Fire Blight in Apples and Pears

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Symptoms & Damage

If you have apple or pear trees, you might see symptoms of fire blight: blackened blossoms and fruit, twig and canopy dieback, and dead areas on branches and trunks.

Fire blight is a common and destructive bacterial disease in apples, pears, and other related plants. In California, fire blight is the most serious disease in pears. It is caused by the bacterial pathogen, *Erwinia amylovora*. Its growth is influenced by temperatures, humidity, tree growth stage, host species and cultivar susceptibility. Fire blight has some characteristic visual symptoms that can help with identification and understanding its life cycle can help with management.

Fire blight survives and overwinters in cankers on branches and trunks. Cankers become active in the spring when conditions are warm and wet as new tree growth begins. Over time, cankers release a light tan, watery ooze that turns dark and leaves streaks on bark. Newly infected wood appears pink, orange, or reddish. If you cut the bark away from the edge of an active canker, you can see reddish flecking in the wood just next to the canker margin (see photos below). Expanding cankers kill wood, turning it dark brown, sunken, dry and cracked.

This disease does best when temperatures are between 75-85° F during the day and above 55° F at night. The disease is spread by pollinators and splashing water drops to open blossoms and growing shoots. It infects flowers and shoots which wilt, shrivel and turn dark brown/black. Infected shoot tips wilt and form a “shepherd’s hook” shape.

You may find characteristic ooze on infected fruit. Dead, blackened fruit, shoots and leaves remain on branches during the season. This can make the infected tree look scorched on the edges, which earned the disease its name. Infections spread down into larger limbs, trunks and root systems. The bacteria move from the main canker into healthy wood in narrow paths less than 1 ½ inches wide, extending up to 3 feet past the main canker. The degree of crop loss depends on the severity and extent of the disease. It can kill highly susceptible hosts. Once a tree is infected, it hosts the disease indefinitely and can be a source of inoculum that infects other nearby trees.

Shriveled, blackened and dead blossoms and fruit infected with fire blight (photo by Jack Kelly Clark, UC IPM).

Hook-shaped wilting and dead shoot tips on branches infected with fire blight (photos by Jack Kelly Clark, UC IPM).

Shoot and canopy dieback caused by fire blight (photos by Jim Adaskaveg, UCCE).

Blackened, dead fruit and bacterial ooze on twigs infected with fire blight on the left (photo by Jack Kelly Clark, UC IPM). Discoloration and bacterial ooze on infected fruit in the center and right photos (photos by Jim Adaskaveg, UCCE).

Canker symptoms of fire blight on branches and trunks: dead tissue, blackened bark, dead branch tissue, grey cankers, red/orange discoloration, dry and cracked bark (left and center photos by Jack Kelly Clark, UC IPM; right photo by Jim Adaskaveg, UCCE).

Management Options

Winter is a great time of year to develop your Integrated Pest Management (IPM) plan for fire blight. IPM is a process for solving pest problems while minimizing risks to people and the environment. The IPM framework provides a "toolbox" approach to pest management: choose a combination of strategies that make sense for your context. Here are some IPM strategies to consider.

Before planting:

- Explore rootstocks and scions that are less susceptible to fire blight (see the section "Choosing Tolerant Varieties" on the UC IPM website).
- Design orchard to promote air movement and reduce humidity.

After planting, use good tree/orchard management practices:

- Provide balanced nutrient inputs and avoid high nitrogen fertilization so that trees are not too vigorous.
- Minimize irrigation during bloom to minimize humidity.
- Scout regularly to look for fire blight symptoms.
- Remove plants that serve as alternate hosts for fire blight.

Pruning:

- Equipment: loppers, hand shears, a saw, and disinfectant.
- Remove infected tissue at least 8-12 inches below the visible infected area.
- In the summer or winter, the disease is inactive and not spreading through the tree, so cleaning pruning shears is not needed.
- In the spring, remove advancing infections and disinfect pruning shears with 10% bleach or Lysol diluted in water. The period right after bloom is critical for removing infections.
- Make sure you remove all infected tissue out of the orchard because it can serve as a source of inoculum. Do not leave infected prunings on the ground. (see "Removing Diseased Wood" on the UC IPM website).

Several spray options can be used within an IPM plan:

- Always follow product label instructions carefully for efficacy and safety.
- Take note of appropriate conditions, timing, frequency, rate, personal protective equipment (PPE) and safety precautions.
- Copper products are available for commercial and noncommercial growers. They can provide some control as a protectant but will not eliminate existing infections. They do not withstand rain well and are most effective when used in the spring.
- Bordeaux mixture is a combination of copper sulfate, lime, and water. These naturally occurring materials can adhere to plants during rainy weather, so it can be a good option for winter application.

- Commercial growers have access to additional product options including biologicals, antibiotics, and plant growth regulators.

Please see the UC IPM website for more important notes on these control options and how to avoid russeting. As you learn more, be sure to take note of appropriate conditions, timing, frequency, personal protective equipment (PPE) and safety for different spray options. Familiarize yourself with the characteristic visual symptoms of fire blight, the environmental conditions it likes and dislikes, and IPM strategies you can combine and tailor to your unique situation.

Fire blight spreads like fire, so be proactive. Help your trees not just survive, but thrive!

For More Info:

See UC IPM websites:
Fire Blight in Commercial Pear Orchards
Fire Blight in Commercial Apple Orchards
Fire Blight in Home & Landscapes
Bordeaux Mixture

Integrated Pest Management for Apples & Pears by Ohlendorf, Statewide Integrated Pest Management Program, University of California Agriculture and Natural Resources, Publication 3340

Pear Production and Handling Manual by Mitcham and Elkins, University of California Agriculture and Natural Resources, Publication 9020

Organic Apple Production Manual by Swezy, University of California Agriculture and Natural Resources, Publication 3403

Fire Blight IPM Webinar Recording 2024 on the UCCE North Bay Specialty Crops YouTube channel: an in-depth look at fire blight and research updates from Jim Adaskaveg (UCCE) and Broc Zoller (local PCA, “The Pear Doctor”)

The Home Orchard by Ingels, Geisel, and Norton, University of California Agriculture and Natural Resources, Publication 3485