ARIZONA COOPERATIVE EXTENSION
THE UNIVERSITY OF ARIZONA
College of Agriculture and Life Sciences

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PLANT DISEASE MANAGEMENT
Horticultural Crops

Fire Blight

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Figure 1. Fireblight symptoms in loquat.

Figure 2. Wilting and bending of infected shoots.

Pathogen

Bacterium, *Erwinia amylovora*

Host

Apple, pear, pyracantha, loquat, quince and other plants in the rose family.

Symptoms/signs

If flowers are infected in the spring during bloom, blossom clusters wilt and shrivel, turn dark brown or black and die within a few days (Figure 1). During spring and summer months, infected shoots and twigs have reddish-brown streaking that turns brown in apple and brown to black in pear. Extensive branch killing is more common in pear than in apple. Infected shoots often bend at the tips and are referred to as a "shepherd's crook" in describing disease symptoms (Figure 2). Masses of bacteria may ooze from infected tissue as a sticky amber or brown droplets. Cankers in infected branches and trunks have a water-soaked appearance, and then become sunken and dry; reddish-brown streaks may appear in the bark.

At a Glance

- Fire blight is a bacterial disease that affects only plants in the rose family such as apple, pear, loquat and pyracantha; roses are not affected.
- Dieback of twigs and branches, as well as shriveling of flowers, occurs in warm, moist weather; affected tissues turn very dark and twigs are crook shaped.
- Prevent disease by planting tolerant varieties; on susceptible varieties, use an antibiotic or copper spray to prevent bloom infection.
- Control by pruning infected tissue well away from infection site using a 20% bleach dip for tools between cuts.

Environmental conditions

Fire blight develops during warm temperatures and high humidity, between approximately 60°F and 85°F, and relative humidity above 60% with free moisture from dew, fog, rain or irrigation. In Arizona, these conditions are often prevalent during the monsoon season in July and August, and disease is more common during this time of the year, especially at higher elevations where both temperature and humidity are favorable for pathogen growth. Infections of flowers occur in spring if there are rain events during flowering in March and early April.

Disease

Fire blight is caused by a bacterium, *Erwinia amylovora* that can infect many plants in the rose family. In Arizona, it is usually only a severe disease of apple, pear, loquat and pyracantha. Interestingly, it is not a disease of roses. The bacterium survives in previously infected tissues in the host plant. It also has been recovered from the surface of healthy plant parts, including buds and wood. When environmental conditions are right, the bacterium multiplies in the plant and infects healthy tissue.

Bacteria enter plant tissue through natural openings or wound sites. Insects, such as bees, flies and ants, splashing rain or irrigation, and pruning tools spread the bacteria to other parts of the plant: flowers, leaves, shoots and fruits. The bacterium will continue to multiply and kill the host tissue as long as environmental conditions favor pathogen growth.

Fire blight is more likely to show up in the high desert and mountains during the summer as a twig or stem canker disease. Bloom periods in the spring are usually too dry for disease development. It may be found at lower elevations earlier if there is a high enough humidity, usually created by irrigation practices.

Prevention/control

Apples

Moderately tolerant: Arkansas Black, Red Delicious
Susceptible: Gravenstein, Jonagold, Granny Smith, Gala, Rome Beauty, Jonathan, Lodi, flowering crabapple

Pears

Moderately tolerant: Surecrop, Kieffer, Ledbetter
Moderately susceptible: Seckel
Highly susceptible: Bosc and Bartlett; Asian pears are susceptible but not damaged as severely as Bartlett

Clean propagation and planting stock

When purchasing susceptible plants, purchase from nurseries in areas away from known infested sites. Use only trees that are known to be free of disease for bud wood.

Pruning

When plants are dormant in winter, remove dead tissue by cutting at least 12 inches below infected tissue. Diseased tissue also should be removed as it appears in the spring or summer. Use a 20% household bleach solution to clean tools between each cut. Pruned plant material should be removed immediately and preferably burned.

Chemical

Chemical sprays prevent bloom infection and may require several applications. Begin treatments at budding or no later than 10% bloom. Apply every 3 to 5 days until the end of bloom. Re-spray immediately after rainfall. Spraying twigs and branches later in the season is not highly effective. Check labels carefully for phytotoxicity. Use label rates according to chemical products.

Compound	Trade name	Comments
Antibiotics Streptomycin sulfate	Agri-Strep Agri-Mycin 17	resistance to streptomycin is common; use alternatives if resistance is suspected
Terramycin	Mycoshield Oxytetracycline Biostat	use as alternative for streptomycin resistance
Copper sulfates	Bordeaux mixture Basicop C-O-C-S	copper can cause russetting of fruit; check label for sensitivity of varieties; acceptable for organic grown
Fixed copper	Kocide	can cause russetting of fruit; acceptable for organic grown

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