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FACT SHEET

L-726

FIRE BLIGHT OF PEAR

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Fire blight, a bacterial disease, is the most important limiting disease factor of pear culture in Texas. It attacks as many as 75 other hosts, including quince, pyracantha, spiraca, hawthorne and mountain ash. Damage occurs as blossom blight, twig blight, girdling of branches or, in some cases, killing of entire trees. Extent of the damage depends on varietal susceptibility, cultural practices, environmental conditions and control measures.

SYMPTOMS

Blossom blight. In spring, the disease first appears as blossom blight. Infected blossoms become water-soaked and turn dark brown. Bacteria then progress down the fruit stem, causing the infected area to become water-soaked and appear dark green. The bacteria and cell sap form a clear milky ooze on diseased tissue. From the fruit stem, the bacteria migrate into the spur and then move into leaves of the blighted spur, which can no longer produce fruit. Infected leaves normally remain attached through the year.

Twig blight. Twig blight is similar in its spread to blossom blight. The bacterium proceeds rapidly down the stem. Exudate forms on diseased tissue and is a source of bacteria, which can be spread by rain and insects to uninfected tissue.

Infected twigs become dark green and look "oily." Bark sinks in and the wood underneath turns dark brown.

Leaf blight. Leaf blight occurs commonly on sucker growth and on non-bearing trees. Infection occurs through the stomata, water pores or wounds. Dissemination is commonly by insects and splashing rain. Leaf infection begins along the leaf margin. The lesion spreads rapidly inward in a fan-like manner. Under optimum conditions, bacteria will extend from the leaf into the leaf stem and eventually into the twig.

Trunk and branch blight. Cankers develop on limbs and the tree trunk and serve as the bacterium's overwintering place. Cankers normally are sunken and dark. Often a crevice is formed between diseased and healthy tissue. This canker may be local or it may completely girdle the branch.

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The next spring the cankers extrude a sugary exudate, which contains viable bacteria. Insects crawling through this exudate pick up the bacterium and carry it to blossoms.

Fruit blight. In some cases, leaf infection can extend down the petiole through the fruit spur and into the fruit. After fruit becomes infected, it turns dark and the outer flesh becomes leathery. Droplets of bacteria and cell material can be seen on infected fruit. This fruit is normally retained on the tree until the stem decays.

DISEASE CYCLE

Bacterium normally overwinters in the twig trunk cankers. In spring, bacteria in the cankers become active and exudate is extruded. This exudate is composed of bacteria and cell material in various stages of decomposition.

Insects passing over these cankers pick up the exudate and carry it to blossoms.

When bacteria enter blossoms, they invade flower parts and spread rapidly down the pedicle into the spur.

Later, insects, principally honey bees, contaminate their mouth parts by feeding in blighted blossoms. They then spread the bacterium from blossom to blossom increasing the incidence of blight.

Later infection is caused by piercing and sucking insects, which carry the bacterium on their bodies and mouth parts to young succulent growth. Rain will also spread the bacterium to non-infected tissue.

Twig and trunk cankers resulting from primary and secondary infection serve as the overwintering stage of the bacterium.

This cycle is outlined in Figure 1.

INFLUENCE OF ENVIRONMENT AND CULTURAL PRACTICES

Rain and windblown mist. These elements spread bacteria to blossoms and may, under some instances, be important in spreading bacteria to young shoots.

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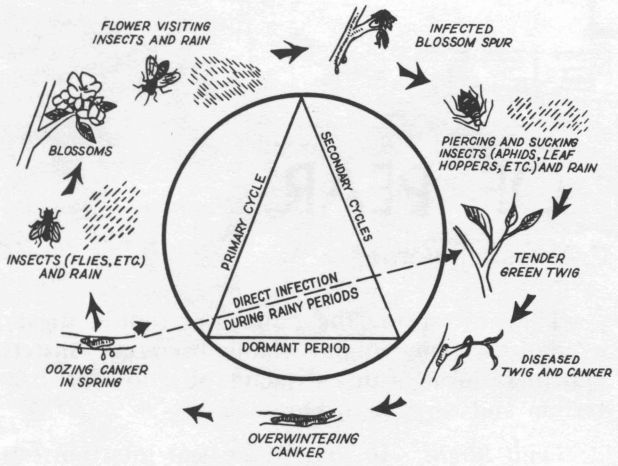

Figure 1. Life cycle of fire blight organism and how it is spread by insects and rain.

