Agronomic Spotlight

Seminis grow forward

Bacterial Diseases of Beans

- Brown spot, common blight, and halo blight are important bacterial diseases of beans.
- These diseases attack leaves and pods and are favored by periods of wet weather.
- The use of certified, disease free seed and resistant varieties are the most effective means of control.

The three most common and important bacterial diseases of beans are bacterial brown spot, halo blight, and common blight. All three of these diseases cause necrotic (brown) spots on leaves and pods. These diseases are favored by wet weather and are spread by splashing water, contaminated equipment, and by people or animals moving through infested fields when plants are wet. [1,2]

Bacterial brown spot

Bacterial Brown Spot is caused by the bacterium *Pseudomonas syringae* pv. *syringae*, and it is one of the most economically important diseases of beans in the U. S. The pathogen overwinters primarily on infected crop and weed hosts and in infested plant debris. It is not usually seed transmitted. The pathogen is spread by windblown rain and overhead irrigation, and infection is favored by moderately warm temperatures, overcast skies, and high humidity. In the northeastern parts of the U. S. the disease is usually seen in the late summer and fall following periods of heavy dew or after a major rainstorm.[1,3]

Figure 1. Foliar symptoms of bacterial brown spot. Howard F. Schwartz, Colorado State University, Bugwood.org.

Symptoms of brown spot initially appear as small (1/8 to 3/8 inch), circular, necrotic (brown) spots on the leaves, often surrounded by a narrow yellow halo. The spots sometimes fall out, giving the leaf a "shot-hole" appearance (Figure 1). Water-soaking and bacterial ooze are not usually seen with this disease. Small (1/16 to 1/8 inch diameter), dark brown spots can develop on pods, and early pod infections can result in the development of malformed pods. [3,4]

Management strategies for bacterial brown spot include crop rotation, the application of copper-based bactericides, and the use of resistant varieties. A two to three year crop rotation away from susceptible hosts is recommended in some areas, but rotation may not be effective in areas where the bacterium is prevalent. Sanitation practices for field equipment and avoiding working in fields when plants are wet will help limit the spread of the disease. The application of copper-based bactericides can also help slow the spread of the disease, but the effectiveness of such applications has been inconsistent. The use of resistant varieties is the best method to control bacterial brown spot. [1,5]

Common blight

Common blight is caused by the bacterium *Xanthomonas axonopodis* pv. *phaseoli*. Infested seed are the most important source of inoculum for this disease, but the pathogen can also survive for a short time in infested crop debris. The disease spreads in the field via windblown rain and overhead irrigation, as well as on contaminated equipment, people, and animals. Common blight is favored by warm conditions (>83°F) and periods of high humidity. [1]

The initial symptoms of common blight are watersoaked spots on the leaves. As they develop, these spots become necrotic, light brown, irregular shaped lesions with distinct, bright yellow margins (Figure 2).[3] Lesions can enlarge and coalesce to cause blighting of the leaves, leading to defoliation. Watersoaked areas can also form on the pods and develop into reddish-brown spots. Pod infection can result in infection of the seed.

The use of certified, disease free seed is important for the control of common blight. Crop rotations of 2 to 3 years can lower inoculum levels. Sanitation practices for field equipment, avoiding working in fields when plants are wet,

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and the application of copper-based bactericides can help slow the spread of common blight. However, copper applications will not eradicate the pathogen from infested fields, and continued wet conditions will often result in spread of the disease, even when copper-based bactericides have been applied.[5] Resistance to common blight is available in some varieties.

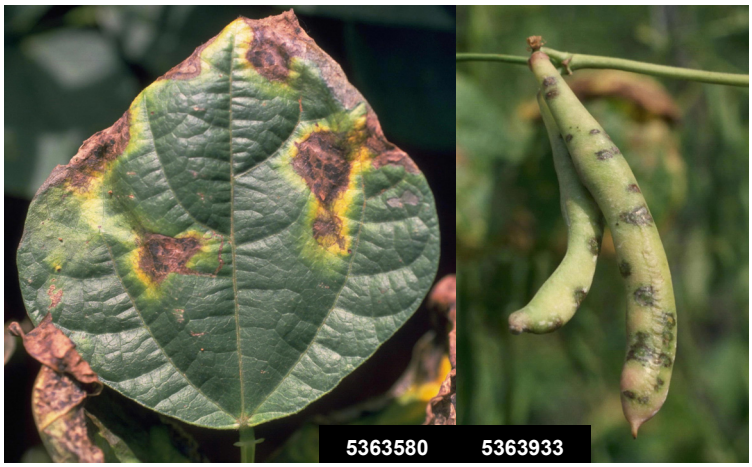

Figure 2. Symptoms of common blight on leaves and pods. Howard F. Schwartz, Colorado State University, Bugwood.org.

Halo blight

Halo blight is caused by the bacterium *Pseudomonas syringae* pv. *phaseolicola*. As with common blight, the halo blight bacterium is seedborne, and infested seed are an important source of this disease. The bacterium can also survive for up to one year in infested crop debris. In contrast to both brown spot and common blight, which are favored by warm conditions, the development of halo blight is favored by humid but cool conditions (60 to 68°F), and the disease is most commonly seen shortly after seedling emergence.[2,4] The disease can continue to spread somewhat as conditions get warmer.[1]

Halo blight initially develops as small, angular, watersoaked spots on the undersides of leaves. The spots become necrotic and reddish-brown, surrounded by greenish-yellow halos that vary greatly in size (Figure 3).[3] At temperatures above 80°F, the halos can be small or completely absent. Infection of the pods results in watersoaked spots that may ooze bacteria.

Because the pathogen is seedborne, the use of certified, disease free seed is important for managing halo blight. As with the other bacterial diseases, crop rotation can reduce inoculum surviving on crop debris, while copper applications and field sanitation practices, including the washing of equipment that has been used in infested fields and avoiding entering fields when plants are wet, will help slow the plant-to-plant spread of this disease.

Two races of the halo blight bacterium (races 1 and 2) are present in North America, and bean varieties with high levels of resistance to both races are available. The use of resistant varieties, along with the use of disease free seed, are the most effective and reliable means for managing this disease.

To help minimize the impact of all three of these bacterial diseases, plants should be grown under optimal horticultural conditions. Vigorous, healthy plants that are properly fertilized and watered are less likely to be affected by many diseases. In particular, excessive nitrogen can make beans more susceptible to bacterial disease.[6]

Figure 3. Large, greenish-yellow halos surround the necrotic halo blight spots on infected leaves. University of Illinois Extension.

Sources:
[1] Hagedorn, D. J. and Inglis, D. A. 1986. Handbook of bean diseases. A3374. University of Wisconsin-Extension.
[2] Wohleb, C. H. and du Toit, L. J. 2011. Common bacterial blight and halo blight: Two bacterial diseases of phytosanitary significance for bean crops in Washington State. Washington State University Extension Fact Sheet FS038E.
[3] Dillard, H. R and Legard, D. E. 1991. Bacterial diseases of beans. Fact Sheet Page: 729.5. Cornell University Cooperative Extension.
[4] Schwartz, H., Steadman, J., Hall. R., and Forster, R. 2005. Compendium of bean diseases, Second Edition. American Phytopathological Society, St. Paul, MN.
[5] Reiners, S. and Seaman. A. 2016. Cornell integrated crop and pest management guidelines for commercial vegetable production.
[6] Zhang, S., Lamberts, M., and Pernezny, K. 2015. Control for snap beans in Florida.. UF/IFAS Extension. Publication #PPP38.

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology Development & Agronomy by Monsanto.