

Fire Blight Identification, Biology & Management

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Figure 1: Shepherd's crook symptom caused by fire blight on flowering pear.



Fire blight is a very destructive disease of pear, **crabapple, cotoneaster, mountain ash, hawthorn, pyracantha, spirea and rose**. Many other species in the rose family are also susceptible to this disease (Table 1). Depending on the individual plant, cultural practices performed, and spring weather conditions, damage can range from death of one or more branch terminals to severe branch mortality and complete death of the plant.

The disease is most severe during warm, moist springs. Young, vigorous plants, or those heavily fertilized with nitrogen, are usually most severely affected.

Symptoms

The most characteristic and easily observed symptoms are wilting and blackening or browning of the blossoms and leaves on the terminal shoots. Terminal shoots are often bent over to form a crook and leaves remain attached to branches and appear as though scorched by fire (Figure 1).

As the infection progresses into secondary branches, the bark blackens and cankers develop on the older, larger portions, particularly at the margins of living and dead tissue (Figure 2). Brown ooze forms at the site of these cankers during moist, warm weather.

The cambial region of infected branches initially appears water-soaked and reddish to reddish-brown in color. At death, the sapwood dries and becomes dark brown.

The pathogen can also spread systemically into shoots and branches from existing cankers causing “canker

blight”. These symptoms usually occur in late spring and summer when leaves on infected shoots and branches turn orange or red. Leaves and branches eventually turn brown or black and appear as typical fire blight symptoms.

Table 1: Woody Plant Genera Susceptible to Fire Blight

<i>Amelanchier/</i> Serviceberry	<i>Mespilus/Medlar</i> <i>Photinia</i>
<i>Aronia/Chokeberry</i>	<i>Physocarpus/Ninebark</i>
<i>Chaenomeles/Quince</i>	<i>Prunus/Cherry</i>
<i>Cotoneaster</i>	<i>Pyracantha</i>
<i>Crataegus/Hawthorne</i>	<i>Pyrus/Pear</i>
<i>Eriobotria/Loquat</i>	<i>Raphiolepis/</i> Indian Hawthorne
<i>Exochorda/Pearlbush</i>	
<i>Heteromeles/Toyon</i>	<i>Rosa/Rose</i>
<i>Kerria</i>	<i>Rubus/Brambles</i>
<i>Malus/Apple/Crab</i>	<i>Sorbus/Mt. Ash</i>

Causal Agents

Fire blight is caused by the bacterium *Erwinia amylovora*. The organism overwinters in branch cankers at the margins of living and dead tissue. During periods of moist, warm weather in the spring, brown ooze containing the bacteria is produced at these cankers.

Figure 2: Canker on branch.



Wind, rain-splash and insects are responsible for the initial transport of the bacteria from the cankers to open blossoms, the primary infection site. Blossom-visiting insects are primarily responsible for secondary infections whereby the organism is transported from infected to healthy blossoms.

Infection may also result from direct inoculation of succulent shoots. Late spring and summer infections occur when the bacterium enters through wounds caused by sucking insects, hail, high winds and pruning tools. The bacterium can also move systemically from existing cankers to cause canker blight, which also typically appears in summer.

Infection & Symptom Development

Blossom infections can occur within minutes when temperatures are above 60°F and moisture is present.

Once a blossom infection occurs, symptoms begin to appear at 103 degree days greater than 55°F. This is usually 5 to 30 days after infection depending on spring temperatures.

Systemic shoot infections (canker blight) are initiated at 200 degree days greater than 55°F after bud-break (“green tip”). Symptoms of canker blight occur at least 300 degree days greater than 55°F after bud-break.

Management

Many species and varieties of crabapple, cotoneaster, apple, pyracantha, etc. are resistant to fire blight and should be used in landscape plantings when possible. Lists of such resistant varieties are available in arboriculture books or from local Extension Services.

Control of fire blight on susceptible stock is difficult and requires a comprehensive program of sanitation, proper cultural practices, and bactericide treatments in order that satisfactory results are attained.

Sanitation

Sanitation refers to the removal of infected terminals and branches from the host. Terminal infections are best pruned out when first noticed. Make cuts in the healthy wood well below the last observable symptom (approximately ten to twelve inches). Branch infections should be removed during dry weather in the late summer or in the dormant season. Sanitation is critical in eliminating overwintering inoculum that contributes to blossom infections and eliminating the source of canker blight infections.

Cultural Practices

Susceptible species should be planted on well-drained soil and the pH maintained at the recommended level for the species in question (neutral to slightly acidic for most members of the Rosaceae). Apply fertilizer in the late fall or early spring according to soil analysis results. Apply only slow release nitrogen products. Prune lightly and often to avoid stimulating rapidly growing sprouts that are highly sensitive to disease.

Chemical Management

The application of bactericide sprays during the dormant season and at flowering will reduce blossom infections. A systemic bactericide is also available for direct injection into flare roots to reduce shoot blight caused by blossom infections. Injection treatments must be applied between bud-break and petal fall in spring. Growth regulators that reduce shoot elongation have also been shown to suppress the incidence of fire blight.