6 weeks after petal fall or soon after mite numbers have reached the threshold level for your area. |
|                              |  |                   | abamectin + chlorantraniliprole | 6 + 28                   | Voliam Targo                                  | 7  |   |
|                              |  |                   | bifenazate (A)                  | UN                       | Various                                       |  |   |
|                              |  |                   | chlorfenapyr (A)                | 13                       | Secure 360 SC                                 | 14   | Apply only once per season.   |
|                              |  |                   | clofentezine (O)                | 10A                      | Apollo SC<br>Apollo                           | 21   |   |
|                              |  |                   | etoxazole (O)                   | 10B                      | Paramite                                      |  | Go to DPIRD website: 'Managing mites in WA deciduous fruit trees.'  |
|                              |  |                   | fenbutatin oxide (A)            | 12B                      | Torque<br>Vendex                              | 2  |   |
|                              |  |                   | hexythiozox (O)                 | 10A                      | Calibre 100 EC<br>Hexythiazox 100 EC<br>Zilch | 3  |   |
|                              |  |                   | maldison (A)                    | 1B                       | Fyfanon 440 EW<br>Fyfanon Premium             |  |   |
|                              |  |                   | milbemectin (OA)                | 6                        | Milbeknock                                    | 14   |   |

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| Spray timing                 | Pest or disease   | Active ingredient                | Chemical class             | Common trade names                                       | WHP (days) | Comments  |
|------------------------------|---|----------------------------------|----------------------------|--|------------|---|
| Fruit development to harvest | Two-spotted mite (cont.)  | paraffinic / petroleum oil (A)   | insecticide spray adjuvant | Various  | 1          |   |
|                              |   | fatty acids – K salt             | insecticide                | Bugguard<br>Hitman<br>Natrasoap                          | N/A        |   |
|                              |   | propargite (A)                   | 12C                        | Omite 300 W<br>Betamite 300 WG<br>Unimite 300 W<br>Omite | 7          |   |
|                              |   | tebufenpyrad (O,A)               | 21A                        | Pyranica   | 14         |   |
|                              | European red mite (continues next page)<br>Ovicides (O) kill mite eggs and newly hatched mites.<br>Adulticides (A) kill active stages of mites. | abamectin (A) + summer oil       | 6                          | Various  | 14         | Apply 2-6 weeks after petal fall or soon after mite numbers have reached the threshold level for your area. |
|                              |   | abamectin + chloranthraniliprole | 6 + 28                     | Voliam Targo   | 7          |   |
|                              |   | bifenazate (A)                   | UN                         | Various  | 7          | Go to DPIRD website: 'Management of European red mite in WA.'   |
|                              |   | clofentezine (O)                 | 10A                        | Apollo SC<br>Apollo                                      | 21         |   |
|                              |   | etoxazole (O)                    | 10B                        | Paramite   |            |   |
|                              |   | fenbutatin oxide (A)             | 12B                        | Torque   | 2          |   |
|                              |   | hexythiozox (O)                  | 10A                        | Calibre 100EC<br>Hexythiazox 100 EC<br>Zilch             | 3          |   |
|                              |   | maldison (A)                     | 1B                         | Fyfanon 440 EW<br>Fyfanon Premium                        |            |   |
|                              |   | milbemectin (O,A)                | 6                          | Milbeknock   | 14         |   |
|                              |   | paraffinic / petroleum oil (A)   | insecticide spray adjuvant | Various  | 1          |   |

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| Spray timing                 | Pest or disease  | Active ingredient               | Chemical class             | Common trade names   | WHP (days) | Comments  |
|------------------------------|--|---------------------------------|----------------------------|--|------------|---|
| Fruit development to harvest | European red mite (cont.)                                      | propargite (A)                  | 12C                        | Omite 300W<br>Betamite 300 WG<br>Unimite 300 W<br>Omite        | 1          | Go to DPIRD website 'Managing mites in WA deciduous fruit trees.' |
|                              |  | tebufenpyrad (O,A)              | 21A                        | Pyranica   | 7          |   |
|                              | Bryobia mite   | bifenazate                      | UN                         | Various  | 7          |   |
|                              |  | clofentezine                    | 10A                        | Apollo SC<br>Apollo  | 21         |   |
|                              |  | fenbutatin oxide                | 12B                        | Torque<br>Vendex   | 2          |   |
|                              |  | paraffinic / petroleum oil (A)  | insecticide spray adjuvant | Various  | 1          |   |
|                              | Lightbrown apple moth (and apple looper) (continues next page) | abamectin + chlorantraniliprole | 6 + 28                     | Voliam Targo   | 7          |   |
|                              |  | acetamiprid + novaluron         | 4A + 15                    | Cormoran   | 70         |   |
|                              |  | <i>Bacillus thuringiensis</i>   | 1B                         | Various  | Nil        |   |
|                              |  | carbaryl                        | 1A                         | Bugmaster Flowable<br>Carbaryl 500 Flowable<br>Carbaryl 500 SC | 77         |   |
|                              |  | chlorantraniliprole             | 28                         | Altacor<br>Altacor Hort  | 14         |   |
|                              |  | chlorpyrifos                    | 1B                         | Various  |            |   |
|                              |  | fenoxycarb                      | 7B                         | Insegar WG<br>Inhibit WG                                       | 14         |   |



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| Spray timing                       | Pest or disease   | Active ingredient               | Chemical class | Common trade names              | WHP (days) | Comments   |   |
|------------------------------------|---|---------------------------------|----------------|---------------------------------|------------|--|---|
| Fruit development to harvest       | Lightbrown apple moth (and apple looper) (cont.)        | indoxacarb                      | 22A            | Various                         | 14         | Best results achieved using a schedule of 3 sprays at 14 day intervals.  |   |
|                                    |   | methomyl                        | 1A             | Various                         | 1          |  |   |
|                                    |   | methoxyfenozide                 | 18             | Various                         | 14         |  |   |
|                                    |   | pyrethrins + piperonyl butoxide | 3A             | Py-Bo                           | 1          |  |   |
|                                    |   | spinetoram                      | 5              | Delegate                        | 7          |  | Target sprays against mature eggs and newly-hatched larvae. |
|                                    |   | tetraniliprole                  | 28             | Vayego 200 SC                   |            |  |   |
|                                    | Fuller's rose weevil and Apple weevil (curculio beetle) | indoxacarb                      | 22A            | Various                         | 14         | Foliar spray. Do not apply more than 2 sprays per season.  |   |
|                                    |   | tetraniliprole                  | 28             | Vayego 200 SC                   | 7          |  |   |
|                                    | Mealybugs   | chlorpyrifos                    | 1B             | Various                         | 14         | Apply 2–3 weeks before harvest if pest numbers are high.<br>Mealybugs excrete honeydew which encourages sooty mould to grow on the fruit |   |
|                                    |   | fatty acids K salt              | insecticide    | Hitman<br>Bugguard<br>Natrasoap |            |  |   |
|                                    |   | clothianidin                    | 4A             | Samurai                         | 21         | Check label before using.  |   |
|                                    |   | sulfoxaflor                     | 4C             | Transform WG                    | 7          |  |   |
|                                    | Longtailed mealybug and tuber mealybug                  | flonicamid                      | 29             | Mainman 500 WG                  | 21         | Do not apply prior to petal fall. Apply with surfactant – refer to label for details.  |   |
| spirotetramat                      |   | 23                              | Movento 240 SC | 21                              |            |  |   |
| Woolly aphid (continues next page) | acetamiprid + novaluron                                 | 4A + 15                         | Cormoran       | 70                              |            |  |   |

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| Spray timing                    | Pest or disease                               | Active ingredient      | Chemical class | Common trade names   | WHP (days) | Comments  |  |
|---------------------------------|---|------------------------|----------------|--|------------|---|--|
| Fruit development to harvest    | Woolly aphid (cont.)                          | chlorpyrifos           | 1B             | Various  | 14         |   |  |
|                                 |   | clothianidin           | 4A             | Samurai  | 7          | Check label before using.   |  |
|                                 |   | diazinon               | 1B             | Diazinon 800<br>Diazol 800<br>Diazinon<br>Dizzy 800            | 14         | Add 1.2 L/100 L of summer oil.  |  |
|                                 |   | flonicamid             | 29             | Mainman 500 WG   | 21         |   |  |
|                                 |   | maldison               | 1B             | Hy-Mal<br>Fyfanon 1000 EC<br>Fyfanon 440 EW<br>Fyfanon Premium | 3          |   |  |
|                                 |   | pirimicarb             | 1A             | Various  | 2          |   |  |
|                                 |   | spirotetramat          | 23             | Movento 240 SC   | 21         | Suppression only. Do not apply prior to petal fall. Apply with surfactant – refer to label for details. |  |
|                                 |   | sulfoxaflor            | 4C             | Transform WG   | 7          |   |  |
|                                 | Collar rot ( <i>Phytophthora</i> )            | Fosetyl-Al             | 33             | Various  | 14         | Can be applied as a foliar spray or as a soil drench.   |  |
|                                 | Mediterranean fruit fly (continues next page) | <b>Foliar baiting:</b> |                |  |            |   |  |
|                                 |   | maldison               | 1B             | Fyfanon 1000 EC<br>Hy-Mal<br>Fyfanon 440 EW                    | 3          | Go to DPIRD website for latest information. There are a series of relevant information sheets.          |  |
|                                 |   | spinosad               | 5              | Naturalure<br>Eco-Naturalure                                   | N/A        |   |  |
|                                 |   | trichlorfon            | 1B             | Various  | 2          |   |  |
| <b>Protein to add to baits:</b> |   |                        |                |  |            |   |  |
| hydrolyzed protein              |   | Cera Bait              | N/A            |  |            |   |  |

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| Spray timing                 | Pest or disease                 | Active ingredient       | Chemical class                    | Common trade names             | WHP (days) | Comments   |  |
|------------------------------|---------------------------------|-------------------------|-----------------------------------|--------------------------------|------------|--|--|
| Fruit development to harvest | Mediterranean fruit fly (cont.) | yeast autolysate        |                                   | Fruit Fly Lure<br>Natflav 500  | N/A        | Add 2 L of protein for every 100 L water + insecticide. Add protein first, then insecticide + water. |  |
|                              |                                 | yeast hydrolysate       |                                   | Flavex                         |            |  |  |
|                              | <b>Cover spray:</b>             |                         |                                   |                                |            |  |  |
|                              |                                 | clothianidin            | 4A                                | Samurai                        | 7          | Use with MAXX surfactant. Check label before using.  |  |
|                              |                                 | maldison                | 1B                                | Fyfanon 440 EW                 | 3          |  |  |
|                              |                                 | spinetoram              | 5                                 | Delegate                       | 7          | PER12590, expires 31 May 2024.   |  |
|                              |                                 | trichlorfon             | 1B                                | Dipterex 500 SL<br>Lepidex 500 | 2          |  |  |
|                              |                                 | thiacloprid             | 4A                                | Calypso 480 SC                 | 21         | PER14562, expires 30 November 2023.  |  |
|                              | Bitter rot                      | dithianon               | M9                                | Various                        | 21         |  |  |
|                              |                                 | mancozeb                | M3                                | Various                        | 14         |  |  |
|                              |                                 | metiram                 |                                   | Polyram DF<br>Fruitcote        |            |  |  |
|                              |                                 | zineb                   |                                   | Zineb                          |            |  |  |
|                              |                                 | ziram                   | Ziram DG<br>Ziram WG<br>Ziragranz | 7                              |            |  |  |
|                              | Target spot and ripe spot       | mancozeb                | M3                                | Various                        | 14         |  |  |
|                              |                                 | metiram                 |                                   | Polyram DF<br>Fruitcote        |            |  |  |
|                              |                                 | thiram                  | Thiram DG<br>Thiragranz           | 7                              |            |  |  |
|                              | Sooty blotch                    | mancozeb                | M3                                | Various                        | 14         |  |  |
| metiram                      |                                 | Polyram DF<br>Fruitcote |                                   |                                |            |  |  |
| zineb                        |                                 | Zineb                   |                                   |                                |            |  |  |

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| Spray timing                 | Pest or disease                | Active ingredient             | Chemical class         | Common trade names                            | WHP (days) | Comments   |
|------------------------------|--------------------------------|-------------------------------|------------------------|---|------------|--|
| Fruit development to harvest | Fly speck                      | mancozeb                      | M3                     | Various                                       | 14         |  |
|                              | Alternaria fruit and leaf spot | boscalid + pyraclostrobin     | 7 + 11                 | Pristine<br>Proxima<br>Lessick                | 14         |  |
|                              |                                | dithianon                     | M9                     | Dragon 700 WG                                 | 21         |  |
|                              | Fruit Maturation               | 1-methylcyclopropene (1-MCP)  | plant growth regulator | Harvista SC                                   | 3          |  |
|                              |                                | aminoethoxyvinylglycine (AVG) |                        | Retain  | 7          |  |
| Postharvest                  | Snails                         | copper sulphate               | unspecified            | Bluestone + wetting agent                     | N/A        | Soil and butt spray only.  |
|                              |                                | iron EDTA complex             | molluscicide           | Multiguard Snail and Slug Killer<br>Eradicate |            | Apply after rain or irrigation.<br>Do not place pellets in heaps                                       |
|                              |                                | metaldehyde                   |                        | Various                                       | N/A        | Apply to ground only, place bait close to tree trunk.  |
|                              |                                | methiocarb                    | 1A                     | Mesurol Snail and Slug Bait                   |            |  |
|                              | San Jose scale                 | diazinon                      | 1B                     | Diazinon<br>Diazinon 800<br>Diazol 800        | N/A        | Apply in autumn if scale is evident in harvested crop.<br>Add 1.2 L/100 L of summer oil.               |
|                              | Woolly aphid                   | diazinon                      | 1B                     | Diazinon<br>Diazinon 800<br>Diazol 800        |            |  |
|                              | Apple scab (black spot)        | Urea                          | -                      | Urea  | N/A        | Breaking down leaf litter with 5% urea helps prevent <i>pseudothecia</i> (fruiting bodies) developing. |

### 3.5 Pear and nashi pest and disease monitoring and treatment calendar

**Not all these pests will occur in your orchard**

**NOTE:** The pest status of each pest varies across fruit growing districts; monitor to avoid unnecessary or poorly timed spraying.

| Pest/ Disease                      | Aug | Sept | Oct | Nov | Dec | Jan | Feb | March | April | May | June | July |
|------------------------------------|-----|------|-----|-----|-----|-----|-----|-------|-------|-----|------|------|
| Snails                             |     |      |     |     |     |     |     |       |       |     |      |      |
| San Jose scale and other scale     |     |      |     |     |     |     |     |       |       |     |      |      |
| Mealybug                           |     |      |     |     |     |     |     |       |       |     |      |      |
| Bryobia mite and European red mite |     |      |     |     |     |     |     |       |       |     |      |      |
| Pearleaf blister mite              |     |      |     |     |     |     |     |       |       |     |      |      |
| Pear scab                          |     |      |     |     |     |     |     |       |       |     |      |      |
| Dimpling bug and thrips            |     |      |     |     |     |     |     |       |       |     |      |      |
| Garden weevil                      |     |      |     |     |     |     |     |       |       |     |      |      |
| Lightbrown apple moth              |     |      |     |     |     |     |     |       |       |     |      |      |
| Two-spotted mite                   |     |      |     |     |     |     |     |       |       |     |      |      |
| Pear slug                          |     |      |     |     |     |     |     |       |       |     |      |      |
| Heliothis caterpillar              |     |      |     |     |     |     |     |       |       |     |      |      |
| Apple weevil                       |     |      |     |     |     |     |     |       |       |     |      |      |
| Fuller's rose weevil               |     |      |     |     |     |     |     |       |       |     |      |      |
| Mediterranean fruit fly            |     |      |     |     |     |     |     |       |       |     |      |      |

 Timing for monitoring and treatment if required.

