A4052-01

Tomato Late Blight

Identification and Management

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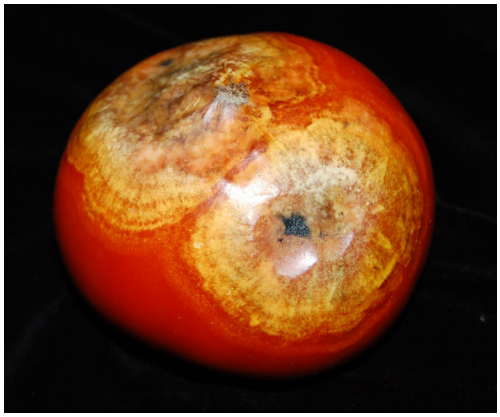
Late blight is a plant disease that affects a variety of *Solanum* spp., including eggplant, pepper, nightshade weeds, and petunia. However, it is most infamously known for its destruction of potato, *S. tuberosum*, and tomato, *S. lycopersicum*.

Tomato leaf late blight lesions can be round to irregular in shape and may have a brown dry center with pale green halo when conditions are dry.

Symptoms

Symptoms of late blight may be found on any above-ground part of the tomato plant. Infected leaves typically have green to brown patches of dead tissue surrounded by a pale green or gray border. When the weather is very humid and wet, late blight infections can appear water-soaked or dark brown in color, and are often described as appearing greasy. White, fuzzy growth may be found on the undersides of leaves or on lower stems. Stem and petiole lesions are brown and are typically not well defined in shape. Discoloration may also occur on the flowers, causing them to drop.

Symptomatic tomato fruits appear mottled, often with golden to dark brown, firm, sunken surfaces. White, fuzzy pathogen growth can also be found in association with the fruit lesions.



Ripe tomato showing late blight symptoms of firm, sunken lesions. Some lesions are dark brown, and others are golden (above) and show rings of pathogen growth.

Whole tomato plants defoliated due to late blight infection. Note fruit hanging on plants despite loss of vines and stems.

Disease spread and conditions

Phytophthora infestans is the oomycete, or water mold pathogen, responsible for tomato late blight. In the United States, this fungus-like organism overwinters primarily in plant debris as mycelia, a filamentous, thread-like growth of the pathogen. In some countries of Europe and South America, the pathogen can produce a soil-persistent spore known as the *oospore*, but this spore has not been identified in the United States. The pathogen spreads by movement of asexual spores: sporangia (airborne spores) and zoospores (water-swimming spores). The pathogen invades host plant cells causing plant death.

The production of pathogen spores is promoted by moist conditions (90–100% relative humidity) with moderate temperatures (60–80˚F). Sporangia may germinate at 64–75˚F, and zoospores are released at 46–64˚F. Mycelia prefer temperatures around 73˚F for optimal growth.

Disease cycle

Phytophthora infestans reproduces asexually (via sporangia and zoospores). In warm weather, sporangia land on susceptible host tissue and directly germinate to create an infection. In cooler wet weather, however, sporangia produce motile zoospores that can infect host tissues. After just 4–5 days of sufficient moisture and moderate temperatures, a new phase of sporulation can occur at the site of the initial infection. New sporangia are then carried by wind and splashed water to new plant tissue, creating new infections. And the disease spreads. Continued and rapid repetition of this asexual disease cycle causes large-scale and fast-advancing late blight epidemics.

Underside of tomato leaf showing typical late blight lesions under relatively dry conditions. Lesions are brown and papery with rings of white, fuzzy pathogen sporulation. Sporulation typically occurs on plants not receiving direct sunlight.

