

## Late Blight Symptoms

**On potato tubers:** Infected potatoes have shallow, brownish or purplish lesions on the surface of the tuber. If you cut across the surface of these infected areas, you'll see a reddish-brown, dry, granular rot that extends up to half an inch into the flesh. Late blight lesions can serve as pathways for other tuber diseases including bacterial soft rot to enter, so late blight symptoms can sometimes be obscured by symptoms of other diseases.



Late blight on potato tuber.

**On potato plants:** Late blight lesions can occur on both leaves and stems. The first appearance of lesions commonly occurs after periods of wet weather. Black lesions appear within 3-7 days of infection of leaves. Under humid conditions, delicate, whitish growth (pathogen spores) are produced at the edge of the lesion, particularly on the underside of the leaf. Lesions turn brown when they dry up. Active lesions are often surrounded by a halo of gray-green tissue. Once lesions dry up, the white spore masses will not be visible. To help identify late blight if outdoor conditions are not humid enough for spores to be produced, you can place suspect leaves or stems in a closed container with a damp paper towel. Check the leaves after about 12 hours to see if the delicate, white pathogen sporulation is visible on the tissue at the edge of the lesion. On stems, late blight causes brown, greasy looking lesions that frequently appear first at the junction between the stem and leaf, or at the cluster of leaves at the top of the stem.

**On tomatoes:** Symptoms on tomato leaves and stems are similar to those on potato. On tomato fruit, late blight causes a firm, dark, greasy looking lesion from which the pathogen spore producing structures emerge under humid conditions.



Late blight on tomato fruit.

## Need More Information?

Fact sheets with information about the biology and management of late blight, along with excellent photos of symptoms on both potato and tomato can be found at <http://vegetablemndonline.ppath.cornell.edu/> and <http://nysipm.cornell.edu/factsheets/vegetables>

Photos of late blight symptoms on tomato and a common landscape weed are posted at <http://www.hort.cornell.edu/lateblight>

**Contact your county Cooperative Extension Office or your local garden center for recommendations on fungicides for late blight control.**

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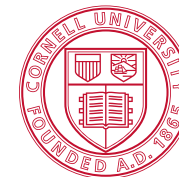
# Late Blight

## A Serious Disease of Potatoes and Tomatoes



Late blight lesions on tomato leaflet.

**IPM** New York State  
Integrated Pest Management  
Program



**Cornell University**  
Cooperative Extension

## What is Late Blight?

Late blight is a plant disease that mainly attacks potatoes and tomatoes, although it can sometimes be found on other crops, weeds and ornamentals in the same botanical family (Solanaceae). Other plants that late blight may infect include petunia, nightshades, and tomatillos. Late blight was a factor in the Irish potato famine in the 1850's, during which millions of people in Ireland starved or were forced to emigrate. Entire potato crops rotted in the field or in storage because of late blight infection. Late blight is caused by an oomycete pathogen that survives from one season to the next in infected potato tubers. This organism is well known for its ability to produce millions of spores from infected plants under the wet weather conditions that favor the disease. Early in the season, the disease can be introduced into a field or garden on infected seed potatoes, from volunteer plants growing from diseased potatoes that were not harvested last season, from infected potatoes in cull piles (rejected potatoes), compost piles, or infected tomato transplants brought into the area.

Spores produced on infected potatoes and tomatoes can travel through the air, land on infected plants, and if the weather is sufficiently wet, cause new infections. Spores can also be washed through the soil to infect potato tubers, which may rot before harvest, or later in storage.

Because the oomycete that causes late blight produces so many spores, and the spores can travel long distances through the air, it is very important that everyone who grows potatoes or tomatoes is able to identify late blight and know how to control it, to avoid being a source of spores that infect potatoes and tomatoes in neighboring gardens and commercial fields. This disease is capable of wiping out not only your entire potato and tomato crop but also commercial fields very quickly under wet conditions, and farmers who grow potatoes or tomatoes are at serious risk of losing their entire income from these crops.