### 3.6 Pear and nashi spray options

**Reference:** Infopest online.

| Spray timing               | Pest or disease | Active ingredient          | Chemical class                         | Common trade names                            | WHP (days) | Comments   |
|----------------------------|-----------------|----------------------------|--|---|------------|--|
| Dormant                    | Snails          | copper sulphate            | unspecified                            | Bluestone                                     | N/A        | Soil and butt spray only.  |
|                            |                 | copper                     | molluscicide                           | Escar-Go                                      | 1          | Go to DPIRD website: 'Snail and slug control.'   |
|                            |                 | iron-EDTA complex          |  | Multiguard Snail and Slug Killer<br>Eradicate |            |  |
|                            |                 | metaldehyde                | 1A                                     | Various                                       | 7          | Apply to ground only, place bait close to tree trunk.  |
|                            |                 | methiocarb                 |  | Mesurool Snail and Slug Bait                  |            |  |
|                            |                 | silicate salts + copper    | unspecified                            | Socusil Snail Repellant                       | N/A        |  |
| Late dormancy to green tip | San Jose scale  | paraffinic / petroleum oil | insecticide, spray adjuvant            | Various                                       | 1          | Rigorous agitation is required to maintain oil in suspension. Oil can be combined with a listed insecticide to improve control.<br>Do not apply oil or insecticide if <b>any part of the tree is more advanced than tight cluster</b> because insecticide is toxic to bees and in combination with oil is phytotoxic to flowers. For dormant spray 2-3% winter oil may be added. |
|                            |                 | chlorpyrifos               |  | 1B  | Various    |  |
|                            |                 | diazinon                   | Diazinon<br>Diazinon 800<br>Diazol 800 |   |            |  |
|                            |                 | polysulphide sulphur       | M2                                     | Lime Sulphur                                  | N/A        |  |

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| Spray timing                      | Pest or disease   | Active ingredient                      | Chemical class    | Common trade names                | WHP (days) | Comments  |
|-----------------------------------|---|--|-------------------|-----------------------------------|------------|---|
| <b>Late dormancy to green tip</b> | <b>Bryobia mite</b>   | polysulphide sulphur                   | M2                | Lime Sulphur                      | N/A        | Apply during dormancy up to bud swell.  |
|                                   |   | paraffinic / petroleum oil             | insecticide spray | Various                           |            | Dormant spray only.   |
|                                   | <b>European red mite</b>  | paraffinic / petroleum oil             | insecticide spray | Various                           |            |   |
|                                   | <b>Pearleaf blister mite</b>                                    | polysulphide sulphur                   | M2                | Lime Sulphur                      |            | Apply during dormancy up to bud swell.  |
|                                   | <b>Pear scab</b> (black spot, pears only)                       | polysulphide sulphur                   | M2                | Lime Sulphur                      |            |   |
| <b>Green tip</b>                  | <b>Longtailed mealybug</b>                                      | buprofezin                             | 16                | Various                           | 56         | Apply twice 10-14 days apart between swollen bud and end of flowering.  |
|                                   | <b>Mealybug</b>   | prothiofos                             | 1B                | Tokuthion                         |            | Apply by dilute spraying equipment. Mix with semi-dormant oil. Apply when crawlers become active under bark. Spray to run-off. Follow-up sprays of other suitable insecticides may be required later if crawlers again become active. |
|                                   | <b>Pear scab</b> (black spot, pears only) (continues next page) | boscalid + pyraclostrobin              | 7 + 11            | Pristine<br>Lessick<br>Proxima    | 14         | Good pear scab control is reliant on a close spraying schedule from budburst to mid-December. <b>Check labels for timing.</b>   |
|                                   |   | cyprodinil                             | 9                 | Chorus<br>Solaris 300 EC          | N/A        |   |
|                                   |   | copper ammonium complex                | M1                | Copperguard<br>Cop-IT<br>Liquicop | 1          |   |
|                                   |   | copper hydroxide<br>copper oxychloride | M1                | Various                           |            |   |



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| Spray timing     | Pest or disease   | Active ingredient             | Chemical class | Common trade names   | WHP (days) | Comments  |
|------------------|---|-------------------------------|----------------|--|------------|---|
| <b>Green tip</b> | <b>Pear scab</b><br>(black spot, pears only)<br>(cont.) | cuprous oxide                 | M1             | Ag Copp 750<br>Red Copper WG<br>Nordox 750 WG                        | 1          | Oil can be combined with copper to improve control.       |
|                  |   | tri-basic copper sulphate     |                | Tri-Base Blue<br>Cuprofix Disperss<br>Bordeaux WG<br>Tribasic Liquid |            |   |
|                  |   | difenoconazole                | 3              | Bogard 100 WG  | 28         |   |
|                  |   | fluopyram<br>+trifloxystrobin | 7 + 11         | Luna Sensation   | 14         | Do not apply more than 4 sprays alone per season.         |
|                  |   | isopyrazam                    | 7              | Seguris Flexi  | 21         |   |
|                  |   | hexaconazole                  | 3              | Various  |            |   |
|                  |   | kresoxim-methyl               | 11             | Stroby WG<br>Disco WG<br>Kresta WG<br>Clubber Strobilurin 500        | 42         | Do not apply more than 3 sprays from Group 11 per season. |
|                  |   | mancozeb                      | M3             | Various  | 14         | May be harmful to predatory mites.                        |
|                  |   | metiram                       |                | Polyram DF<br>Fruitcote  |            |   |
|                  |   | myclobutanil                  | 3              | Systhane 400 WP<br>Domiclo 400 WP<br>Butanil 400 WP<br>Stamina       | 21         | After petal fall, add a protectant fungicide.             |
|                  |   | penconazole                   | 3              | Various  | 14         | Refer to label for tank mixing with other fungicides.     |
|                  |   | penthiopyrad                  | 7              | Fontelis   | 28         |   |
|                  |   | thiram                        | M3             | Thiragranz<br>Thiram DG<br>Thiram WP<br>Thiram 800 WG                | 7          |   |

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| Spray timing                                    | Pest or disease   | Active ingredient           | Chemical class | Common trade names  | WHP (days) | Comments  |
|---|---|-----------------------------|----------------|---|------------|---|
| <b>Green tip</b>                                | <b>Pear scab</b><br>(black spot, pears only)<br>(cont.)               | ziram                       | M3             | Ziragranz<br>Ziram DG<br>Ziram Granuflo<br>Ziram WG           | 7          |   |
| <b>White bud to end of blossom (petal fall)</b> | <b>Longtailed mealybug</b>  | buprofezin                  | 16             | Various   | 56         | Apply twice 10-14 days apart between swollen bud and end of flowering.  |
|   | <b>Pear scab</b><br>(black spot, pears only)<br>(continues next page) | boscalid + pyraclostrobin   | 7 + 11         | Pristine<br>Lessick<br>Proxima                                | 14         |   |
|   |   | captan                      | M4             | Various   | 7          | Apply at 7 day intervals till petal fall, then 10-14 day intervals. Risk of russet in some varieties. No more than 5 sprays/season. |
|   |   | cyprodinil                  | 9              | Chorus<br>Solaris 300 EC                                      | N/A        | Do not use after petal fall.  |
|   |   | difenoconazole              | 3              | Bogard 100 WG   | 28         | After petal fall apply only with a protectant scab fungicide.   |
|   |   | dodine                      | 7              | Syllit 400 SC   | 5          | Read label carefully.   |
|   |   | fluopyram + trifloxystrobin | 7 + 11         | Luna Sensation  | 14         | Do not apply more than 4 sprays alone per season.   |
|   |   | hexaconazole                | 3              | Various   |            |   |
|   |   | kresoxim- methyl            | 11             | Stroby WG<br>Disco WG<br>Kresta WG<br>Clubber Strobilurin 500 | 42         | Do not apply more than 3 sprays from Group 11 per season.   |
|   |   | mancozeb                    | M3             | Various   | 14         | May be harmful to predatory mites.  |
| metiram   | Polyram DF<br>Fruitcote   |                             |                |   |            |   |

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| Spray timing                                    | Pest or disease   | Active ingredient           | Chemical class | Common trade names  | WHP (days) | Comments  |
|---|---|-----------------------------|----------------|---|------------|---|
| <b>White bud to end of blossom (petal fall)</b> | <b>Pear scab</b><br>(black spot, pears only)<br>(cont.)               | myclobutanil                | 3              | Domiclo 400 WP<br>Systhane 400WP<br>Butanil 400 WP<br>Stamina | 21         | After petal fall, add a protectant fungicide.                 |
|   |   | penconazole                 |                | Various   | 14         | Refer to label for tank mixing with other fungicides.         |
|   |   | thiram                      | M3             | Thiragranz<br>Thiram DG<br>Thiram WP<br>Thiram 800 WG         | 7          |   |
|   |   | ziram                       |                | Ziragranz<br>Ziram DG<br>Ziram Granuflo<br>Ziram WG           |            |   |
| <b>Petal fall to early fruit development</b>    | <b>Pear scab</b><br>(black spot, pears only)<br>(continues next page) | boscalid + pyraclostrobin   | 7 + 11         | Pristine<br>Lessick<br>Proxima                                | 14         |   |
|   |   | captan                      | M4             | Various   | 7          |   |
|   |   | difenoconazole              | 3              | Bogard 100 WG   | 28         | After petal fall apply only with a protectant scab fungicide. |
|   |   | dithianon                   | M9             | Delan 700 WG<br>Dithianon 700 WG<br>Dragon 700 WG             | 21         |   |
|   |   | dodine                      | 7              | Syllit 400 SC   | 5          | Read label carefully.   |
|   |   | fluopyram + trifloxystrobin | 7 + 11         | Luna Sensation  | 14         | Do not apply more than 4 sprays alone per season.             |
|   |   | hexaconazole                | 3              | Various   |            |   |

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| Spray timing                                 | Pest or disease   | Active ingredient                                     | Chemical class          | Common trade names  | WHP (days) | Comments  |
|--|---|---|-------------------------|---|------------|---|
| <b>Petal fall to early fruit development</b> | <b>Pear scab</b><br>(black spot, pears only)<br>(cont.) | kresoxim-methyl                                       | 11                      | Stroby WG<br>Disco WG<br>Kresta WG<br>Clubber Strobilurin 500 | 42         | Do not apply more than 3 sprays from Group 11 per season.   |
|  |   | mancozeb  | M3                      | Various   | 14         | May be harmful to predatory mites.                          |
|  |   | metiram   |                         | Polyram DF<br>Fruitcote                                       |            |   |
|  |   | myclobutanil  | 3                       | Domiclo 400 WP<br>Systhane 400WP<br>Butanil 400 WP<br>Stamina | 21         | After petal fall, add a protectant fungicide.               |
|  |   | penconazole   |                         | Various   | 14         | Refer to label for tank mixing with other fungicides.       |
|  |   | thiram  | M3                      | Thiragranz<br>Thiram DG<br>Thiram WP<br>Thiram 800 WG         | 7          |   |
|  |   | trifloxystrobin                                       | 11                      | Flint 500 WG  | 35         | Apply as a block of three treatments with 10 day intervals. |
|  |   | zineb   | M3                      | Zineb   | 14         |   |
|  |   | ziram   |                         | Ziragranz<br>Ziram DG<br>Ziram Granuflo<br>Ziram WG           | 7          |   |
|  |   | <b>Lightbrown apple moth</b><br>(continues next page) | acetamiprid + novaluron | 4A + 15   | Cormoran   | 35  |

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| Spray timing                          | Pest or disease               | Active ingredient             | Chemical class | Common trade names       | WHP (days) | Comments  |
|---------------------------------------|-------------------------------|-------------------------------|----------------|--------------------------|------------|---|
| Petal fall to early fruit development | Lightbrown apple moth (cont.) | <i>Bacillus thuringiensis</i> | 11C            | Various                  | Nil        | Adjust water volume and/or rate of product to ensure the minimum application rate /ha. Check label for minimum rate.  |
|                                       |                               | chlorantraniliprole           | 28             | Altacor<br>Altacor Hort  | 14         |   |
|                                       |                               | chlorpyrifos                  | 1B             | Various                  |            | Apply after petal fall, then 10–14 days later. May need follow-up sprays.   |
|                                       |                               | fenoxycarb                    | 7B             | Insegar WG<br>Inhibit WG |            | Apply 7–10 days after petal fall. Thorough coverage essential. Will suppress San Jose scale in a full season program. |
|                                       |                               | indoxacarb                    | 22A            | Various                  |            | No more than 6 applications per season.   |
|                                       |                               | methoxyfenozide               | 18             | Various                  |            |   |
|                                       |                               | spinetoram                    | 5              | Delegate                 | 7          |   |
|                                       |                               | tetraniliprole                | 28             | Vayego 200 SC            |            |   |
|                                       | Mealybugs                     | chlorpyrifos                  | 1B             | Various                  | 14         | Apply first at petal fall then 10–14 days later. May need follow-up sprays.   |
|                                       | Longtailed mealybug           | acetamiprid + novaluron       | 4A + 15        | Cormoran                 | 35         |   |
|                                       |                               | clothianidin                  | 4A             | Samurai                  | 21         | Check label before using.   |
|                                       |                               | flonicamid                    | 29             | Mainman 500 WG           | 21         |   |
|                                       |                               | sulfoxaflor                   | 4C             | Transform WG             | 7          |   |

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| Spray timing                          | Pest or disease                         | Active ingredient               | Chemical class      | Common trade names                 | WHP (days) | Comments   |
|---------------------------------------|---|---------------------------------|---------------------|------------------------------------|------------|--|
| Petal fall to early fruit development | Garden weevil                           | alpha-cypermethrin              | 3A                  | Various                            | 14         | <b>Trunk and butt spray only.</b> Monitor weevil emergence using a single-sided cardboard trunk band. Continue monitoring after spraying. Summer oil can be added at 1–2% to help prolong residual activity. |
|                                       |   | indoxacarb                      | 22A                 | Various                            | 7          |  |
|                                       |   | tetraniliprole                  | 28                  | Vayego 200 SC                      |            |  |
| Fruit development to harvest          | Heliiothis caterpillar (native budworm) | Bacillus thuringiensis          | 11C                 | Various                            | Nil        | Read 'Critical Comments' on label.   |
|                                       |   | carbaryl                        | 1A                  | Bugmaster Flowable Carbaryl 500 SC | 77         | Do not apply within 30 days after full bloom if reduction in fruit set is not desired.   |
|                                       |   | chlorantraniliprole             | 28                  | Altacor<br>Altacor Hort            | 14         | No more than 6 applications per season.  |
|                                       |   | indoxacarb                      | 22A                 | Various                            |            |  |
|                                       |   | <i>Helicoverpa</i> NPV          | insecticide - virus | Various                            | N/A        | Thorough coverage is essential as product must be ingested. Most effective against young larvae.   |
|                                       |   | pyrethrins + piperonyl butoxide | 3A                  | Py-Bo<br>Pyzap                     | 1          |  |
|                                       |   | spinetoram                      | 5                   | Delegate                           | 7          |  |

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| Spray timing                 | Pest or disease       | Active ingredient               | Chemical class | Common trade names       | WHP (days) | Comments  |
|------------------------------|-----------------------|---------------------------------|----------------|--------------------------|------------|---|
| Fruit development to harvest | Lightbrown apple moth | acetamiprid + novaluron         | 4A + 15        | Cormoran                 | 35         |   |
|                              |                       | <i>Bacillus thuringiensis</i>   | 11C            | Various                  | Nil        | Adjust water volume and/or rate of product to ensure the minimum application rate.<br>Check label for minimum rate.   |
|                              |                       | carbaryl                        | 1A             | Various                  | 77         | Do not apply within 30 days after full bloom if reduction in fruit set is not desired.                                |
|                              |                       | chlorantraniliprole             | 28             | Altacor<br>Altacor Hort  | 14         |   |
|                              |                       | chlorpyrifos                    | 1B             | Various                  |            | Apply after petal fall then 10–14 days later. May need follow-up sprays.  |
|                              |                       | fenoxycarb                      | 7B             | Insegar WG<br>Inhibit WG |            | Apply 7-10 days after petal fall. Thorough coverage essential. Will suppress San Jose scale in a full season program. |
|                              |                       | indoxacarb                      | 22A            | Various                  |            | No more than 6 applications per season.   |
|                              |                       | methomyl                        | 1A             | Various                  | 2          | Apply at calyx stage from late November on.   |
|                              |                       | methoxyfenozide                 | 18             | Various                  | 14         |   |
|                              |                       | pyrethrins + piperonyl butoxide | 3A             | Py-Bo<br>Pyzap           | 1          |   |
|                              |                       | spinetoram                      | 5              | Delegate                 | 7          | Target sprays against mature eggs and newly-hatched larvae.   |
|                              |                       | tetraniliprole                  | 28             | Vayego 200 SC            |            |   |



