



# Potato Progress

Research and Extension for Washington's Potato Industry

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## Management of Potato Late Blight in the Columbia Basin

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Late blight is expected in the Columbia Basin in 2003. Much has been previously published on the management of late blight. This article is a summary of important management information.

### SYMPTOMS

Leaf lesions are round or semi-circles, often surrounded by a light green to yellow halo. Lesions are more likely to begin at the leaf edge than in the middle of the leaf. Active late blight infections commonly have white mycelium growing on the underside of infected leaves that can be seen particularly easily when dew is present or on lower leaves subject to higher humidity. These lesions, unlike those of early blight, will grow through leaf veins, hence, the general round or half-circle shape in contrast to the angular-shaped lesions of early blight. Actively growing lesions have a water-soaked appearance and are gray-green in color, whereas older lesions are usually dried up, brown and brittle. Late blight symptoms can appear on stems and/or leaves. Stem infections appear as black-purplish lesions covered with mycelium that appear as a light, white-colored coating.

### CULTURAL CONTROL

Management of potato late blight in the Columbia Basin of Washington and Oregon requires a combination of several strategies: strict sanitation, proper irrigation management, and cultural practices. Sanitation practices (such as not planting infected seed, using a seed treatment containing mancozeb or cymoxanil, controlling cull piles and volunteers), proper watering (such as timing, frequency, length, no overlaps) and proper cultural practices (such as not planting within 80 - 100 ft. of the pivot center) will reduce disease pressure and increase the effectiveness of foliar fungicides.

### CHEMICAL CONTROL

Fungicides, along with a good cultural control program will provide an effective late blight control. Best control of late blight will occur by using fungicides as outline below:

1. Begin first protectant application just prior to row closure;
2. Use EBDC or Chlorothalonil;
3. Apply every 7 days (this recommendation may be modified by the late blight hot line);
4. Apply either by air, or combining air and chemigation in rotation, always beginning with air;
5. Use full label rates;
6. Maintain applications until harvest.

U Fungicides are most effective when they are applied to foliage 1) before infection occurs or 2) during

very early stages of disease development, when not yet detectable by the human eye. Later applications help to reduce the rate of disease spread, but are not nearly as effective as early applications. Established late blight infections are very difficult to manage in sprinkler-irrigated fields because the microclimate within the canopy following irrigation usually favors disease spread.

U Total crop and canopy coverage with fungicides is essential for late blight management. The late blight organism, *Phytophthora infestans*, will most likely find and infect any plants or plant surfaces skipped during application.

### POTATO LATE BLIGHT FUNGICIDES

Several fungicides are labeled for use against potato late blight. Each product has specific conditions for use and is labeled with details regarding rates and application. Fungicides work against late blight by inhibiting one or more of the following: germination of spores (and as a result, reduced infection of plants), growth within the plant, production of spores (sporulation), and formation or development of lesions.

#### Efficacious and cost effective fungicides recommended for use are:

1. EBDC (ethylene bis-dithiocarbamate) fungicides. Examples: Metiram (Polyram), Mancozeb (Dithane M-45, Manzate 200, and Penncozeb), and Maneb (Manex);
2. Chlorothalonil (Bravo, Echo).

#### Fungicides that may provide additional control when infections are already in the field and conditions favor disease spread (rain and mild weather) but are not the primary fungicides recommended:

1. Cymoxanil (Curzate) plus an EBDC or chlorothalonil;
2. Dimethomorph (Acrobat) plus an EBDC or chlorothalonil;
3. Propamocarb hydrochloride (Previcur, formerly Tattoo C), plus EBDC or chlorothalonil;
4. Zoxamide + mancozeb (Gavel);
5. Fluazinam (Omega);
6. Pyraclostrobin (Headline).

#### Do not use the following and/or only with the combination of other products for the control of late blight:

1. Mefenoxam (Ridomil Gold, Ultraflourish) prepacks are not recommended for management of late blight; however, mefenoxam can be effective for management of pink rot and *Pythium* leak in storage.
2. Super Tin by itself will not adequately control severe late blight, but it is effective when mixed with Polyram or another EBDC fungicide.
3. Copper fungicides should not be used alone for control of foliar late blight in the Columbia Basin.

### METHODS OF FUNGICIDE APPLICATION

The choice of application method is important in managing late blight, and strengths and weaknesses of air, ground, chemigation, and air alternated with chemigation application methods are discussed in the article, "Fungicide Application for Management of Potato Late Blight", published in April 30, 2001 issue of *Potato Progress* (soon to be available on [www.potatoes.com](http://www.potatoes.com)).

#### Additional Considerations

U In the Columbia Basin in 1995, aircraft application was most common (75%), followed by chemigation (25%), and ground (very little application). Chemigation has become more common because it is less expensive than air application. Equipment availability and other financial considerations may determine

method more than delivery efficiency of the fungicide.

