

## **Fungicide for Managing Late Blight in Potato**

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The estimated probability for the occurrence of late blight (caused by *Phytophthora infestans*) in 2009 is relatively high based on early season (April-May) weather. Whether late blight is found and the timing of first identification (if late blight does occur) will be affected by several factors, including future weather and fungicide use patterns by growers.

With the confirmed findings of late blight in 2008 and the possibility for late blight in 2009, it is important to review the value of fungicides for managing potato late blight. Foliar fungicides can be highly effective if used properly. There are three factors to consider when designing a foliar fungicide program to control potato diseases: 1) fungicide choice, 2) application method, and 3) timing and frequency of applications.

### **WHICH FUNGICIDE SHOULD I USE?**

Selecting the right product for disease control can save you money. On the other hand, using the wrong fungicide or a less effective fungicide can cost you money. Some more expensive products don't necessarily provide better disease control. Two groups of standard fungicides that have a broad spectrum of activity against potato diseases are chlorothalonil and ethylene bisdithiocarbamate (EBDC) based products. Both are effective against early and late blight and their efficacy is similar under the conditions of the Pacific Northwest.

“Add-in” products such as Agri Tin, Super Tin, Curzate, Previcur Flex, and Forum can be mixed with the standard protectants for added disease control. Agri Tin and Super Tin are also effective against early blight and brown spot. However, these products can also cause phytotoxicity when applied at low spray volumes or when temperatures are high. Excellent control of early blight can be achieved with QoI fungicides (strobilurin and similar chemistries) such as Headline, Quadris, Tanos, and Reason. Headline and Quadris are effective against late blight at double the early blight rate (12 fl oz/acre for both products). Tanos is a mixture of famoxate (good against early blight) and Curzate (good against late blight). The active ingredient in Reason is fenamidone. Reason is effective against both early blight (5.5 fl oz. rate) and late blight (8.2 fl oz.).

It is recommended that QoI fungicides be tank-mixed with a standard protectant to prevent the development of fungicide resistance in the early blight population. This resistance has already occurred in the Midwestern US and some resistance has been found in southern Idaho. The first resistant isolates were identified from Twin Falls County in 2006 through a survey conducted by North Dakota State University. Additional testing by private companies has shown the resistance to be more widespread, occurring in Minidoka, Cassia, Power, and Bingham counties. QoI fungicides should never be applied consecutively unless they are applied as a tank mix. Read the label carefully to follow manufacturer recommendations with respect to resistance

management. Endura is very effective for controlling early blight and at higher rates it provides good white mold protection. However, Endura is not effective against late blight.

Gavel and Omega are extremely effective against late blight. These products can be used in place of the standard protectants when late blight pressure is high. University research shows that foliar applications of Gavel can be effective in reducing the tuber blight phase of late blight. Omega is effective against late blight and has the added benefit of good white mold control.

Revus Top is a new fungicide that contains the two active ingredients (mandipropamid for late blight and difenoconazole for early blight). This product has shown good efficacy against early blight in southern Idaho.

Crop-phite, Fosphite, Phostrol, Prophyt, Resist 57, and Topaz are fungicide formulations of phosphorous acid. Other phosphorous acid products are available, but efficacy data are scarce for control of potato diseases in the Pacific Northwest. Applications of phosphorous acid have resulted in increased tuber protection to both late blight tuber blight and pink rot. However, research shows that phosphorous acid must be applied at high rates multiple times (8 pt/acre twice for late blight and 10 pt/acre three times for pink rot) in the season for significant tuber protection. Additionally, phosphorous acid is not effective in protecting the foliage from late blight. These fungicides are not cost effective as foliar applications for controlling late blight on potato vines.

Storage rots (pink rot and Pythium leak) can be suppressed by applying foliar fungicides containing mefenoxam (Ridomil® Gold products, Metastar, Ultra Flourish). Some of the Ridomil Gold products are pre-packed with a standard protectant such as chlorothalonil or mancozeb. In recent years, all isolates of the late blight pathogen have been from strains that are resistant to mefenoxam. The pre-pack partner will provide protection against late blight, but the mefenoxam will not. Mefenoxam is still effective against some populations of the pink rot pathogen.

University research around the country has shown that spray programs based on copper fungicides do not perform as well as programs based on standard protectants for controlling late blight.

### **WHAT APPLICATION METHOD IS THE BEST?**

Ground, air, and chemigation applications of fungicides can all be effective if time is taken to ensure proper application. Chemigation has been criticized for having low levels of fungicide residue in the potato canopy following application. Research performed in Idaho with Dithane DF Rainshield has shown that fungicide residues on stems are just as high with chemigation as stem residues from aerial application. Research and field observations have shown that chemigation is an effective method for late blight control. It is the least expensive application method, but requires more grower management. If an airplane is used, care must be taken to ensure fungicide is applied to areas which are

difficult to fly (i.e. near power lines and buildings). Aerial applications have the benefits of quick application and less management time by the grower. Irrigation is needed to redistribute residues down in the potato canopy.

### **HOW OFTEN AND HOW FREQUENTLY SHOULD FUNGICIDES BE APPLIED?**

Timing and frequency of application are perhaps the most critical components of a good spray program and this is where taking shortcuts can be dangerous. The first fungicide application for late blight should be made just prior to row closure. Once a canopy has formed, conditions are often favorable for late blight. In years with frequent rain events in June and July, weekly applications are needed to cover and protect new growth. Later in the season when crop growth slows, increasing the interval may be an option. Applying fungicides later than row closure and stretching the interval between applications increases the risk for foliar and tuber blight, but has been adequate in dry years with infrequent precipitation.

Whenever late blight is confirmed in an area, protectant programs should be maintained in areas near affected fields until the end of the growing season. Thundershowers can quickly spread the pathogen over long distances.

### **SUMMARY**

Using a protectant fungicide on a regular schedule with the application method best suited to your needs can be done economically, and provide good protection to late blight. It is important to choose the right fungicide, apply it properly, and maintain a good program while vines are actively growing.