

Growers Guide to Seedborne Diseases of Dry Bean (*Phaseolus Vulgaris*)

Seedborne diseases of dry beans (*Phaseolus vulgaris*) are a major concern for organic producers because disease can be introduced to new fields via infected seeds. Organic growers lack organic seed treatment tools that are available to conventional growers to minimize these diseases. Seedborne diseases of beans can be caused by fungi, bacteria, and viruses. The UVM Plant Diagnostic Clinic has developed seed screening methods for pathogens present in the northeastern USA based on International Seed Testing Association (ISTA) protocols. Testing was available in 2025 to organic growers to determine the incidence of the major seedborne diseases impacting organic beans.

Management Strategies

To limit in-field disease and prevent seedborne transmission, start by planting disease-free or treated seed. Conventional pesticide seed treatments are widely available, however there are limited product options for organic production. Biological control options include applications of *Trichoderma* spp. or *Bacillus subtilis* strains that are antagonists to dry bean seedborne pathogens. These can be applied as seed treatments. Be sure to check with organic certifiers to confirm products are approved for use in organic production systems. To suppress early infection, practice crop rotation and avoid beans or other susceptible hosts (e.g., sugar beet, potato) for 2–3 years. Deep plowing can help reduce pathogen inoculum near the soil surface. Since some pathogens like *Rhizoctonia* (web blight) thrive in poorly drained soils, promote soil health practices and improve field drainage for disease management. Avoid overhead irrigation to minimize leaf infections, and work in fields only when foliage is dry to minimize spread. Resistant cultivars, when available, are an important tool in disease prevention. Copper-based sprays may offer limited protection in organic systems but should be used in accordance with label restrictions and organic certification requirements.

Bacterial Seedborne Diseases of Dry Bean

Bacterial seedborne diseases of dry bean (*Phaseolus vulgaris*) include Common Bacterial Blight (CBB), caused by *Xanthomonas phaseoli* pv. *phaseoli* and *X. fuscans* pv. *fuscans*; Halo Blight, caused by *Pseudomonas syringae* pv. *phaseolicola*; and Bacterial Brown Spot, caused by *P. syringae* pv. *syringae*. These pathogens are primarily spread through infected seed and splash dispersal during wet conditions. (Fig. 1)

Fungal Seedborne Diseases of Dry Bean

True seedborne diseases of dry bean—those transmitted internally through the seed and embryo—include Anthracnose (*Colletotrichum lindemuthianum*), Ascochyta Leaf Spot (*Phoma exigua*), Pink Pod Rot (*Trichothecium roseum*), DampingOff/Web Blight (*Rhizoctonia solani*), and White Mold (*Sclerotinia sclerotiorum*). These pathogens can survive within the seed tissues and infect seedlings shortly after germination. The most effective strategy to minimize these diseases is to plant certified, disease-free seed. Hot water and steam seed treatments or biological or microbial seed treatments (e.g., *Trichoderma*-based products) may be used in organic systems, though efficacy can vary. Use resistant cultivars when available and avoid saving seed from symptomatic plants. (Fig. 2)