U Application methods vary in terms of how much fungicide is deposited on and within the canopy and how redistribution occurs over time within the canopy due to movement of irrigation water or rainwater. (For example, one study showed that chemigation deposited low amounts of chlorothalonil on and in the canopy and redistribution over time by water caused chlorothalonil levels to drop even more. In such a situation, fungicide levels could fall below those required for sufficient control of late blight, particularly near the end of a standard application interval.)

U Application methods also vary in terms of how far into the canopy (upper vs. lower leaves) the fungicides penetrate initially. If protection is needed immediately in the lower canopy, then air may not be the best application choice.

U Alternating air application with chemigation on a 7-day interval can increase fungicide residue levels in the crop canopy at a reduce cost. This methodology provides several of the benefits of both methods without the adverse effects of using only one.

### Fungicide Application Tips

The important components of late blight management are: proper timing of the first application, fungicide selection, frequency of fungicide use, fungicide rates, and application method. Keep in mind the following suggestions when applying fungicides:

U Consult the toll-free late blight hotlines (OR and WA) for timing of initial fungicide application and intervals between applications. The Columbia Basin Late Blight Forecasting Model, current disease conditions, and weather forecasts are used to determine fungicide timing. The model is based on the number of rainy days in April and May. Both hotlines will provide information on the probability of late blight occurrence in the Columbia Basin before the end of May. The number for Washington is 800-984-7400, and for Oregon 1-800-705-3377. A web site with current information is [www.wsu.edu:8080/~djohnsn/](http://www.wsu.edu:8080/~djohnsn/) Click on "Current late blight forecast and management recommendations."

U Begin applications at least 7 days prior to late blight exposure. Usually this requires making the first application just prior to row closure and continuing on a 7-day interval for three weeks or more. These early applications are extremely important because of the susceptibility of the foliage and the higher chance for weather conditions favorable for late blight development.

U Continue applications UNTIL HARVEST at recommended intervals to protect both new and old foliage. Consult the hotlines for suggested intervals. Applications in late season may be as important as early season applications, even if late blight up to that point has been a minor problem in the Basin. In late August or September, plant water use decreases while watering levels sometimes stay constant, dews begin to form, and overall temperatures are reduced, all of which can contribute to extensive late blight infection.

U Do not skip any plants. Total crop coverage is essential.

U Maintain adequate residue levels of fungicides on the foliage. Use a consistent application interval.

U Let fungicides dry on the foliage before beginning normal irrigation.

U When disease pressure is high, use short application intervals ( 5- 7 days).

U Ridomil Gold, copper, and tin fungicides are not effective against late blight by themselves. Super Tin is effective when mixed with metiram (Polyram) or mancozeb. Tin mixtures are most efficient from mid-season until harvest.

U Apply the first fungicide application by air and then rotate with chemigation. This is an effective and cost-saving program for late blight fungicide application, especially when disease incidence and pressure require a 7-day application frequency.

U All fields need protection from late blight. This includes fields scheduled for early harvest.

## Aphid and Late Blight Hotlines Up and Running for 2003

Aphid Hotline: Maintained by Keith Pike, WSU, Prosser, the number for this line is: **888-673-6273**. So far this year few aphids are being found in potatoes, but stay tuned to the hotline for updates throughout the season. The hotline will also cover the leafhopper/potato yellows situation in the Basin.

Lateblight Hotline: Maintained by Dennis Johnson, WSU Pullman, the number for this line is: **800-984-7400**. Late blight has not been found so far this season, but is predicted to be a problem.

## Potato Yellows Syndrome Research Project Contacts

If you have a field or any part thereof with symptoms of the yellows syndrome so common in 2002, please contact one of the following individuals. All the folks below are a part of a WSPC-funded research project on this disease. We are planning to better-understand the disease, and hope to learn from fields infected in 2003. **Symptoms of this disease include curled yellow or purplish leaves similar to leafroll virus, shortened internodes, swollen nodes, aerial tubers, and early plant decline.**

<b>Southern WA and Oregon:</b>	<b>Phil Hamm, 541-567-8321 or 541-561-4724</b>
<b>Southern and Central Basin:</b>	<b>Alan Schreiber, 509-539-4537</b>
<b>North Basin:</b>	<b>Andy Jensen, 509-760-4859</b>
<b>Yakima Valley and Southern WA:</b>	<b>Joe Munyaneza, 509-454-6564</b>

## Field Day Dates

Mark your calendar and plan to attend these educational field days this season.

Seed Lot Field Day, WSU Othello	June 27
Paterson USDA-ARS Field Day	July 16
Pest Management Field Day, Ag. Dev. Group, Eltopia	August 6
Mount Vernon Potato Field Day	August 21