Bacterial spot occurs in most countries where stone fruits are grown. The disease is caused by a bacterium Xanthomonas arboricola pv. pruni (formerly Xanthomonas campestris pv. pruni).

Infected leaves have angular spots, most numerous at the tip ends and along midribs. Photo by K. Peter.

Other names for the disease are bacteriosis, bacterial leaf spot, or bacterial shot hole. Common hosts include peach, nectarine, prune, plum, and apricot. Other hosts are sweet and tart cherry, almond and wild peach. Cultivars within Prunus species vary widely in their susceptibility to this disease. The disease affects fruit, leaves, and twigs. Fruit loss on some cultivars can be very high. Early and severe defoliation can affect fruit size and the winter hardiness of buds and wood.

Symptoms

The symptoms of bacterial spot are quite different from other diseases of stone fruits. They may be confused with nitrogen deficiency and spray injury. The disease first appears as small, water-soaked, grayish areas on the undersides of leaves. Later the spots become angular and purple, black, or brown in color. The mature spots remain angular and are most numerous at the tip ends and along the midribs of leaves. The infected areas may drop out, giving the infected leaves a shot hole, tattered appearance. On plum, the shot-hole effect is more pronounced than on other stone fruits. Infected leaves eventually turn yellow and drop. Severe defoliation often results in reduced fruit size and increased sunburn and fruit cracking. As a result, tree vigor and winter hardiness are also reduced. Other leafspot diseases and spots due to spray injury tend to be much more circular in outline. Often, these are not confined by veins in the leaf as is bacterial spot.

Fruit infected early in the season develop unsightly deep-pitted blemishes and may exhibit gumming. Since the infected areas cannot expand with increased fruit size, the spots crack as the fruit matures. Pits or cracks on the fruit surface extend into the flesh and create large, brown to black depressed areas on the fruit surface. Lesions that develop during the preharvest period are usually superficial and give the fruit a mottled appearance. On plum, the fruit symptoms are likely to be quite different in that large, black, sunken areas are most common. On a few cultivars small, pit-like spots occur. Cracks on fruit serve as points of infection by the brown rot fungus as the fruit ripens.

On peaches and nectarines, twig symptoms usually consist of cankers on the previous year’s growth associated with and initially extending to about an inch on either side of leaf and flower buds; these affected buds usually fail to open. These overwintering cankers, often termed spring cankers, are first visible during bloom. A canker extending downward from the terminal bud that fails to open is referred to as a “black tip.” When conditions are moist, the canker surface has a black, water-soaked appearance. As the season progresses, the canker can lengthen and the bark surface cracks. Summer cankers are formed on current-season growth and are visible early to midsummer (June through early August).
**Disease Cycle**

The bacterial spot pathogen overwinters in association with buds, in protected areas on the woody surface of the tree (e.g., cracks in the bark), and in leaf scars that become infected during leaf drop the previous season.

**Conditions for infection**

In late winter as temperatures are above 65°F, leaf and flower buds swell, new tissue emerges, and the bacteria begin to multiply. The bacteria are spread from cankers by dripping dew and in splashing and/or wind-blown rain to the newly emerging leaves. Bacteria can also infect through natural openings or wounds. High-moisture conditions are very favorable for both leaf and fruit infections. Leaf infections can occur for at least as long as terminal growth and leaf emergence continues. Severe fruit infections are more common when frequent periods of rainfall or even extended heavy dews and very high humidity occur from late bloom to near pit-hardening. Bacterial spot is more severe in areas where peaches are grown in light, sandy soils and disease is more severe on stressed trees. Wind and wind-blown sand can increase the severity of bacterial spot by creating wounds for the bacteria to infect.

**Disease Management**

Bacterial spot is very difficult to control on highly susceptible cultivars. Under optimal environmental conditions for disease development, control can be difficult even on moderately susceptible cultivars. Control and management measures must be applied preventatively to successfully reduce losses from this disease. Once bacterial spot symptoms are observed, it is almost impossible to bring the disease under control if environmental conditions remain favorable. Environmental conditions that favor bacterial spot development include heavy rain events when temperatures are above 75°F. Extended periods of hot, dry weather reduce the threat of the disease.

Planting resistant cultivars is the most effective control measure. An increasing number of good peach cultivars are highly resistant to bacterial spot. Resistance in plums, nectarines, and apricots is not as common. Most, if not all, cultivars developed west of the Rocky Mountains are highly susceptible because they are bred in an environment unsuitable for disease development. Many of the new low-acid white and yellow stone fruit cultivars are highly susceptible to bacterial spot infection. Check with the nursery on the bacterial spot susceptibility before purchasing and planting new stone fruit cultivars.

Major outbreaks of bacterial spot in young orchards are often attributed to poor cultural practices. Trees in poor vigor are more susceptible, so orchard management programs should be designed to maintain good vigor. High populations of ring nematode have also been associated with increased bacterial spot, which may be related to stress caused by the nematodes. Minimize blowing sand and/or soil particles within and surrounding the orchard by employing appropriate ground covers and/or by use of appropriately placed windbreaks to blunt the damaging effects of strong winds while still allowing for air movement through the orchard.

There are no completely successful spray programs for control of bacterial spot. Chemical sprays with copper-based bactericide and the antibiotic oxytetracycline have moderate efficacy but must be used preventatively. Copper-based sprays are applied from dormant to shuck-split phenology stages to reduce initial inoculum. Because of high sensitivity of peach foliage to copper, rates are reduced progressively in successive sprays during this period. For the cover sprays that start at shuck-off, copper is replaced by the antibiotic oxytetracycline, which helps suppress the development of the disease, but does not eliminate it. Because chemical control is uncertain, planting resistant cultivars appear to be the best long-term control strategy.