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DOW AGROSCIENCES
APPLES, Pears AND STONE FRUIT POCKET GUIDE

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There are some 10.3 million apple and pear trees of fruit-bearing age in Australia, making this the country’s largest fruit growing sector. Stone fruit is also very significant with around 8.4 million trees of fruit-bearing age.

These fruitgrowing sectors have seen major challenges in recent years. Pests and diseases afflict both sectors, sometimes in plague proportions, causing losses in production but no challenge is more significant than the widespread drought. Using costly irrigation water to nurture the crop is a poor use of money if control of pests and diseases is neglected or given low priority.

This pocket guide aims to support growers and advisors with information that will assist in:

- the identification of the key pests and diseases of apples, pears and stone fruit
- determining the correct products to apply to control these pests and diseases
DISEASE MANAGEMENT
APPLE SCAB/PEAR SCAB *(Black Spot)*

Apples and pears only

Apple scab or black spot (*Venturia inaequalis* and *V. pirina*) is a serious disease in every growing region of the world (except Western Australia).

During the winter, the fungus survives mainly on the previous season's fallen leaves on the orchard floor. It also over-winters on twigs, bud scales or leaves that remain on the tree. During winter, the fungus forms small, flask-shaped bodies in which spores (ascospores) develop. The timing of the discharge of ascospores in spring depends on moisture, temperature and light. Once an ascospore lodges on a leaf or fruit and germinates, it penetrates the tissue and a characteristic scab will appear 2–3 weeks later. The conditions for spore release and survival are well understood and black spot warning services are available in all states.

The first symptoms usually are small brown or olive green spots with indefinite margins on the underside of young leaves. On older leaves, the spots are more definite in outline and become velvety-grey to sooty black. Severe infection can cause leaf drop. Early infection of the fruit can cause distortion, while late infections on more mature fruit appear as dark, roughly circular spots.
BROWN ROT/BLOSSOM BLIGHT
Stone fruit only

Brown rot (*Monilinia fructicola* and *M. laxa*) can cause serious fruit loss especially if there is very wet weather during flowering or immediately pre-harvest. Losses are mainly associated with blossom blight (which reduces fruit set and potential yield) and brown rot on maturing fruit.

The disease survives from season to season on mummified fruit and/or infected wood left on the tree. Fruit and prunings on the ground are also significant sources of infection.

Blossom blight occurs to a greater or lesser extent in most years. Infected blossoms continue to produce spores up to and throughout the harvest period. Injuries caused by insects, hail or fruit splitting allow the establishment of infections and subsequent formation of spores. Fruit which fall to the ground leading up to and during harvest are readily infected with brown rot and are considered to be of major importance in the starting of severe outbreaks.
POWDERY MILDEW

Apples only

Powdery mildew of apples (Podosphaera leucotricha) affects leaves, buds, shoots and fruits. The disease stunts the growth of trees and is found wherever apples are grown.

The fungus overwinters in fruit and leaf buds and the first powdery mildew symptoms occur on flowers and shoots that emerge from infected buds in spring. Spores from these infected leaves give rise to secondary mildew infections on the leaves or shoots which extend rapidly throughout spring and early summer.

Infected leaves become partly or entirely covered with the white powdery fungus, which eventually kills them. The edges of infected leaves may become wavy, and often roll upwards and inwards, exposing the lower surfaces. Infected leaves fall prematurely. Shoots, when heavily infected, become covered with the fungus and may either die or only grow weakly. Infected buds are smaller than healthy ones, have a pinched appearance, and open later. Blossoms are usually only infected when flower clusters are produced from infected buds. Usually all blossoms and leaves produced from an infected bud are affected and fail to set fruit. Fruit may become infected soon after petal fall, the affected areas become russeted and, where growth is restricted, cracks may develop.
Scab or freckle (Venturia carpophila) is a fungal disease that affects nearly all stone fruit types but is most important on mid-season and late-season peaches, nectarines and apricots.

The disease overwinters on twig lesions and spores are blown or splashed onto developing fruits, leaves and shoots. Infections are most severe during wet weather in spring and summer. There is a long incubation period of around 45 days before symptoms are seen. The fungus can also overwinter in infected leaves which fall to the ground in autumn.

