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## G92-1120 Fire Blight of Apple, Pear and Woody Ornamentals

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# Fire Blight of Apple, Pear and Woody Ornamentals

This NebGuide tells how fire blight is spread among apple, pear and woody ornamentals. It describes the disease cycle and offers advice for treatment and protection.

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*John E. Watkins, Extension Plant Pathologist*

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Fire blight, caused by *Erwinia amylovora*, is the oldest, most serious bacterial disease of apple and pear. It was first reported in the late 18th century in the Hudson River Valley in New York. The disease is indigenous to North America, and probably occurred on native American plants such as crabapple, hawthorn and mountain ash and then spread to susceptible cultivated apples, pears and woody ornamentals planted by the early American pioneers. As the settlers moved west, so did fire blight. By the early 1900s it became established as a serious threat wherever apples and pears were grown in North America.

Fire blight has a wide host range. The pome fruits and many species in the rose family are susceptible. *Table I* is a partial list of susceptible hosts.

Apple, crabapple, pear, cotoneaster, hawthorn, firethorn (*Pyracantha*) and mountain ash are principal hosts for fire blight in Nebraska. Resistant species and/or cultivars of most hosts are available. Many selections of the callery pear used as ornamentals show resistance, as do a number of cultivars of apple and crabapple. In addition to these seven important hosts, there are plants in 33 additional genera in the family Rosaceae that are susceptible to fire blight. Some of these appear in *Table I*.

**Table I. Some common hosts susceptible to fire blight.**

Apple	Flowering Almond	Pear
Cotoneaster	Flowering Japanese Quince	Raspberry
Crabapple	Hawthorn	Rose
Firethorn	Mountain ash	

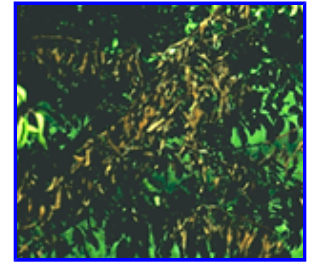
## Symptoms and Signs

Origin of the term "fire blight" is unknown but it accurately describes the disease -- blighted branches and persistent blackened leaves that appear scorched as if by heat (*Figure 1*). Injuries caused by the blight

pathogen make fire blight not only destructive to the current year's apple or pear crop but also extremely dangerous to any apple or pear industry in a region.

**Figure 1. Scorched appearance of blighted branches.**

- *Blossoms.* Blossom infection causes a reduction in the current fruit crop and that of the next year through killing of fruit spurs. Infected blossoms first appear water-soaked, then wilt, shrivel and turn brown. They remain attached to the cluster base and often persist into fall. Infection may spread through the flower cluster base and other blossoms of the same cluster.
- *Twig and Leaf Blight.* The scorched appearance of affected leaves, twigs and branches is the most obvious symptom. After the blossoms, the succulent twigs and water sprouts are the next most susceptible parts. Infected leaves quickly wilt and turn dark brown (apple) or black (pear) and adhere to blighted twigs.



**Figure 2. Cane-like shepherd's crook of an infected twig.**

The twigs often form a cane-like shepherd's crook at the tips (*Figure 2*). The bending of the shoot tip to form the shepherd's crook is apparently due to the loss of turgor and death of shoot cells. This symptom is accompanied by a gray/green discoloration of the stem and attacked leaves and the exudation of ooze. This ooze, a characteristic sign of the blight pathogen, is a watery exudate that issues from infected plant parts under wet conditions.



- *Limb and Trunk Blight.* The infection advances downward from blossom and twigs to older branches, causing localized cankers. The spread may continue into scaffold limbs and eventually into the main trunk. The bark in branch cankers and scaffold limbs becomes sunken, darker than normal and remains smooth. When the outer bark is removed the sapwood appears water-soaked with reddish streaks. These red streaks help distinguish this disease from low temperature injury. The cankers on large scaffold branches and the trunk eventually become cracked or creviced.

With few exceptions symptoms on firethorn, hawthorn, mountain ash and cotoneaster are generally similar to those on apple, crabapple and pear.

## Disease Cycle

Through the winter, bacteria remain in a dormant state in diseased twigs and at the edge of cankers. During warm spring rains, the milky ooze that exudes from infected tissues contains millions of bacterial cells. This exudate attracts flies, honeybees, ants, aphids, beetles and other insects. They in turn carry the bacteria to blossoms, foliage and twigs. Although honeybees are capable of spreading the bacteria from blossom to blossom, they apparently do not visit cankers. Ants, beetles and flies feed on the ooze in cankers, and as they visit blossoms in search of nectar they carry the bacteria with them.

The bacteria enter the host through natural openings in blossoms and leaves or through wounds in the bark. Wounding by insects, hail, pruning or wind whip is necessary for infection of twigs. Spread downward within the tree or shrub also occurs by rain splash.

Infections continue to develop until the spring flush of growth stops or until about a month after flowering.

## Damage

Accurate estimates of losses from fire blight are difficult to obtain, but no doubt range in the millions of dollars annually. Fire blight is considered the most damaging disease of pome fruit in North America. Unlike

many other plant diseases, fire blight is destructive to the current year's crop, and will cause permanent damage to an orchard. It is extremely dangerous to the pear or apple industry in a fruit growing region.

In the 1970s fire blight became prevalent on certain woody ornamentals, especially cotoneaster. The loss of an established crabapple tree or cotoneaster hedge in the home landscape can be significant in terms of aesthetic value, time, labor and replacement costs.

## **Treatment**

Fire blight treatment involves 1) reducing the amount of pathogen inoculum, 2) reducing the susceptibility of the host through horticultural practices and 3) preventing infection at critical times with antibiotics or fungicides. Unfortunately, no single measure provides good control of fire blight.

Prune and discard all infected twigs and branches with cankers. Cuts should be at least one foot below the infected area. Pruning tools should be disinfected after each cut by dipping the cutting surface into a disinfectant such as 70 percent alcohol or a diluted household bleach solution (one cup household bleach to nine cups water). Pruning should be done during the dormant season to avoid spreading the bacteria.

Some species and/or cultivars of apple, crabapple, pear and woody ornamentals are resistant to fire blight. Homeowners should question the nursery owner about the susceptibility of a specimen before using it in the landscape. Resistant species for firethorn include *Pyracantha crenulata*, *P. coccinea lalandii* and *P. fortuneana*. For cotoneaster, *Cotoneaster adpressa*, *C. dammeri*, *C. pannosa*, *C. horizontalis* and *C. microphylla* are resistant. Many of the new cultivars of crabapple also are resistant to fire blight.

The most susceptible apple cultivars are Jonathan, Rome Beauty and Yellow Transparent; and among pears, Bartlett and Forelle are highly susceptible. These cultivars should be avoided in areas where fire blight is endemic.

Plant nutrition can be important in fire blight treatment. Avoid stimulation of succulent growth in spring by making only a light application of nitrogen. Generally, fertilizer that is applied to the lawn will provide sufficient nutrition for most woody ornamentals in the landscape.

Copper-based fungicides and the antibiotic, streptomycin, are somewhat effective in controlling fire blight. Application of the coppers at green tip stage helps reduce inoculum produced in carryover cankers on branches. Control of blossom blight is done by spraying with streptomycin during flowering. Before purchasing either product, make certain the host you plan to treat is listed on the label. Always follow all label directions and precautions during application.

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### ***File G1120 under: PLANT DISEASES***

#### ***B-9, Trees***

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