TECHNOTE
A UNIQUE FUNGICIDE GROUP FOR CONTROL OF LATE BLIGHT AND SCLEROTINIA IN POTATOES

Emblem, a trusted fungicide for control of diseases in grapevines, apples and brassicas, is now registered for use in potatoes. Emblem contains the active fluazinam, a new chemical group for potatoes, and is highly effective against late blight and sclerotinia. In fact, it is the only product registered for control of both of these diseases. For early blight (target spot) control Emblem’s excellent liquid formulation ensures good compatibility with early blight fungicides such as Ace® Foliar Fungicide, Barrack® Betterstick, Fortress® 500 Fungicide or Penncozeb® 750DF Fungicide when tank mixed with Emblem or applied as part of the overall spray program.

MODE OF ACTION
Fluazinam, the active ingredient in Emblem, is the common name of a member of the fungicide group described as uncouplers of oxidative phosphorylation (FRAC Group 29). The members of this group are considered to be at low risk for the development of resistance making fluazinam a valuable tool in resistance management. Emblem effects the sporangia and zoospores directly, blocks the release of zoospores and reduces sporulation on lower parts of leaves.

KEY FEATURES AND BENEFITS

<table>
<thead>
<tr>
<th>KEY FEATURES</th>
<th>BENEFITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent efficacy on leaves and tubers</td>
<td>Emblem is one of the most active fungicides</td>
</tr>
<tr>
<td>Free of resistance issues</td>
<td>'Multi-site' contact fungicide – acts on different biochemical processes</td>
</tr>
<tr>
<td>New chemical group for potatoes</td>
<td>Resistance management</td>
</tr>
<tr>
<td>Liquid formulation</td>
<td>Emblem is very easy to use and apply</td>
</tr>
<tr>
<td>Flexible application window</td>
<td>Emblem can be used throughout the crop cycle</td>
</tr>
<tr>
<td>Rainfast after 2 hours and in up to 40mm rain</td>
<td>Emblem offers optimized protection</td>
</tr>
<tr>
<td>Low quantity of active ingredient per hectare</td>
<td>Low use rate per Ha</td>
</tr>
<tr>
<td>No phytotoxicity an any potato crop</td>
<td>Safe to use on all potato varieties</td>
</tr>
</tbody>
</table>

KEY DISEASES IN POTATOES AND EMBLEM

Late blight (Phytophthora infestans)
Irish or late blight (Phytophthora infestans) thrives under warm, moist conditions and can cause significant damage to both potato foliage and tubers if not controlled. In most Australian potato producing districts late blight is considered to be a sporadic disease that is usually associated with very wet weather. Late blight infections can appear rapidly and the disease requires vigilance to prevent infection and spread when conditions favour disease development. A new late blight strain named the A2 strain has now developed in other countries but is yet to be found in Australia. The A2 strain is more virulent and has become resistant to several classes of fungicides including metalaxyl which was highly effective against the original A1 strain. A range of fungicide chemistry for late blight control is the best defence for control as this allows rotation of the modes of action involved and serves to delay or stop the onset of resistance. Emblem will represent new chemistry for Australian potato growers.

Sclerotinia (Sclerotinia sclerotiorum, Sclerotinia minor)
Sclerotinia is a problem in Australian potato crops in very wet seasons. The disease thrives in very moist conditions that occur with prolonged rainfall events or excessive overhead irrigation. High humidity, free moisture and the lack of air movement in dense potato canopies allows sclerotinia to thrive. Sclerotia (reproductive organs) can survive in the soil for several years. When they germinate, mycelium grows on or near the soil surface. Infection occurs at the soil line or where branches touch the soil surface. Ascospores may also be released from sclerotia and these can cause wider spread infection.

As the disease is soil-borne it can survive on a wide range of host plants that includes both crops and weed species that are...
associated with potato production. Infection can be limited by using cultural methods such as the timing of irrigation to allow plants to dry before nightfall. As there is little difference between the susceptibility of potato varieties to the disease, the application of fungicide treatments remains the most effective approach to disease control.

Emblem is registered for the control of sclerotinia in potatoes in a number of overseas countries where it is now regarded as a standard treatment for the control of this disease.

Conditions that favour the development of the disease in potatoes are similar to those that allow the development of potato Late Blight. Emblem applications provide useful control of these two important potato diseases.

**Early blight (Alternaria solani) (Target spot)**

Early blight appears in crops later in the season than late blight. Healthy crops tend to limit early disease establishment.

The disease becomes apparent as crops mature and it can spread rapidly if moist conditions occur at that time. Effective spray programmes combine contact and systemic fungicides to maintain green leaf area during tuber sizing.

**EMBLEM LABEL DIRECTIONS**

Apply as a protectant fungicide treatment before late blight or sclerotinia becomes established in the crop. Early application before row closure is useful for the control of sclerotinia in potatoes. Apply in a spray volume of 250 to 500 L/ha using nozzles that provide a medium droplet size and repeat at 7 to 10 day intervals. Use the shorter interval when wet conditions favour late blight development.

