

# MANAGING LATE BLIGHT IN POTATOES USING A PREDICTIVE FORECAST MODEL

– A new initiative by AuSPICA

In response to a recurrence of late blight in some parts of Australia, AuSPICA, in collaboration with US expert, Emeritus Professor, Dr Steve Johnson, have developed an SMS alert system. The message, sent to members, contains spray recommendations with the aim of preventing the establishment of late blight.

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## AN INTRODUCTION TO LATE BLIGHT

Late blight, caused by *Phytophthora infestans*, is an oomycete or water mould, a fungus-like microorganism that can have a significant economic impact on the potato industry. The first visible symptom of late blight is dark brown spots on leaves. These irregular shaped lesions will develop further

until the plant is killed or desiccated prior to harvest<sup>1</sup>. A lighter green halo will form around the lesion on the leaves (Figure 1), whilst the underside of infected leaves develop milky-white spores under moist conditions (Figure 2).

These symptoms will help distinguish late blight from other common diseases such as target spot (*Alternaria spp.*) and/or *Botrytis*.

The importance of late blight monitoring and management is demonstrated by how quickly late blight can spread. Once established and under the right environmental conditions, the pathogen will spread quickly in ring-like patterns in the crop. Ultimately the disease can progress, causing the entire crop to come to an early death, resulting in yield loss. Furthermore, spores can be spread locally by wind and infect surrounding potato crops<sup>2</sup>. For this reason, late blight is an industry-wide problem, requiring an industry-wide response.

## LATE BLIGHT OCCURRENCE

The 2021/22 season saw the reintroduction of late blight in potato crops as a major concern in some potato production areas.

Seed crops where late blight was at its worst resulted in early death of the plants, preventing visual inspections as well as leaf sampling for PVY



**Figure 1.** (Left) Typical symptoms of late blight on upper foliage of a potato plant.



**Figure 2.** (Right) Underside of the potato leaf showing sporulation of the late blight pathogen.

testing. This resulted in some seed crops being unable to qualify for AuSPICA certification labels.

Commercial potato crops were also impacted, with crop defoliation and in severe cases early crop death occurring in potato crops infected with late blight causing yield loss.

### **HOW WE ARE RESPONDING**

In response to the previous season, AuSPICA with the assistance and expert advice of Professor Steve Johnson, worked to implement a spray recommendation system. The aim of the system is to prevent the establishment of late blight in crops. This work is funded by the AuSPICA Knowledge hub program through its membership.

Dr Steve Johnson visited Australia over the summer and during this time worked closely with AuSPICA to introduce a model of his own design, targeting the Thorpdale and Ballarat regions. These regions were used to develop the forecast model and test it

under field conditions. The future plan is to identify other areas where the model can be used.

The model, used in conjunction with rainfall data recorded by the Bureau of Meteorology, can provide spray recommendations.

The recommendations are then sent via SMS to seed growers and AuSPICA Knowledge hub members. The message will recommend either a 'protectant spray' or a 'translaminar or systemic spray' to be applied at earliest convenience, otherwise no spray will be recommended. The model, time of year, days since spraying, and presence or absence of late blight in the region are all factors contributing to the final recommendations delivered by the AuSPICA certification officers.

The use of this model by AuSPICA Seed Certification Officers commenced following a meeting with growers in Thorpdale in December 2022, with a similar meeting held in

the Ballarat region. At this meeting the need for a response to late blight, the way in which the model will run, timing of recommendations, and grower concerns were all discussed. In the time since the meeting in December, ten spray recommendations have been sent to seed growers and Knowledge Hub members in the Gippsland region, whilst the Ballarat region has only received four recommendations.

### **LATE BLIGHT IN SEASON 2022/23**

The 2022/23 season saw the expected return of late blight in potato crops which were not subjected to an appropriate pesticide spray program.

Late blight has also been seen in areas this season that did not have the presence of late blight noted in the 2021/22 season.

However, growers that reacted to SMS recommendations sent by AuSPICA noted significant improvements in the longevity of their crops.

### **COMMENTS FROM DAVID HOTCHKIN OF HOTCHKIN POTATO GROWERS**

*"I've had the following thoughts on the late blight modelling developed by Dr Steve Johnson and AuSPICA.*

*We've been using this formula the past few years ourselves to economically control the disease. We've found that we can accurately predict when the disease is likely to affect our crops, and therefore be able to better target when to spray, and with which group of chemicals to spray, to prevent crop damage. Sometimes using this formula means that we don't spray for periods of time, meaning obvious savings and a better environmental situation.*

*Traditionally we have two main parts of the season when our late blight risk is at its highest in Thorpdale.*

*Firstly, from early November to the middle of January. If we have cool wet weather over a significant period during this part of the year, our early crops can collapse suddenly, substantially reducing yield and solids. Without early prediction and targeted spraying, the economic loss for us at this time of year can run into a six-figure sum.*

*The second high risk period in Thorpdale is from about middle of March through to the end of the growing season late into April. Again, cool wet conditions favouring late blight at this time of year can lead to significant reduction in yield and solids if targeted spraying to prevent the disease from taking hold has not occurred.*

*In summary, I have found that the Experimental Modelling works for our business.*

Of most importance is the judicious use of fungicides and together with the informed knowledge of the appropriate environmental conditions, this can be used to prevent late blight establishing in a crop. We do not want to wait until symptoms of late blight develop in the crop, but rather use protectant fungicide chemistry strategically to prevent disease development in the crop. Once established in a field late blight becomes difficult to manage, particularly when the weather is favourable for the disease.

Overall benefits from the late blight forecast model include fewer spray applications than previously used for late blight and more appropriate use of chemistry modes (protectant, systemic and translaminar) to better manage late blight in potatoes. Ultimately saving money with using the right chemistry, at the right time, to achieve the right result.



**For more information about AuSPICA and membership contact:**

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**To sign up for future SMS spray recommendations:**

Visit the AuSPICA website [www.auspica.org.au](http://www.auspica.org.au) or call the office 03 5962 0000 and sign up to the Knowledge Hub.

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**REFERENCES;**

1. UNECE Standard S-1 concerning the marketing and commercial quality control of Seed Potatoes – UNECE Guide to Seed Potato Diseases, Pests and Defects, United nations, 2014
2. <https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/plant/potato-late-blight>

**COMMENTS FROM DAVID HOTCHKIN OF HOTCHKIN POTATO GROWERS (CONT.)**

*I also believe AuSPICA sending out messages to its members based on the late blight Modelling Tool is great way to assist growers making their spraying decisions. During the growing season, growers tend to be very busy, and don't always have the time to keep an eye on everything, so to have Jack in the background keeping an eye on the Model and sending regular messages has been helpful. My belief is that our industry can be well served using this kind of technology, and the messaging is an important part of its uptake.*

*I also believe this type of messaging could be used to assist growers to better control other pests and diseases. Late blight has been particularly prevalent the last two seasons, but Target Spot is another disease not well controlled a lot of the time. We could have a hot dry year next year and run into problems with potato moth which is also not well controlled at times because of poorly targeted spraying. Hopefully this type of messaging system can be extended to other pests and diseases, such as these.*

*My hope is that AuSPICA can further develop this messaging technique to assist its members with pests and diseases as they arrive with the different seasons. Further development could assist pest and disease management challenges that arise with the various climatic changes that come our way from time to time.*

*I also hope that growers take up membership with AuSPICA to help them run these programs, because good information costs money.*