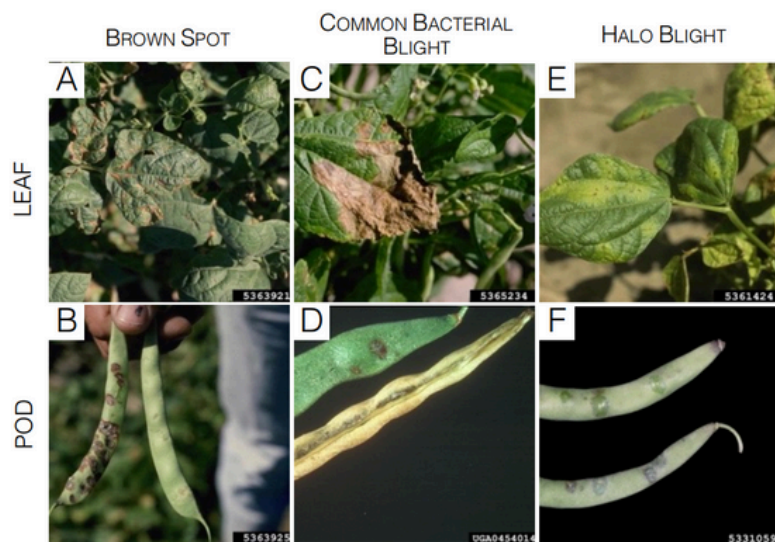


Figure 1. Bacterial brown spot symptoms include circular, brown spots on leaves (A) and pods (B) surrounded by yellow halo, shot-hole appearance. Common bacterial blight (CBB) shows water-soaked spots at leaf margins, between veins, burned appearance (C) and sunken-brown pod lesions (D). Halo blight symptoms include small, water-soaked lesions with yellow-green halo on lower surface of leaves (E) and pods with ooze (F). Photos credits: IPM Images.

Please contact Giovanna Sassi, PhD or Ann Hazelrigg, PhD with questions or concerns about this report. gsassi@uvm.edu, Ann.Hazelrigg@uvm.edu



Extension
College of Agriculture and Life Sciences



Created: 07/2025

USDA NIFA Northeastern IPM Center Grant # 143809-24001

Issued in furtherance of Cooperative Extension work, Acts of May 8, and June 30, 1914, in cooperation with the United States Department of Agriculture. University of Vermont Extension, Burlington, Vermont. University of Vermont Extension, and U.S. Department of Agriculture, cooperating, offer education and employment to everyone without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or familial status. Any reference to commercial products, trade names, or brand names is for information only, and no endorsement or approval is intended.

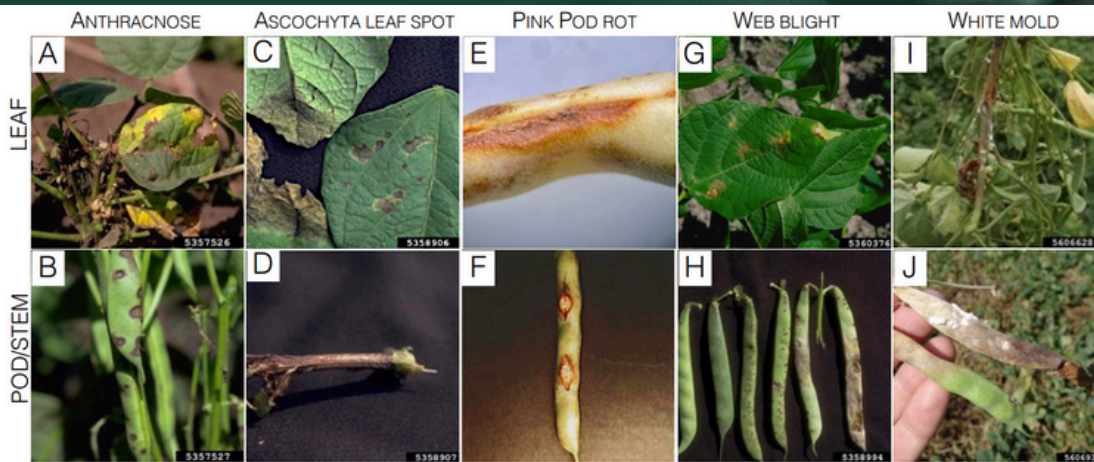


Figure 2. True seedborne (internal) fungal diseases of dry bean. Anthracnose symptoms are red-purple, eye-spot or angular lesions on leaves (A), petioles, pods (B) later turning brown to black. Ascochyta leaf spot symptoms include concentric brown- black leaf (C) or stem spots (D) with small, black fungal fruiting bodies (pycnidia). Pink pod rot symptoms include watery lesions on pods at first, turning chocolate brown then powdery white-pink mold appears (E, F). Web blight/root rot disease shows olivebrown, irregular spots that enlarge and coalesce on leaves (G), petioles and pods (H). White mold signs include white, cottony fungus (I, J) and sclerotia, that both can contaminate seed lots. Photos credits: IPM Images and G. Sassi (UVM)

In contrast, external seedborne contaminants are typically associated with the seed surface or seed coat. (Fig. 3) These include Alternaria Leaf Spot (*Alternaria alternata*), Fusarium Wilt and Root Rot (*Fusarium oxysporum*, *F. solani*), and Ashy Stem Blight (*Macrophomina phaseolina*). While these fungi may not be internal, they can still cause early infection if not removed or managed prior to planting. Surface disinfestation using hot water, vinegar, or peroxide-based treatments may reduce seed contamination. Cultural practices such as residue management, monitoring and early removal of diseased plants can further limit field-level and help reduce pathogen survival and spread.