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| Spray timing                                    | Pest or disease                        | Active ingredient      | Chemical class   | Common trade names  | WHP (days)   | Comments  |
|---|--|------------------------|--|---|--|---|
| Fruit development to harvest                    | Wingless grasshopper                   | carbaryl               | 1A   | Cricket and Grasshopper Killer Bait                               | N/A  | Go to DPIRD website: 'Wingless grasshoppers and their control.'   |
|   |  |                        |  | Bugmaster Flowable Carbaryl 500 SC                                | 77   |   |
|   |  | chlorpyrifos           | 1B   | Various   | 14   | Do not retreat within 10 days.  |
|   |  | indoxacarb             | 22A  | Various   |  |   |
|   |  | maldison               | 1B   | Fyfanon ULV   | 3  |   |
|   | <i>Metarhizium anisopliae</i>          | biological insecticide | Green Guard SC<br>Green Guard SC - Premium<br>GreenGuard ULV | N/A   | For best results, apply when grasshoppers are at early nymph stage. Refer to label for details of application. |   |
|   | Pear slug                              | carbaryl               | 1A   | Bugmaster Flowable Carbaryl 500 SC<br>Carbaryl Wettable - Granule | 77   |   |
|   |  |                        |  | spinetoram  |  |   |
|   | Mealybug                               | chlorpyrifos           | 1B   | Various   | 14   |   |
|   | Longtailed mealybug and tuber mealybug | flonicamid             | 29   | Mainman 500 WG  | 21   |   |
|   |  | spirotetramat          | 23   | Movento 240 SC  | 21   | Do not apply prior to fruitlets reaching 10 mm in diameter. Apply with surfactant – refer to label for details. |
| San Jose scale (crawlers) (continues next page) | acetamiprid + novaluron                | 4A + 15                | Cormoran   | 35  |  |   |

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| Spray timing                 | Pest or disease  | Active ingredient               | Chemical class                                | Common trade names                                  | WHP (days) | Comments  |
|------------------------------|--|---------------------------------|---|---|------------|---|
| Fruit development to harvest | San Jose scale (crawlers) (cont.)  | chlorpyrifos                    | 1B  | Various   | 14         | Monitor scale for crawlers in early summer, for effective timing of sprays.                                 |
|                              |  | diazinon                        |   | Diazinon 800<br>Diazinon<br>Diazol 800<br>Dizzy 800 |            |   |
|                              |  | fenoxycarb                      | 7B  | Insegar WG<br>Inhibit WG                            |            | Suppresses scale when used in a full season schedule against lightbrown apple moth.                         |
|                              |  | spirotetramat                   | 23  | Movento 240 SC                                      | 21         | Do not apply prior to petal fall. Apply with surfactant – refer to label for details.                       |
|                              | European red mite (continues next page).<br><b>Ovicides (O)</b> kill mite eggs and newly hatched mites.<br><b>Adulticides (A)</b> kill active stages of mites. | abamectin (A) + summer oil      | 6   | Various   | 14         | Apply 2-6 weeks after petal fall or soon after mite numbers have reached the threshold level for your area. |
|                              |  | abamectin + chlorantraniliprole | 6 + 28  | Voliam Targo  | 7          | Go to DPIRD website 'Management of European red mite in WA.'  |
|                              |  | bifenazate (A)                  | UN  | Acramite  |            |   |
|                              |  | clofentezine (O)                | 10A   | Apollo SC   | 21         |   |
|                              |  | etoxazole (O)                   | 10B   | Paramite  |            |   |
|                              |  | fenbutatin oxide (A)            | 12B   | Torque<br>Vendex                                    | 2          |   |
| hexythiozox (O)              |  | 10A                             | Calibre 100 EC<br>Hexythiazox 100 EC<br>Zilch | 3   |            |   |
| maldison (A)                 |  | 1B                              | Fyfanon 440 EW                                |   |            |   |
| milbemectin (O,A)            | 6B   | Milbeknock                      | 14  |   |            |   |

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| Spray timing                 | Pest or disease  | Active ingredient               | Chemical class              | Common trade names                           | WHP (days) | Comments   |
|------------------------------|--|---------------------------------|-----------------------------|--|------------|--|
| Fruit development to harvest | European red mite (cont.)  | paraffinic / petroleum oil (A)  | insecticide spray adjuvant  | Various                                      | 1          |  |
|                              |  | tebufenpyrad (O,A)              | 21A                         | Pyranica                                     | 14         |  |
|                              | Two-spotted mite<br>Ovicides (O) kill mite eggs and newly hatched mites.<br>Adulticides (A) kill active stages of mites. | abamectin (A)                   | 6                           | Various                                      | 14         | Apply with summer oil.   |
|                              |  | abamectin + chlorantraniliprole | 6 + 28                      | Voliam Targo                                 | 7          | Use water volume not less than 1000 L/ha.                          |
|                              |  | bifenazate (A)                  | UN insecticide              | Various                                      |            |  |
|                              |  | chlorfenapyr (A)                | 13                          | Secure 360 SC                                | 14         | Apply only once per season.  |
|                              |  | clofentezine (O)                | 10A                         | Apollo SC<br>Apollo                          | 21         | Go to DPIRD website: 'Managing mites in WA deciduous fruit trees.' |
|                              |  | etoxazole (A)                   | 10B                         | Paramite                                     |            |  |
|                              |  | fenbutatin oxide (A)            | 12B                         | Torque Miticide<br>Vendex                    | 2          |  |
|                              |  | hexythiazox (O)                 | 10A                         | Calibre 100EC<br>Hexythiazox 100 EC<br>Zilch | 3          |  |
|                              |  | maldison (A)                    |                             | 1B   |            | Fyfanon 440EW  |
|                              |  | milbemectin (OA)                | 6B                          | Milbeknock                                   | 14         |  |
|                              | paraffinic oil (A)   | insecticide, spray adjuvant     | Various                     | 1  |            |  |
|                              | petroleum oil (A)  |                                 | Biocover                    |  |            |  |
|                              | tebufenpyrad (OA)  | 21A                             | Pyranica                    | 14   |            |  |
|                              | Pearleaf blister mite  | carbaryl                        | 1A                          | Various                                      | 77         |  |
|                              |  | paraffinic oil (A)              | insecticide, spray adjuvant | Various                                      | 1          |  |
| petroleum oil (A)            |  | Biocover                        |                             |  |            |  |

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| Spray timing                 | Pest or disease   | Active ingredient            | Chemical class              | Common trade names                          | WHP (days) | Comments   |  |
|------------------------------|---|------------------------------|-----------------------------|---|------------|--|--|
| Fruit development to harvest | <b>Bryobia mite Ovicides (O)</b> kill mite eggs and newly hatched mites.<br><b>Adulticides (A)</b> kill active stages of mites. | bifenazate <b>(A)</b>        | UN insecticide              | Various                                     | 7          | Apply at not less than 1000 L/ha.  |  |
|                              |   | clofentezine <b>(O)</b>      | 10A                         | Apollo SC                                   | 21         | Apply only once per season.  |  |
|                              |   | fenbutatin oxide <b>(A)</b>  | 12B                         | Torque Miticide Vendex                      | 2          | Go to DPIRD website: 'Managing mites in WA deciduous fruit trees.'   |  |
|                              |   | paraffinic oil <b>(A)</b>    | insecticide, spray adjuvant | Various                                     | 1          |  |  |
|                              |   | petroleum oil <b>(A)</b>     |                             | Biocover                                    |            |  |  |
|                              | <b>Apple weevil</b> (curculio beetle)   | alpha-cypermethrin           | 3A                          | Various                                     | 14         | <b>Trunk and butt spray only.</b> Monitor weevil emergence — usually occurs late November to early December. Continue monitoring after spraying. Summer oil can be added at 1–2% to help prolong activity.                           |  |
|                              |   | tetraniliprole               | 28                          | Vayego 200 SC                               | 7          |  |  |
|                              | <b>Fuller's rose weevil and Apple weevil</b> (curculio beetle)  | azinphos-methyl              | 1B                          | Gusathion 200 SC                            | 14         | Apply lower rate as a high volume spray to foliage. Use higher rate as a butt and soil spray only. For weevils apply no more than twice per season. Do not retreat within 10 days. Do not apply for more than 2 consecutive seasons. |  |
|                              |   | indoxacarb                   | 22A                         | Various                                     |            |  |  |
|                              |   | tetraniliprole               | 28                          | Vayego 200 SC                               | 7          |  |  |
|                              | <b>Mediterranean fruit fly</b> (continues next page)  | <b>Foliar baiting:</b>       |                             |   |            |  |  |
|                              |   | maldison                     | 1B                          | Hy-Mal<br>Fyfanon 1000 EC<br>Fyfanon 440 EW | 3          | Go to DPIRD website for latest information.  |  |
| spinosad                     | 5   | Naturalure<br>Eco-Naturalure | N/A                         |   |            |  |  |

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| Spray timing                 | Pest or disease                 | Active ingredient               | Chemical class | Common trade names                            | WHP (days) | Comments   |  |
|------------------------------|---------------------------------|---------------------------------|----------------|---|------------|--|--|
| Fruit development to harvest | Mediterranean fruit fly (cont.) | trichlorfon                     | 1B             | Various                                       | 2          |  |  |
|                              |                                 | <b>Protein to add to baits:</b> |                |   |            |  |  |
|                              |                                 | hydrolyzed protein              |                | Cera Bait                                     | N/A        |  |  |
|                              |                                 | yeast autolysate                |                | Fruit Fly Lure<br>Natflav 500                 | N/A        | Add 2 L of protein for every 100 L water + insecticide. Add protein first, then insecticide + water.   |  |
|                              |                                 | yeast hydrolysate               |                | Flavex  |            |  |  |
|                              |                                 | <b>Cover spray:</b>             |                |   |            |  |  |
|                              |                                 | clothianidin                    | 4A             | Samurai                                       | 7          | Use with MAXX surfactant. Check label before using.  |  |
|                              |                                 | spinetoram                      | 5              | Delegate                                      |            | PER1259, expires 31 May 2024   |  |
|                              |                                 | trichlorfon                     | 1B             | Various                                       | 2          | Only apply when stung fruit detected.  |  |
| thiacloprid                  | 4A                              | Calypso 480 SC                  | 21             | PER14562, expires 30 November 2023.           |            |  |  |
| Postharvest                  | Snails                          | copper sulphate                 | unspecified    | Bluestone + wetting agent                     | N/A        | Soil and butt spray only.  |  |
|                              |                                 | iron-EDTA complex               | molluscicide   | Multiguard Snail and Slug Killer<br>Eradicate |            | Apply to ground only, place bait close to tree trunk.  |  |
|                              |                                 | metaldehyde                     |                | Various                                       |            |  |  |
|                              |                                 | methiocarb                      | 1A             | Mesurol Snail and Slug Bait                   |            |  |  |
|                              | Two-spotted mite                | propargite (A)                  | 12C            | Omite 300W<br>Unimite 300W                    |            | Omite is used only postharvest as it may cause fruit spotting, leaf burn and possible defoliation; this is more likely under hot conditions. |  |
| Leaf fall                    | Pear scab (pears only)          | urea                            |                | Urea + wetting agent                          | N/A        | Encourages early dormancy, assists with the breakdown of leaf litter and reduces carryover of scab spores.                                   |  |

### 3.7 Postharvest treatments for apples and pears

#### Fungicides for storage rots

The following fungicides are registered for postharvest dipping of apples and pears. Submerge fruit for approximately 30 seconds. Dipping should occur within 24 hours of harvest.

**Reference:** Infopest online

| Disease controlled   | Active ingredient                     | Fungicide group | Trade names  |
|--|---------------------------------------|-----------------|--|
| External rot causing organisms   | bromochlorodimethylhydantoin          | sanitiser       | Nylate<br>Anylate P  |
| Controls bacteria and fungi in agricultural and industrial premises, postharvest fruit and vegetable washing and processing facilities | chlorine as chlorine dioxide          | sanitiser       | Vibrex Horticare   |
|  | chlorine as calcium hypochlorite      | sanitiser       | Activ 8<br>Hypochlor<br>Dry-Tec Disinfestation<br>Dry-Tec Duration |
| Blue mould ( <i>Penicillium expansum</i> and <i>P. solitum</i> )<br>Grey mould ( <i>Botrytis cinerea</i> )                             | fludioxonil                           | 12              | Scholar<br>Sentura<br>Fludy 230 SC<br>Starling                     |
| Blue mould ( <i>Penicillium expansum</i> )   | imazalil                              | 3               | Fungazil 500 EC<br>Fungaflor 500 EC<br>Imzacure 500 EC             |
| Blue mould ( <i>Penicillium expansum</i> )   | imazalil as a sulphate                | 3               | Various  |
| Assists in the control of bacteria and fungi on a range of fruit and vegetables  | iodine                                | sanitiser       | Iodine Granules  |
| Blue mould ( <i>Penicillium</i> spp.)<br>Grey mould ( <i>Botrytis cinerea</i> )<br>Ripe fruit rot ( <i>Gleosporium album</i> )         | iprodione                             | 2               | Various  |
| Control of bacterial growth in the process water for postharvest processing of fruit and vegetables                                    | peroxyacetic acid + hydrogen peroxide | sanitiser       | Adoxysan<br>Tsunami on Farm  |
| <i>Penicillium</i> spp.<br><i>Botrytis</i> spp.<br><i>Neo fabrea</i> spp.  | pyrimethanil                          | 9               | ecoFog – 160 Pyr   |
| Blue mould ( <i>Penicillium expansum</i> )<br>Grey mould ( <i>Botrytis cinerea</i> )<br>Fruit rot ( <i>Gleosporium album</i> )         | thiabendazole                         | 1               | Storite<br>Tecto Flowable SC<br>Presertex<br>Thiabendazole 500 S   |

### DPA (diphenylamine) for superficial scald

DPA is recommended for immersion or drench application to control superficial scald of apple and pear varieties as listed in the table.

**Warning:** There are many **different rates and recommendations on the label.**

**Ensure that the label is read carefully and fully understood.**

**Reference:** Infopest online

| Active ingredient | Common trade names  | Crop and varieties   |
|-------------------|---|--|
| diphenylamine     | Campbell DPA 310<br>Scald Inhibitor<br><br>Chemley No-Scald DPA | <b>Apples:</b> Bonza, Granny Smith, Golden Delicious, Jonathon, Red Delicious, Lady Williams<br><b>Pears:</b> Nijisseiki(20 <sup>th</sup> Century), WBC (Bartlett), Packhams Triumph |

### Calcium treatments for bitter pit

Calcium chloride will reduce bitter pit on apples which occurs during storage. It may also delay the softening of all varieties during storage.

Several products are available which contain calcium chloride that are suitable for postharvest dipping of apples.

When mixing calcium chloride with fungicides and DPA refer to the label for directions.

The most effective control is achieved by treating fruit within 24 hours of harvest.

