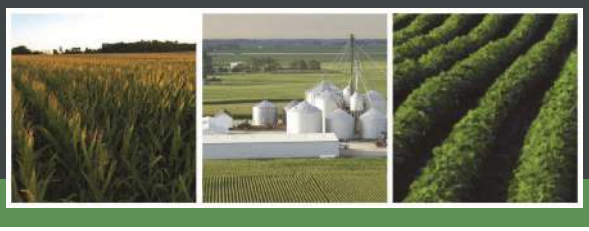

Agronomic Spotlight

Soybean Sudden Death Syndrome

- Sudden death syndrome (SDS) is caused by a soil-borne fungus; foliar symptoms can be similar to other soybean diseases.
- Soybeans are at greater risk for SDS when planted into cool, wet soils, when soybean cyst nematodes are present, and when summer rains cause saturated soils.
- Managing SDS involves several practices such as relieving soil compaction, delaying planting, and selecting soybean products with a good disease tolerance package.

Symptoms

SDS is caused by the soil-borne fungus *Fusarium virguliforme*. Foliar symptoms typically occur after the onset of flowering. Initial symptoms of SDS are chlorotic mottling and crinkling of leaves (Figure 1). As the disease progresses, leaf tissue between major veins turns yellow, then brown as it dies. Entire leaflets may shrivel and die and in severe cases leaflets drop off, leaving petioles attached. Splitting the stem and taproot of a SDS-infected plant will reveal tan to light brown streaks in the cortical tissue while the pith tissue remains white or slightly cream-colored. Root rot or decreased root vigor can be seen in plants with severe foliar symptoms of SDS. If such plants are removed from moist soil, light-blue spore masses of *F. virguliforme* may be seen. The presence of these spore masses, along with the symptoms mentioned above, is considered diagnostic for SDS.

Distinguishing SDS

Interveinal chlorosis and necrosis is typical of SDS, but it is also common to several diseases including brown stem rot, charcoal rot, and stem canker.[1] Unlike SDS, dead leaflets tend to remain attached to the petioles with these diseases. Other identifying factors can be seen when stems are split. Brown stem rot can be distinguished from SDS by the discolored, brown pith and little discoloration of the cortex. Charcoal rot produces small, black microsclerotia within stem tissue. Stem canker often produces spore mats within the stem that appear as longitudinal striations. In some instances chemical injury can also cause similar foliar symptoms; however, no pathogen is present and roots of symptomatic plants appear healthy.

Figure 1. SDS foliar symptoms include chlorotic mottling, necrosis, and leaf crinkling.

Disease Cycle

The fungus overwinters in crop residue or soils and can infect soybean plants as soon as one week after crop emergence. SDS is favored by high-yield environments and is especially prevalent in years when cool temperatures occur prior to or during flowering and pod set. Temperatures close to 80° F lead to development of SDS foliar symptoms.[2] SDS is usually most severe in saturated soils, such as in low spots or in areas prone to ponding. Compacted areas such as around field entrances or where machinery has been driven may also exhibit more severe SDS symptoms. In addition, moderate to high populations of soybean cyst nematode (SCN) can be associated with SDS and may increase the severity of the disease.

Disease Management

Management options for SDS are limited and fungicides are not effective. Early planting can predispose soybeans to SDS infection. Plant fields without a history of SDS first; fields with known SDS problems should be planted last. Correcting soil compaction and improving water movement in the soil may reduce the risk for SDS. This can mean different tactics in different soils types with reports of tillage helping to reduce SDS in some situations while no-till was beneficial in other soil types.[1] Selecting soybean products with good to excellent ratings for tolerance to SDS is a key component of managing SDS. If SCN is present in a field with a history of SDS, a management plan for both pathogens should be devised. This includes planting soybean products with tolerance to SDS and resistance to SCN. While crop rotation is not an effective control option for SDS, a two-year rotation to help maintain SCN population densities below threshold levels may be part of an overall disease management plan for SDS and SCN.

Sources: [1] Westphal, A., Abney, T.S., Xing, L. and Shaner, G. 2008. Sudden death syndrome of soybean. The Plant Health Instructor. http://www.apsnet.org (verified 6/20/13); [2] Robertson, A. and Leandro, L. 2010. Answers to questions about soybean sudden death syndrome in Iowa 2010. Iowa State University Extension. http://www.extesnion.iastate.edu (verified 6/24/13).

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