Symptoms are most noticeable on fruit, but can also occur on leaves and twigs. Infected fruit develop small circular patches on the surface which later enlarge and become scabby. On apricots the patches are pale green at first, darkening later as the fruit matures. On peaches, the patches are raised and black, and on nectarines they appear pale green with a dark centre. Infected leaves can develop grey spots and tattered edges, while branches are stunted and die at the tips.
PRODUCT PROFILE

Active ingredient: Mancozeb
Formulation: Water dispersible granule
Fungicide group: Group M3
Target diseases:
- APPLES AND Pears: Apple scab (black spot), bitter spot, fly speck, pear scab, ripe fruit spot, sooty blotch and target spot
- STONE FRUIT: Brown rot, freckle, rust and shot hole
Activity: Protectant
Packaging: 20 kg bag
Application rate: 150-200 g/100 L water

KEY FEATURES
- Well established reputation of proven product performance – the world’s largest selling protectant fungicide.
- Multi-site activity – very effective disease resistance management program partner.
- New improved formulation providing improved rainfastness and improved wetting, spreading and sticking properties.
- Low dust levels.

APPLICATION AND USE
- In apples and pears, apply at 7-10 day intervals following a copper spray at green tip stage.
- In stone fruit, apply at early bloom (1-10%), then repeat at mid to full bloom (50-100%); At petal fall and at shuck fall continuing with a protective spray program at 2 week intervals.
- Use the higher rate and shorter spray interval when weather conditions favour disease development.
- The addition of an adjuvant to the spray mix may improve initial spray deposits, fungicide redistribution and weatherability.
- May be phytotoxic to some plum varieties.
**Systhane™ 400WP**

**FUNGICIDE**

*Apples and pears only*

**PRODUCT PROFILE**

**Active ingredient**
Myclobutanil

**Formulation**
Wettable powder

**Fungicide group**
Group 3

**Target diseases**
Apple scab (black spot) and powdery mildew

**Activity**
Protectant and curative

**Packaging**
600 g box containing 10 × 60 g sachets

**Application rate**
12 g/100 L water

**KEY FEATURES**

- Provides excellent disease control in all weather conditions.
- Very safe to beneficial insects and mites – ideal for IPM programmes.
- Wettable powder formulation provides excellent fruit finish.
- Ideal for use on crops grown for export markets due to its widely approved international residue tolerance profile.
- Water soluble sachets are easy to use.

**APPLICATION AND USE**

- As a black spot protective treatment, apply at green tip, or at spur burst following a recommended green tip fungicide spray; Repeat at 7–10 day intervals or as indicated in district spray schedules.
- After petal fall, and whenever spray intervals exceed 10 days, add a protectant fungicide.
- As a black spot curative treatment, apply within 5 days after the commencement of an infection period.
- When controlling powdery mildew in apples, apply at early pink stage and repeat at 10–14 day intervals until December or as indicated in district spray schedules.
PEST MANAGEMENT
APPLE DIMPLING BUG

Apples and pears only

Apple dimpling bug (Yellow mirid) (Campylomma liebknechtii) is native to Australia and is commonly found on many native and introduced flowering plants.

It overwinters in the adult form on weeds and surrounding crops. In spring, with rising temperatures, populations start to build up and move to alternative host plants including apple trees. In summer, a generation can be completed in about three weeks. Adults can live for three to four weeks. All mirids are very active, running and hopping with short rapid flights when disturbed.

In its young stages, apple dimpling bug appears to prey on other insects and possibly mites whereas only the adult stage damages plants.

In some seasons it is a serious pest as it feeds in the blossom and on the fruitlets. This causes raised, scabby areas on the young fruit resulting in characteristic depressions or ‘dimples’ as the apple grows.
CODLING MOTH

Codling moth (Cydia pomonella) originated in Europe but is now found in almost every country that grows apples. Whilst it is a key pest of apples, codling moth also attacks pears.

There are usually 2 to 3 generations a year depending on climatic conditions. In early spring the moths emerge about the time the fruit trees are in full bloom. The moths emerge usually in one or more periods of peak activity, each period referred to as a ‘flight’. Eggs laid during the first flight give rise to the first generation of the new season. Adults of the first generation give rise to the second generation and so on. The codling moth is active only at dusk so moths mate and then lay eggs after dusk, usually on leaves, when the temperature reaches a minimum of 13°C (preferably 15°C) for several days in succession. The eggs hatch in about 10 days.

Newly hatched caterpillars chew through the fruit skin and bore to the core. The presence in fruit of one or more holes plugged with brown sawdust-like excrement is characteristic of codling moth attack. The caterpillars enter the fruit through the sides, stem end, or calyx end, and a syrupy substance may exude from the holes as the fruit matures. Damaged fruit often falls from the trees.
FRUIT FLIES
(Including Queensland Fruit Fly and Mediterranean Fruit Fly)

Fruit flies are the fruitgrower’s worst pest. They appear on nearly every continent and millions of dollars are spent annually on their control and eradication. Adult fruit flies lay eggs in ('sting') ripening fruit and the larvae (maggots) feed in the flesh.

