



BACTERIAL SPOT OF STONE FRUITS

Bacterial spot, caused by *Xanthomonas arboricola* pv. *pruni* (syn.: *Xanthomonas campestris* pv. *pruni*), was originally described in 1903 on Japanese plum from Michigan. The disease also is referred to as bacterial leaf sport, bacterial shot hole, bacterial crack, and black spot. Bacterial spot has been reported in most of stone fruit producing areas in the world. In the United States, bacterial spot occurs in all stone fruit-growing areas east of the Rocky Mountains. The disease is more common and most severe in areas where stone fruits are grown in light, sandy soils and the environment is humid or moist and warm during the growing season. The most common hosts include peach and nectarine, Japanese plum, apricot, and almond. American and European plum are less susceptible than Japanese plum. Bacterial spot is one of the most important diseases of peaches and nectarines in Illinois.



Figure 1. Symptoms of bacterial spot on peach leaves.

Symptoms

Leaf. Leaf symptoms are first visible as angular, grayish, water-soaked lesions, approximately 1-3 millimeters in diameter, often located along the midrib, leaf tip, or both, or along the leaf margin (Figure 1). As the lesions age and enlarge to several millimeters in diameter, lesion centers become purple and necrotic, and if they abscise, a shot-hole appearance results. Multiple lesions result in leaf chlorosis and premature abscission (Figure 1). Severe defoliation can occur on highly susceptible cultivars. Consecutive years of disease with severe defoliation may weaken trees and reduce fruit quality.

Twig. Lesions caused on twigs are designated as “spring” or “summer” canker. Spring cankers occur on twigs of the previous summer’s growth, developing from leaf scar infections in late fall. These cankers are visible about the time of leaf emergence and appear as slightly raised, blisterlike areas that can extend

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several centimeters along the twig. Summer cankers are formed on new green shoots and are visible first in early summer. Another symptom is “black tip,” which is visible in late winter before leaf emergence and is limited to the terminal bud region of the previous year’s growth. The terminal bud usually fails to open and a dark cankered area, completely surrounding the twig, can extend several centimeters downward from the tip.

Fruit. Fruit symptoms first are visible about three to five weeks after petal fall as small, water-soaked, brownish lesions. On peaches, spots usually form on the side exposed to the sun (Figure 2). Spots may slowly enlarge and merge to cover large irregular areas on the fruit. During periods of high humidity, gum may exude from these lesions (Figure 2). Skin cracking and pitting may occur near the spots during fruit enlargement. Fruits infected at an early stage of development are usually the most malformed.



Figure 2. Symptoms of bacterial spot on peach fruits.

On plums, large, sunken, black spots form on some varieties; small, pit-like lesions on others.

Life Cycle

The pathogen invades peach twigs via fresh leaf scars in the fall. These infections then are expressed as spring cankers or black tips in the following winter to early spring. In plum, the major route of the twig infection appears to be by systemic movement of bacteria through leaf petioles from infected leaves. In peach, most primary inoculum is overwintered bacteria associated with spring cankers and black tip. In addition, bacteria may overwinter in terminal buds of peach. The occurrence of primary and subsequent secondary infections depend entirely on environmental conditions. Frequent periods of moisture during late bloom to a few weeks after petal fall are very conducive to primary fruit and leaf infections on peach and nectarine. Wind-driven rain may increase disease severity. Similar environmental conditions throughout the growing season allow for the continuation of secondary infections. Hot, dry conditions are not favorable for infection by the bacterial spot pathogen.

Disease Management

1. Where bacterial spot occur, planting highly susceptible varieties should be avoided. The following varieties have been reported somewhat resistant: Belle of Georgia, Biscoe, Candor, Comanche, Garnet Beauty, Harbrite, Harken, Late Sunhaven, Loring, Madison, Norman, Pekin, Raritan Rose, Red Haven, Redskin and Sunhaven. The following varieties are reported as very susceptible:
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Babygold S, Blake, Elberta, Halehaven, Jersey Queen, Jerseyland, July Elberta, J.H. Hale, Kal Haven, Rio-Oso-Gem, Suncling, Suncrest, and Sunhigh.