### Reducing the risk of calcium burn

Calcium chloride treatment of apples can lead to some skin damage. Damage can be minimised if precautions are taken during harvest and postharvest prior to treatment:

- Take all reasonable care to avoid bruising or puncturing the skin during fruit harvesting.
- Any skin injury is a site for excessive calcium absorption and subsequent damage.
- Avoid treating hot fruit. Never treat fruit with a pulp temperature exceeding 30°C. If necessary, cool fruit with water or delay treatment (never exceed 24 hours).
- Pre-washing fruit and bins prior to treatment for bitter pit or scald is highly recommended. As well as cooling the fruit it will wash dust and soil contamination from the fruit and bins. This will reduce contamination of the dip solution.
- Calcium uptake by the fruit is completed in about 12 hours. Drenching with fresh water soon after this time will remove any risk of further tissue damage from residual calcium chloride on the skin of the apple.



**Other postharvest treatments: Smartfresh™**

**Smartfresh™** (1-methylcyclopropene – 1-MCP) is registered for postharvest treatment of apples and pears.

**Apples:** Smartfresh™ maintains fresh picked qualities with improved firmness, protection against skin greasiness and effective control of superficial scald.

**Pears:** Smartfresh™ maintains quality and appearance through significant decrease of bruising, better stem freshness, control of scald and internal browning.

Smartfresh™ is marketed by AgroFresh Inc., a subsidiary of Rohm and Haas. It is applied using the proprietary Smartfresh delivery system by a registered applicator.

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Website: [agrofresh.com](http://agrofresh.com)

## 4 Summer Fruit

### 4.1 Development stages of summer fruit

Photographs by Shane Hetherington, NSW Department of Primary Industries



Dormant



Budswell



Budbreak



Full bloom



Petal fall



Shuck fall



## 4.2 Exotic pests of summer fruit



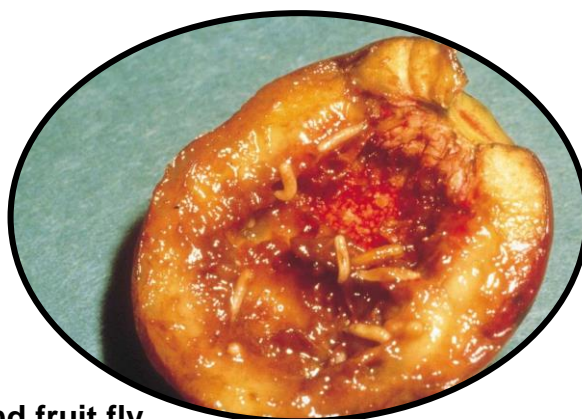
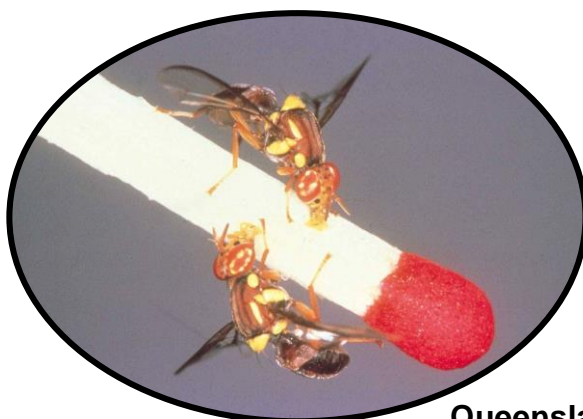
Sharka – Plum pox virus



Cherry aphid



Oriental fruit moth



Queensland fruit fly

### 4.3 Summer fruit pest and disease monitoring and treatment calendar

Not all these pests will occur in your orchard

**NOTE:** The pest status of each pest varies across growing districts; monitor to avoid unnecessary or poorly timed spraying.

| Pest/disease                     | Aug | Sept | Oct | Nov | Dec | Jan   | Feb | March | April | May | June | July |
|----------------------------------|-----|------|-----|-----|-----|-------|-----|-------|-------|-----|------|------|
| Dormancy release                 | ■   |      |     |     |     |       |     |       |       |     |      |      |
| Shothole, Rust and Freckle       | ■   |      |     |     |     |       |     |       |       | ■   |      |      |
| Leaf curl                        | ■   |      |     |     |     |       |     |       |       | ■   |      |      |
| San Jose scale and Frosted scale | ■   |      |     |     |     |       |     |       |       |     |      | ■    |
| Bryobia mite                     | ■   |      |     |     | ■   |       |     |       |       |     |      |      |
| Brown rot                        | ■   |      |     |     |     | ■     |     |       |       |     |      |      |
| Snails                           | ■   |      |     |     |     |       |     |       | ■     |     |      |      |
| Thrips and Western flower thrips | ■   |      |     |     |     | W F T |     |       |       |     |      |      |
| Mealybug                         | ■   |      |     |     |     |       |     |       |       |     |      |      |
| European earwig                  |     | ■    |     |     |     |       |     |       |       |     |      |      |
| Black and Green peach aphids     |     |      | ■   |     |     |       |     |       |       |     |      |      |
| Wingless grasshopper             |     |      | ■   |     |     |       |     |       |       |     |      |      |
| Rutherglen bug                   |     |      | ■   |     |     |       |     |       |       |     |      |      |
| Garden weevil                    |     |      | ■   |     |     |       |     |       |       |     |      |      |
| Lightbrown apple moth            |     |      | ■   |     |     |       |     |       |       |     |      |      |
| Heliothis caterpillar            |     |      |     | ■   |     |       |     |       |       |     |      |      |
| Two-spotted mite                 |     |      |     | ■   |     |       |     |       |       |     |      |      |
| Peach silver mite                |     |      |     | ■   |     |       |     |       |       |     |      |      |
| Mediterranean fruit fly          |     |      |     | ■   |     |       |     |       |       |     |      |      |
| Apple weevil                     |     |      |     |     | ■   |       |     |       |       |     |      |      |
| Fuller's rose weevil             |     |      |     |     | ■   |       |     |       |       |     |      |      |
| Cherry slug                      |     |      |     |     | ■   |       |     |       |       |     |      |      |
| Carpophilus beetle               |     |      |     |     | ■   |       |     |       |       |     |      |      |

■ Timing for monitoring and treatment if required.

#### 4.4 Summer fruit spray options

Reference: Infopest Online

| Spray timing   | Pest or disease                              | Active ingredient                             | Chemical class   | Common trade names                                  | Crop                  | WHP (days) | Comments  |  |
|----------------|--|---|--|---|-----------------------|------------|---|--|
| <b>Dormant</b> | <b>Bacterial canker or bacterial gumosis</b> | copper sulphate + hydrated lime or lime putty | M2   | Bordeaux mixture                                    | Summer fruit          | 1          | See NSW DPI Integrated Pest and Disease Management for Australian Summerfruit. Page 14: Bacterial Canker. |  |
|                |  | cupric hydroxide + mancozeb                   | M1 + M3  | ManKocide DF  |                       | 14         |   |  |
|                |  | copper ammonium acetate                       | M1   | Liquicop<br>Cop-IT                                  | Apricots,<br>cherries | 1          |   |  |
|                |  | cuprous oxide                                 |  | Ag Copp 750<br>Nordox 750 WG<br>Red Copper WG       | Apricots,<br>cherries |            |   |  |
|                |  | cupric hydroxide                              |  | Various   |                       |            |   |  |
|                |  | copper oxychloride                            |  | Various   | Summer fruit          |            |   |  |
|                |  | tri-basic copper sulphate                     | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid | Apricots,<br>cherries                               |                       |            |   |  |
|                | <b>San Jose scale</b>                        | chlorpyrifos                                  | 1B   | Various   | Summer fruit          | 14         |   | It is recommended to combine a dormant oil with any of these insecticides. |
|                |  | diazinon                                      |  | Diazinon<br>Diazinon 800<br>Diazol 800<br>Dizzy 800 |                       |            |   |  |
|                |  | paraffinic / petroleum oil                    | insecticide,<br>spray<br>adjuvant                                    | Various   | Summerfruit           | 1          |   |  |

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| Spray timing                     | Pest or disease                                | Active ingredient                             | Chemical class | Common trade names   | Crop                           | WHP (days) | Comments   |
|----------------------------------|--|---|----------------|--|--------------------------------|------------|--|
| <b>Dormant</b>                   | <b>Frosted scale</b>                           | lime sulphur                                  | M2             | Lime Sulphur   | Summer fruit (except cherries) | 1          |  |
|                                  | <b>Dormancy release</b>                        | fatty acid esters                             | PGR            | Waiken™  | Cherries                       | N/A        | To advance bud break apply 35–50 days before normal bud break. To retard bud break apply 0–20 days before normal budbreak. |
| <b>Late dormancy to budswell</b> | <b>Bacterial canker or bacterial gummosis</b>  | copper sulphate + hydrated lime or lime putty | M1             | Bordeaux mixture   | Summer fruit                   | 1          | See NSW DPI Integrated Pest and Disease Management for Australian Summerfruit. Page 14: Bacterial Canker.                  |
|                                  |  | cupric hydroxide + mancozeb                   | M1 + M3        | ManKocide DF   |                                | 14         |  |
|                                  |  | copper ammonium acetate                       | M1             | Cop-IT<br>Liquicop   | Apricots, cherries             | 1          |  |
|                                  |  | cuprous oxide                                 |                | Ag Copp 750<br>Nordox 750 WG<br>Red Copper WG                        | Apricots, cherries             |            |  |
|                                  |  | cupric hydroxide                              |                | Various  |                                |            |  |
|                                  |  | copper oxychloride                            |                | Various  | Summer fruit                   |            |  |
|                                  |  | tri-basic copper sulphate                     |                | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid | Apricots, cherries             |            |  |
|                                  | <b>Bacterial spot</b>                          | copper oxychloride                            | M1             | Various  | Summer fruit                   | 1          |  |
|                                  | <b>San Jose scale</b><br>(continues next page) | chlorpyrifos                                  | 1B             | Various  | Summer fruit                   | 14         |  |

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| Spray timing                     | Pest or disease                        | Active ingredient          | Chemical class              | Common trade names                                  | Crop                           | WHP (days)                  | Comments  |
|----------------------------------|--|----------------------------|-----------------------------|---|--------------------------------|-----------------------------|---|
| <b>Late dormancy to budswell</b> | <b>San Jose scale</b> (cont.)          | diazinon                   | 1B                          | Diazinon<br>Diazinon 800<br>Diazol 800<br>Dizzy 800 | Summer fruit                   | 14                          | It is recommended to combine a dormant oil with any one of these insecticides |
|                                  |  | paraffinic / petroleum oil | insecticide, spray adjuvant | Various   |                                | 1                           |   |
|                                  | <b>Frosted scale</b>                   | lime sulphur               | M2                          | Lime Sulphur  | Summer fruit (except cherries) | 1                           |   |
|                                  | <b>Snails</b>                          | copper sulphate            | unspecified                 | Bluestone   | Summer fruit                   | N/A                         | Soil and butt spray. Go to DPIRD website: 'Snail and slug control.'           |
|                                  |  | copper                     | molluscicide                | Escar – Go  |                                | 1                           |   |
|                                  |  | iron EDTA complex          |                             | Eradicate<br>Multiguard Snail and Slug Killer       |                                | N/A                         |   |
|                                  |  | metaldehyde                |                             | Various   |                                | 7                           |   |
|                                  |  | methiocarb                 |                             | 1A  |                                | Mesurol Snail and Slug Bait |   |
|                                  |  | silicate salts + copper    | U12                         | Socusil<br>Snail Repellent                          |                                | N/A                         |   |
|                                  | <b>Bryobia mite</b>                    | paraffinic / petroleum oil | insecticide, spray adjuvant | Various   |                                | 1                           | Go to DPIRD website: 'Managing mites in WA deciduous fruit trees.'            |
|                                  |  | lime sulphur               | M2                          | Lime Sulphur  | Summer fruit (except cherries) | 1                           |   |
|                                  | <b>Leaf curl</b> (continues next page) | copper oxychloride         | M1                          | Various   | Peaches, nectarines            | 1                           |   |
| Various                          |  |                            |                             | Summer fruit  |                                |                             |   |



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| Spray timing                | Pest or disease                | Active ingredient           | Chemical class | Common trade names   | Crop                                | WHP (days) | Comments |                                |
|-----------------------------|--------------------------------|-----------------------------|----------------|--|-------------------------------------|------------|----------|--------------------------------|
| Late dormancy to budswell   | Leaf curl (cont.)              | cuprous oxide               | M1             | Ag Copp 750<br>Nordox 750 WG<br>Red Copper WG                        | Peaches,<br>nectarines              | 1          |          |                                |
|                             |                                | cupric hydroxide            |                | Various  |                                     |            |          |                                |
|                             |                                | copper octanoate            |                | Tricop   |                                     |            |          |                                |
|                             |                                | chlorothalonil              | M5             | Various  | Peaches                             | 7          |          |                                |
|                             |                                | cupric hydroxide + mancozeb | M1 +M3         | ManKocide DF   | Summer fruit                        | 14         |          |                                |
|                             |                                | dithianon                   | M9             | Various  | Peaches,<br>nectarines              | 21         |          |                                |
|                             |                                | dodine                      | U12            | Dodine<br>Syllit 400SC   |                                     | N/A        |          | Do not apply after petal fall. |
|                             |                                | tri-basic copper sulphate   | M1             | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid |                                     | 1          |          |                                |
|                             |                                | lime sulphur                | M2             | Lime Sulphur   | Summer fruit (except cherries)      |            |          |                                |
|                             |                                | ziram                       | M3             | Ziragranz<br>Ziram DG<br>Ziram WG                                    | Cherries,<br>nectarines,<br>peaches | 7          |          |                                |
|                             |                                | Ziram Granuflo              |                | Summer fruit (except apricots)                                       |                                     |            |          |                                |
|                             | Shothole (continues next page) | copper ammonium acetate     | M1             | Cop-IT<br>Liquicop   | Summer fruit                        | 1          |          |                                |
|                             |                                |                             |                | cupric hydroxide   |                                     |            |          | Various                        |
| cupric hydroxide + mancozeb |                                |                             | M1 + M3        | ManKocide DF   |                                     |            |          | 14                             |

| Spray timing   | Pest or disease            | Active ingredient         | Chemical class   | Common trade names   | Crop                                | WHP (days) | Comments |                                   |     |
|--|----------------------------|---------------------------|--|--|-------------------------------------|------------|----------|-----------------------------------|-----|
| <b>Late dormancy to budswell</b>                     | <b>Shothole</b><br>(cont.) | cuprous oxide             | M1   | Nordox 750 WG<br>Red Copper WG                                       | Summer fruit                        | 1          |          |                                   |     |
|  |                            |                           |  | Ag Copp 750  | Summer fruit<br>(except nectarines) |            |          |                                   |     |
|  |                            | copper oxychloride        |  | Various  | Summer fruit                        |            |          |                                   |     |
|  |                            | tri-basic copper sulphate | M9   | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid | Summer fruit                        | 21         |          |                                   |     |
|  |                            | dithianon                 |  | Various  |                                     |            |          |                                   |     |
|  |                            | lime sulphur              |  | M2   | Lime Sulphur                        |            |          | Summer fruit<br>(except cherries) | N/A |
|  |                            |                           |  |  |                                     |            |          |                                   |     |
| <b>Rust</b>  | copper oxychloride         | M1                        | Various  | Summer fruit   | 1                                   |            |          |                                   |     |
|  | lime sulphur               | M2                        | Lime Sulphur   | Summer fruit<br>(except cherries)                                    | N/A                                 |            |          |                                   |     |
| <b>Freckle</b><br>(scab)<br>(continues on next page) | copper ammonium acetate    | M1                        | Cop-IT<br>Liquicop   | Apricots   | 1                                   |            |          |                                   |     |
|  | cuprous oxide              |                           | Ag Copp 750<br>Nordox 750 WG<br>Red Copper WG                        |  |                                     |            |          |                                   |     |
|  | cupric hydroxide           |                           | Various  |  |                                     |            |          |                                   |     |
|  | copper oxychloride         |                           | Various  |  |                                     |            |          |                                   |     |
|  | tri-basic copper sulphate  |                           | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid |  |                                     |            |          |                                   |     |