Late blight stem lesions on potato..

## Some History

Late blight used to be a frequent problem for potato farmers in the U.S., but a new fungicide introduced in the early 1970's was extremely effective against late blight, and for many years it was found only rarely. Starting in the late 1980's, new strains of the late blight pathogen were found in Mexico that were resistant to this fungicide. These new strains made their way into the U.S., and in some years cause serious late blight epidemics in tomatoes, potatoes, or both. In years when late blight is a problem, you can play an important role in minimizing its spread by controlling late blight in your garden. This will prevent spores from being produced that could cause infection in nearby gardens and commercial fields. To control late blight, gardeners must learn to recognize the disease symptoms and use an assortment of practices for disease management. Fungicide applications may be needed in some years to prevent loss of tomatoes and potatoes in your garden. If disease becomes severe it may be necessary to destroy infected plants to prevent spread to nearby gardens and farms.

## Preventing Late Blight

**Avoid sources of inoculum:** The most effective management strategy for late blight is to avoid sources of early season inoculum (spores). Late blight can only survive on living tissue, so potato tubers or tomatoes (transplants or imported fruit) are the only source of early season inoculum. One important way to avoid introducing late blight on potatoes is to plant healthy certified seed potatoes. Many states where potato seed is produced have seed certification programs to ensure that the seed meets certain standards for disease levels. Certified seed is not a guarantee that late blight will not be present, however. Examine your seed carefully before you plant, and plant only sound, blemish-free tubers. Destroy (not just putting them into cull piles) any rejected tubers that you don't plant. Other ways to avoid early season inoculum: make sure any potatoes put into compost piles are completely decomposed (rotted), and pull up and destroy any potato plants that come up from tubers that were left in the garden last season.

**Resistant Varieties:** Planting resistant varieties will slow down (but not prevent) the development of late blight. Currently, "Defender" and "Elba" are the most resistant varieties available. Potato varieties with moderate levels of resistance include: Kennebec, Sebago, and Allegany. Resistant tomato varieties will be available soon. The first resistant tomato variety will be a cherry tomato called "Mountain Magic".

**Fungicides:** If the growing season is wet, and late blight is present, fungicides will be necessary to protect your plants from infection. For home gardeners the only available fungicides that are effective against late blight are protectant materials, which means that they must be on the foliage before spores land on leaves and initiate infection. (Infection only occurs when the leaves are wet.) Therefore, continuous fungicide coverage is necessary to protect plants from infection. Tomatoes and potatoes are susceptible to late blight at any time during the growing season. Choose a fungicide that has maneb, mancozeb, chlorothalonil, or fixed copper as an active ingredient AND has tomato and potato late blight on the label. Of these fungicides, only some of the fixed copper products are approved for organic production. Contact your Cornell Cooperative Extension office for more information about controlling late blight. And remember, all pesticides should be used in accordance with instructions on the label.

If you choose **not** to use fungicides it's important that you keep an eye on your potatoes and tomatoes and remove and destroy infected plants to avoid spreading the disease to nearby gardens and farms. If possible, destroy infected plants on a dry, sunny day when dislodged spores will die quickly. If the weather is continuously wet, it is better to destroy plants sooner rather than waiting for a dry day.

**Scouting:** During the growing season, check your potatoes and tomatoes for symptoms of late blight twice each week. Check more often during periods of wet weather. If you find any late blight in your garden, intensify your fungicide applications (by increasing application frequency or rates) within the guidelines listed on the label. If late blight becomes severe, destroy diseased plants by thoroughly tilling them under, or by cutting them off and immediately burying or bagging them to avoid producing large numbers of spores that could put nearby farmers and gardeners at risk.

**To avoid tuber infection:** Hill up soil around the base of potato plants to provide a barrier to spores that can wash through the soil. Vines should be dead 2-3 weeks before digging potatoes for storage. If you want to harvest before the vines have died naturally, cut stems just above the surface of the soil 2-3 weeks before harvesting.