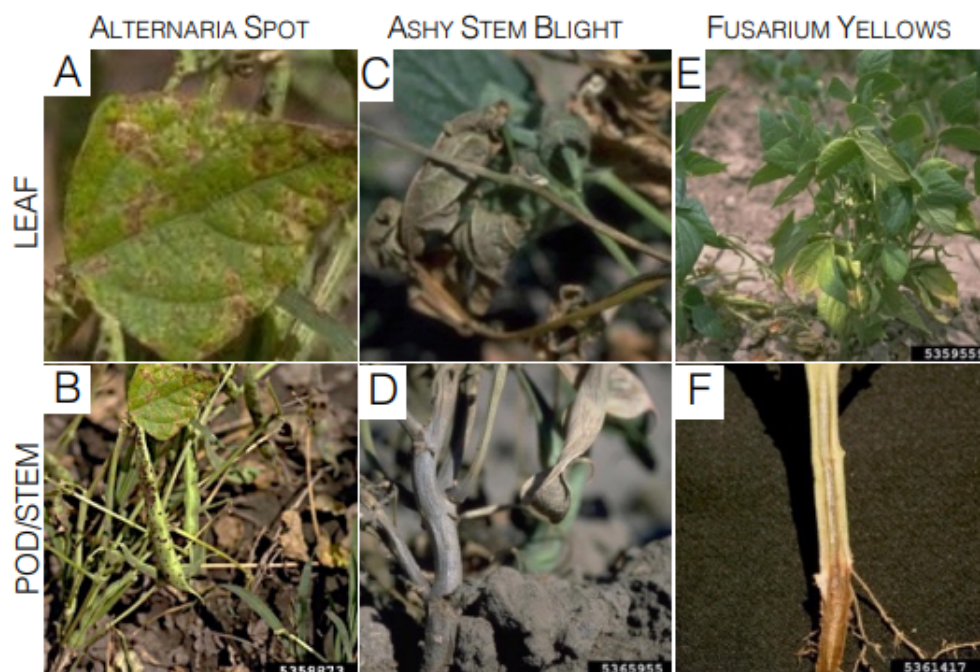


Figure 3. External seedborne fungal diseases of dry bean. Alternaria leaf and pod spot symptoms include small, necrotic, brown flecks on leaves (A) and pods (B). Later appearing as papery, concentric rings with a yellow halo. Ashy stem, pod blight symptoms include sunken, gray lesions on leaves (C), stems, pods (D), becoming yellow (chlorotic) and wilted. Fusarium yellows/wilt symptoms include yellowing of lower leaves (E), wilting, red-brown vascular tissue (F), stunting, water-soaked pod lesions. Photos credits: IPM Images.

Citations

1. Harveson, R.M., et al. (2015). Compendium of Bean Diseases and Pests, 2nd Edition. APS Press.
2. McGrath, M.T., (2021) Bean Anthracnose Factsheet. Cornell University. vegetables.cornell.edu
3. Horst, R. K. (Ed.). (2013). Westcott's plant disease handbook. Springer. P. 67-71
4. Liu et al (2013) Mycologia, 105(4), pp. 844–860. DOI: 10.3852/12-315
5. International Rules for Seed Testing (ISTA) 2023-7-006: Detection of Colletotrichum lindemuthianum in *Phaseolus vulgaris* (bean) seed. ISSN 2310-3655.

Please contact Giovanna Sassi, PhD or Ann Hazelrigg, PhD with questions or concerns about this report. gsassi@uvm.edu, Ann.Hazelrigg@uvm.edu



Extension
College of Agriculture and Life Sciences



Created: 07/2025

USDA NIFA Northeastern IPM Center Grant # 143809-24001

Issued in furtherance of Cooperative Extension work, Acts of May 8, and June 30, 1914, in cooperation with the United States Department of Agriculture. University of Vermont Extension, Burlington, Vermont. University of Vermont Extension, and U.S. Department of Agriculture, cooperating, offer education and employment to everyone without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or familial status. Any reference to commercial products, trade names, or brand names is for information only, and no endorsement or approval is intended.