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| Spray timing                                   | Pest or disease                        | Active ingredient                                     | Chemical class | Common trade names   | Crop                           | WHP (days) | Comments   |
|--|--|---|----------------|----------------------|--------------------------------|------------|--|
| <b>Late dormancy to budswell</b>               | <b>Freckle (scab)</b> (cont.)          | lime sulphur  | M2             | Lime Sulphur         | Summer fruit (except cherries) | N/A        |  |
| <b>Budburst/ pink bud to fruit development</b> | <b>Brown rot</b> (continues next page) | captan  | M4             | Various              | Summer fruit (except apricots) | 7          | See NSW DPI Integrated Pest and Disease Management, page 27: 'Blossom blight and brown rot.'                       |
|  |  | chlorothalonil  | M5             | Various              | Summer fruit                   | 7          | See 'Additional Restraints for stonefruits' on label.  |
|  |  |   |                |                      | Plums                          | 1          |  |
|  |  | cyprodinil  | 9              | Chorus Solaris 300EC | Summer fruit (except cherries) | N/A        | Maximum 3 applications. Do not use after shuckfall.  |
|  |  | dodine  | M7             | Syllit 400SC         | Peaches, nectarines            | N/A        | Do not apply after petal fall  |
|  |  | fluopyram + trifloxystrobin                           | 7 + 11         | Luna Sensation       | Summer fruit                   | 1          | Maximum 2 applications per season.   |
|  |  | iprodione   | 2              | Various              | Summer fruit                   | Nil        |  |
|  |  | mancozeb  | M3             | Various              | Summer fruit                   | 14         | May be phytotoxic to some plum varieties. Test new plum varieties on a small scale before applying to entire crop. |
|  |  | penthiopyrad  | 7              | Fontelis             | Summer fruit                   | Nil        |  |
|  |  | propiconazole   | 3              | Various              | Summer fruit                   | 1          |  |
|  |  | sulfur  | M2             | Various              | Summer fruit (except apricots) | 1          |  |
| thiram   | M3                                     | Thiragranz<br>Thiram DG<br>Thiram WP<br>Thiram 800 WG | Summer fruit   | 7                    |                                |            |  |

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| Spray timing   | Pest or disease                               | Active ingredient           | Chemical class | Common trade names         | Crop                                 | WHP (days) | Comments   |
|--|---|-----------------------------|----------------|----------------------------|--------------------------------------|------------|--|
| <b>Budburst/<br/>pink bud to<br/>fruit<br/>development</b> | <b>Brown rot<br/>(cont.)</b>                  | triforine                   | 3              | Saprol                     |                                      | N/A        |  |
|  |   | ziram                       | M3             | Ziram DG<br>Ziragranz      | Cherries,<br>nectarines<br>peaches   | 7          |  |
|  |   |                             |                | Ziram Granuflo<br>Ziram WG | Summer fruit<br>(except<br>apricots) |            |  |
|  | <b>Leaf curl</b>                              | chlorothalonil              | M5             | Various                    | Peaches                              | 7          | See 'Additional Restraints for stonefruits' on label.  |
|  |   | dodine                      | M7             | Dodine<br>Syllit 400SC     | Peaches,<br>nectarines               | 5          | Do not apply after petal fall.   |
|  |   | ziram                       | M3             | Ziragranz<br>Ziram DG      | Peaches,<br>cherries,<br>nectarines  | 7          |  |
|  |   |                             |                | Ziram Granuflo<br>Ziram WG | Summer fruit<br>(except<br>apricots) |            |  |
|  | <b>Shothole<br/>(continues<br/>next page)</b> | chlorothalonil              | M5             | Various                    | Summer fruit                         | 7          | See 'Additional Restraints for stonefruits' on label.  |
|  |   |                             |                |                            | Plums                                | 1          |  |
|  |   | fluopyram + trifloxystrobin | 7 + 11         | Luna Sensation             | Summer fruit                         | 1          | Maximum 2 applications per season.   |
|  |   | mancozeb                    | M3             | Various                    | Summer fruit                         | 14         | May be phytotoxic to some plum varieties. Test new plum varieties on a small scale before applying to entire crop. |
|  |   | metiram                     |                |                            | Fruitcote<br>Polyram DF              |            |  |

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| Spray timing                                    | Pest or disease         | Active ingredient | Chemical class | Common trade names                                    | Crop                             | WHP (days) | Comments   |
|---|-------------------------|-------------------|----------------|---|----------------------------------|------------|--|
| <b>Budburst / pink bud to fruit development</b> | <b>Shothole (cont.)</b> | ziram             | M3             | Ziragranz<br>Ziram DG<br>Ziram Granuflo<br>Ziram WG   | Summer fruit (except apricots)   | 7          |  |
|   | <b>Freckle (scab)</b>   | chlorothalonil    | M5             | Various   | Apricots                         | 7          | See 'Additional Restraints for stonefruits' on label.  |
|   |                         | dithianon         | M9             | Various   | Apricots, nectarines, peaches    | 21         |  |
|   |                         | mancozeb          | M3             | Various   | Summer fruit                     | 14         | May be phytotoxic to some plum varieties. Test new plum varieties on a small scale before applying to entire crop. |
|   |                         | penthiopyrad      | 7              | Fontelis  | Summer fruit                     | Nil        |  |
|   |                         | thiram            | M3             | Thiragranz<br>Thiram WP<br>Thiram DG<br>Thiram 800 WG | Summer fruit                     | 7          |  |
|   | <b>Rust</b>             | chlorothalonil    | M5             | Various   | Summer fruit (except nectarines) | 7          | See 'Additional Restraints for stonefruits' on label.  |
|   |                         | mancozeb          | M3             | Various   | Summer fruit                     | 14         | May be phytotoxic to some plum varieties. Test new plum varieties on a small scale before applying to entire crop. |
|   |                         | metiram           |                | Fruitcote<br>Polyram DF                               | Summer fruit                     |            |  |

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| Spray timing                                    | Pest or disease                                       | Active ingredient            | Chemical class | Common trade names                         | Crop                | WHP (days) | Comments   |
|---|---|------------------------------|----------------|--|---------------------|------------|--|
| <b>Budburst / pink bud to fruit development</b> | <b>Aphids, Black peach aphid or Green peach aphid</b> | acetamirid + novaluron       | 15 + 4A        | Cormoran                                   | Summer fruit        | 35         |  |
|   |   | clothianidin                 | 4A             | Samurai                                    | Peaches, nectarines | 7          | Check label before using.  |
|   |   | fatty acids - potassium salt | insecticide    | Bug Guard<br>Hitman<br>Natrasoap           | Summer fruit        | N/A        |  |
|   |   | imidacloprid                 | 4A             | Various                                    | Summer fruit        | 21         | Apply as a full cover spray ensuring thorough coverage.  |
|   |   | maldison                     | 1B             | Various                                    |                     | 3          |  |
|   |   | methomyl                     | 1A             | Various                                    | Nectarines, peaches | 1          |  |
|   |   | pirimicarb                   |                | Various                                    | Summer fruit        | 2          | Use at least 1,100 L spray/ha.   |
|   |   | pymetrozine                  | 9B             | Chess<br>Endgame<br>Metro 250WP<br>Pymento | Summer fruit        | 28         |  |
|   | <b>Black peach aphid</b>                              | spirotetramat                | 23             | Movento 240 SC                             | Summer fruit        | 21         | To ensure there is sufficient foliage for product uptake do not apply prior to shuck fall. Apply with surfactant – refer to label for details. |
|   | <b>Tuber mealybug and Longtailed mealybug</b>         | spirotetramat                | 23             | Movento 240 SC                             | Summer fruit        | 21         | To ensure there is sufficient foliage for product uptake do not apply prior to shuck fall. Apply with surfactant – refer to label for details. |

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| Spray timing                                    | Pest or disease              | Active ingredient               | Chemical class | Common trade names                 | Crop                           | WHP (days)                           | Comments  |
|---|------------------------------|---------------------------------|----------------|------------------------------------|--------------------------------|--------------------------------------|---|
| <b>Budburst / pink bud to fruit development</b> | <b>European earwig</b>       | chlorpyrifos                    | 1B             | Various                            | Summer fruit                   | 14                                   | Chlorpyrifos can be applied as a foliar spray or combined with sunflower oil and cracked grain to be applied as a ground bait.  |
|   |                              | carbaryl                        | 1A             | Bugmaster Flowable Carbaryl 500 SC | Summer fruit (except cherries) | 35                                   | Go to DPIRD website: 'Management of European earwig.' Monitor for this pest using single-sided corrugated cardboard trunk bands. Continue monitoring throughout season. |
|   |                              | indoxacarb                      | 22A            | Avatar                             | Cherries                       | 14                                   | PER11002, valid to 31 Mar 2025.   |
|   | <b>Thrips</b>                | fatty acids – potassium salts   | insecticide    | BugGuard<br>Hitman<br>Natrasoap    | Summer fruit                   | N/A                                  | Go to DPIRD website: 'Thrips pests in pome and stone fruit.'  |
|   |                              | methomyl                        |                | 1A                                 | Various                        | Summer fruit                         |   |
|   |                              | pyrethrins + piperonyl butoxide |                | 3A                                 | Py-Bo                          | Summer fruit                         |   |
|   |                              | tau-fluvalinate                 |                |                                    | Klartan<br>Mavrik Aquaflow     | Nectarines, peaches, plums, cherries |   |
| <b>Fruit development to harvest</b>             | <b>Western flower thrips</b> | spinetoram                      | 5              | Delegate                           | Summer fruit                   | 3                                    | Check label for WFT resistance strategy. Go to DPIRD website: 'Chemical control of western flower thrips.'  |



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| Spray timing                 | Pest or disease                        | Active ingredient         | Chemical class | Common trade names   | Crop                           | WHP (days) | Comments  |
|------------------------------|--|---------------------------|----------------|--|--------------------------------|------------|---|
| Fruit development to harvest | Bacterial canker or bacterial gummosis | copper ammonium acetate   | M1             | Cop-IT<br>Liquicop   | Apricots<br>cherries           | 1          | These copper formulations are registered to be used 7 days after petal fall and repeated 7-10 days later. |
|                              |  | cuprous oxide             |                | Ag Copp 750<br>Nordox 750 WG<br>Red Copper WG                        | Apricots,<br>cherries          |            |   |
|                              |  | copper oxychloride        |                | Various  | Apricots,<br>cherries          |            |   |
|                              |  | cupric hydroxide          |                | Various  | Apricots,<br>cherries          |            |   |
|                              |  | tri-basic copper sulphate |                | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid | Apricots,<br>cherries          |            |   |
|                              | Garden weevil                          | alpha-cypermethrin        | 3A             | Various  | Summer fruit (except cherries) | 14         | Trunk and butt spray only.  |
|                              |  | indoxacarb                | 22A            | Various  | Summer fruit (except cherries) | 7          | Refer to weevil section in 'Common Pests of Summer fruit in WA.'  |
|                              | Leaf curl                              | chlorothalonil            | M5             | Various  | Peaches                        | 7          | See 'Additional Restraints for stonefruits' on label.   |
|                              |  | ziram                     | M3             | Ziram DG<br>Ziram Granuflo   | Summer fruit (except apricots) |            |   |
|                              | Shothole (continues next page)         | chlorothalonil            | M5             | Various  | Summer fruit                   | 7          | See 'Additional Restraints for stonefruits' on label.   |
|                              |  |                           |                |  | Plums                          | 1          |   |
|                              |  | dithianon                 | M9             | Delan 700 WG<br>Dithianon 700 WG<br>Dragon 700 WG                    | Summer fruit                   | 21         |   |

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| Spray timing                 | Pest or disease  | Active ingredient | Chemical class | Common trade names  | Crop                             | WHP (days) | Comments   |
|------------------------------|------------------|-------------------|----------------|---|----------------------------------|------------|--|
| Fruit development to harvest | Shothole (cont.) | mancozeb          | M3             | Various   | Summer fruit                     | 14         | May be phytotoxic to some plum varieties. Test new plum varieties on a small scale before applying to entire crop. |
|                              |                  | thiram            |                | Thiragranz<br>Thiram DG<br>Thiram 800 WG                          | Summer fruit                     | 7          |  |
|                              |                  | ziram             |                | Ziragranz<br>Ziram DG<br>Ziram Granuflo<br>Ziram WG               | Summer fruit (except apricots)   |            |  |
|                              | Rust             | chlorothalonil    | M5             | Various   | Summer fruit (except nectarines) | 7          | See 'Additional Restraints for stonefruits' on label.  |
|                              |                  | dithianon         | M9             | Delan 700 WG<br>Dinon 700 WG<br>Dithianon 700 WG<br>Dragon 700 WG | Peaches, plums, nectarines       | 21         |  |
|                              |                  | mancozeb          | M3             | Various   | Summer fruit                     | 14         | May be phytotoxic to some plum varieties. Test new plum varieties on a small scale before applying to entire crop. |
|                              |                  | propiconazole     | 3              | Various   | Plums                            | 1          | Label specifies plums for prune production.  |
|                              |                  | sulfur            | M2             | Various   | Summer fruit (except apricots)   | N/A        | Can be applied 4 weeks after petal fall.   |
|                              |                  | zineb             | M3             | Zineb   | Peaches, nectarines, plums       | 14         |  |

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| Spray timing                 | Pest or disease                            | Active ingredient | Chemical class | Common trade names  | Crop                           | WHP (days) | Comments  |
|------------------------------|--|-------------------|----------------|---|--------------------------------|------------|---|
| Fruit development to harvest | Freckle (scab)                             | chlorothalonil    | M5             | Various   | Apricots                       | 7          | See 'Additional Restraints for stonefruits', on label.  |
|                              |  | dithianon         | M9             | Delan 700 WG<br>Dinon 700 WG<br>Dithianon 700 WG<br>Dragon 700 WG | Apricots, nectarines, peaches  | 21         |   |
|                              |  | mancozeb          | M3             | Various   | Summer fruit                   | 14         | May be phytotoxic to some plum varieties. Test new plums varieties on a small scale before applying to entire crop. |
|                              |  | penthiopyrad      | 7              | Fontelis  | Summer fruit                   | Nil        |   |
|                              |  | thiram            | M3             | Thiragranz<br>Thiram DG<br>Thiram WG<br>Thiram WP                 | Apricots, cherries, peaches    | 7          |   |
|                              |  | ziram             |                | Ziragranz<br>Ziram DG<br>Ziram Granuflo<br>Ziram WG               | Cherries, nectarines, peaches  |            |   |
|                              | Wingless grasshopper (continues next page) | carbaryl          | 1A             | Bugmaster Flowable<br>Carbaryl 500 SC                             | Summer fruit (except cherries) | 35         | Go to DPIRD website: 'Wingless grasshoppers and their control.'   |
|                              |  |                   |                | Cricket and Grasshopper Killer Bait                               | Summer fruit                   | N/A        |   |
|                              |  | indoxacarb        | 22A            | Various   | Summer fruit (except cherries) | 7          |   |

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| Spray timing                 | Pest or disease                    | Active ingredient             | Chemical class              | Common trade names                                  | Crop                           | WHP (days) | Comments   |
|------------------------------|------------------------------------|-------------------------------|-----------------------------|---|--------------------------------|------------|--|
| Fruit development to harvest | Wingless grasshopper (cont.)       | <i>Metarhizium anisopliae</i> | biological insecticide      | Green Guard SC<br>Green Guard ULV                   | Summer fruit                   | N/A        | For best results, apply when grasshoppers are at early nymph stage. Refer to label for details of application. |
|                              | Rutherglen bug                     | trichlorfon                   | 1B                          | Dipterex 500 SL<br>Lepidex 500                      | Summerfruit                    | 2          | It is recommended to spray nearby weeds.   |
|                              | Bryobia mite                       | bifenazate                    | UN                          | Various   | Summer fruit (except cherries) | 3          | Go to DPIRD website: 'Managing mites in WA deciduous fruit trees.'   |
|                              |                                    | fenbutatin oxide              | 12B                         | Torque<br>Vendex                                    | Peaches, nectarines            | 14         |  |
|                              | San Jose Scale (crawlers)          | acetamiprid + novaluron       | 15 + 4A                     | Cormoran  | Summer fruit                   | 35         |  |
|                              |                                    | chlorpyrifos                  | 1B                          | Various   | Summer fruit                   | 14         |  |
|                              |                                    | diazinon                      | 1B                          | Diazinon 800<br>Diazinon<br>Diazol 800<br>Dizzy 800 | Summer fruit                   | 14         |  |
|                              |                                    | paraffinic oil                | insecticide, spray adjuvant | Bioclear<br>Biopest<br>Trump Spray Oil              | Summer fruit                   | 1          |  |
|                              |                                    | spirotetramat                 | 23                          | Movento 240 SC                                      | Summer fruit                   | 21         |  |
|                              | Apple weevil (continues next page) | alpha-cypermethrin            | 3A                          | Various   | Summer fruit (except cherries) | 14         | Refer to weevil section in 'Common Pests of Summer Fruit in WA.'   |