Affected fruit are readily recognised since the skin around the sting marks becomes discoloured and rots develop rapidly.

More than 80 species of fruit fly are found in Australia but the two most economically damaging species are:
- the native Queensland fruit fly (*Bactrocera tryoni*) in the eastern states and Northern Territory
- the Mediterranean fruit fly or "Med fly" (*Ceratitis capitata*) in Western Australia.

In warmer regions Queensland fruit fly completes 4–5 or more overlapping generations from spring to autumn. It over-winters mainly as sheltering adults and activity increases rapidly again in spring. In colder areas adults flies don’t survive winter and flies re-invade in spring.

In the south-west of WA, Med fly is active in late spring, summer and autumn. In summer the life cycle takes 28–34 days but in winter the life cycle may take as long as 60–115 days. Med fly can over-winter as adults, as eggs and larvae, or as pupae in the ground. As temperatures increase in spring, adults emerge from the ground and overwintering flies become active.
**LIGHTBROWN APPLE MOTH**  
(*LBAM*)

LBAM (*Epiphyas postvittana*) is a native leafroller moth with a wide range of host plants. It is more prevalent in cooler regions as it does not survive well at high temperatures. It is a key pest of apples, pears and stone fruit.

As the annual growth of weeds and pasture dries off from October to January, the moths that lay the spring and summer generations of eggs search for other suitable host plants. This is when fruit crops may be attacked. The caterpillars feed on new shoots, foliage and fruit.

Although apples and pears can be attacked from fruit-set to maturity, peaches and apricots become infested mostly in the last few weeks before the fruit ripens. Peaches suffer further damage from mould (botrytis rot, brown rot) developing where caterpillars feed.

LBAM caterpillars feed from within the sheltering nest they construct by webbing leaves to fruit or other leaves. Damage to leaves is not of commercial importance in mature trees. However LBAM also feed on fruit which often form part of the shelter. Damage is usually confined to the surface of the fruit, where tracks are eaten away. Sometimes the caterpillars will burrow into the fruit, particularly around the stem.
Longtail mealybugs (*Pseudococcus longispinus*) are soft-bodied sucking insects covered in a white wax coating.

There are three or four generations per year depending on climatic conditions. Mealybugs prefer mild humid conditions. In spring they move to new growth and quickly mature into adults.

Feeding by mealybugs does not usually cause economic damage, rather they excrete sticky honeydew which leads to sooty mould development on leaves and fruit if large populations arise. The sooty mould covering on leaves can reduce photosynthesis and mould on fruit can lead to rotting.

Longtail mealybugs have become an increasing pest in recent years. The reasons for the increase in occurrence are not clear but reduced use of broad spectrum insecticides and removal of natural enemies of the pest, through impact of some fungicides or insecticides, are possible causes.
ORIENTAL FRUIT MOTH
(OFM)

OFM (Grapholita molesta) is native to north-west China and was introduced to Australia at the beginning of the 20th century. Small numbers of OFM can cause damage of economic significance.

OFM is a serious pest of peaches and nectarines. It has also been known to attack apricots, and in recent years its incidence on apples has increased. OFM damage in apples and pears is difficult to distinguish from codling moth damage.

Depending on the area there can be 5 to 6 generations over the summer. The complete life cycle in summer, from egg to adult, is about 33 days. Moths, eggs, caterpillars, and pupae (cocoons) can all be present at the same time in an orchard from September to April.

Caterpillars bore into the tip of young succulent shoots and tunnel their way down the centre of the shoot, killing it. This damage is generally not important, except on young trees where it may interfere with the development of tree shape. More important is damage to fruit. Whilst caterpillars do infest green fruit, damage is common to ripening fruit, particularly during moist weather. Fruit infestation also often leads to fruit rots.
San Jose scale (*Diaspidiotus perniciosus*) is a pest of deciduous fruit trees throughout the world and is present in most orchard districts where apples, pears and stone fruit are grown. It is a sucking insect that injects a toxin into the plant as it feeds causing localised discolourations.

The reproduction and development of the scale is comparatively rapid during the summer, the life cycle being about six weeks. Thus several generations may turn over in a year and as an individual female may produce as many as 400 young, the increase in numbers may be very rapid.

San Jose scale can affect shoots and fruit. On fruit, distinctive circular red areas develop around scales. On shoots, the scale impede the flow of sap in the tree and also secrete a poisonous substance into the plant cells. Abnormal yellowing of the leaves and unseasonal leaf drop, gumming and cracking of the bark, followed by dieback of the infected branches are symptoms commonly noticed in trees under attack. Branches in the tops of trees are usually the first to be injured. Unchecked, vigorous infestations on mature trees permanently affect their structure, vigour and productivity. An undetected infestation can kill young trees within three years.
WESTERN FLOWER THRIPS
(WFT)

WFT (Frankliniella occidentalis) were first detected in Western Australia in 1993 and have now spread to all mainland states.