Excess moisture. Excess moisture is also important in the blossom blight stage. Water in the flower dilutes sugars so that bacteria can develop and enter natural openings of the flowers. Dry periods during blooming favor development of high sugar levels in flowers; this high sugar level inhibits development of bacteria.

Soil fertility. Nitrogen appears to be most important in disease development. Applications of nitrogen result in more succulent growth which is very susceptible to the bacterium.

Pruning. Although some pruning is good, excessive pruning results in more succulent growth. Thin and remove blighted limbs only during the dormant season.

Irrigation. Avoid heavy applications of irrigation water. Sprinkle irrigation should ***never*** be used in a pear orchard.

CONTROL

No varieties are presently propagated which are entirely resistant to fire blight; however, some varieties are more tolerant than others.

More tolerant varieties of pears are Orient, Kieffer and Waite.

Varieties to be used on a trial basis are Magness and Moonglow.

Cultural means of reducing fire blight. Prune infected portions of the plant 4-6 inches below the last visible symptoms. When cuts are larger than 2 inches in diameter, paint them with white-lead paint, prepared tree paint or with a coal-tar creosote paint. The latter can be made at home by thinning ordinary commercial coal tar with creosote oil until it has the consistency of thick paint. Usually this requires about 1 part creosote oil to 3 parts coal tar. This paint disinfects and protects the wound and cut, but take care not to cover live bark.

Dip all pruning equipment in 10 percent household bleach for 2 seconds to prevent spreading the bacterium from one cut to another. To prevent bleach from corroding tools, dip them in a light oil and wipe clean at the end of each day.

Bordeaux mixture. Excellent results are obtained when three to four applications of a weak bordeaux mixture are applied beginning when 10 percent of the blossoms are open and on a continued schedule every 5 to 7 days until a total of three to four applications are made. If blossoming is prolonged because of cold or damp weather, additional applications may be required.

Bordeaux mixture is prepared by dissolving 2 pounds of copper sulfate in a non-metal container with a little water. Add this to 100 gallons of water combined with 6 pounds of hydrated lime. Small amounts of bordeaux mixture are made by dissolving 2½ teaspoons of copper sulfate in 1 quart of water and then by mixing this with a gallon of water in which 4 teaspoons of lime are dissolved. The mixure is then brought up to 3 gallons. Some burning of the foliage may result from the copper, but it does not seriously damage the tree.

No restrictions are placed on bordeaux mixture so long as the total dosage does not exceed 11 lbs. act./A.

Zineb. Applications of zineb have been used with some success in other pear-producing areas. Zineb containing fungicides is used on the same spray schedule as bordeaux mixture at the rate of 2 pounds in 100 gallons of water. It can be used up to 7 days before harvest.

Antibiotics. Antibiotic sprays can reduce the blossom blight phase of the disease. Streptomycin or a mixture of streptomycin and terramycin is used at the rate of 50 ppm. Make the first applications when 10 percent of the blossoms are open, and apply one spray to protect late blossom clusters. If there is a ½ inch rainfall within 24 hours after any application, repeat spray as soon as possible.

Spray non-bearing trees as often as needed to prevent spread of fire blight. Use spray concentrate of 100 ppm.

One advantage of antibiotics is that they are absorbed by the foliage and are systemic within the leaf. They sometimes cause a chlorotic mottling of the foliage, which usually disappears after applications are discontinued.

Do not apply antibiotics after fruit is visible. Total dosage should not exceed 200 ppm act./A.

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