

at a glance

- The bacterium *Erwinia amylovora* is the causal agent of fire blight. The disease spreads rapidly via insects, birds, splashing rain, and contaminated tools.
- Optimum weather conditions for spread are rain, high humidity, and warm spring temperatures between 65°F and 85°F.
- The pathogen overwinters in cankers on twigs, branches, and trunks of host trees, which may show a bacterial ooze in spring.
- For backyard trees, the disease is best managed through the physical removal of infected tissue.
- Copper-based products, antibiotics, biopesticides, essential oils, peracetic acid-peroxide products, and systemic acquired-resistance products are also available for disease management.

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Fire Blight of Shrubs and Trees in Idaho

Introduction

Fire blight is a widespread disease in both commercial and home plantings and is caused by the bacterium *Erwinia amylovora*. The disease affects members of the rose plant family (Rosaceae). Apple, pear, quince, hawthorn, firethorn, and crab apple are highly susceptible, depending on the variety. The disease also occurs on cotoneaster, spirea, hawthorn, blackberry, raspberry, and mountain ash.

Fire blight kills limbs and ultimately causes plant death. Under ideal conditions for infection, the disease spreads rapidly via insects, birds, splashing rain, and contaminated tools. Injured fruit or foliage, through insect damage or hail, is particularly prone to infection, since the pathogen typically enters the plant through a wound or other natural opening like a blossom. In Idaho, disease severity is highly dependent on weather conditions. Warm (65°F–85°F), rainy weather with high humidity is conducive to severe disease, but hot summer weather generally stops or slows its development. Disease severity also varies with plant age; it can kill young trees in a single season though older ones sometimes survive, including after enduring continuous dieback and infections.

Symptoms

Symptoms of fire blight appear on flowers, leaves, petioles, fruits, shoots, branches, and root stocks. Brown to black dead tissue, similar in appearance to a fire-scorched appearance, is a characteristic symptom—hence the name *fire blight*. Wilting also can occur. The initial symptom in spring is typically blossom blight. Flowers and associated leaves appear water soaked, wilt, turn brown, and die (Figure 1). Shoot blight is also a prominent symptom. Initially, downward wilting of the shoot tips occurs, resembling what is referred to as “shepherd’s crook” (Figure 2). This is followed by necrosis of the leaves and stems. Infected leaves and fruit also gradually dry and remain attached on the branch rather than dropping from the tree.

In susceptible hosts, the disease progresses into and kills vascular tissue (xylem and phloem), staining it a darker color. As a result, cankers on the bark develop. Although the majority of cankers are small and inconspicuous, in susceptible varieties the cankers girdle and kill the branch or even the entire tree. In advanced infections, cracks develop in the bark and the surface appears slightly sunken.



Figure 1. Early fire blight infection on an ornamental crab apple tree (*Malus* spp.).



Figure 2. Fire blight infection on an ornamental pear tree (*Pyrus* spp.). Note the “shepherd’s crook” appearance of the infected shoot.

The fire blight bacterium overwinters in the cankers on twig, branches, and trunks of host trees and the infection cycle initiates from the bacterial ooze that appears from the cankers in the spring.

Tree death may occur if the bacterial infection reaches the roots of a susceptible rootstock, even in older trees and years when conditions are not conducive for the development of severe fire blight symptoms. Mature trees with rootstock infection have limited new growth, leaf yellowing, and sometimes tan-colored bark.

Management

Management depends on the severity of infection and the degree of infestation within the location. Severe infections

may require pruning or complete removal of trees; for mild infections, chemical/biological control and the use of disease-tolerant varieties may be appropriate. A combination of approaches to minimize initial infection and subsequent disease development is recommended.

Choosing more disease-tolerant tree and shrub varieties is recommended. Varieties that bloom late or throughout the season are usually more prone to infection. Succulent tissue of growing plants is very susceptible; therefore, avoid heavy nitrogen fertilization because it can promote excessive, unnecessary growth. When dealing with trees that are already infected, remove diseased limbs. Remove infected branches at least eight inches below the damaged area and sanitize the pruning shears between cuts, particularly during spring and summer, when the bacteria are active. In wood aged two years or more, remove infected branches 12–18 inches below the visibly infected tissue. Removing diseased limbs not only prevents the bacterium from spreading throughout the entire plant, but reduces overall disease pressure in the orchard. Removal of blossoms and late blooms limits the number of flowers and therefore potential points of infection.

Chemical control is available. In years when the weather conditions are conducive for disease, apply copper-based products. Copper-based products may need multiple applications if favorable fire blight weather conditions persist. Some copper compounds cannot be applied to flowers, so check the label to ensure it can be used for a specific plant, environment, and timing. Only use antibiotics (streptomycin, oxytetracycline, kasugamycin) on open blossoms because they are ineffective on existing cankers or shoot blight. Additionally, repeated applications may result in the development of antibiotic resistance. Biopesticides, essential oils, peracetic acid-peroxide products, and systemic acquired-resistance products are also available.

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