Control of WFT is difficult as they are resistant to most existing insecticides and have the capability to develop resistance to new insecticides very quickly. Coupled with this, WFT breed on a wide range of flowering plants including weeds, vegetable crops and fruit trees.

WFT are prolific breeders. The length of the life cycle and life expectancy of the adults depends on temperature and food quality: at 30°C the life cycle is approximately 12 days while at 20°C it is 19 days.

Adult and larval thrips damage both flowers and fruit. In flowers they cause bronzing of petals and sepals, and occasionally flower abortion through severe damage to stamens and styles. Feeding by WFT during fruit formation causes scarred and deformed fruit while feeding on ripening stone fruit causes silver russetting on fruit in the weeks just prior to harvest. Damage to apples is usually due to egg laying of WFT and shows up as areas of white discoulouration of the apple skin as the fruit grows. These are known as ‘pansy spots’.
WOOLLY APHID

Woolly aphid (Eriosoma lanigerum) is an important pest of apples that infests both the aerial and root parts of the tree.

Woolly aphid has a tremendous reproductive capacity and may produce more than 20 generations per season. In spring the aphids become active once the soil temperature reaches approximately 10°C – this usually coincides with the tree breaking winter dormancy. Crawlers of the aphid migrate from the roots to the tree shoots with new shoots continually being infested during the growing period. Woolly aphid overwinters as a nymph on the roots of apple trees. It can also overwinter as a young nymph on the above-ground part of the tree in protected areas on the trunk or main limbs. Where trees are heavily infested, colonies may persist on the above-ground parts of the trees throughout the winter, especially if a warm winter is experienced.

As the young lateral shoots develop during the summer, the aphids migrate to the under-surfaces of these, and may cause very severe injury to this new wood and destruction of the buds. Heavily infested trees become distorted in appearance, with little fruiting or leaf-bearing wood developing.

Infestations cause knotted and gnarled lumps and scars on the older wood, usually coated with the white woolly secretion produced by the aphids. Under this waxy secretion the dark-bodied aphids may be found sucking the sap from the trees.
Pest management

PRODUCT PROFILE

Active ingredient: Buprofezin
Formulation: Suspension concentrate
Insecticide group: Group 16
Target pests: Pears: Longtail mealybug
Activity: Contact and ingestion
Packaging: 1 L and 10 L containers
Application rate: 30-60 mL/100 L water

KEY FEATURES

• Ideal for use in IPM programmes with excellent safety especially to parasitoid wasps.
• Highly favourable environmental and OH&S profile.

APPLICATION AND USE

• Apply twice, 10–14 days apart between swollen bud and the end of flowering in sufficient volume to ensure the bark is soaked, with thorough coverage to the point of run-off.
• Use the high rate when heavy infestations occur and/or where IPM systems have not effectively managed pest populations, particularly under harsh environmental conditions.
• Only works on juvenile forms of the pest and will not work on adults; Make sure application is timed to coincide with the right pest growth stage.
Delegate

INSECTICIDE

PRODUCT PROFILE

Active ingredient: Spinetoram
Formulation: Water dispersible granule
Insecticide group: Group 5
Target pests: Codling moth, oriental fruit moth, lightbrown apple moth, loopers, heliothis and western flower thrip
Activity: Contact and ingestion
Packaging: 800 g containers
Application rate: 15-20 g/100 L water

KEY FEATURES

• A new and unique mode of action (effective insect resistance management program partner).
• Ideal for use in IPM programmes (safe to most key beneficial insects).
• A very short re-entry period profile.
• Excellent fruit finish.
• Short withholding periods – 3 days for stone fruit; 7 days for apples and pears.
• Highly favourable environmental and OH&S profile.

APPLICATION AND USE

• Can be applied as a dilute or concentrate spray.
• Target sprays against mature eggs and newly hatched larvae.
• Repeat applications at 14 day intervals as egg hatch continues or new infestations occur.
• Apply higher rates as pest pressure increases, where there is a history of codling moth problems or where spray intervals are being stretched.
• DO NOT make more than 4 applications per season.
**Lorsban™ 500EC**

**INSECTICIDE**

**PRODUCT PROFILE**

- **Active ingredient**: Chlorpyrifos
- **Formulation**: Emulsifiable concentrate
- **Insecticide group**: Group 1B
- **Target pests**
  - APPLES AND PEARS: San Jose scale, woolly aphid and wingless grasshopper
  - STONE FRUIT: San Jose scale and European earwig
- **Activity**: Contact
- **Packaging**: 1 L, 5 L and 20 L containers
- **Application rate**: 50 or 100 mL/100 L water

**KEY FEATURES**

- Fast acting.
- Low persistence after application.
- IPM-compatible when used during dormancy.
- Well established reputation of proven product performance (40 year history).

