

Scouting for Soybean Stem Diseases

Acknowledgments

Authors

Kiersten Wise, Purdue University; Carl Bradley, University of Illinois; Martin Chilvers, Michigan State University; Loren Giesler, University of Nebraska-Lincoln; Febina Mathew, South Dakota State University; Daren Mueller and Adam Sisson, Iowa State University; Damon Smith, University of Wisconsin; Albert Tenuta, Ontario Ministry of Agriculture

Reviewers

Emmanuel Byamukama, South Dakota State University; Anne Dorrance, The Ohio State University; Doug Jardine, Kansas State University; Dean Malvick, University of Minnesota; Samuel Markell, North Dakota State University; Laura Sweets, University of Missouri

Photographs

All photos were provided by and are the property of the authors except brown stem rot split stem by X.B. Yang, Iowa State University; brown stem rot foliar symptoms, stem canker images, and Sclerotinia stem rot images by Craig Grau, University of Wisconsin; charcoal rot left image and pod and stem blight right image by Alison Robertson, Iowa State University; charcoal rot right image by Tristan Mueller, Iowa Soybean Association; Fusarium wilt aboveground symptoms by John Kennicker, Iowa State University; sudden death syndrome left image by Gary Munkvold, Iowa State University

Sponsors

The Soybean Disease Management series is a multi-state collaboration sponsored by the North Central Soybean Research Program (NCSRP). This project was funded in part through Growing Forward 2 (GF2), a federal-provincial territorial initiative. The Agricultural Adaptation Council assists in the delivery of GF2 in Ontario. Contributors to this series come from land-grant universities in the North Central states and Canada.

NCSRP NORTH CENTRAL SOYBEAN RESEARCH PROGRAM



United States Department of Agriculture
National Institute of Food and Agriculture



Our soybean checkoff.
Effective. Efficient. Farmer-Driven.

© 2015 | All Rights Reserved | Crop Protection Network

This information is provided only as a guide, and the authors assume no liability for practices implemented based on this information.

The Crop Protection Network is a multi-state and international collaboration of university/provincial Extension specialists and public/private professionals that provides unbiased, research-based information to farmers and agricultural personnel.

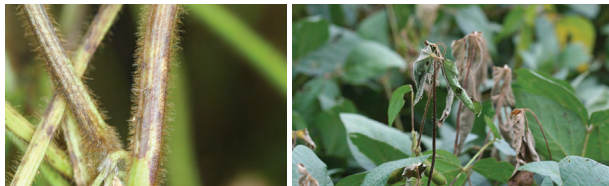
The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



Scouting for Soybean Stem Diseases

The most effective management of soybean stem diseases starts with proper identification. Symptoms of soybean stem diseases typically appear in the mid to late reproductive stages of soybean.

Diseases



Anthrachnose stem blight (fungus: *Colletotrichum truncatum*)

Stems and petioles with red to brown irregular shaped blotches in early soybean reproductive growth stages and black fungal bodies near soybean maturity. Leaf symptoms include reddish veins and rolling. Infected petioles cause leaves to twist down into a Shepherd's crook and can result in early defoliation.



Brown stem rot (fungus: *Phialophora gregata*)

Stems will have reddish-brown discoloration in the pith (center of stem), which may only be found at nodes. Although it appears healthy in most cases, the stem exterior of severely infected plants will look olive green and shiny. Leaf symptoms include interveinal chlorosis and necrosis of youngest leaves, symptoms may not occur on all plants. Root rot is typically not evident in plants with brown stem rot, unlike roots with sudden death syndrome.



Charcoal rot (fungus: *Macrophomina phaseolina*)

The lower stem and taproot appear light gray or silver and small, dark microsclerotia can be present. The interior of stems and taproot will be discolored with microsclerotia. Leaves yellow and die but remain attached to the plant.



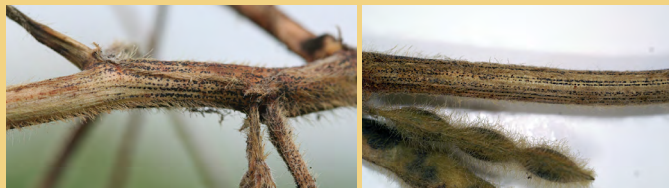
Fusarium wilt (fungus: *Fusarium* spp.)

The inside of the stem and roots will have brown vascular tissue. Upper leaves wilt and lower canopy leaves drop early. Roots are stunted with purplish-brown to black discoloration. If plant roots are incubated, there will be no purple/blue spore masses, unlike roots with sudden death syndrome.



Phytophthora root and stem rot (oomycete: *Phytophthora sojae*)

A dark brown lesion beginning at the taproot and extending up several nodes on the stem can be observed. This lesion surrounds the entire stem. Brown internal stem discoloration can be observed on plants at any stage. Roots are discolored and leaves yellow and wilt but remain attached to the plant.



Pod and stem blight (fungus: *Diaporthe phaseolorum* var. *sojae*)

Black, raised specks (pycnidia) in linear rows can be seen on mature soybean stems. Pycnidia can also be seen on petioles and pods.



Stem canker (fungus: *Diaporthe caulivora*, *D. aspalathi*)

A dark, red-brown canker forms at a node and can extend over several nodes. Lesions often do not entirely surround the stem. Inside the stem, there is discoloration or browning near the lesion. Leaves will have interveinal chlorosis and necrosis and remain attached to the plant.



Sudden death syndrome (fungus: *Fusarium virguliforme*)

The stem interior shows brown or gray discoloration below the outer layer but pith is white (unlike brown stem rot). Leaves show interveinal chlorosis and necrosis and drop from the plant after they die. Root discoloration and rotting, along with internal browning of the taproot, can be observed.



Sclerotinia stem rot (white mold; fungus: *Sclerotinia sclerotiorum*)

White, cottony mold can be seen on the lower stem and black, hard sclerotia may be present. These sclerotia can also be embedded inside the stem. Leaves wilt and turn grayish green between veins but remain attached to the plant.