Sustainable Agriculture Facts

Growing for tomorrow

Integrated Management of Late Blight on Potatoes

FIGURE 1. Spores developing on underside of leaf.

Late blight has been a problem for potato growers in North America since the 1840s. The recent arrival of a new form of the late blight fungus, the "A2 mating type", is resulting in many new strains of the fungus. These new strains are sometimes more aggressive and some may have overcome genetic resistance in some potato cultivars or be resistant to some fungicides. For example, strains have been found in North America that differ in their response to the fungicide metalaxyl. Some strains are sensitive to the fungicide and some strains are insensitive.

For effective control of late blight, integrated management MUST be adopted by all producers, large and small, including organic farmers, home gardeners and other specialized growers, by pesticide and equipment manufacturers and suppliers, and by government agencies, extension specialists and crop consultants.

Fungicides cannot be used alone for effective control of late blight, but must be used as one tool in an integrated management strategy. Cultural practices are the first line of defense, and forecasting techniques and proper application technology are essential for efficient, targeted applications of fungicides.

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All fungicides, old or new, must be used as protectants, before late blight is established. Attempting to use any fungicide to eradicate the disease after it is well established promotes the selection and spread of new fungicide resistance.

FIGURE 2. Late blight symptoms on top of leaf.

Symptoms

The first symptoms of late blight are small light green water soaked spots which usually develop on the lower leaves. Under favorable cool moist weather conditions, the spots rapidly enlarge into dark brown spreading spots. These spots are not limited by leaf veins as with early blight. Under the cool moist conditions of early morning, a white mildew growth, comprised of fungal mycelium and spores, develops on the under surface of lesions. The outer margin of the lesions is surrounded by a pale green to yellow border. Plants that are severely affected by late blight have a distinctive odor as a result of the rotting leaf and stem tissue.

Tuber symptoms are characterized by an irregular reddish brown staining of the tissue immediately below the potato skin. A dry rot may result in slightly depressed areas in association with the reddish brown color. Further rotting of affected tubers may occur in storage and is often accompanied by bacterial soft rot, pink rot, leak and fusarium dry rot.

Late Blight Prevention & Control

Healthy Seed

Obtain seed from sources with effective disease management practices. The use of certified seed is highly recommended. Grade seed carefully while cutting and discard suspicious looking tubers and seed pieces.

Crop Varieties and Resistant Cultivars

Select varieties with resistance to late blight wherever practical. Various publications available through agriculture extension specialists provide information on resistant varieties. Where practical, the use of short season varieties may help reduce the period of use for fungicides.

Sanitation and Cull Clean-up

Follow a program of sanitation for storage facilities and equipment to eliminate sources of the disease. Avoid leaving tubers, including debris or slivers from seed cutting, in cull piles for any length of time. Avoid uncovered cull piles during the growing season. Check with local authorities for methods of disposal.

Forecasting Techniques and Scouting Systems

To effectively schedule preventative fungicide applications and eliminate unnecessary fungicide use, local weather forecasts should be used to identify conditions conducive to disease development. Scout fields to identify hot spots and other sources of disease.

FIGURE 3.
Blackening of stem is another late blight symptom.

