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Help Protect the Famous Idaho Potato

Diagnose and Control Late Blight in Your Home Garden

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At a Glance

- Late blight of potato and tomato is both an old and reemerging disease in Idaho. Its causal organism, *Phytophthora infestans*, is listed as an invasive species in Idaho.
- The best way to prevent the disease is to plant certified seed and healthy planting materials in your garden.
- Late-blight lesions on potato leaves are circular to irregularly shaped and brown and potato tubers develop reddish-brown lesions and rot. Late-blight lesions on tomatoes exhibit irregularly shaped dark brown patches on the leaves, petioles, and stems and affected fruits have brown lesions that are firm to the touch.
- Warm temperatures (60°F–75°F during the day and 50°F–60°F at night) and wet humid conditions favor infection by the pathogen and thus the disease's rapid progression.
- Destruction of infected plants is critical to protect the Idaho potato industry.

Introduction

POTATO AND TOMATO PLANTS can be susceptible to late blight, a disease caused by the fungal-like pathogen *Phytophthora infestans*, which literally means “plant destroyer.” This fungal-like pathogen was responsible for the Irish Potato Famine of 1845–52. Late blight continues to be a major threat to food security worldwide, including the billion-dollar potato-growing industry of Idaho, the largest potato-producing state in the United States. Because of its high potential for damage and its non-native status, the pathogen is considered an invasive species by the Idaho State Department of Agriculture. The late-blight pathogen can also infect and survive in potatoes and tomatoes in home gardens. Such gardens can be a source of inoculum that can endanger commercial potato production if the disease is not rapidly diagnosed and adequately managed. It is important

to know that late blight, due to rapid reproduction and wind dispersion, can spread from a garden to potato fields hundreds of miles away. Fortunately, the normally hot, dry conditions of southern Idaho are not conducive to late blight. Nevertheless, disease outbreaks occur every few years and home potato and tomato growers should be aware of late blight.



Figure 1. Late-blight lesions on potato leaves are characteristically bordered by a light-green margin. Courtesy of Jeff Miller, Miller Research (Rupert, Idaho).

Symptoms and Signs

In commercial potato fields in southern Idaho, late blight typically occurs later in the growing season, from July onwards, with symptoms often appearing after plants have reached row closure. However, the disease can appear at any time in a home garden. Tell-tale symptoms of late blight on potato or tomato are circular to irregularly shaped brownish-black, water-soaked lesions on the leaves. These lesions usually are bordered by a light-green margin (Figures 1 and 2). Petioles and stems can also be infected and develop similar lesions (Figure 3). The entire potato and tomato plant will eventually become infected and die from late blight.



Figure 2. On tomato leaves, late-blight lesions appear irregularly shaped and water-soaked in appearance. Photo by Kasia Duellman.



Figure 3. Late-blight infections on potato stems. Courtesy of Jeff Miller, Miller Research (Rupert, Idaho).

Tomato fruit can also be infected, with symptoms appearing as diffuse, dark brown, mottled patches that are firm, not soft with white mold growth as the signs of the disease (Figure 4). Lesions on the surface of affected potato tubers may be sunken, brown, or purplish in color. Underneath, dry, firm lesions that are reddish or tannish brown in color and extend slightly inward may develop. These lesions are best observed by lightly peeling the skin over the affected areas of a tuber (Figure 5). Symptoms of late blight can further develop in storage; affected tubers can be more susceptible to secondary infection by soft rot organisms that decay tubers more quickly.

Under high humidity and cool night temperatures of 50°F–60°F, alternating with days of 60°F–75°F, the pathogen initiates spore production on threads of white, mold-like growth on the undersides of leaves along the edges of the blotchy lesions.



Figure 4. Diffused mottled patches on tomato fruit that is firm appear as white moldy growth on the fruit's surface. Photo by Kasia Duellman.



Figure 5. Peeled potatoes with red to tan firm lesions on the internal surface. Courtesy of Jeff Miller, Miller Research (Rupert, Idaho).

The spores produced on the leaves are easily disseminated by splashing rain or irrigation water, which subsequently infects the tubers and leaves of neighboring susceptible plants. Wind can carry the spores longer distances, to commercial fields of potatoes up to several miles away.

Diagnosing late blight based on symptoms alone is challenging, since the symptoms can resemble those of other aggressive diseases such as gray mold (*Botrytis cinerea*) and early blight (*Alternaria solani*). If your tomato or potato plants have symptoms similar to those described above, it is important to confirm the cause, since late blight is a highly contagious disease that threatens Idaho potato production. A laboratory diagnosis can confirm the cause and University of Idaho Extension personnel can assist with obtaining a diagnosis. Please contact your local Extension office or Research and Extension Center to initiate diagnostic procedures.

Management

Prevention is the first line of defense. To reduce the risk of late blight, purchase and plant certified seed potato tubers, which are often available at local nurseries. Planting potatoes purchased at the grocery store that are meant for eating dramatically increases the risk of introducing late blight and other tuber-borne diseases into your garden. Additionally, such eating potatoes may not sprout as expected, leading to disappointing results in the garden. When purchasing tomato seedlings,

look for late-blight-resistant varieties from a reputable source.

Additional preventive measures can reduce the chance of your plants getting late blight. Any practice that promotes the drying of the plant canopy helps to reduce the disease's incidence. For example, increasing space between plant rows increases airflow between plants and thus helps to limit the virus' initial introduction and minimizes its spread within the garden. For tomatoes, pruning lower leaves and branches reduces rain splash in the lower canopy. If left unpruned, the resulting increased humidity and moisture in the canopy may allow the pathogen to flourish. Adopting strategies that prevent plants from touching each other, such as providing stakes for support, minimizes risk of plant-to-plant movement of the pathogen from splashing water drops from rain or overhead sprinklers. Watering plants from below rather than overhead sprinkling reduces the chance for splashing spores onto healthy leaves and helps to keep foliage dry. Sanitizing garden tools regularly with soapy water or alcohol also lowers the risk of spreading the pathogen from infected to healthy plants during pruning or other garden activities.

If you confirm the presence of late blight in your garden, follow the rules governing invasive species in Idaho: immediately destroy late-blight-infected plants by burning or putting them in well-sealed plastic bags for proper waste disposal in landfills. Indeed, removal of the source of infection is one small but critically important step to lessen the impact of the disease in nearby potato fields.

Protectant fungicides are also available for the home garden; however, these work best when applied before infection occurs and symptoms appear. These fungicides protect plants when environmental conditions become favorable for the disease, but they need to be reapplied often. Once late blight has taken hold in a home garden, fungicides are not effective. Destroying infected plants as described above thus becomes the best management strategy. Organic control options are available but are less effective. These strategies include more frequent application of organic fungicides, such as liquid copper, or burning and removing infected plants.

Additional Reading

Bohl, W. H., P. Hamm, P. Nolte, R. E. Thornton, and D.

A. Johnson. 2003. *Managing Late Blight on Irrigated Potatoes in the Pacific Northwest* (PNW 555).

Schumann, G. L., and C. J. D'Arcy. 2000 (updated 2018). Late Blight of Potato and Tomato. *Plant Health Instructor*.

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