

Integrated Management for Sudden Death Syndrome In Soybean

Sudden Death Syndrome (SDS) is considered one of the top four yield robbing diseases in soybeans. Yield losses from SDS have ranged from slight to nearly 100%, depending on disease onset and severity. Average yield losses in the United States were estimated at \$190 million a year¹. Managing SDS includes several steps to potentially reduce its impact on soybean yield potential.

SDS Disease Life Cycle Facts

- Caused by soil born fungi (*Fusarium virguliforme*) that overwinter in crop residue or soil and can infect plants as soon as one week after crop emergence.
- Favored by high yield environment and cool temperatures prior to or during flowering and pod set.
- Prevalent in reduced or no-till fields and in soils with high moisture during vegetative growth.
- Severe infection can occur in field saturated areas, such as low spots or areas prone to ponding.
- More severe symptoms can be observed in compacted soils around field entrances or where machinery has been driven.
- Moderate to high levels of soybean cyst nematode (SCN) has shown to be associated with SDS and may increase the severity of SDS.
- The disease can affect the entire field, but usually begins as scattered areas within a field.

SDS Symptoms

Sudden Death Syndrome fungus infects the soybean root system and the base of the stem, producing toxins that are translocated to the leaves. Symptoms may be seen during the vegetative growth stages; however they are most commonly seen during the early reproductive stages through pod fill.

Foliar symptoms begin as small light yellow spots on the upper leaves. The yellowing spots gradually enlarge and develop a brown necrotic center, while the interveinal tissues are killed

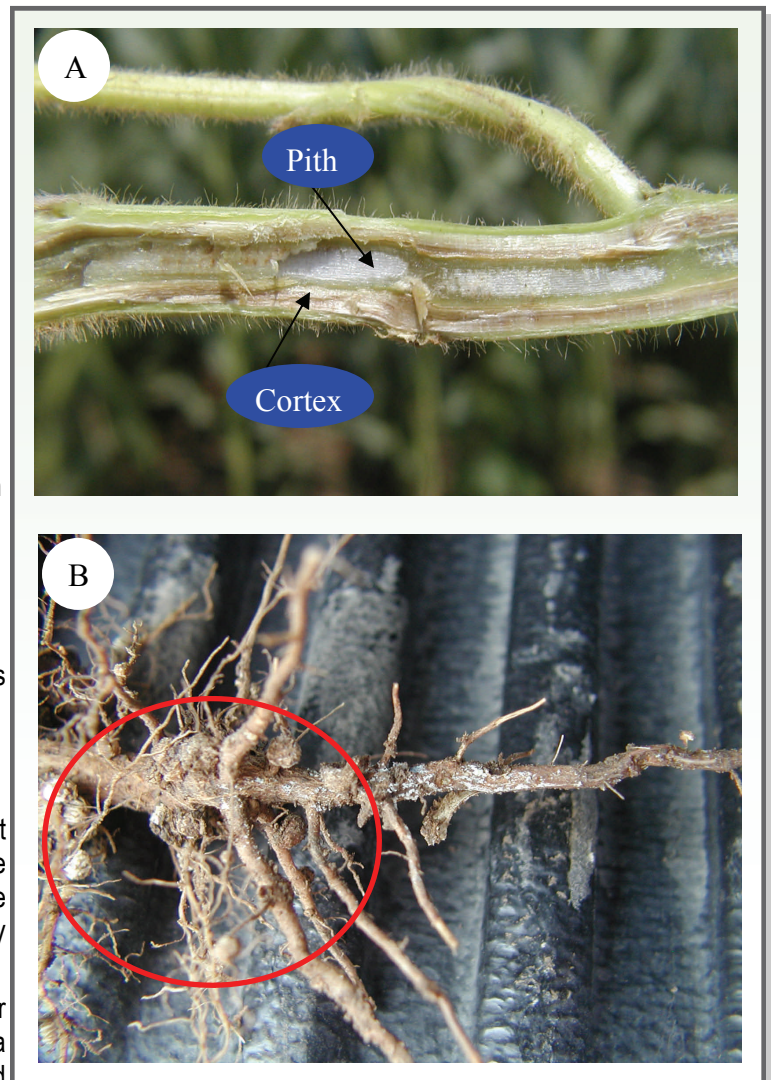


Figure 2. Infected stem showing slightly tan to light brown discoloration of the cortex, while the pith is white color (A). Blue masses of spores on the soybean taproot (B).