**APPLICATION AND USE**

- Apply to coincide with woolly aphid crawler activity.
- Apply as a dormant spray, post-pruning.
- Ensure spray volume is adequate to provide complete coverage of the whole tree.
**PRODUCT PROFILE**

<table>
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<th>Details</th>
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</thead>
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<td>Formulation</td>
<td>Wettable granule</td>
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<td>Insecticide group</td>
<td>Group 1B</td>
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<tr>
<td>Target pests</td>
<td>APPLES: Apple dimpling bug and lightbrown apple moth</td>
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<td></td>
<td>PEARs AND STONE FRUIT: Lightbrown apple moth</td>
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<td>Activity</td>
<td>Contact and ingestion</td>
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<tr>
<td>Packaging</td>
<td>3 kg containers</td>
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<td>Application rate</td>
<td>33-67 g/100 L water</td>
</tr>
</tbody>
</table>

**KEY FEATURES**

- Fast acting.
- Low persistence after application.
- Excellent fruit finish.
- Well established reputation for proven product performance (40 year history).

**APPLICATION AND USE**

- Apply up to late pink (balloon stage) for apple dimpling bug and at the end of flowering if necessary.
- Do not apply for a minimum of 3 days before bees are actively foraging.
Naturalure™
FRUIT FLY BAIT CONCENTRATE

PRODUCT PROFILE
Active ingredient Spinosad
Formulation Bait concentrate
Insecticide group Group 5
Target pests Fruit flies (including Queensland fruit fly and Mediterranean fruit fly)
Activity Ingestion
Packaging 4 L and 208 L containers
Application rate 1 L concentrate/ha

KEY FEATURES
• Approved for use on organic crops by Biological Farmers of Australia.
• Unique mode of action (very effective insect resistance management program partner).
• Ideal for use in IPM programmes (very safe to beneficial insects).
• Safe to crops.
• A nil withholding period.
• Highly favourable toxicology profile.

APPLICATION AND USE
• Begin application as soon as monitoring traps indicate flies are present and repeat every 7 days or sooner if rain washes off the deposit.
• A large droplet size of 4000-6000 µ (4-6 mm) is recommended to optimise duration of the bait’s attractiveness to flies.
• Can be applied as a band or spot spray.
• Re-application is required if rain washes bait from foliage.
Prodigy™ INSECTICIDE

Apples and pears only

PRODUCT PROFILE

Active ingredient: Methoxyfenozide
Formulation: Suspension concentrate
Insecticide group: Group 18
Target pests: Lightbrown apple moth and loopers
Activity: Contact and ingestion (ovicidal and larvicidal)
Packaging: 1 L and 5 L containers
Application rate: 25 mL/100 L water

KEY FEATURES

• Safe to all beneficial insects (ideal for IPM programmes).
• Extended (14-21 days) residual activity on treated surfaces.
• Active on eggs and caterpillars.
• Excellent environmental and OH&S profile.
• Highly stable in water within a pH range of 4.0 and 9.0.
• Non-scheduled product.

APPLICATION AND USE

• Can be applied as a dilute or concentrate spray.
• For spring generations of LBAM, commence spraying at petal fall applying in a series of 3 applications at 14 day intervals.
• For later summer generations (spray when moth activity is indicated by pheromone traps or lure pots), apply 2 sprays at 21 day intervals ensuring thorough coverage of developing fruit clusters.
• DO NOT make more than 3 applications per season.
WEED MANAGEMENT
Fruit trees have root systems that do not compete well with other plants. The bulk of tree roots grow in the top 60-90 cm of soil where cover crops or weeds will most often be found. If competition is reduced, fruit trees form most of their roots in the much more biologically active top 60 cm of soil. In areas with poor quality soils, it is therefore important not to give the best 30 cm of soil to weeds.

Weeds can also greatly out-compete the trees for nutrients, especially nitrogen. This complicates attempts to create an efficient nutrient balance in trees, as it is never certain from one application to the next what percentage of the applied nutrient will be taken up by the trees, or when it will get there. Trying to compensate for weed growth by applying higher rates of nitrogen fertiliser may increase the nutrient in the tree, but more often leads to greatly increased weed growth.

