

Plant Diseases

Fire Blight

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Fire blight, caused by the bacterium *Erwinia amylovora*, is a serious disease of apple and pear. This disease occasionally damages cotoneaster, crabapple, hawthorne, mountain ash, ornamental pear, firethorn, plum quince and spiraea.

Symptoms

The fire blight bacterium can affect any portion of a susceptible plant. The name “fire blight” describes the most characteristic symptoms of this disease: a brown-to-black scorched appearance of twigs, flowers and foliage.

The blossom blight phase is usually the first symptom observed in the spring. Blossoms and fruit spurs appear water-soaked, wilted, shriveled and finally turn brown to black.

Shoot blight occurs when infections begin at the shoot tips and move rapidly down the shoots. Leaves turn brown (apple, crabapple) or black (pear). Frequently, the tip of the blighted shoot bends over and resembles a shepherd’s crook.

Limb and trunk blight occur when the infection moves downward from infected shoots or fruit spurs into larger branches or the trunk. Dark, slightly sunken cankers (dead areas) are formed. On susceptible varieties, these cankers can girdle and kill the entire branch or tree.

During humid or rainy weather, blighted tissues often exude a milky-white, sticky ooze that later turns an amber color. This ooze, which is very apparent on blighted fruit, contains millions of bacteria that can cause new infections.



Disease Cycle

The bacteria overwinter in trunk and branch cankers. In the spring, the bacteria resume multiplication when temperatures are above 65 F. Their growth is favored by heavy dews or high humidity. The bacteria are carried by wind, rain and insects to blossoms or young, succulent shoots. Bacteria can enter the flowers and leaves through natural openings. However, wounds and injuries made by insects, hail, wind, humans and possibly frost are important means of entrance. New infections and disease development usually continue until rapid spring growth stops.



Control

1. Resistant varieties

Refer to Tables 1 and 2 for lists of apple, pear, crabapple, ornamental pear and pyracantha varieties with resistance to fire blight. During warm, wet weather, varieties rated moderately susceptible to moderately resistant will develop some infections. However, these infections will not advance as far in resistant varieties as in susceptible varieties.

2. Pruning

Cankers and blighted shoots should be removed, as they can serve as a source of bacterial spread. Delay the removal of infected shoots until the dormant season to avoid spreading infection to healthy shoots. Dormant pruning also prevents the formation of new, susceptible shoots as would occur during the growing season, while fire blight is active. Examine the larger branches and trunks carefully for cankers, since these are the most likely overwintering sites for the bacterium.

If only a few trees are lightly infected, spring pruning to remove newly infected twigs and shoots can reduce spread of the disease if done carefully. The trees must be inspected daily and new infections must be promptly removed as soon as symptoms are observed. Cuts should be made 10 to 12 inches beyond the last evidence of disease. To avoid spreading the bacterium, the pruning shears should be sterilized after each cut. Household bleach, diluted one to four with water, has traditionally been used for this purpose. However, recent research has indicated that Lysol®, at the same dilution, is just as effective as bleach and causes less corrosion of tools than bleach. Best results were obtained by soaking the tools for at least one minute, as opposed to dipping them.

3. Proper fertilization practices

Excessive pruning and high nitrogen fertilization will promote vigorous growth, which is susceptible to fire blight infection. Fertilization and pruning practices on susceptible varieties should be adjusted to promote moderate growth only.

4. Chemical control

The antibiotic streptomycin is the most effective spray material for controlling fire blight. However, streptomycin is useful only for prevention. It should not be used if symptoms are present.

The critical time for fire blight prevention is during the bloom period. Apply streptomycin at 100 parts per million (8 oz/100 gal or 1 teaspoon/gal) beginning when 20 percent of the blooms are open and continuing until petal fall. Streptomycin bloom sprays should be applied every five days under normal weather conditions, and every three or four days if the weather is unusually warm. Streptomycin is most effective when applied alone, as a dilute spray, under slow drying conditions.

Certain copper-based sprays may be helpful in fire blight control. However, they will not eliminate the need for streptomycin sprays. A Bordeaux mixture, which consists of 8 lbs. copper sulfate (bluestone), 8 lbs. spray lime and 1 gal. dormant oil in 100 gal. water, applied when trees are dormant in late winter, helps reduce the number of bacteria present on the cankers. Do not use Bordeaux mixture after the silver tip stage. Certain fixed coppers (Kocide, Champ, C-O-C-S) can be used until the 1/4-inch green tip stage.

Several fixed coppers are labeled for use during the bloom period. Weak Bordeaux mixtures (2-6-100) without oil may also be used at this time. However, russetting of the fruit is a problem when applying copper materials after green tip.

Table 1
Reactions of various fruit and ornamental varieties to fire blight.*

	Moderately Resistant	Moderately Susceptible	Highly Susceptible
Apple	Arkansas Black Empire Liberty Priscilla Redspur Red Delicious Topred	Freedom Fugi Golden Delicious Jonafree McIntosh Prima Redfree Stayman Turley Winesap	Cortland Gala Ginger Gold Jonagold Jonathan Julyred Lodi Mutsu Paulared Rome Transparent Tydman's Red
Pear	Ayers Keiffer Moonglow Orient	Seckel	Bartlett Bosc Red Bartlett
Ornamental Pear	Bradford Capitol Faurier White House	Red Spire	Aristocrat Autumn Blaze
Firethorn	Kasan Teton	Wyattii	Lalandei Mohave <i>P. koidzumii</i>

** This is only a partial list of common cultivars. Actual reactions may differ, depending on environmental conditions.*

Table 2
Reaction of ornamental crabapples to fire blight.

Resistant	Moderately Resistant	Moderately Susceptible	Highly Susceptible
Adams Adams - dwarf Adirondack Baccata Jackii Baskatong Beverly Bob White Candied Apple Coral Burst David Dolgo Profusion Radiant Red Baron Robinson - dwarf Sargent - dwarf Spring Snow - dwarf White Angel Zumi Calocarpa	Centurion Donald Wyman Doubloons Floribunda - dwarf Indian Summer Louisa Ormiston Roy Pink Spires Prairie Fire Red Pillar Red Splendor - dwarf Royalty - dwarf Sargent Selkirk Sentinel Sinai Fire Spring Snow	Brandywine Indian Magic Jewel Berry Liset Liset - dwarf Purple Prince Red Jade - weeping Red Jewel Silver Moon Strawberry Parfait Sugar Tyme Tea	Floribunda Klem's Improved Bechtel Mary Potter Pink Princess Professor Sprenger Red Jade - dwarf Snow Drift Snow Drift - dwarf Winter Gold

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label. Persons who do not obey the law will be subject to penalties.

Disclaimer Statement

Pesticides recommended in this publication were registered for the prescribed uses when printed. Pesticide registrations are continuously reviewed. Should registration of a recommended pesticide be canceled, it would no longer be recommended by The University of Tennessee.

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