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| Spray timing                 | Pest or disease       | Active ingredient               | Chemical class | Common trade names      | Crop  | WHP (days) | Comments  |
|------------------------------|-----------------------|---------------------------------|----------------|-------------------------|---|------------|---|
| Fruit development to harvest | Apple weevil (cont.)  | indoxacarb                      | 22A            | Various                 | Summer fruit (except cherries)                              | 7          |   |
|                              |                       | tetraniliprole                  | 28             | Vayego                  | Summer fruit  | 3          |   |
|                              | Fuller's rose weevil  | indoxacarb                      | 22A            | Various                 | Summer fruit (except cherries)                              | 7          | Refer to weevil section in 'Common Pests of Summer fruit in WA.'        |
|                              |                       | tetraniliprole                  | 28             | Vayego                  | Summer fruit  | 3          |   |
|                              | Lightbrown apple moth | acetamiprid + novaluron         | 15 + 4A        | Cormoran                | Summer fruit  | 35         |   |
|                              |                       | <i>Bacillus thuringiensis</i>   | 11C            | Various                 | Summer fruit  | Nil        | Read 'Critical Comments' on label.                                      |
|                              |                       | carbaryl                        | 1A             | Various                 | Summer fruit (except cherries)                              | 35         |   |
|                              |                       | chlorpyrifos                    | 1B             | Strike-out 500 WP       | Summer fruit  | 14         |   |
|                              |                       |                                 |                | Lorsban 750 WG          | Summer fruit (except cherries)                              |            |   |
|                              |                       | chlorantraniliprole             | 28             | Altacor<br>Altacor Hort | Summer fruit  |            |   |
|                              |                       | indoxacarb                      | 22A            | Various                 | Summer fruit (except cherries)                              | 7          | Best results achieved when Avatar treatments are applied consecutively. |
|                              |                       | pyrethrins + piperonyl butoxide | 3A             | Py-Bo<br>Pyzap          | Summer fruit  | 1          |   |
| spinetoram                   | 5                     | Delegate                        | Summer fruit   | 3                       | Target sprays against mature eggs and newly-hatched larvae. |            |   |

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| Spray timing                 | Pest or disease   | Active ingredient               | Chemical class | Common trade names   | Crop                           | WHP (days) | Comments  |
|------------------------------|---|---------------------------------|----------------|--|--------------------------------|------------|---|
| Fruit development to harvest | Heliothis (native budworm)  | <i>Bacillus thuringiensis</i>   | 11C            | Various  | Summer fruit                   | Nil        | Read 'Critical Comments' on label.                            |
|                              |   | carbaryl                        | 1A             | Various  | Summer fruit (except cherries) | 35         |   |
|                              |   | indoxacarb                      | 22A            | Various  | Summer fruit (except cherries) | 7          |   |
|                              |   | methomyl                        | 1A             | Various  | Peaches, nectarines            | 1          |   |
|                              |   | pyrethrins + piperonyl butoxide | 3A             | Py-Bo  | Summer fruit                   |            |   |
|                              | Looper caterpillars   | <i>Bacillus thuringiensis</i>   | 11C            | Various  | Summer fruit                   | Nil        | Read 'Critical Comments' on label.                            |
|                              |   | pyrethrins + piperonyl butoxide | 3A             | Py-Bo  | Summer fruit                   | 1          |   |
|                              | Cherry slug   | carbaryl                        | 1A             | Bugmaster Flowable<br>Carbaryl 500 Flowable<br>Carbaryl 500 SC | Summer fruit (except cherries) | 35         |   |
|                              |   | spinetoram                      | 5              | Delegate   | Summer fruit                   | 3          |   |
|                              | Two-spotted mite (continues next page)<br>Ovicides (O) kill mite eggs and newly hatched mites.<br>Adulticides (A) kill active stages of mites | bifenazate (A)                  | UN             | Acramite<br>Duramite<br>Macromite                              | Summer fruit (except cherries) | 3          | Go to DPIRD website: 'Miticides in WA deciduous fruit trees.' |
|                              |   | chlorfenapyr (A)                | 13             | Secure 360 SC  | Peaches                        | 7          |   |
|                              |   | clofentazine (O)                | 10A            | Apollo<br>Apollo SC  | Summer fruit                   | 21         |   |
|                              |   | etoxazole (O)                   | 10B            | Paramite   | Summer fruit (except cherries) | 7          |   |

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| Spray timing                 | Pest or disease                 | Active ingredient                 | Chemical class   | Common trade names                                      | Crop                                      | WHP (days) | Comments   |                                       |
|------------------------------|---------------------------------|-----------------------------------|--|---|---|------------|--|---------------------------------------|
| Fruit development to harvest | Two-spotted mite (cont.)        | fatty acids – potassium salts (A) | unspecified  | BugGuard<br>Hitman<br>Natrasoap                         | Summer fruit                              | N/A        |  |                                       |
|                              |                                 | fenbutatin oxide (A)              | 12B  | Torque<br>Vendex  | Peaches<br>Nectarines                     | 14         |  |                                       |
|                              |                                 | hexythiozox (O)                   | 10A  | Calibre 100 EC<br>Exitox<br>Hexythiazox 100 EC<br>Zilch | Summer fruit                              | 3          |  |                                       |
|                              |                                 | milbemectin (O,A)                 | 6B   | Milbeknock  | Summer fruit                              | 14         |  |                                       |
|                              |                                 | petroleum oil (O,A)               | insecticide, spray adjuvant                              | Biocover  | Summer fruit                              | 1          |  | Check label for rates and conditions. |
|                              |                                 | paraffin oil (O,A)                |  | Biopest<br>Trump Spray Oil                              |   |            |  |                                       |
|                              |                                 |                                   |  | Bioclear  | Summer fruit (except apricots & cherries) |            |  |                                       |
|                              | propargite (A)                  | 12C                               | Betamite 300 WG<br>Omite 300 W<br>Omite<br>Unimite 300 W | Summer fruit  | 7   |            |  |                                       |
|                              | Brown rot (continues next page) | captan                            | M4   | Various   | Summer fruit (except apricots)            | 7          | See NSW DPI Integrated Pest and Disease Management for Australian Summer Fruit pg.27 'Blossom blight and brown rot.' |                                       |
|                              |                                 | chlorothalonil                    | M5   | Various   | Summer fruit                              | 7          | See 'Additional Restraints for stonefruits' on label.  |                                       |



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| Spray timing                 | Pest or disease   | Active ingredient           | Chemical class | Common trade names                                    | Crop                           | WHP (days) | Comments   |
|------------------------------|-------------------|-----------------------------|----------------|---|--------------------------------|------------|--|
| Fruit development to harvest | Brown rot (cont.) | fluopyram + trifloxystrobin | 7 + 11         | Luna Sensation  | Summer fruit                   | 1          | Maximum 2 applications per season.   |
|                              |                   | iprodione                   | 2              | Various   |                                | Nil        |  |
|                              |                   | mancozeb                    | M3             | Various   |                                | 14         | May be phytotoxic to some plum varieties. Advisable to test any new plum varieties on a small scale before applying to entire crop |
|                              |                   | penthiopyrad                | 7              | Fontelis  |                                | Nil        |  |
|                              |                   | propiconazole               | 3              | Various   |                                | 1          |  |
|                              |                   | sulfur                      | M2             | Various   | Summer fruit (except apricots) | N/A        |  |
|                              |                   | thiram                      | M3             | Thiragranz<br>Thiram DG<br>Thiram WP<br>Thiram 800 WG | Summer fruit                   | 7          |  |
|                              |                   | triforine                   | 3              | Saprol  | Summer fruit                   | 1          |  |
|                              |                   | ziram                       | M3             | Ziragranz<br>Ziram DG                                 | Cherries, nectarines, peaches  | 7          |  |
|                              |                   | ziram                       | M3             | Ziram Granuflo<br>Ziram WG                            | Summer fruit (except apricots) | 7          |  |

| Spray timing                 | Pest or disease                         | Active ingredient               | Chemical class | Common trade names             | Crop                           | WHP (days)                                   | Comments   |
|------------------------------|---|---------------------------------|----------------|--------------------------------|--------------------------------|--|--|
| Fruit development to harvest | Mediterranean fruit fly                 | <b>Foliar baiting:</b>          |                |                                |                                |  |  |
|                              |   | trichlorfon                     | 1B             | Dipterex 500 SL<br>Lepidex 500 | Summer fruit                   | 2  | Go to DPIRD website for the latest information   |
|                              |   | maldison                        |                | Fyfanon 400 EW                 |                                | 3  |  |
|                              |   | spinosad                        | 5              | Naturalure                     |                                | N/A  |  |
|                              |   | <b>Protein to add to baits:</b> |                |                                |                                |  |  |
|                              |   | Yeast autolysate                |                | Fruit Fly Lure<br>Natflav 500  | Summer fruit                   | N/A  | Add 2 L of protein for every 100 L water + insecticide. Add protein first, then insecticide + water.   |
|                              |   | Yeast hydrolysate               |                | Flavex                         |                                |  |  |
|                              |   | <b>Cover spray:</b>             |                |                                |                                |  |  |
|                              |   | acetamiprid + novaluron         | 15 + 4A        | Cormoran                       | Summer fruit                   | 35   | Suppression only   |
|                              |   | spinetoram                      | 5              | Delegate                       | Summerfruit                    | 3  | PER12590, expires 31 May 2024. Suppression only.   |
|                              | tetraniliprole                          | 28                              | Vayego         | Summer fruit                   | 3                              | Maximum 3 applications with 10 day interval. |  |
|                              | thiacloprid                             | 4A                              | Calypso        | Summerfruit                    | 14                             | PER14562 expires 30 September 2023.          |  |
|                              |   |                                 |                | Peaches                        | 21                             |  |  |
|                              | Carpophilus beetle (dried fruit beetle) | bifenthrin                      | 3A             | Various                        | Summer fruit (except cherries) | 1  | Monitor stone fruit orchards for Carpophilus beetles as fruit approach maturity and become susceptible to attack. Carpophilus beetles are a vector of brown rot. |
|                              |   |                                 |                |                                | Cherries                       | 1  |  |
| tetraniliprole               |   | 28                              | Vayego 200SC   | Summer fruit                   | 3                              | Suppression only                             |  |

| Spray timing             | Pest or disease                        | Active ingredient           | Chemical class | Common trade names   | Crop                | WHP (days) | Comments   |
|--------------------------|--|-----------------------------|----------------|--|---------------------|------------|--|
| Postharvest to leaf fall | Bacterial canker or bacterial gummosis | cupric hydroxide + mancozeb | M1 + M3        | ManKocide DF   | Summer fruit        | N/A        | See NSW DPI Integrated Pest and Disease Management for Australian Summer fruit. Page 14: 'Bacterial canker.' |
|                          |  | copper ammonium acetate     | M1             | Cop-IT<br>Liquicop   | Apricots, cherries  |            |  |
|                          |  | cuprous oxide               |                | Ag Copp 750<br>Nordox 750 WG<br>Red Copper WG                        | Apricots, cherries  |            |  |
|                          |  | cupric hydroxide            |                | Various  |                     |            |  |
|                          |  | copper oxychloride          |                | Various  | Summer fruit        |            |  |
|                          |  | tri-basic copper sulphate   |                | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid | Apricots, cherries  |            |  |
|                          | Leaf curl                              | cuprous oxide               | M1             | Ag Copp 750<br>Nordox 750 WG<br>Red Copper WG                        | Peaches, nectarines | N/A        |  |
|                          |  | cupric hydroxide            | M1             | Various  | Peaches, nectarines | N/A        |  |
|                          |  | cupric hydroxide + mancozeb | M1 + M3        | ManKocide DF   | Summer fruit        | N/A        |  |
|                          |  | copper oxychloride          | M1             | Various  | Summer fruit        |            |  |
|                          |  | tri-basic copper sulphate   | M1             | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid | Peaches, nectarines |            |  |

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| Spray timing             | Pest or disease              | Active ingredient           | Chemical class | Common trade names   | Crop                             | WHP (days) | Comments |
|--------------------------|------------------------------|-----------------------------|----------------|--|----------------------------------|------------|----------|
| Postharvest to leaf fall | Shothole                     | copper ammonium acetate     | M1             | Liquicop<br>Cop-IT   | Summer fruit                     | N/A        |          |
|                          |                              | cupric hydroxide            |                | Various  |                                  |            |          |
|                          |                              | cuprous oxide               |                | Nordox 750 WG<br>Red Copper WG                                       | Summer fruit                     |            |          |
|                          |                              |                             |                | Ag Copp 750  | Summer fruit (except nectarines) |            |          |
|                          |                              | copper oxychloride          | M1 + M3        | Various  | Summer fruit                     |            |          |
|                          |                              | cupric hydroxide + mancozeb |                | ManKocide DF   | Summer fruit                     |            |          |
|                          |                              | tri-basic copper sulphate   | M1             | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid |                                  |            |          |
|                          | Freckle                      | copper ammonium acetate     | M1             | Cop-IT<br>Liquicop   | Apricots                         | N/A        |          |
|                          |                              | cuprous oxide               |                | Ag Copp 750<br>Nordox 750 WG<br>Red Copper WG                        | Apricots                         |            |          |
|                          |                              | cupric hydroxide            |                | Various  | Apricots                         |            |          |
|                          |                              | copper oxychloride          |                | Various  |                                  |            |          |
|                          |                              | tri-basic copper sulphate   |                | Bordeaux WG<br>Cuprofix Disperss<br>Tri-Base Blue<br>Tribasic Liquid |                                  |            |          |
| Postharvest to leaf fall | Snails (continues next page) | copper                      | molluscicide   | Escar-go   | Summer fruit                     | N/A        |          |
|                          |                              | copper sulphate             | unspecified    | Bluestone  |                                  |            |          |

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| Spray timing             | Pest or disease | Active ingredient       | Chemical class | Common trade names                         | Crop        | WHP (days) | Comments |
|--------------------------|-----------------|-------------------------|----------------|--|-------------|------------|----------|
| Postharvest to leaf fall | Snails (cont.)  | iron EDTA complex       | molluscicide   | Eradicate Multiguard Snail and Slug Killer | Summerfruit | N/A        |          |
|                          |                 | metaldehyde             |                | Various                                    |             |            |          |
|                          |                 | methiocarb              | 1A             | Mesurol Snail and Slug Bait                |             |            |          |
|                          |                 | silicate salts + copper | U12            | Socusil Snail Repellent                    |             |            |          |

#### 4.5 Postharvest treatments for summer fruit

When dipping summer fruit, fruit should be submerged to allow sufficient time to thoroughly wet the fruit, approximately 30 seconds. Fungicide treatments should be applied as soon as is practical after harvest, usually within 24 hours.

