Fire Blight in Ornamental Trees and Shrubs

Fact Sheet 2.907

Quick Facts

• Fire blight is a bacterial disease that can kill branches and trees and shrubs in the rose family, including crabapple, hawthorn, and ornamental pear.

• Symptoms include dead branches, water-soaked blossoms, light brown to blackened leaves, discolored bark, "shepherd's crook" twigs, and withered fruits.

• Fire blight bacteria can be spread by insects, splashing rain, or irrigation water.

• Management includes selecting and planting resistant varieties, cultural practices, pruning, and using preventative chemical treatments.

Disease Cycle

Fire blight is caused by the bacterium *Erwinia amylovora*. Bacteria overwinter in blighted branches and at the edge of cankers (areas of bark killed by bacteria). In spring, when temperatures frequently reach 65 F and moisture is abundant, bacteria multiply rapidly. Masses of bacteria are forced through cracks and bark pores to the bark surface, where they form a sweet, gummy exudate called bacterial ooze. Insects, including pollinators, may be attracted to this ooze, where they pick up the bacteria on their bodies, and inadvertently carry it to opening blossoms. Rain and/or wind splashing the bacteria can also spread fire blight.

Once in the blossom, bacteria multiply rapidly in the nectar and enter the flower tissue (Fig. 1). From the flower, the bacteria may move into the branch. When the bacteria invade and kill the cambial tissue of the branch, all flowers, leaves and fruit above the girdled area blacken and die.

Infection can also take place through natural openings in leaves (stomata) or branches (lenticels), or through wounds caused by pruning, hail, or insects. Droplets of bacterial ooze can form on twigs within three days after infection.

During the growing season, trees infected with fire blight will activate natural defenses to try to slow the spread of the disease. Some species and cultivars are better at inhibiting the disease than others.
Limited infections can be managed by pruning out infected tissue. In a landscape with many trees and shrubs in the rose family, removing all infested trees is not practical as the inoculum is so abundant naturally. Even if all infected trees were removed from a property, susceptible trees could still become infected by fire blight.

The most important step in managing this disease is planting resistant species. Varieties differ in their degree of susceptibility to the bacterium, but no cultivar is totally immune to infection when the pathogen is abundant and conditions are favorable. For specific information about crabapples, refer to CSU Extension Fact Sheet #7.424.

In years with high pressures of the bacterium, even resistant cultivars may show symptoms, but are better able to compartmentalize damage. With minor infections, trees may wall off the spread of the disease and pruning could occur during the following dormant season to remove the cankered twigs.

Dormant Pruning

Pruning woody plants susceptible to fire blight is best done in the dormant season up to one month before budbreak. Remove all blighted twigs and cankered branches back to a main branch union or junction at least eight inches below the canker—do not leave stubs. Pruning may be difficult on smaller trees where there isn’t enough branch material to support aggressive pruning (Fig. 5). For more detailed information on pruning cuts, refer to CSU Extension Garden Notes #613.
If the canker encompasses the entire circumference of the branch, the branch must be removed. If the infection reaches the main trunk, the tree and stump should ultimately be removed.

While there are recommendations to sanitize pruning tools between cuts when pruning out fire blight infections, research has not shown that infections are spread by tools or that sterilizing tools between cuts has a measurable effect on disease spread.

**In-Season (Summer) Pruning**

In summer, pruning cuts must be made 18-24 inches from the visible canker. As with all pruning cuts, do not leave stubs and remove the infected branches back to a branch union or junction. If the distance between the canker and the nearest branch is less than 18-24 inches, the cut must be made at a lower branch union.

Because summer pruning can result in significant canopy loss (Fig. 5), in general, dormant season pruning is recommended. **Consider consulting with an ISA Certified Arborist to discuss pruning options.**

To decrease the chance of re-infection, promptly remove infested branches from the site. During pruning, take care to avoid unnecessary wounds to the tree. Avoid pruning when it is humid or when rain is forecasted.

**Chemical Treatment Options**

If cultural approaches are insufficient, chemical treatments can be considered. Treatment options differ for ornamental trees and trees grown for fruit production.

*Any pesticides must be applied strictly according to the label instructions.* Factors to consider with chemicals are availability, potential phytotoxicity, and the critical timing of sprays. Chemical treatments are not effective to control symptomatic fire blight, but can be used to slow the spread of the disease. When spring weather is not favorable to fire blight development (i.e. warm and dry), chemical treatments may not suppress fire blight more than weather conditions alone.

Several products are available to homeowners that are labeled for suppression of fire blight and their success rate varies.

In general, these products must applied multiple times, up to weekly, through the flowering cycle. They may decrease new infections but won’t eliminate infections already existing in the tree. Sprays are usually applied to open blossoms, so the timing of applications will vary depending on the tree’s bloom cycle. Refer to the label of the product for specific application use, timing instructions, and restrictions.

Streptomycin and oxytetracycline are antibiotics that can be used to protect ornamental trees. These must be applied by a licensed pesticide applicator. Antibiotics are used before symptom development to help prevent disease spread. Consult a tree care professional for applying these preventative treatments.

Plant growth regulators can also help slow the spread of fire blight and need to be applied by a licensed pesticide applicator.

**For More Information**

- [Fire Blight of Apple and Pear](https://extension.wsu.edu) (Washington State University Extension)
- [Fire Blight in Ornamentals](https://extension.psu.edu) (Penn State University Extension)