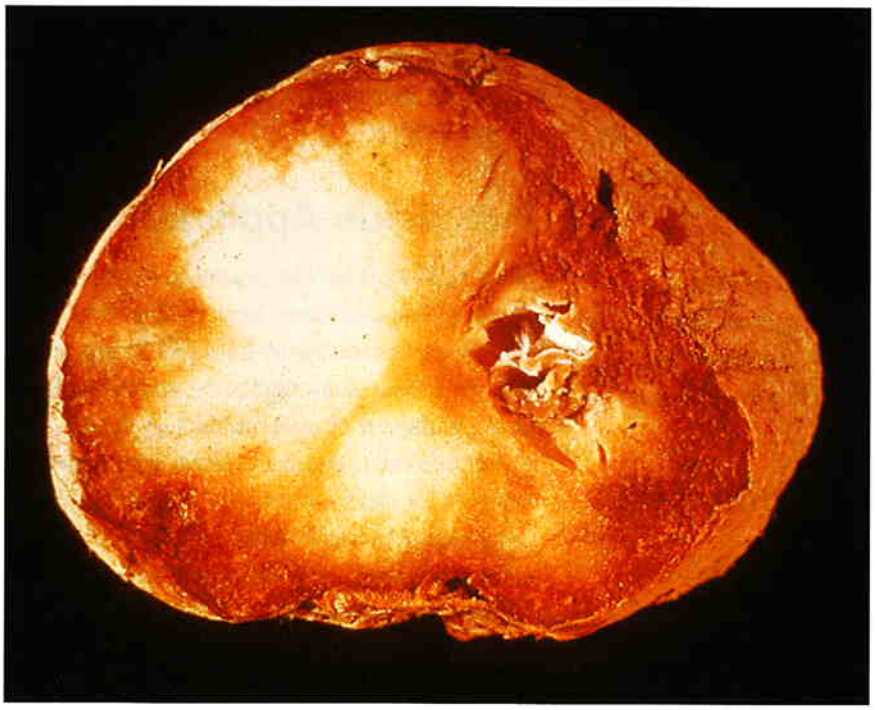

FIGURE 4.
Tuber infected by late blight.

Cultural Practices and Rotation:

Use proper cultural practices, including the following, as the first line of defense:

- Rotate potato crops with non-late blight hosts.
- Use proper hilling to reduce infection in tubers.
- Increase spacings of plants to reduce canopy density.
- Carefully manage irrigation use to avoid increasing disease risk through prolonged periods of wetness.
- Identify and destroy hot spots of infection in a field to reduce production and spread of spores. Bag and destroy individual plants, or use chemical and fungicide treatments for larger areas.
- Avoid fields that cannot be easily sprayed with fungicide.
- Control weed hosts, such as hairy nightshade.
- Promptly remove or destroy volunteer potatoes found in other crops grown in rotation or elsewhere.

For current potato blight information contact the Manitoba Potato Disease Hotline 1-800-428-6866 between June 1 and October 1.

Scheduled Fungicide Programs

Use fungicides as part of a **preventative program**. No fungicide is effective in eradicating disease that has already set in. Attempting to use fungicides as curatives can promote the spread of fungicide resistance. Consult the current edition of the Manitoba *Guide to Crop Protection* for recommended fungicides.

- Begin a fungicide program early in the season, always before disease develops, and continue through until harvest. Scouting programs, forecasts based on local weather conditions and stage of crop development should be used to determine when to begin applications and to adjust the timing of applications during the growing season.

- Follow label instructions for application rates, spray intervals and limitations on numbers of sprays. Do not exceed the label's application rates. Spray intervals are generally seven to 10 days for contact fungicides and 10-14 days for systemic and some other fungicides. When disease potential is high, such as during rapid plant growth or heavy rains, the shorter spray intervals on the label should be used. When disease potential is lower, such as during extended hot dry weather, the longer spray intervals listed on the label are appropriate.

- When the maximum number of applications of a fungicide is reached, switch to an unrelated alternate product.

- Crops should be monitored throughout the growing season (spring culls to harvested crops) for late blight. Pathogen populations should be monitored for sensitivity to metalaxyl or other fungicides for which resistance may be a problem. (Where available, rapid screening services for fungicide sensitivity are valuable in this regard). Where resistance to a fungicide is identified in a field, use of that fungicide should be discontinued.

- Rotate between different fungicide groups or use tank mixtures of different fungicides, particularly when using fungicides that enter plant tissues or have single or limited-site activity against the fungus.

- Organic farmers may be able to use copper-based fungicides as part of an integrated disease management plan and maintain organic certification.

Fungicide Application

When applying fungicides, complete coverage of the foliage (stems and leaves, top to bottom of canopy) with fungicide is necessary to enable disease prevention, regardless of the application method (ground or air, traditional or newer technology sprays). To ensure adequate coverage of plants, use equipment designed for and appropriate to fungicide applications. Do not over-extend acreage beyond what a sprayer can cover in the **minimum** time available, including bad weather. For example, no more than two to three days acreage capacity per machine. Use adequate water volumes and increase water volume as the crop grows. Ensure regular and proper equipment calibration.

The information utilized in this fact sheet originally appeared in a fact sheet S96-02 published by the Pest Management Regulatory Agency in 1996.

For more information, contact: Your local Manitoba Agriculture or PFRA office; or

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Harvesting, Grading & Storage Monitoring

- ***Harvest only when vines, both leaves and stems, are completely dead. Harvest suspect, shaded or wet areas after the rest of the harvest is complete.***

- ***Grade potatoes and remove infected tubers before they are put in storage.***

- ***Monitor storage facilities for "hot spots" which indicate the start of storage breakdown due to rots. Carefully manage air flow, humidity and temperature to reduce storage losses.***