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# FIRE BLIGHT

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# FIRE BLIGHT OF APPLES AND PEARS

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Fire blight is a common and frequently destructive bacterial disease of certain plants belonging to the rose family. It is one of the most serious diseases of apple and pear.

The bacterium that causes fire blight attacks as many as 75 other hosts, including quince, chokecherry, cotoneaster, crabapple, hawthorn, Japanese quince, loquat, mountain-ash, pyracantha, raspberry, rose, spirea, and strawberry.

## Varietal Susceptibility

Apple and pear varieties differ in their reaction to fire blight. Local weather conditions also affect the amount of disease found in a variety from year to year. Table 1 shows varieties classified according to their degree of susceptibility.

**Table 1. Varieties and degree of susceptibility to fire blight.**

Host	Susceptible	Moderately susceptible	Resistant
Apple	Jonathan Minjon Secor Yellow Transparent Beacon Cortland Prairie Spy Wealthy Rome Beauty	Duchess Early McIntosh Grimes Golden Delicious Haralson King David Missouri Pippin Turley Sharon	Delicious Winesap Northwestern Greening
Pear	Bartlett Clapp's Favorite Flemish Beauty Patten	Douglas Garber Kieffer Seckel	Magness Moonglow

## Cause and Symptoms

Fire blight is caused by a bacterial organism, *Erwinia amylovora*, that lives from one season to the next in cankers on infected twigs, branches, or trunk.

In the spring the bacteria multiply rapidly and start oozing to the surface of the "holdover" cankers in the form of clear, milky, or amber-colored droplets. Rains, wind, and insects (honey bees and bumblebees) all help to spread bacteria from the oozing cankers to the blossoms and new leaves.

Infection of blossoms is favored by temperatures of 76°F accompanied by precipitation or very high relative humidity. Infected blossoms wilt, turn brown and die.

Most of the leaf and twig blight infection is caused by bacteria which are blown through the air in bacterial strands. These strands become lodged in various portions of the tree. Rain dissolves the gelatinous strands, freeing the bacteria for entry into natural openings in the leaves and bark. Infected leaves usually are killed entirely, but occasionally only a portion will show infection. Leaves killed by fire blight will turn brown (apple) or black (pear) and remain attached to the tree (Figure 1).



Figure 1. Terminal branch killed by fire blight bacteria.

Newly infected twigs become watery, dark green and somewhat oily. The succulent tissue then dries, shrivels, darkens and the end of the twig bends over at the tip. The infected blossoms, leaves and twigs give the appearance of having been scorched by fire.

Infection of branches and trunk results in the development of cankers. On the branches many of the cankers are found on the underside. At first the cankers are light brown in color and as they age the bark cracks and the canker surface becomes depressed (Figure 2). They may continue to enlarge until they girdle the branch or trunk, in which case the part above the girdle dies.



Figure 2. Holdover cankers on young apple tree during dormant season (left) and following spring (right).

## Control

Losses from this disease can be reduced if growers and homeowners follow a blight-prevention program of sanitation and spraying.

**Sanitation:** Remove and burn all twigs and branches having cankers since the fire blight bacteria overwinter in them. Cut out the diseased wood only while the trees are dormant in order to reduce the chances of spreading the bacteria on saws and cutting knives. When removing a diseased branch, the cut should be made at the junction of a lower, lateral branch at least a foot below the visible signs of the disease.

Cankers on main limbs or on the trunk are removed by surgical methods. The infected tissue is excised with a wood chisel and mallet, tracing the canker about 2 inches beyond the visible margins (Figure 3). Remove all the diseased bark and scrape the wound clean to sound wood. The finished cut should be elongated with the grain and pointed at both ends to aid the healing process.

All pruning tools should be disinfected after each cut by dipping them into a 5-percent chlorox solution. This concentration is prepared by diluting 1 part of the commercial

chlorox solution with 20 parts of water. All fresh cuts and wounds should be painted with a good asphalt-base tree wound dressing or tree paint.



Figure 3. Large trunk or branch cankers can be removed by surgically excising the diseased tissue with a wooden mallet and chisel.

**Spraying:** Commercial antibiotics are available to orchardists and homeowners alike. Streptomycin when applied at a dosage of 50-100 parts per million, is an effective spray material for controlling fire blight. It should be applied first at the pink stage (3-4 days before blossoms open) and repeated every 5-7 days for about 3 weeks. A commercial formulation including streptomycin is available under the trade name Agrimycin 17 (streptomycin sulphate plus oxytetracycline).

Zineb (1 1/3 tablespoons per gallon of water) or Bordeaux mixture (1-3-100) will help to protect open blossoms against the fire blight bacterium also. A spray schedule should be followed similar to that using streptomycin.

**Fertilization:** Rapidly growing twigs which have been stimulated by excessive fertility or heavy pruning are extremely susceptible to infection. Therefore, it is best to use either manure or one of the slow-release fertilizers on young trees and susceptible varieties.