For early blight (target spot) control include Ace Foliar Fungicide, Barrack Betterstick, Fortress 500 Fungicide or Penncozeb 750DF Fungicide in the spray program with Emblem or use in a tank mix with Emblem.

**WITHOLDING PERIOD**

Do not harvest for 14 days after application. Treated crops should not be grazed or fed to animals.

**RE-ENTRY PERIOD**

The crop can be re-entered as soon as the spray is dry.

**COMPATIBILITY**

Emblem is compatible with Ace, Barrack Betterstick, Fortress and Penncozeb 750DF, as well as a wide range of agricultural chemicals. A jar test with local water should be conducted before using any new tank mixtures with Emblem.

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**TRIAL RESULTS**

**Figure 1:** Pictures showing the difference between treated and untreated trial sites in Tasmania

**Figure 2:** Trial photographs showing the difference between treated and untreated sites in Tasmania

**Untreated control**

**Treated with 250 mL of Emblem**

**Plant senescence in untreated control**

**Fungicide application at early crop stage before row closure**

**Late fungicide application at flowering**
TRIAL RESULTS

Late blight control, Tasmania

Graph 1: Emblem provided significantly better control of late blight than all other treatments in this trial.
Trial location: Lileah, Tasmania 2007/2008
Variety: Russet Burbank
Conducted by: Peracto
Treatments: 7 applications of Emblem applied every 8 to 14 days versus standard fungicides

Late blight control, UK (Trial 1)

Graph 3: Emblem provided an additional 15t/ha of marketable yield compared to the untreated crop.
A total of 5 trials were conducted and all showed similar results.
Two treatments applied – 11 July and 8 August

Potato yield t/ha

Late blight control, UK (Trial 1)

Graph 2: Emblem provided excellent long term control of late blight verses the untreated crop.
A total of 5 trials were conducted and all showed similar results.
Two treatments applied – 11 July and 8 August

Mean % control of late blight

Sclerotinia control, Tasmania

Graph 4: Emblem provided exceptional control of Sclerotinia when applied either prior to or after row closure.
Trial location: Lileah, Tasmania 2007/2008
Variety: Russet Burbank
Conducted by: Peracto
One applied at 39 DAP and one at 66 DAP (before row closure and early flowering)

Trial CCA 07238 - % Incidence of sclerotinia stems infected 123DAP

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SPRAY PROGRAMS

The following spray programs have been put together to assist with working out the correct product choices for different diseases in both high and low disease pressure situations. Emblem has been positioned so as to take advantage of its excellent activity on late blight and sclerotinia. Application early in the crop protects from these two diseases whilst applications later in the crop maximise quality and yield by preventing the spread of the disease down to the tubers.

**Figure 3:** Fungicide disease program (high disease pressure)

<table>
<thead>
<tr>
<th>Predominant Diseases</th>
<th>Pre-Harvest</th>
<th>Post Flowering</th>
<th>Flowering</th>
<th>Vegetative Growth</th>
<th>Pre-Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Blight</td>
<td>Barrack x 2</td>
<td>Barrack x 2</td>
<td>Supernova</td>
<td>Supernova</td>
<td>Barrack</td>
</tr>
<tr>
<td>Early Blight + Sclerotinia</td>
<td>Fortress</td>
<td>Barrack + Emblem x 2</td>
<td>Barrack x 2</td>
<td>Barrack</td>
<td>Ace*</td>
</tr>
<tr>
<td>Late Blight + Sclerotinia</td>
<td>Fortress</td>
<td>Emblem x 3</td>
<td>Supernova</td>
<td>Medley MZ</td>
<td>Emblem</td>
</tr>
<tr>
<td>Early Blight + Late Blight + Sclerotinia</td>
<td>Fortress</td>
<td>Barrack + Emblem x 3</td>
<td>Supernova</td>
<td>Medley MZ</td>
<td>Barrack</td>
</tr>
</tbody>
</table>

*Apply Fortress instead if wet weather has extended spray interval by more than 14 days.

**Figure 4:** Fungicide disease program (low disease pressure)

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<thead>
<tr>
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<th>Post Flowering</th>
<th>Flowering</th>
<th>Vegetative Growth</th>
<th>Pre-Harvest</th>
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</thead>
<tbody>
<tr>
<td>Early Blight</td>
<td>Barrack</td>
<td>Barrack</td>
<td>Barrack</td>
<td>Supernova</td>
<td>Ace</td>
</tr>
<tr>
<td>Early Blight + Sclerotinia</td>
<td>Fortress</td>
<td>Barrack + Emblem</td>
<td>Barrack</td>
<td>Barrack</td>
<td>Supervisor</td>
</tr>
<tr>
<td>Late Blight + Sclerotinia</td>
<td>Fortress</td>
<td>Emblem</td>
<td>Barrack</td>
<td>Supernova</td>
<td>Emblem</td>
</tr>
<tr>
<td>Early Blight + Late Blight + Sclerotinia</td>
<td>Fortress</td>
<td>Barrack + Emblem</td>
<td>Barrack</td>
<td>Supernova + Emblem</td>
<td>Barrack</td>
</tr>
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</table>

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