2. When planning an orchard, low-lying or shaded sites with poor air circulation and soil drainage should be avoided. Any practice that promotes faster drying of fruit and foliage will help reduce the risk of infection.
 3. Efforts should be made to avoid introduction of bacterial spot into new stone fruit growing areas where environmental conditions are favorable for disease development. Vigorous, disease-free trees from a reputable nursery should be purchased.
 4. Trees should be pruned annually to allow for better air circulation and to maintain tree vigor. Pruning during dry weather in the latter half of the dormant season is recommended. Wild or neglected stone fruits near the orchard should be destroyed. Trees should be fertilized to maintain their vigor, but not excessive shoot growth.
 5. Successful chemical control depends highly on timing of applications. Once the disease observed, it is difficult to control it. Fall application near leaf drop and/or early-season applications of fixed copper is beneficial in preventing leaf scar infection and reducing overwintering inoculum. Chemical application at bloom and for several weeks after bloom reduce amount of diseased fruits at harvest. A Chemical other than copper that is used with some success is oxytetracycline. Commercial orchardists should follow the spray schedule provided in the Midwest Fruit Pest Management Guide (<https://ag.purdue.edu/hla/Hort/Documents/ID-465.pdf>). In the home gardens, spraying for bacterial spot is not considered practical
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Relative bacterial spot rating for peaches and nectarines in Michigan.

Bacterial spot resistance	Yellow melting flesh peach
Excellent	Biscoe, Blazing Star, Candor, Contender, Harrow Beauty, Harrow Diamond, PF1, PF12A, PF24-007, PF27A, Starfire
Good	Blaze Prince, Desiree, Encore, Garnet Beauty, Gloria, Glowingsstar, John Boy, Messina, PF5B, PF14 Jersey, PF24-007, PF19-007, PF28-007, Redkist, Redstar, Summer Serenade, Victoria, PF 11 Peach, PF9A-007
Moderate	Allstar, Autumn Star, Beaumont, Canadian Harmony, Coral Star, Early Loring, Glenglo, Harbinger, Harrow Dawn, Harrow Fair, Loring, Madison, PF20-007, PF23, PF25, PF15A, PF17, Redhaven, PF23, PF27A, Early Star, Risingstar, PF5D-Big, PF24C Cold Hardy
Fair	Bounty, Cresthaven, GaLa, Jerseyqueen
Poor	Elberta, Fayette, Flavorcrest, Halehaven, Lauro, Spring Flame, Suncrest
Bacterial spot resistance	Yellow non-melting flesh peach
Good	Goldnine, Vulcan, Venture, Vinegold, Virgil, Allgold, GoldJim
Moderate	Veecling, Catherina
Fair	Babygold 5, Babygold 7
Bacterial spot resistance	White flesh peach
Good	Manon, Saturn (flat), Scarlet Pearl, Southern Pearl
Moderate	Blushingstar, Carolina Belle, Raritan Rose Spring Snow, Sugar May
Fair	Benedicte, Klondike White, Lady Nancy, White Lady,
Poor	Opale, Snow Bride, Snow Beauty, Snow Giant, Snow King, Snow Prince, Snowfire, Yukon King
Bacterial spot resistance	Yellow nectarine
Moderate	Fantasia, Firebrite, Harblaze, Harflame, Mayfire, Mericrest, PF11 Nectarine, Stark Ovation, Sunbright
Fair	Flavortop, Summer Beaut, Sunglo, Redgold, Eastern Glo
Poor	June Glo, Honey Royale, Honeyblaze, Honeykist
Bacterial spot resistance	White nectarine
Good	Emeraude
Moderate	Jade
Fair	Arctic Sweet, ArcticGlo, Crimson Snow
Poor	Scarlet Pearl, Arctic Belle, Arctic Jay, Arctic Gold, Zephyr, Arctic Pride