Weeds also use water, particularly during summer, a precious and very limited commodity that is far better used by trees to maintain fruit quality. Perhaps even more importantly, weeds can block the sprinkler patterns of the irrigation system, and may greatly reduce the efficiency of water application. Weeds block sprinklers causing over-watering in some areas of the orchard and under-watering in others, with the result that leaching and drought stress can often occur in the same orchard block. Certain taller weeds can even interfere with orchard workers when they are thinning and harvesting fruit.
Weed management

Gallery™ 750
DRY FLOWABLE HERBICIDE

PRODUCT PROFILE
Active ingredient  Isoxaben
Formulation  Dry flowable
Herbicide group  Group O
Target weeds  Broadleaf weeds
Activity  Residual
Packaging  1 kg
Application rate  375-750 g/ha

KEY FEATURES
- Provides up to 6 months control of broadleaf weeds and, when used in conjunction with pendimethalin or oryzalin, provides season-long control of all weeds.
- Binds tightly to soil and will not leach to groundwater.
- Saves on the hidden costs of using knockdown herbicides e.g. labour, water, machinery wear-and-tear and fuel.
- Prevents limited water in the soil profile from being taken up by competitive weeds. This is particularly important in a dry climate such as that in Australia.

APPLICATION AND USE
- Use the higher rate where weed pressure is high or where longer residual activity is required.
- Rain or irrigation (>12.5 mm) within 21 days is required to initiate product activation.
- When weeds are present at time of application, apply with a suitable knock-down herbicide.
- DO NOT make more than 2 applications per 12 month period.

CONTENTS
GoalTender™

HERBICIDE

PRODUCT PROFILE

Active ingredient: Oxyfluorfen
Formulation: Suspension concentrate
Herbicide group: Group G
Target weeds: Broadleaf weeds and some grasses
Activity: Contact and residual
Packaging: 10 L containers
Application rate:
- KNOCKDOWN: 37.5 mL/ha + Ripper™ (480 g/L glyphosate);
- RESIDUAL CONTROL: 1 or 2 L/ha alone

KEY FEATURES

- Depending on use rate, provides knockdown and/or extended weed control for up to 4 months.
- Outstanding control of ‘hard to kill’ weeds including marshmallow and annual nettles.
- Adds to activity of Ripper by enhancing weed spectrum and speed of kill.
- Binds tightly to soil and will not leach to groundwater.
- New improved low odour S5 formulation.

APPLICATION AND USE

- DO NOT apply once bud swell has occurred.
- For extended residual control, apply to weed free soil.
- Use the higher rates to obtain extended residual activity.
### HERBICIDE PRODUCT PROFILE

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<td><strong>Formulation</strong></td>
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<td><strong>Herbicide group</strong></td>
<td>Group M</td>
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<td><strong>Target weeds</strong></td>
<td>Grass and broadleaf weeds</td>
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<td><strong>Activity</strong></td>
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<tr>
<td><strong>Packaging</strong></td>
<td>20 L containers</td>
</tr>
<tr>
<td><strong>Application rate</strong></td>
<td>1.5-2.25 L/ha</td>
</tr>
</tbody>
</table>

### KEY FEATURES

- Non-selective, non-volatile, water soluble liquid herbicide.
- Controls an extensive range of annual, perennial grass and woody weeds.
- Inactivated on clay and organic matter within the soil and therefore has no residual control.
- Rainfast 6 hours after application.
- Excellent compatibility profile.

### APPLICATION AND USE

- Use the lower rate when weeds are <15 cm tall.
- Only apply as a directed or shielded spray.
- DO NOT allow spray drift to contact any part of the plant, including the trunk.
- Where knockdown of existing weeds is required, use Ripper in conjunction with a residual herbicide such as Gallery or GoalTender.
PRODUCT PROFILE

Active ingredient: Haloxyfop
Formulation: Emulsifiable concentrate
Herbicide group: Group A
Target weeds: Grass weeds
Activity: Systemic
Packaging: 1 L and 5 L containers
Application rate:
- ANNUAL GRASSES: 200–400 mL/ha
- PERENNIAL GRASSES: 400–800 mL/ha
- 25–50 mL/100 L as spot spray

KEY FEATURES
- Controls an extensive range of annual and perennial grass weeds.
- Rapid weed uptake.
- Low environmental impact.
- Well established reputation of proven product performance (24 year history).

