

Common Bacterial Blight on Beans

Symptoms

Common bacterial blight affects foliage and pods and is a major problem of both snap beans and dry beans worldwide. The disease is particularly severe in warm, humid climates with high levels of rainfall and causes losses in both yield and seed quality.

Both common fuscous and halo blights occur on dry beans and are often difficult to distinguish from one another.

Leaf symptoms of common bacterial blight initially appear as small, water-soaked spots (Fig. 1), usually more evident on the underside of the leaves. As the lesions enlarge, they develop into dry, brown spots with distinct, rather narrow, lemon yellow halos. These lesions frequently occur at the leaf margins (Fig. 2). Spots may coalesce, and the yellowing of leaves becomes more generalized, with large dead areas of affected leaves (Fig. 3). In severe cases, leaflets are killed and premature defoliation may result.

Symptoms on pods appear as large, water-soaked areas somewhat circular and slightly sunken (Fig 4). As symptoms progress, pod lesions may become distinctly brick-red in color and more deeply pitted. Under highly humid conditions, pod lesions become covered with a yellow-colored bacterial exudates or ooze that can dry to a yellowish, crusty mass. Pod lesions sometimes are surrounded by a reddish margin. Pod symptoms can appear with little foliar damage.



Figure 1. Initial symptoms associated with common bacterial blight consist of water-soaked lesions.



Figure 2. Common blight lesions on leaf margins.

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Figure 3. More advanced lesions of common bacterial blight showing large areas of necrotic tissue.



Figure 4. Striking water-soaking symptoms of common bacterial blight on bean pods.

Causal Agent

The causal agents of common bacterial blight, *Xanthomonas campestris* pv. *phaseoli*, and/or *Xanthomonas campestris* pv. *phaseoli* var. *fuscans*) are related to bacteria that cause devastating bacterial diseases of tomato, pepper, citrus, lettuce, and many ornamental crops in Florida.

Xanthomonas c. pv. phaseoli has a limited host range, affecting snap bean, dry beans, scarlet runner bean, and a few other members of the legume family such as tepary bean, soybean, *Dolichos lablab*, *Lupinus polyphyllus*, *Stizolobium deeringianum*, *Strophostyles helvola*, *Vigna aconitifolia*, *V. angularis*, *V. mungo*, *V. radiata*, and *V. unguiculata*.

Inoculum Source and Conditions

Contaminated seed is probably the major source of bacteria introduced into new fields of bean crops, but common blight can also develop when beans are planted in fields with previous occurrence, and when climate is consistently hot and wet and humid.

X. c. pv. phaseoli may survive in crop debris in the soil from season to season. *X. c. pv. phaseoli* can also survive and multiply as an epiphyte or resident on the shoot surfaces of weed hosts, primarily members of the legume family.

Alternative weed hosts, without showing symptoms, may also serve as sources of inoculum for this pathogen.

Common bacterial blight causes significant damage at warm temperatures (82-90 degrees F for daytime highs). Rainfall or overhead irrigation is usually favorable for disease development and progression in the field. Splashing water spreads the bacterial pathogen from diseased plants to healthy plants.

Cells of *X. c. pv. phaseoli* enter bean plants through openings, such as stomates (breathing pores) in leaves and other plant organs and through hydathodes (vein endings) at margins of leaves.

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Wounding of plants, such as that created by wind-blown soil particles, can create portals for ingress of blight bacteria.

Bacteria are also readily transmitted mechanically, especially when field plants are wet. Particularly, insects -- such as whiteflies, leafminers, and beetles -- may transmit the bacterium from plant to plant.

Cells of *X. c. pv. phaseoli* may invade and travel within the vascular (water-conducting) tissue of the bean plant.

The bacteria invade the seeds and remain dormant until germination begins. Even a trace of infected seed when planted can initiate severe infection of entire fields.

The bacteria exude in the leaf and pod spots and are spread mainly by splashing and blowing rain. Warm, humid conditions favor development of the disease.

Control

Since this disease can be seedborne, the use of preferably certified high-quality pathogen-free seed is the most important measure for eliminating the inoculum source. Seed should also be treated with an antibiotic.

Crop rotation or planting beans in ground where beans have not been grown for 2 to 3 years will eliminate the threat of debris infection.

Suspending field operations when leaves are wet reduces chances of field spread. This practice can greatly reduce blight disease development and spread.

Plowing down harvested bean stubble in the fall hastens the destruction of the organisms. Spraying foliage with a copper-based bactericide will be of some benefit once the disease appears.

Crops should be promptly destroyed and residues disked.

Leguminous weeds that may serve as inoculum reservoirs and insects, particularly whiteflies should be controlled.

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