

Plant Pathology Fact Sheet

Recognizing Late Blight on Tomato Seedlings

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Late blight is an extremely important and damaging disease of tomatoes and potatoes, and occurs wherever these crops are grown. Until recently, late blight was considered a minor problem in Kentucky; however, a severe outbreak in July 2009 caused heavy losses to home gardeners and commercial producers. Although the source of this outbreak was never determined, introduction on infected transplants was suspected. In May 2010, late blight was confirmed on tomato transplants being sold by a number of retail garden centers in central and northern Kentucky. No serious outbreaks occurred that year because of the hot and dry weather that prevailed, but losses would have been high in a cooler, wetter summer due to the sheer number of infected transplants that were sold to unsuspecting gardeners.

Introduction of this disease on transplants may or may not take place every year, but it represents a threat to tomato (and potato) producers in Kentucky. Tomato seedlings that have late blight when transplanted



FIGURE 1. DARKENED, IRREGULAR, AND WATER-SOAKED LESIONS ON LEAVES OR STEMS ARE TYPICALLY SEEN ON TOMATO SEEDLINGS AFFECTED BY LATE BLIGHT.

can serve as sources of inoculum (spores) that can spread to nearby gardens and commercial plantings, so every measure should be taken to prevent these plants from making it to the field. The added threat is that sources of disease are introduced early in the tomato production season, magnifying the potential for heavy losses in seasons that favor late blight.

Learning to identify late blight on tomato seedlings is extremely important for home

gardeners and commercial producers. This knowledge will help prevent the unintentional introduction of a devastating disease AND allow other tomato and potato growers to be alerted to a potential threat.

SYMPTOMS AND SIGNS

On seedlings, late blight first appears as circular-to-irregularly shaped, water-soaked blotches on leaves (FIGURE 1), petioles, and stems (FIGURES 2 & 3) that expand rapidly under favorable conditions. In humid environments, white and fuzzy fungal growth may be present (FIGURE 4) and indicates that spores are being produced and released into the area. Extensive blighting of foliage (FIGURE 5) follows; death of seedlings is common where stem infections occur. If conditions become unfavorable for disease after the appearance of symptoms, lesions can “dry out”, leaving brown-to-black necrotic areas on foliage and stems.

CAUSE AND DISEASE DEVELOPMENT

Late blight is caused by *Phytophthora infestans*, a fungus-like organism belonging to a group of microorganisms called “oomycetes” or water molds. The late blight pathogen needs living tissue to survive and does not generally overwinter in Kentucky since susceptible hosts are killed during the cold winter months. The pathogen does not survive on seeds, even if the disease was present on the crop before seeds were extracted. Potential sources of inoculum (spores) that can affect tomato seedlings



FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5

FIGURE 2. IN SOME CASES, ONLY STEM LESIONS WILL BE PRESENT INITIALLY; LESIONS WILL BE DARKENED AND WATER-SOAKED. THESE LESIONS MAY GIRDLE THE STEM AND KILL GROWTH ABOVE THAT POINT.

FIGURE 3. LARGE STEM LESIONS CAUSED BY LATE BLIGHT ON A POTTED TOMATO TRANSPLANT.

FIGURE 4. TUFTS OF FUNGAL GROWTH AND SPORES PRESENT IN A LATE BLIGHT LESION ON A YOUNG TOMATO PLANT.

FIGURE 5. SEVERE DAMAGE CAUSED BY LATE BLIGHT ON A FLAT OF TOMATO SEEDLINGS.

for personal use or sale in Kentucky include volunteer potatoes; infected tomatoes in greenhouses or other protected environments; imported, diseased planting material; and spores blown in from areas where late blight is active. Tomato plugs or seedlings produced out of state are thought to become exposed to the late blight pathogen from infected volunteer tomatoes and potatoes, susceptible weed hosts, or susceptible plants such as tomatoes, eggplants, and petunias (related to tomatoes) grown in greenhouses.

Late blight is most aggressive during periods of cool and wet weather. The ideal climate for infection and development is characterized by cool nights (50-59° F) and warm days (70-79° F) along with frequent periods of rain, fog, or heavy dew. Disease development is slowed or stopped at temperatures above 86° F, although the pathogen can remain dormant in infected tissue and re-emerge if temperatures fall back to the disease-favorable range. During favorable conditions, symptoms will appear around 5 days after infection occurs, and spore production will begin on infected tissue 1 to 2 days later. Large numbers of spores are produced, and are then spread by wind, water splash, or mechanical contact. Thus, the disease can spread rapidly in transplant production facilities and retail outlets. Once infected tomatoes make it into gardens and commercial fields, a large-scale epidemic is likely if weather is cool and rainy for extended periods of time.

TIPS FOR BUYING HEALTHY TOMATO SEEDLINGS

1. If possible purchase plants grown locally from seed and not plugs brought in from out-of-state. The risk from late blight is generally lower on these types of plants than on imported, finished plants or locally-grown plants produced from imported plugs.

2. Look carefully at all plants on display for the characteristic symptoms and signs of late blight (refer to figures). The disease may be evident on just a few plants in a garden center at first, and symptoms will be mild. The disease often develops earliest in shaded areas of the retail bench, particularly beneath overhanging racks. Left unmanaged, the disease can affect large numbers of seedlings in a short time frame.
3. If you suspect that plants are infected by late blight, alert your local Cooperative Extension representative as quickly as possible. Suspect plants need to be tested quickly to confirm the presence of late blight. This is important because certain diseases or environmental problems can mimic late blight and laboratory tests are needed to provide a positive identification. Do not buy plants from retail outlets where late blight is suspected until testing is complete. It may seem reasonable to just buy the healthy-looking plants around those that appear to be diseased, but there is still risk if late blight is active in the retail center. It takes several days from the time a plant is infected by the late blight pathogen to the appearance of symptoms. Plants that seem healthy could actually have the disease and would certainly show symptoms once brought home and planted. If tests come back negative, it should be safe to plant seedlings purchased from that particular retail outlet.
4. Do not purchase tomato seedlings from a retail center where late blight has been confirmed until all plants have been destroyed and new, healthy stock brought in. In cases where late blight is confirmed in retail outlets, Cooperative Extension will work with store management to help bring the problem under control.

5. As an added measure of safety, consider holding purchased plants in an isolated area for a week before transplanting them in the garden or field. Water the plants as needed and watch for the appearance of symptoms of late blight (or other diseases and insects). Plants that appear healthy after this period will likely be safe to plant. If late blight (or another problem) is suspected, contact a representative of the Cooperative Extension Service for assistance in identifying the problem before moving these seedlings outside.

Additional Resources

Disease management and crop production advice can be found in the following University of Kentucky publications available at County Extension offices, as well as on the Internet.

- Home Vegetable Gardening in Kentucky, ID-128 (2011)
<http://www.ca.uky.edu/agc/pubs/id/id128/id128.pdf>
- IPM Scouting Guide for Common Pests of Solanaceous Crops in Kentucky, ID-172 (2008)
<http://www.ca.uky.edu/agc/pubs/id/id172/id172.pdf>
- Late Blight of Tomato, PPFS-VG-13 (2011)
http://www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-VG-13.pdf
- Management Tips for Disease Control in Commercial Vegetables in Kentucky, PPFS-VG-05 (1994)
http://www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-VG-5.pdf
- Vegetable Production Guide for Commercial Growers, ID-36
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>

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