



## Anthracnose of Soybean

### Disease Facts

- Anthracnose is a fungal disease of soybean that occurs worldwide wherever soybean is grown.
- Anthracnose in soybean is primarily caused by the fungal species *Colletotrichum truncatum* in the Midwestern U.S. but may also be caused by several related species.
- *Colletotrichum* species that infect soybeans have a wide host range, including alfalfa, velvetleaf, and ragweed; however, anthracnose of corn is caused by a different pathogen.
- Anthracnose can infect stems, leaves, and pods of soybean and is generally present in soybean fields to some degree every season.
- Significant yield reductions are rare in the Midwestern U.S., but they are more common in the South.

### Disease Symptoms

- Soybeans are susceptible to infection at all stages of development. Plants and seed may be infected.
- If infected seed is planted, early disease development may result in damping off (seed or seedling rot causing plant death). Dark brown lesions develop on cotyledons, stem may collapse, and seedling may die under severe infection.
- Most commonly, however, plants become infected during bloom and podfill (reproductive stages) due to spores spread from infected plant residue.
  - Symptoms appear on stems, pods, and leaf petioles as irregularly-shaped brown blotches.
  - Severe symptoms may include leaf rolling, premature defoliation, and stunted plants. Pods may be shriveled and contain less seed, moldy seed, or no seed.
- In some cases, pods can be diseased, and the seed may be infected but without symptoms in the seed.

### Disease Life Cycle

- *Colletotrichum* species overwinter as mycelia on crop residue or infected seed.
- Infected seed can result in pre- and post-emergence damping off.
- Spores from infected plant residue are distributed by wind and rain. Spores can infect soybean plants at any stage.



Anthracnose-infected soybean stem. Irregular, randomly distributed lesions are covered by small black dots, which are the fruiting bodies (acervuli) of the fungus. Tiny black spines (setae) may be evident when viewed with 10X magnification.

Photo by Jim Boersma, DuPont Pioneer Field Agronomist, 2012.

### Disease Life Cycle (continued)

- Wet, warm weather favors the disease. Infection may occur when leaf wetness, rain, or dew periods exceed 12 hours/day.
- Leaf, stem, and pod infections generally develop later in the season.
- Black fungal fruiting bodies develop on infected tissue, generally when the soybean plants are near maturity.
- The disease survives on residue of plants and seeds to infect future crops.



Soybean plants lodging due to anthracnose infection. Photo by Donald Specker, DuPont Pioneer Product Agronomist, 2004.

## Yield Impacts

- Under typical growing conditions, anthracnose is unlikely to cause significant yield reductions in the Midwestern U.S.
  - Yield impacts in the Southern U.S. are more common; anthracnose was determined to be one of the 10 most damaging diseases averaged over 15 southern states (Wrather and Koenning, 2006).
  - Anthracnose is favored by warm, humid, and wet environments and can cause severe yield reductions under these conditions.
- Infected pods generally contribute more to yield loss than infected stems or petioles. Infected pods may produce small seed or no seed at all.
- In addition to direct yield loss from infected pods and seeds, harvest losses can occur if plants lodge.



Photo by Jim Boersma, DuPont Pioneer Field Agronomist, 2000.



Soybean plant showing moderate symptoms of anthracnose on the stem. This level of infection would likely result in little or no yield loss due to the disease. Photo by Travis Kriegshauser, DuPont Pioneer Sr. Manager, Encirca<sup>SM</sup> Services, 2014.

## Disease Management

- Rotation to non-host crops is a proven strategy to reduce anthracnose inoculum in a field. As soybean residue breaks down over time, it deprives the pathogen of its survival host.
- Tillage that buries or shreds crop residue, enhancing its breakdown in the soil, is beneficial in reducing anthracnose inoculum in prior fields of soybeans or other host crops.
- Foliar fungicides applied between the R3 and R5 soybean growth stages can help suppress anthracnose and reduce seed infection.
- DuPont Pioneer offers producers high quality, disease-free seed, which enhances seed vigor and stand establishment.
  - This seed comes with several choices of Pioneer Premium Seed Treatment, including EverGol<sup>®</sup> Energy fungicide seed treatment.
  - EverGol<sup>®</sup> Energy fungicide seed treatment is a next-generation technology with multiple modes of action that provides enhanced protection against a broad spectrum of seed borne and soil borne diseases.

## Disease Management (continued)

- A recent research study investigated soybean varieties' resistance to anthracnose (Yang and Hartman, 2015).
  - Results showed no significant differences among commercial varieties in resistance to this disease.
  - However, at least one source of soybean germplasm showed significantly better resistance; thus, genetic solutions may have potential in the future.

## References

- Wrather, J.A., and Koenning, S.R. 2006. Estimates of disease effects on soybean yields in the United States 2003 to 2005. *J. Nematol.* 38:173-180.
- Yang, H.C., and Hartman, G.L. 2015. Methods and evaluation of soybean genotypes for resistance to *Colletotrichum truncatum*. *Plant Dis.* 99:143-148.

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