**Reference:** Infopest Online

| Pest or disease controlled   | Active ingredient                           | Common trade names  | Chemical class | Crop                           |
|--|---|---|----------------|--------------------------------|
| External rot causing organisms   | bromochlorodimethylhydantoin                | Nylate  | sanitiser      | Summer fruit                   |
| Controls bacteria and fungi in agricultural and industrial premises, postharvest fruit and vegetables washing and processing facilities.   | chlorine as chlorine dioxide                | Vibrex Horticare  | sanitiser      | Summer fruit                   |
|  | chlorine as calcium hypochlorite            | Active 8<br>Hypochlor<br>Frexus Disinfestation<br>Frexus Duration | sanitiser      | Summer fruit                   |
| Brown rot ( <i>Monilinia</i> spp.)<br>Grey mould ( <i>Botrytis cinerea</i> ).<br>Rhizopos rot ( <i>Rhizopus stolonifer</i> ).  | fludioxonil                                 | Scholar   | 12             | Summer fruit                   |
| To assist in the control of bacteria and fungi on a range of fruit and vegetables.   | iodine                                      | Iodine Granules   | sanitiser      | Summer fruit                   |
| Brown rot ( <i>Monilinia</i> spp.).<br>Transit rot ( <i>Rhizopus stolonifer</i> ).   | iprodione                                   | Various   | 2              | Summer fruit                   |
| Postharvest treatment of certain fruits and vegetables for improved quality after shipping, storage or handling. Smartfresh™ is applied by use of a proprietary delivery system. | 1-methylcyclopropene                        | Smartfresh™   | PGR            | Plums<br>Apricot<br>Nectarines |
| Control of bacterial growth in the process water for postharvest processing of fruit and vegetables.   | peroxyacetic acid<br>+<br>hydrogen peroxide | Adoxysan<br>Tsunami on Farm                                       | sanitiser      | Summer fruit                   |
| Brown rot ( <i>Monilinia</i> spp.).  | triforine                                   | Saprol  | 3              | Summer fruit                   |

## 5 Chemical thinning options

### Chemicals available for fruit thinning in Australia

Reference: Infopest online

| Active ingredient          | Trade name/s                | Crop                    | Type of Thinner |
|----------------------------|-----------------------------|-------------------------|-----------------|
| ammonium thiosulfate (ATS) | Culminate                   | Apples, Peaches & Plums | Blossom         |
|                            | Biothin                     | Peaches & Plums         |                 |
|                            | Thin-it                     | Apples, Peaches & Plums |                 |
| benzyladenine (BA)         | 6-BA Plant Growth Regulator | Apples                  | Post Bloom      |
|                            | Abscission                  |                         |                 |
|                            | Baga                        |                         |                 |
|                            | Bapsol                      |                         |                 |
|                            | Bapsol 100                  |                         |                 |
|                            | Cytolin                     |                         |                 |
|                            | Exilis                      |                         |                 |
|                            | Exilis 5XL                  |                         |                 |
|                            | Maxcel                      |                         |                 |
|                            | Perlan                      |                         |                 |
|                            | Promalin                    |                         |                 |
| carbaryl                   | Bugmaster Flowwable         | Apples                  | Post Bloom      |
|                            | Carbaryl 500                |                         |                 |
|                            | Carbaryl 500SC              |                         |                 |
|                            | Carbaryl Wettable Granule   |                         |                 |
| ethephon                   | Coupon Forte                | Apples                  | Blossom         |
|                            | Disrobe 720                 |                         |                 |
|                            | ACP Boll Cracker 900        |                         |                 |
|                            | Ethefon 900 Extra           |                         |                 |
|                            | Ethefon                     |                         |                 |
|                            | Ethefon 480                 |                         |                 |
| Ethefon 720                |                             |                         |                 |



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| Active ingredient             | Trade name/s   | Crop                             | Type of Thinner              |
|-------------------------------|----------------|----------------------------------|------------------------------|
| ethephon (cont.)              | Ethephon 720SL | Apples                           | Blossom                      |
|                               | Ethephon 900   |                                  |                              |
|                               | Ethin          |                                  |                              |
|                               | Ethon 720      |                                  |                              |
|                               | Euchre 720     |                                  |                              |
|                               | Goku           |                                  |                              |
|                               | Gro-phon 720   |                                  |                              |
|                               | K-Ethephon     |                                  |                              |
|                               | Promote 1000   |                                  |                              |
|                               | Promote 720    |                                  |                              |
|                               | Sentral 720    |                                  |                              |
| gibberellic acid (GA)         | Ralex          | Apricots, Nectarines and Peaches | Inhibits next season blossom |
| metamitron                    | Brevis         | Apples                           | Post Bloom                   |
| naphthalene acetic acid (NAA) | NAA 20         | Apples                           | Blossom                      |
|                               | NAA Stop Drop  |                                  |                              |
|                               | Bloomfresh NAA | Apples, Pears                    |                              |

## 6 Herbicide guide for deciduous orchards in WA

### Definitions

**Knockdown herbicides** control established weeds only. They may be **contact**, only burn off those parts of the plant contacted or **systemic**, absorbed and translocated throughout the plant for a total kill.

**Pre-emergent** or **residual herbicides** control germinating weed seeds before they emerge, but some can be effective up to the two-leaf stage. Control relies on a barrier of chemical in the surface of the soil.

**Key:** Knockdown herbicide =  Residual herbicide =

**Reference:** Infopest Online

| Weeds controlled                       | Active ingredient               | Chemical class | Common trade names                 | Crop  | Comments  |
|--|---------------------------------|----------------|------------------------------------|---|---|
| annual and perennial grasses           | 2,2 DPA                         | J              | Altapon 2,2 –DPA<br>Dalapon 740 SP | Pome fruit,<br>summer fruit<br>(except plums) | Knockdown, systemic herbicide.<br>DO NOT apply to trees under 4 years old.<br>Best results with half rate at 4–6 week interval. |
| broad-leaf weeds,<br>grasses and couch | amitrole + ammonium thiocyanate | Q              | Various                            | Pome fruit,<br>summer fruit                   | Knockdown, systemic herbicide, absorbed mainly through leaves. <b>Do not apply less than 56 days before harvest.</b>            |
| annual broad-leaf and grasses          | amitrole + paraquat dichloride  | LQ             | Alliance                           | Pome fruit,<br>summer fruit                   | Can be combined with residual herbicides for longer term control.   |
| dock                                   | asulam                          | K              | Various                            | Apples  | Narrow-spectrum knockdown herbicide.  |
| various broad-leaf weed species        | carfentrazone-ethyl             | G              | Various                            | Pome fruit,<br>summer fruit                   | Can be used for desuckering or combined with a knockdown herbicide.<br>Refer to label.  |
| grass weeds only                       | clethodim                       | A              | Various                            | Non-bearing fruit trees                       |   |

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| Weeds controlled                                     | Active ingredient                | Chemical class | Common trade names                      | Crop                                      | Comments  |
|--|----------------------------------|----------------|---|---|---|
| annual grasses and broad-leaf weeds                  | dichlobenil                      | K              | Casoron G<br>Sierraron 4G<br>Casoron 4G | Apples,<br>apricots,<br>peaches,<br>plums | Pre-emergent granular herbicide   |
| capeweed   | diquat                           | L              | Various                                 | Pome fruit,<br>summer fruit               | Can be useful under heavy infestations.<br>Refer to label.  |
| grasses only   | fluazifop-p-butyl                | A              | Various                                 | Pome fruit,<br>summer fruit               | Knockdown, systemic herbicide.  |
| various grasses and broad-leaf weeds                 | flumioxazin                      | G              | Chateau                                 | Pome fruit,<br>summer fruit               | Only apply to dormant trees   |
| broad spectrum, good on broad-leaf weeds and clovers | glufosinate-ammonium             | N              | Various                                 | Pome fruit,<br>summer fruit               | Partially systemic knockdown herbicide.<br>Do not use on trees less than 2 years old unless shielded from spray drift. Withholding period of 21 days applies for pome and summer fruit orchards.  |
| broad spectrum, both annual and perennial            | glyphosate                       | M              | Various                                 | Pome fruit,<br>summer fruit               | Knockdown, systemic herbicide.<br>Do not use on trees less than 3 years old unless shielded from spray drift.<br><b>Lower rates</b> are intended for annual weeds and the <b>higher rates</b> are for perennial weeds.<br>For the best rate refer to label recommendations. |
| broad spectrum, both annual and perennial            | glyphosate + carfentrazone-ethyl | M + G          | Broadway                                | Pome fruit,<br>summer fruit               | Improved broad-leaf control, especially marshmallow.  |
| annual and perennial grasses                         | haloxyfop-r-methyl               | A              | Various                                 | Pome fruit,<br>summer fruit               | Knockdown herbicide. Check label for optimum rates. The addition of an adjuvant is important.   |
| broad-leaf weeds                                     | isoxaben                         | K              | Gallery 750                             | Pome fruit,<br>summer fruit               | Pre-emergent.<br>Requires rain/irrigation (12.5 mm) within 21 days to activate it.  |

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| Weeds controlled   | Active ingredient | Chemical class | Common trade names         | Crop                        | Comments   |
|--|-------------------|----------------|----------------------------|-----------------------------|--|
| annual grasses, good on crab-grass                                   | napropamide       | K              | Devrinol WG                | Summer fruit                | Residual herbicide. Requires mechanical incorporation or 20 mm rainfall/irrigation within 10 days of application.  |
| annual grasses and broad-leaf weeds                                  | norflurazon       | F              | Zoliar DF<br>Zoliar 800 DF | Pome fruit<br>summer fruit  | Residual herbicide. Apply before weed emergence, can be tank mixed with a knockdown. Do not use more than 5 kg/ha per season.  |
| grasses and broad-leaf weeds   | oryzalin          | D              | Various                    | Pome fruit,<br>summer fruit | Residual herbicide. Apply to soil free of weeds and trash. Requires rain/irrigation (12.5 mm) within 21 days to activate it.   |
| annual grasses and broad-leaf weeds                                  | oxyfluorfen       | G              | Various                    | Pome fruit,<br>summer fruit | Residual herbicide. <b>Do not use after budswell</b> or on apples and pears if less than 3 years old. Apply to freshly cultivated weed-free soil. Addition of oxyfluorfen to glyphosate, paraquat or diquat improves knockdown control and increases the speed of activity. These combinations can be used all year. |
| annual grasses and broad-leaf weeds                                  | paraquat          | L              | Various                    | Pome fruit,<br>summer fruit |  |
| annual grasses and broad-leaf weeds                                  | paraquat + diquat | L              | Various                    | Pome fruit,<br>summer fruit | Knockdown, contact herbicide. If water volume exceeds 200 L/ha add non-ionic surfactant at label rates.  |
| annual grasses and broad-leaf weeds (good on ryegrass and wire-weed) | pendimethalin     | D              | Various                    | Pome fruit,<br>summer fruit | Residual herbicide. Apply to soil free of weeds and trash. Requires rain/irrigation (5 mm) within 10 days to activate it.  |

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| Weeds controlled  | Active ingredient | Chemical class | Common trade names | Crop                     | Comments  |
|---|-------------------|----------------|--------------------|--------------------------|---|
| seedling weeds and grasses  | pine oil          | Organic        | Bioweed            | Pome fruit, summer fruit | Suitable for organic production.<br>For more info visit <a href="http://certifiedorganics.info">certifiedorganics.info</a>            |
| broad-leaf weeds  | saflufenacil      | G              | Sharpen WG         | Pome fruit               | Knockdown herbicide – the addition of an adjuvant is important.   |
| annual broad-leaf weeds   | simazine          | C              | Various            | Pome fruit               | Residual herbicide.<br>Apply to a bare moist soil.<br>Do not use if trees less than 2 years old.                                      |
| annual grasses and broad-leaf weeds (good on ryegrass and wire-weed). | trifluralin       | D              | Various            | Pome fruit, summer fruit | Residual herbicide.<br>Do not use after budswell.<br>Must be incorporated within 4 hours, so is best suited as a pre-plant treatment. |

## 7 Responsible Pesticide Use

### 7.1 Integrated Pest Management (IPM)

Integrated Pest Management (IPM) is a pest management system that aims to identify and prevent pest populations from reaching economically damaging levels. Chemical control is only used if, when and where required. The outcome is a decrease in chemical use, higher number of beneficial insects, less resistance to chemicals and lower residue levels. Other control options may include biological, cultural or physical methods.

IPM requires correct pest identification, understanding of the biology of pests and beneficials biology and the damage that each pest causes. IPM uses a decision making process based upon monitoring, established thresholds, timing of the control measure for maximum efficiency and assessment of the results obtained.

### 7.2 Pesticide resistance

#### What is pesticide resistance?

Most pest and disease populations have a very small number of individuals that are resistant to a given pesticide. Frequent use of the same pesticide kills susceptible individuals while resistant individuals survive and go onto breed. This process selects for a strain of the pest or disease that contains an increasing number of resistant individuals. Once the resistant proportion of the population reaches a critical level, the lack of control ultimately renders that pesticide useless. This is known as resistance.

#### What pesticides are prone to resistance?

All pesticides (herbicides, insecticides, miticides and fungicides) are susceptible to resistance developing against them but miticides and some of the fungicides are most at risk. This is because mites and fungi are usually resident in orchards and have a short life cycle. These attributes favour the rapid selection of resistant individuals if pesticide use is heavy.

Often when a pest or disease becomes resistant to a particular active ingredient it is resistant to other pesticides in the same activity group.

#### How do I avoid or delay resistance?

All pesticide products have resistance management strategies included on the label. It is important that pesticides are applied using the correct dilutions and application rate and that the resistance management guidelines given on the label are followed.

Some of the key factors to avoid or delay resistance are based on the principles of Integrated Pest Management and include:

**Natural enemies** — Use of natural enemies, sometimes known as beneficials, either through introducing them into the orchard or supporting those already present. Beneficials may reduce the pest to a level where a pesticide is not required or a

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reduced number of sprays required. Be aware of pesticides that are harmful to beneficials. If available, select pesticides that are least harmful to natural enemies.

Information on the suitability of pesticides for preservation of natural enemies, based on their toxicity is available on the website, [goodbugs.org.au/chemicals.html](http://goodbugs.org.au/chemicals.html)

**Cultural control methods** — Using such techniques as orchard hygiene e.g. destroying fallen fruit and dust suppression can reduce the pest population and subsequently reduce exposure to pesticide.

**Pest monitoring** — This will determine when a pest or disease is present and help decide whether a spray is required, and if required, the optimum time to apply it.

**Pesticide use** — Many pesticides are listed to be used only a specific number of times in a season, this advice needs to be followed. If more sprays are required than the maximum permitted then alternate between different activity groups.

Be aware of seasonal limits for fungicides that are used both in the field and post-harvest.

CropLife Australia is an organisation that represents the developers, registrants, manufacturers and formulators of crop protection and ag-biotechnology products. This group has developed Pesticide Resistance Management Strategies to assist in reducing the development of resistance to pesticides for a range of agricultural pests. Further information about CropLife Australia or their Resistance Management Strategies can be obtained from their website, [www.croplife.org.au/](http://www.croplife.org.au/)

## 7.3 Chemical labels, permits and material safety data sheets

### Chemical labels

A chemical label is a legally binding document. To use a product other than in the manner specified on the label is permitted only in situations described as 'low risk use'.

### Regulation change – low risk new pesticide uses

As published in the WA Government Gazette, 1 February 2011 No. 14, The Health Department of WA has modified the Health (Pesticides) Regulations 1956 to provide a more flexible approach for agricultural pesticide use, particularly in relation to low risk uses.

These amendments relate to Regulation 87 of the new regulations that allow the following practices, in **agricultural situations only**:

- Use of a pesticide for an unspecified pest on a registered crop.
- Use of a pesticide at a lower frequency than that shown on the label.
- Use of a pesticide at a lower rate of application than that shown on the label.
- Use of a pesticide for a crop/pest combination registered in another jurisdiction, provided the pesticide is registered for use in Western Australia and the label does not prohibit the use in Western Australia.

The Health (Pesticides) Regulations 2011 have been published in the Government Gazette and a copy of the new regulations is available on the following link:

[slp.wa.gov.au/gazette/gazette.nsf/gazlist/C3A3F5EE85423DDB482578260025339E/\\$file/gg014.pdf](http://slp.wa.gov.au/gazette/gazette.nsf/gazlist/C3A3F5EE85423DDB482578260025339E/$file/gg014.pdf)

See page 349, Regulation 87. Use in accordance with label.



