Early Blight (Alternaria Solani) in New Zealand Potato Crops

Summary

Early Blight, caused by *Alternaria solani*, is a significant fungal disease affecting potatoes in New Zealand, leading to reduced yield, poor tuber quality, and increased production costs. The disease spreads primarily through fungal spores carried by wind, rain, and mechanical movement, thriving in warm and humid conditions.

The challenge of managing Early Blight is becoming more complex due to the loss of key crop protection chemicals and the development of resistant pathogen populations. A clear example of this is the establishment of resistant Alternaria strains in the Franklin region, where a key fungicide group (Group 7 - SDHI) has lost its efficacy. Other regions are still managing the disease effectively, but the longevity of certain fungicides depends on following proper resistance management strategies.

Effective control of Early Blight requires an integrated approach, combining cultural practices, chemical treatments, and biological strategies. Key recommendations include rotating fungicides, using combinations of non-cross-resistant products, and adhering to a robust resistance management plan to slow the development of resistant populations. Recent field trials have highlighted the importance of using Mancozeb in combination with other fungicides to significantly slow the build up of resistant populations.

By adopting best practices, including careful monitoring and resistance management, New Zealand growers can minimise the risks of Early Blight, ensuring continued effective use of crop protection products and protecting future potato yields.

What is Early Blight?

Early Blight is a fungal disease caused by *Alternaria solani*, affecting potato plants. It begins with small dark lesions on older leaves, which expand and form concentric rings. These lesions cause premature leaf drop, resulting in reduced photosynthesis and affecting tuber development. The disease can also spread to stems and tubers, leading to further yield and quality losses.

How does Early Blight spread?

The disease is primarily spread through fungal spores (conidia) released from infected plant material. These spores are dispersed by wind, rain, and mechanical activity (e.g., workers, equipment). The pathogen can also persist in soil on plant debris, where it can infect new crops in subsequent seasons. Conditions favorable for disease spread include warm temperatures (18–25°C) and high humidity or rain, which promote spore germination.

Resistance Management and Chemical Control Challenges

In New Zealand, resistant strains of pathogens, including *Alternaria solani*, are emerging, making some fungicides less effective. This is particularly concerning for the future of agri-chemicals, highlighting the need for robust resistance management strategies.

A clear example of this is the development of resistant *Alternaria* populations in the Franklin region. Reports from growers indicate an increasing number of cases where the disease is not responding to standard control programs. Work conducted by a chemical company has shown that a key fungicide, a Group 7 SDHI (Succinate Dehydrogenase Inhibitor) product, is no longer effective in controlling Early Blight in this region due to the establishment of disease resistant populations.

Though resistant populations have been observed in other regions, they are not yet as widespread as in Franklin. The longevity of SDHI chemistries in these areas will depend on growers adhering to the recommended resistance management strategies.

Minimising Risks and Implementing Resistance Management

To combat the rise of resistance and minimise the risks associated with Early Blight, it is essential for growers and agronomists to follow effective resistance management strategies. These include:

- Rotation of Fungicides: Using fungicides from different chemical groups in rotation helps to reduce the likelihood of resistance development.
- Use of Non-Cross-Resistance Partners: Combining fungicides with different modes of action can prevent cross-resistance. For example, pairing Group 7 SDHI fungicides with other non-cross-resistant fungicides, such as Mancozeb, is critical.
- Integrated Pest Management (IPM): Regular scouting, timely fungicide applications, and crop rotation are key components of an IPM program to manage Early Blight effectively.
- Monitoring for Resistance: Growers should be vigilant and report any instances where control measures fail, allowing for early identification of resistant populations.

Integrated Disease Management

On-farm prevention of Early Blight involves an integrated approach combining cultural, chemical, and biological practices:

- Crop Rotation: Avoid planting potatoes in the same field consecutively to reduce pathogen buildup.
- Field Hygiene: Ensure proper disposal of infected plant debris, especially after harvest, and clean equipment between uses to avoid mechanical spread.
- Use Resistant Varieties: Where available, plant resistant or tolerant potato varieties to reduce disease incidence.
- Fungicide Application: Implement a robust fungicide program, beginning at the first signs of disease and following resistance management strategies.

Research and Trial Results

Potatoes New Zealand conducted a field trial last season in the Pukekawa region to evaluate the efficacy of various fungicide combinations for Early Blight control. The trial investigated combinations of currently used and registered agrichemicals along with new and as yet unregistered products. The trial was carried out on a commercially grown potato crop. A total of eight different fungicide treatment applications were made at intervals of six to ten days, starting when plants reached the mid-vegetative stage.

Findings

All fungicide treatments significantly reduced disease development compared to untreated plots. Treatments that included Mancozeb, either alone or in combination with other chemistries, showed the most effective results.

Key Takeaway

Combining Mancozeb with other non-cross-resistant fungicides significantly enhanced control, emphasizing the importance of adhering to resistance management strategies and rotating fungicide types to prevent resistance.

Importantly, no phytotoxicity (crop damage) was observed in any of the treatments during the trial, indicating that the fungicides used did not harm the crop under the trial conditions.

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Photo 1 - Untreated on the left and treatment 8 on the right

Photo 2 - Early blight in treatment 7

Photo 3 - Early blight in treatment 3

Photo 4 - Early blight in treatment 9

Conclusion

Early Blight remains a serious threat to potato production in New Zealand. As resistant populations of *Alternaria solani* are becoming more established, particularly in the Franklin region, it is crucial for growers to adopt resistance management strategies. These include rotating fungicides, using combinations of different chemistries, and following recommended IPM practices. Ongoing research and trials will continue to provide valuable insights into effective disease management, helping to safeguard both yield and the future use of crop protection chemistries.