APPLICATION AND USE
- The addition of an adjuvant to the spray mix is required (Uptake™ Spraying Oil is recommended).
- Use a minimum water volume of 50 L/ha although higher volumes (150 L/ha) are recommended.
## PRODUCT HARVEST WITHHOLDING PERIODS
### DOMESTIC MARKET

<table>
<thead>
<tr>
<th>Product</th>
<th>Harvest Withholding Period</th>
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<tbody>
<tr>
<td>Systhane 400WP</td>
<td>Do not apply later than 21 days before harvest</td>
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<tr>
<td>Dithane Rainshield Neo Tec</td>
<td>Do not harvest for 14 days after application</td>
</tr>
<tr>
<td>Applaud</td>
<td>Do not harvest for 8 weeks after application</td>
</tr>
</tbody>
</table>
| Delegate                | APPLES AND Pears: Do not harvest for 7 days after application  
                          | STONE FRUIT: Do not harvest for 3 days after application |
| Lorsban 500EC           | Do not harvest for 14 days after application |
| Lorsban 750WG           | Do not harvest for 14 days after application |
| Prodigy                 | Do not harvest for 21 days after application |
## PRODUCT COMPATIBILITY GUIDELINES

<table>
<thead>
<tr>
<th>Compatible with</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Systhane 400WP</td>
<td>Most commonly used fungicides and insecticides</td>
</tr>
<tr>
<td>Dithane Rainshield Neo Tec</td>
<td>Most commonly used fungicides and insecticides</td>
</tr>
<tr>
<td>Applaud</td>
<td>Most commonly used fungicides and insecticides</td>
</tr>
<tr>
<td>Delegate</td>
<td>Most commonly used fungicides and insecticides</td>
</tr>
<tr>
<td>Lorsban 500EC</td>
<td><strong>FUNGICIDES</strong>: NOT compatible with fixed, liquid or organic coppers and wettable sulphur; Compatible with chlorothalonil, thiram, triadimefon, zineb and ziram</td>
</tr>
<tr>
<td>Lorsban 750WG</td>
<td><strong>INSECTICIDES and MITICIDES</strong>: Compatible with carbaryl, cypermethrin, diazinon, dicofol, dimethoate, esfenvalerate, maldison, methidathion, methomyl, oils, parathion and trichlorfon</td>
</tr>
<tr>
<td>Prodigy</td>
<td>Most commonly used commercial insecticides and fungicides and foliar fertilisers</td>
</tr>
<tr>
<td>Gallery 750</td>
<td>Products containing only oryzalin or only pendimethalin</td>
</tr>
<tr>
<td>GoalTender</td>
<td>Glyphosate products, oryzalin, diquat, paraquat and diquat/paraquat</td>
</tr>
<tr>
<td>Ripper 480</td>
<td>GoalTender, oryzalin, pendamethalin, simazine and trifluralin</td>
</tr>
<tr>
<td>Verdict 520</td>
<td>Oryzalin and simazine</td>
</tr>
</tbody>
</table>

**Note:** Since product formulation specifications of other manufacturers’ products may change without Dow AgroSciences being notified, a physical check prior to application is recommended.
<table>
<thead>
<tr>
<th>Dormant</th>
<th>Spurburst</th>
<th>Pink Stage</th>
<th>Full Bloom</th>
<th>Petal Fall</th>
<th>Fruit Development</th>
<th>Fruit Sizing</th>
<th>Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dithane Rainshield – for apple and pear scab (black spot), bitter rot, fly speck, ripe fruit spot, sooty blotch and target spot</td>
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<tr>
<td>Systhane 400WP – for apple and pear scab (black spot)</td>
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<tr>
<td>Systhane 400WP – for powdery mildew</td>
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<tr>
<td>Applaud – for longtail mealybug (pears only)</td>
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<tr>
<td>Delegate – for codling moth, lightbrown apple moth, oriental fruit moth, loopers, heliothis and western flower thrip</td>
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<tr>
<td>Lorsban 500EC – for San Jose scale, woolly aphid and wingless grasshopper</td>
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<tr>
<td>Lorsban 750WG – for apple dimpling bug for lightbrown apple moth</td>
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<tr>
<td>Naturalure – for fruit fly control</td>
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<tr>
<td>Prodigy – for lightbrown apple moth and looper control</td>
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<tr>
<td>Gallery – pre-emergent herbicide for long-term control of broadleaf weeds</td>
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<tr>
<td>GoalTender – add to knockdown herbicides for increased control of grass and broadleaf weeds</td>
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<tr>
<td>Ripper – non-selective control of many annual, perennial and woody weeds</td>
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<tr>
<td>Verdict 520 – selective grass weed control</td>
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<tr>
<td>Stage</td>
<td>Products</td>
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</tr>
<tr>
<td>Dormant</td>
<td>Dithane, Rainshield – for brown rot, freckle, rust and shot hole</td>
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<tr>
<td>Spurburst</td>
<td>Delegate – for oriental fruit moth, lightbrown apple moth, western flower thrip and pear and cherry slug</td>
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<tr>
<td>Pink Stage</td>
<td>Lorsban 500EC – for San Jose scale and European earwig (not for use in cherries)</td>
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<tr>
<td>Full Bloom</td>
<td>Lorsban 750WG – for lightbrown apple moth and mealybug suppression</td>
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<tr>
<td>Petal Fall</td>
<td>Naturalure – for fruit fly control</td>
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<tr>
<td>Fruit Development</td>
<td>Gallery – pre-emergent herbicide for long-term control of broadleaf weeds</td>
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<tr>
<td>Fruit Sizing</td>
<td>GoalTender – add to knockdown herbicides for increased control of grass and broadleaf weeds</td>
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<tr>
<td>Harvest</td>
<td>Ripper – non-selective control of many annual, perennial and woody weeds</td>
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<tr>
<td></td>
<td>Verdict 520 – selective grass weed control</td>
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</tbody>
</table>
Effective and efficient application of pesticides is essential for continued profitable production of high quality fruit. It will also minimise chemical residues on produce and minimise the amount of chemical ending up off-target in the environment.

