



Organic Seed Potatoes, Fingerlings,
Onion Sets, Shallots, and Garlic

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UNDERSTANDING LATE BLIGHT

Advice and Tips from The Maine Potato Lady™

In the "tomato and potato epidemic of 2009," farmers and gardeners across the Northeast were shocked to find their tomatoes and potatoes affected by "late blight." The fungus that causes late blight is well-known for its role in the Irish Potato Famine of the mid-19th century, when it nearly destroyed the Irish potato crop and caused widespread starvation. Here are some tips for recognizing late blight, understanding and controlling its life cycle, and managing an infection should it appear in your garden.

What is Late Blight? One of the few plant diseases that can completely destroy a crop, late blight is a devastating fungal disease that attacks plants in the Solonacae family, primarily potatoes and tomatoes. It can also infect petunias, nightshades, and tomatillas. Caused by a fungus-like organism called *Phytophthora infestans*, late blight is an oomycete pathogen known for its ability to produce millions of spores very quickly. All parts of the plant can become infected, first showing irregular dark green, water-soaked lesions that eventually turn brown and die. White spore structures will show on the undersides of the leaves during high humidity. Infected tubers show purplish-brown lesions on the surface and brownish granular rot inside. Late blight lesions can serve as conduits for secondary infections such as bacterial soft rot or fusarium soft rot.

How Does Late Blight Spread So Rapidly? Overgrowth and spread of the fungus occurs when infected plant matter is present during warm, humid weather. The inoculum (the infected matter) may be present in transplants and seedlings, diseased "volunteer" plants, culled potatoes, diseased seed potatoes, and plant waste. (The fungus becomes inactive in dry weather but is still present if the plant is alive. The spores, which stay viable on living plant material, can survive from year to year, thus providing next season's inoculums.) When conditions are right (temperatures between 50°F and 70°F and relative humidity greater than 95% for three to five days), infected plant tissue can produce millions

of blight spores at an explosively rapid rate. The spores can travel up to 50 miles on the wind, infecting nearby farms and gardens.

How Can Late Blight Be Prevented and Controlled? It's critical that gardeners and farmers know how to recognize and manage late blight, both to secure their own crops and to prevent their farms from becoming sources of infection.

- **Be prepared to respond** should an outbreak occur in your area or on your farm. Learn techniques for management of the disease to minimize crop loss and spread of inoculum from you to your neighbors.
- **Plant only healthy tubers or transplants.** Be sure that you purchase transplants and seed stock that is free from the pathogen. Certified potato seed is not guaranteed to be disease-free, but it meets state standards. Most seed growers do a late blight screening to prevent sales of lots infected with the pathogen.
- **Use blight-resistant varieties where applicable.** Resistant varieties are not necessarily immune, but are less likely to be affected. Potato varieties that show field resistance which are available in The Maine Potato Lady catalog include Kennebec, German Butterball, Elba, and Magic Molly. We welcome your personal observations.
- **Understand the conditions under which late blight is likely to occur.** Periods of rain or dew (relative humidity greater than 95%) and temperatures between 50°F and 70°F for three to five days are the ideal weather conditions. Several states offer

blight forecasting to help growers manage this disease. Contact your local Cooperative Extension agency for more information.

- **Use a preventive spray program** beginning when the plants are 6" tall and repeating the spray schedule recommended by your state's extension service. In Maine, we typically begin with a 10-day spray schedule, going to 7 or 5 days depending on weather conditions and the severity scale. Conventional growers may obtain fungicide recommendations from local cooperative extension agents. Organic growers can choose from among several prophylactic products which are applied to the leaf surface to prevent the blight spores from attaching there. The most effective product is copper hydroxide. Compost teas have been shown to be effective as they colonize the leaf surfaces with microorganisms that are antagonists to invading pathogens. Compost is regulated in organic production; check with your certifier before using. Other products that work like the compost tea include Serenade™ (contains *Bacillus subtilis*) and Actinovate® (contains *Streptomyces lydicus*). Organic growers should check with their certifiers to identify approved products.

- **Learn to recognize late blight.** Scout your potato and tomato plants at least twice a week. Inspect the stems and leaves in the lower canopy, looking for dark lesions (spots) and whitish moldy-looking areas (these contain the spores.)

- **Remove and destroy infected plants.** If you spot late blight on a cultivated plant, pull and destroy the plant, preferably on a sunny day when the lesions are dried, being careful to minimize spread of the spores. Scout for "volunteer" potato plants in the field or compost pile, too, and destroy these completely, taking care not to drop contaminated material or release spores to the air. Ensure that no live, infected plant material is in your garden or compost piles.

- **Harvest and store potatoes safely.** Harvest potatoes about two weeks after the plants are dead, whether they die at maturity or after manual killing of the tops. The two-week delay ensures that the skins are set; this will reduce harvest injuries through which diseases can be introduced. Allowing the plant tops to die also minimizes the spread of the late blight spores, if they are present on the plants, to the tubers. Avoid harvesting in damp or rainy weather. Let the soil dry on the tubers and lightly brush off excess dirt. Cure the tubers in the dark for 10-20 days at 50°F-60°F, ensuring good air circulation. Inspect the potatoes,

culling any that show signs of rot or breakdown. Then store at 38°F-42°F in total darkness. As you use the potatoes for eating, inspect them for signs of disease; other diseases besides late blight can lead to bacterial soft rot in stored potatoes. Remove rotten potatoes and dispose properly.

- **Establish and implement a fall clean-up plan** to minimize carryover of the inoculum to next year's crop. The fungus can only survive on live plant material, usually tubers. Turn under plants after harvest to allow the soil environment to decompose properly. If you choose to compost, the pile must get hot and be turned to ensure that it heats thoroughly. Tubers – and inoculums on them – can survive in the garden, in compost piles that don't completely heat up or freeze, in thick cull piles that don't freeze, in culls from storage or purchase that are not disposed of properly, and in greenhouses that do not freeze. Late blight will not survive on stakes or equipment.

Is Late Blight Dangerous to Humans? Late blight is a plant pathogen, not a human pathogen. Healthy tomatoes and potatoes from infected plants are safe to eat. Cut off the diseased part and eat the rest. Choose only healthy vegetables for canning or storage.

Where Can I Get More Information? Many organizations offer good information, pictures, and product recommendations to help identify and manage late blight. We've found these resources helpful:

www.nysipm.cornell.edu/publications/blight/files/late_blight.pdf

www.hort.cornell.edu/department/Facilities/lihrec/vegpath/photos/lateblight_potato.htm

www.umassvegetable.org

www.attra.ncat.org/attra-pub/PDF/lateblight.pdf

Recommended Products

- **Actinovate®** - See page 29 of The Maine Potato Lady's Catalog- <https://www.mainepotatolady.com/productcart/pc/viewCategories.asp?idCategory=62>

- **Serenade™** <http://www.serenadegarden.com>

- **Copper Hydroxide** – Check with OMRI (Organic Materials Review Institute) <http://www.omri.org> or your local certifier.