For any queries on this contact:

Chris Sharpe, Chemical Coordinator, email [chris.sharpe@agric.wa.gov.au](mailto:chris.sharpe@agric.wa.gov.au)

## Permits

In special cases a product may be used in a manner different to that specified on the label by obtaining a minor use permit from the Australian Pesticides and Veterinary Medicines Authority (APVMA).

In the section on Spray options for the various commodity groups, some chemicals listed for use in WA orchards are under an APVMA permit for minor use. Be aware of permit expiry dates and make sure to read the permit and label instructions. Copies of permits for minor use are available from the website [apvma.gov.au](http://apvma.gov.au).

For enquiries on a permit for minor use contact the Australian Pesticides and Veterinary Medicines Authority

Email: [contact@apvma.gov.au](mailto:contact@apvma.gov.au)

Website: [apvma.gov.au](http://apvma.gov.au)

## Material Safety Data Sheets (MSDS)

Material Safety Data Sheets are available for each chemical to supplement the information provided on the label. They are not part of, nor a substitute for, the chemical label. **Any farm chemical handled or stored on a property must have an up-to-date MSDS available on the premises in a known location.** The Occupational Safety and Health Regulations 1996 require that an MSDS be supplied at the first sale of a hazardous chemical and thereafter upon request. The MSDS of a chemical must be shown to any persons employed on that property, prior to using the product.

MSDS are available from chemical company websites. One website that stores a large number is MSDS Australia at [msds.com.au](http://msds.com.au).

## 7.4 Maximum Residue Limits (MRLs) and withholding periods

Use of agricultural chemicals may leave residues on fruit. The level of residue that remains at harvest depends on the chemical, the formulation, the application rate, method of application, time and number of treatments, use of adjuvants, the interval since the last application and climatic conditions.

Limits for these residues are determined in various countries by health authorities. These limits are called **Maximum Residue Limits** (MRLs) and are set to ensure correct use of pesticides and to prevent consumers from taking in excessive residues. Orchardists have the responsibility to ensure that fruit they sell does not exceed MRLs for the chemicals they apply.

The **withholding period** for a particular pesticide is the minimum time between when the crop is last sprayed and when it is harvested. This withholding period may vary for different crops. A withholding period of seven days means that the grower must wait for seven days between the last application of the pesticide before the crop is harvested. Growers applying chemicals at the correct rate and observing the withholding period before harvest should produce fruit with residues lower than the MRL for Australia.

Orchardists involved in production of fruit for export should be aware that other countries may have different or no MRLs for chemicals used in Australia. If the importing country has a lower MRL than the Australian MRL, longer withholding periods or changed rates of application may be necessary. If the importing country has no MRL set for a chemical used in Australia, that chemical should not be applied to the crop as any detectable residue on the fruit will be unacceptable.

Growers exporting fruit should contact their exporter or industry body before spraying to ensure that MRLs in the export markets are not exceeded. For apples, check the Apple and Pear Australia Limited website [apal.org.au](http://apal.org.au). For summer fruit check with your exporter.

## 7.5 Safe handling and use of pesticides

### Training courses

A number of organisations provide chemical training courses for people working in agricultural industries. These courses are aimed at raising the skills, knowledge and competence of agricultural and veterinary chemical users and those in the supply chain. Accreditation from an approved training provider is required for many quality assurance programs.

**ChemCert** - training, up-skilling and industry accreditation for users of Agricultural and Veterinary chemicals.

Website: [chemcert.com.au](http://chemcert.com.au)

**AusChem Training WA** - Courses in the selection, handling, application and disposal of agricultural and veterinary chemicals.

Website: [auschemwa.com.au](http://auschemwa.com.au)

**AgSAFE** - Accreditation and Training program applies to the safe storage, handling, transport and sale of agricultural and veterinary chemicals. Website: [agsafe.com.au/agsafe](http://agsafe.com.au/agsafe).

### Disposal

**ChemClear** - This chemical industry organisation collects unwanted rural chemicals by providing a safe and easy collection and disposal service for all chemical users within Australia.

Website: [chemclear.com.au](http://chemclear.com.au).

**DrumMuster** - A chemical industry organisation, in conjunction with cooperating local councils, that provides a pesticide container disposal service.

Website: [drummuster.com.au](http://drummuster.com.au).

## 7.6 Pesticide application

### Canopy spraying

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Poor application technique will negate the good work of monitoring for pests to determine the need for and timing of a pesticide application, and correct selection of a pesticide to control the pest.

Poor spray application technique can result in the incorrect rate being applied. Over-spraying may result in pesticide wastage, phytotoxicity, residues that exceed the maximum residue limit (MRL), and be detrimental to the environment. Under-spraying may result in less than expected efficacy and increased risk of resistance developing.

Correct calibration of a sprayer is essential to apply the chemical at the label rate and to get maximum efficiency of coverage of the target.

Some principles of good spray application are:

- Sprayers should be calibrated correctly at least once per season – best done at the start of the season.
- The main factors affecting good spray application are **air volume and direction, tractor speed** and **droplet size**.
- The objective is to **replace the air in the canopy** with droplet-laden air from the sprayer. Placing balloons on the far side of the row and checking that they move when the sprayer is driven past will indicate if replacement of air is occurring.
- The **ground speed** of the tractor and sprayer has to be selected so that the air in the canopy is completely replaced.
- The aim is to select nozzles and an operating pressure to maximise the droplet spectrum in the range 70–250 microns. More than 50 per cent of the droplets should be in this range for canopy spraying.
- Measure the outputs from each individual nozzle. Replace any nozzle that varies more than 10 per cent from the manufacturer's specifications.
- Maintain records of calibrations, which will include such details as the different blocks, tractor speed, nozzle configurations and pump pressure for future reference.

### Choice of equipment

Several factors may influence your choice of equipment.

All spray equipment has advantages and disadvantages so a sprayer should be selected which is suited to the size and density of the crop to be sprayed.

### Application volume

High volume (dilute) spraying has been the conventional application strategy in pome and summer fruit orchards. In recent years more growers are adopting low volume (concentrate) spray application in their orchards.

The advantages of low volume spraying include:

- reduced pesticide wastage through less run-off
- reduced spraying time (less tank refills)
- potential to use lower pesticide rates.

Important considerations when choosing low volume spraying include:

- accurate sprayer calibration is essential (less margin for error)
- pesticide labels must be interpreted correctly

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- many pesticide labels specify high volume application only.

Research supports the use of low volume application in apples and pears. The final report of the Horticulture Australia Limited project Improving spray application in apples and pears (Project AP 95026) by Peter G Cole, David A Riches and Helen French, clearly demonstrates the advantages and disadvantages of low volume spraying.

### 7.7 Regulations and acts relating to use of pesticides

The following information includes the areas of responsibility and contact details for Western Australian government agencies.

**Department of Primary industries and Regional Development**, previously, Department of Agriculture and Food, Western Australia

- regulates some aspects of the use of pesticides and veterinary medicines in agriculture, including the management of residue affected land and produce
- provides information on the control of pests and diseases in animals and plants
- regulates the control of declared plants and animals in agricultural and pastoral lands.

#### Legislation:

- Agriculture and Related Resources (Spraying Restrictions) Regulations 1979
- Aerial Spraying Control Act 1966 (and Regulations)
- Biosecurity and Agriculture Management (Agriculture Standards) Regulations 2013
- Biosecurity and Agriculture Management Act 2007

Website: [agric.wa.gov.au](http://agric.wa.gov.au)

### Department of Health

- regulates the safe use of pesticides through the Health (Pesticides) Regulations 2011, where it affects human health
- regulates the supply and use of poisons through the Poisons Act 1964
- licenses pest management technicians and registered businesses
- provides some training and guidelines for the pest management industry
- provides information and advice on public health control programs
- provides toxicological advice on the human health aspects of pesticides

The Department of Health works closely with WA local governments and environmental health officers.

#### Legislation:

- Health (Pesticides) Regulations 2011
- Health Act 1911
- Poisons Regulations 1965
- Poisons Act 1964

Website: [health.wa.gov.au](http://health.wa.gov.au)

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### **Department of Water and Environment Regulation**, previously Department of Environment Regulation

- regulates waste management sites, contaminated sites, air and water quality, illegal discharge and pollution, under the environmental protection act 1986
- regulates pesticide manufacturing facilities
- regulates the transport of liquid chemical wastes including pesticide wastes
- investigates and may take enforcement action if there is evidence of an inappropriate pesticide application which has caused environmental harm or there has been a pesticide spill which has or may cause pollution or environmental harm
- provides guidance on chemical storage and disposal.

#### Legislation:

- Environmental Protection (Unauthorised Discharges) Regulations 2004
- Environmental Protection (Controlled Waste) Regulations 2004
- Environmental Protection Act 1986
- Environmental Protection Regulations 1987
- Swan River Trust Act 1988

Website: [der.wa.gov.au](http://der.wa.gov.au)

### **Department of Water and Environment Regulation**, previously Department of Water

- protects existing and future public drinking water source areas (PDWSAS) these include underground water pollution control areas, water reserves and catchment areas
- provides guidance on land use compatibility in PDWSAS
- provides guidance on chemical storage, handling and disposal in PDWSAs.

#### Legislation:

- Metropolitan Water Supply Sewerage and Drainage Act 1909
- Rights in Water and Irrigation Act 1914
- Country Areas Water Supply Act 1947

Website: [water.wa.gov.au](http://water.wa.gov.au)

### **Department of Mines, Industry Regulation and Safety**, previously Department of Commerce (WorkSafe Division)

- regulates the workplace to ensure the safety and health of people at work
- responds to requests to investigate possible breaches of the legislation
- provides information to employers and employees on occupational safety matters
- promotes awareness of occupational safety matters to the community.

#### Legislation:

- Occupational Safety and Health Act 1984
- Occupational Safety and Health Regulations 1996

Website: <https://www.commerce.wa.gov.au/worksafe>

**Department of Mines, Industry Regulation and Safety**, previously Department of Mines and Petroleum

- regulates the storage, handling and transport of dangerous goods to minimise the risk to people property and the environment
- responds to dangerous goods incidents and emergencies
- investigates possible breaches of the legislation
- contributes to the development and implementation of national dangerous goods safety policy and legislation
- provides information and promotes awareness of dangerous goods safety matters to industry, government and the community.

Legislation:

- Dangerous Goods Safety Act 2004
- Dangerous Goods Safety Regulations 2007

Website: [dmp.wa.gov.au](http://dmp.wa.gov.au)

**Chemistry Centre Western Australia**

- provides chemical analytical support to the government, industry, academia and the community
- conducts research into chemical analytical methods
- provides advice on the chemistry of pesticides and other chemicals, and how they behave in soil, water, air and other substrates
- assists other government agencies with the management of chemical spillages, residues in foods and environmental contamination.

Website: [chemcentre.wa.gov.au](http://chemcentre.wa.gov.au)

## 7.8 Safety for bees

An important component in helping fruit set is the use of imported honey bee hives. The survival of honey bees in a system where pesticides are relied upon for managing orchards can be helped if knowledge of pesticide toxicity is used to minimise adverse effects.

Be aware of the bee toxicity rating of any pesticide used and whether hives are located near the orchard. If this is the case, please advise apiarists before chemicals are applied.

### **Bee health**

Bees actively foraging on flowers either in the crop or on ground covers may be adversely affected by pesticide applications. The type and time of application of pesticides will influence the level of bee kill. Some pesticides have very low toxicity to bees and are able to be applied even when the bees are foraging. Other short-term residual pesticides will be safe to bees if applied in the evening or at night when the bees are not foraging. More persistent pesticides may remain toxic to bees well after application.

Foraging bees may bring pesticide-contaminated pollen or nectar back to the hive. This is fed to the house bees, which in turn feed the larvae and queen. In this way the whole colony may be killed.

Symptoms of bee toxicity vary:

- There may be a sticky mass of bees dying in front of the hive.
- Bees may move very slowly.
- Bees may exhibit strange and aggressive behaviour.

One particularly toxic pesticide is the insecticide carbaryl. Not only is it very toxic to bees when applied, but carbaryl-contaminated pollen may remain toxic for up to eight months when stored in the hive.

### **Food safety**

Apiarists in districts where orchards are located in forest areas will be sourcing honey from eucalypts. In some instances, the bees from these forest-based hives will be attracted to ground flora (weeds) and this nectar will be collected and stored as honey within the hive and harvested and sold for human consumption. Sub-lethal levels of chemical can enter the food chain in this way.

### **Further reading**

AgriFutures Australia have published a book on the toxicity of pesticides to honey bees: Honey bee Pesticide Poisoning A risk management tool for Australian farmers and beekeepers.

This book enables beekeepers and farmers to identify pesticides that are toxic to bees, and provides information that will help them manage the risk of honey bee poisoning. It also contains a number of useful forms, contact details and other relevant information.

This publication can be purchased from Agrifutures for \$55.00 or is available as a pdf document on their website <https://www.agrifutures.com.au/>

## **7.9 Organochlorines and other chemical residues**

Orchards and old orchard sites are often contaminated with organochlorine pesticides such as dieldrin, heptachlor and DDT from past use of these products. They break down slowly in the soil. There is a danger that grazing animals, particularly cattle and poultry, will become contaminated with these pesticides and have meat and/or eggs high in residues. Areas of old orchard or old orchard land that may have been replanted and may be grazed by cattle, sheep or poultry can be tested to determine if there is a contamination risk from grazing them.

In addition to the risk posed by organochlorines, there may be residue risks to grazing animals from other pesticides that were used in the past or are still being used for pest control in the orchard. Some examples of pesticide risk include poultry feeding on contaminated weevil adults or on baits used to manage snails, European earwigs or wingless grasshoppers.

Consult a biosecurity officer from the nearest office of the Department of Primary Industries and Regional Development for any queries on pesticide residue risks to grazing animals.

## 8 Diagnostic services

### Department of Primary Industries and Regional Development's Diagnostic Laboratory Services (DDLs)

DDLs - Plant pathology and entomology were formerly part of AGWEST Plant Laboratories. They provide pest and disease diagnostic services that are available to orchardists.

For more information on their services, sample submission forms and sampling techniques contact:

DDLs Specimen Reception

Phone: (08) 9368 3351

Email: DDLs@dpird.wa.gov.au

Or visit their websites:

<https://www.agric.wa.gov.au/mites-spiders/ddls-entomology-services>

<https://www.agric.wa.gov.au/bacteria/ddls-plant-pathology-services>

### Pest and Disease Information Service (PaDIS)

The Pest and Disease Information Service (PaDIS) provides advisory and identification services on animal and plant pests, weeds and diseases that impact, or have the potential to negatively impact, Western Australia's agriculture and food industries.

They provide the following services for customers in Western Australia:

- frontline contact for unfamiliar pests, weeds and diseases
- frontline contact for plant biosecurity emergency response
- weed identification (if relevant to agriculture or quarantine)
- insect identification
- animal pest identification
- disease identification (if relevant to agriculture or quarantine)
- control advice for pests, weeds and diseases of agricultural concern.

Please note: Services for commercial operators in relation to disease identification and diagnosis, cannot be handled by this service. Please contact the diagnostic laboratory service DDLs for their full list of services and costs. If the seed, plant, disease (plant or animal) is suspected of being a new threat to agricultural industries, fees will be waived.

To contact PaDIS

Exotic Plant Pest and Disease Hotline: 1800 084 881

Email: [padis@dpird.wa.gov.au](mailto:padis@dpird.wa.gov.au)

Phone: (08) 9368 3080

For more information on how to send specimens for identification go to:

<https://www.agric.wa.gov.au/livestock-biosecurity/sending-specimens-identification>



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### **MyPestGuide™ Reporter**

DPIRD has developed an app that can be used to report the presence of unfamiliar pests, diseases and weeds. Reports can be made via the app or online.

For more information go to

<https://www.agric.wa.gov.au/pests-weeds-diseases/mypestguide>