Recommendations for dilute spraying (to the point of first run-off) are expressed in amount of product per 100 litres of water. No rate for Concentrate Spraying is provided. Instead, when concentrate spraying, the same amount of product should be applied to the target canopy as would be applied in a dilute application to the point of first run-off. A statement on the suitability for concentrate spraying will normally be supplied in the Mixing/Application section on the label.

Whenever applying chemicals it is important to consider:

- Application Timing – Applying the right chemical at the right time within an integrated pest management strategy.
- Application Rate – Applying the correct rate (calibration).
- Spray Coverage – Achieving effective coverage (sprayer set-up).
**Dilute Spraying**
- Use a sprayer designed to apply high volumes of water to the point of first run-off in as many parts of the canopy as possible, with coverage that is as even as possible throughout the crop. Avoid excessive run-off. This is called the required dilute spray volume.
- The required dilute spray volume of water may be determined by applying different test volumes, using different settings on the sprayer, from industry guidelines or by getting expert advice.
- Add the amount of product as specified in the DIRECTIONS FOR USE table for each 100 L of water.
- The required dilute spray volume will change with canopy size, density and structure, the sprayer type and sprayer set-up and operation. As the canopy grows during the season and the trees age, so too will the required dilute spray volume need to change.

---

The indicative water volumes in the chart are **for guidance only**. Water rates for each canopy type MUST be determined using the calibration system described above.

**Canopy Size Calibration Chart for Tree Crops (excluding citrus) – Required Dilute Spray Volume (litres/100 m of Row)**

<table>
<thead>
<tr>
<th>Tree Height (metres)</th>
<th>Sparse Canopy</th>
<th>Dense Canopy</th>
</tr>
</thead>
<tbody>
<tr>
<td>4m</td>
<td>140 to 220</td>
<td>70 to 110</td>
</tr>
<tr>
<td>3m</td>
<td>105 to 165</td>
<td>75 to 110</td>
</tr>
<tr>
<td>2m</td>
<td>70 to 110</td>
<td>75 to 110</td>
</tr>
<tr>
<td>1m</td>
<td>75 to 110</td>
<td>75 to 110</td>
</tr>
</tbody>
</table>

---

**NOTE:** When measuring tree canopies, ignore sparse branches protruding in any direction and measure to where the canopy is reasonably continuous.
Concentrate Spraying

- Use a sprayer designed and set-up for concentrate spraying (i.e. a sprayer which applies water volumes just less than that required to reach the point of run-off).
- Set up and operate the sprayer to achieve reasonably even coverage throughout the canopy using your chosen spray volume.
- Determine the required dilute spray volume (see Dilute Spraying on page 39) for the crop canopy. Consult your local advisor, agronomist or Department of Agriculture for help in determining this volume. This is needed to calculate the concentrate mixing rate.
- The mixing rate for concentrate sprays can then be calculated in the following way.

Example only

- Dilute spray volume as determined above e.g. 1500 L/ha.
- Your chosen concentrate spray volume e.g. 500 L/ha.
- The concentration factor in this example is therefore 3 (i.e. 1500 L ÷ 500 L = 3).
- If the dilute label rate is 25 mL/100 L, then the concentrate rate becomes 3 × the dilute rate i.e. 75 mL/100 L of concentrate spray.

- The chosen spray volume and sprayer set up and operation may need to be altered as the crop grows.
- For further information on concentrate spraying, consult relevant industry guidelines.
- Always follow spraying best practices.
For more information contact your local Dow AgroSciences representative on
TOLL FREE 1800 700 096

www.dowagro.com/au/

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