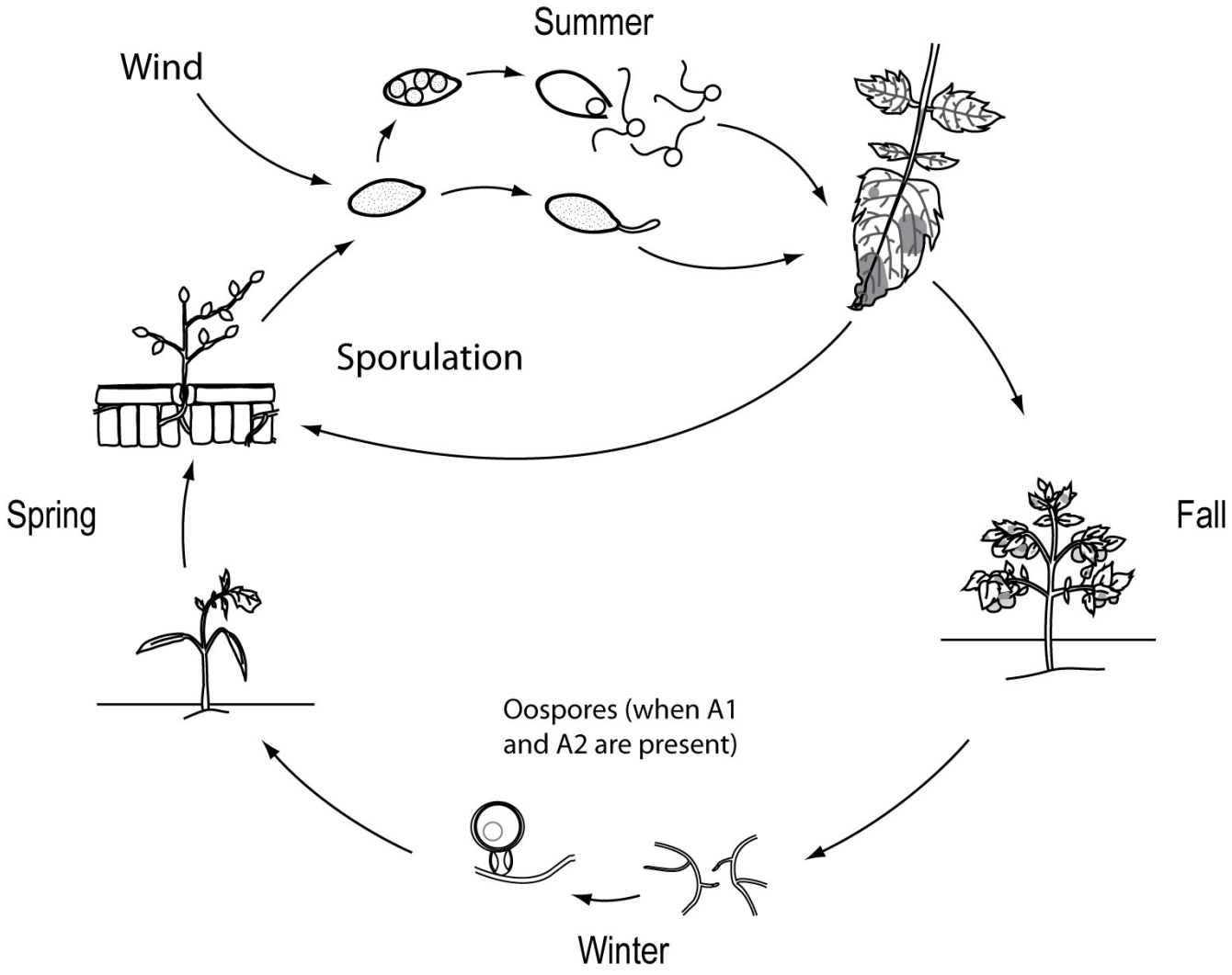
Management

Strategies for managing late blight in tomato include planting resistant cultivars, eliminating volunteers (tomato plants that have re-seeded from the previous year's crop), spacing plants to increase airflow and reduce humidity, and applying preventive and effective fungicides to avoid infection.

Various fungicides are registered for use in controlling tomato late blight. Some categories of fungicides are appropriate in conventional systems, and others are appropriate in organic systems. For either production system type, it is critical to apply fungicides *before* initial infection for best control of late blight.

Commercial producers in Wisconsin have adopted use of Blitecast. This disease-forecasting tool indicates appropriate timing for preventive fungicide applications based on favorable weather. This tool can aid in reducing the need for multiple, calendar-based fungicide applications prior to actual disease risk. For further information and access to Blitecast information, please refer to the University of Wisconsin Vegetable Pathology website (**www.plantpath.wisc.edu/wivegdis/**). For Wisconsin-specific fungicide recommendations, please refer to *Commercial Vegetable Production in Wisconsin* (A3422), a guide available through the UW-Extension Learning Store website (**learningstore.uwex.edu**).

Tomato Late Blight Disease Cycle



Note A1 and A2 mating type interaction at bottom of figure. The U.S. does not currently have this phase of the disease cycle, but in some parts of the world, the pathogen will mate and produce a soilborne spore (oospore).

For more information

USAblight
www.usablight.org
This national late blight reporting and information website also provides useful statewide disease occurrence, management information, and alerts.

University of Wisconsin Vegetable Pathology website
www.plantpath.wisc.edu/wivegdis/

Commercial Vegetable Production in Wisconsin (A3422)
learningstore.uwex.edu

Your local Extension office
In Wisconsin:
yourcountyextensionoffice.org

Outside of Wisconsin:
www.csrees.usda.gov/Extension

UW Extension
University of Wisconsin-Extension

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