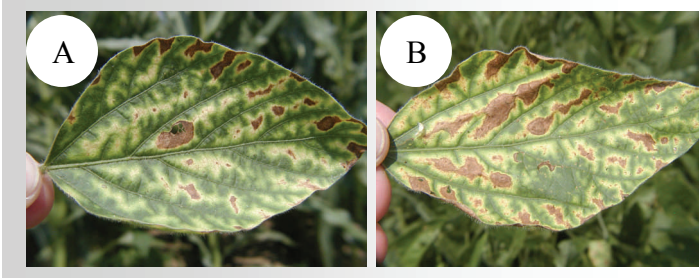


Figure 1. Symptoms of SDS on soybean leaves. Early stage of development with light yellow spots (A). Gradual enlargement of the yellow spots developing brown necrotic center (B).

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(Figure 1 A-B). A green vein pattern will remain on the leaves until they defoliate. Splitting the stem of an infected soybean plant with SDS can show a slightly tan to light brown discoloration of the cortex but the pith is white to creamy color (Figure 2A). Additionally, the SDS fungus may form blue masses of spores on the soybean taproot (Figure 2B).

Infected plants often have increased flower and pod abortion and reduced seed size and quality.

Management Practices

Little can be done this year to fields that exhibited SDS symptoms; however management decisions can be developed for the 2012 growing season.

Fungicides are not an option to control SDS due to the nature of the disease and there is no single management practice available to control SDS completely. Therefore, an integrated management plan with multiple practices is recommended to help limit SDS damage.

The following management practices can be conducted to limit the severity and impact of SDS on soybeans:

- **Variety Choice.** Selecting the right variety is one of the most important SDS integrated management decisions that can be made before the growing season begins. Although there are no soybean varieties with complete resistance to SDS, differences in susceptibility do exist. Consider planting highly tolerant cultivars. Planting a susceptible variety may yield a few bushels higher only when it is grown in disease-free conditions. Plant varieties that are described as very resistant or moderately resistant to soybean cyst nematode (SCN). **Consult the seed guide for SDS and SCN tolerance ratings.**
- **Balance the Overall Disease Package.** If SDS was not a major disease this year and soybeans will not be planted in the same field in 2012, balancing the disease package for the 2012 crop is better than emphasizing only on SDS tolerance.
- **Planting Date.** Either delay planting or plant early-maturing varieties. It is possible to plant early but in warm, dry soil conditions³. Early planting under wet cool conditions can increase stress on young roots. This may predispose soybean plants to infection by SDS fungus.

Consider planting fields with no history of SDS first and those with a history of SDS last.

- **Soil Conditions.** Soils with compaction and/or drainage problems may lead to biggest problems with SDS. Cultural practices that can alleviate soil compaction, and improve drainage in low spots may lessen SDS severity. Maintain optimum soil fertility and pH for soybean production to avoid additional stress.
- **Relation Between SDS and SCN.** Managing SCN may lessen SDS impact on soybeans. It has been reported that there appears to be an interaction between SDS and SCN. If both are present in a field, yield losses may be more dramatic than if either is present alone. Good management practices for SCN can reduce related losses, and they may also provide some benefits with SDS management⁴.
- **Corn Kernels.** It has been reported that corn kernels may serve as host for SDS fungus⁵. Minimizing corn harvest losses may reduce SDS populations and infection.

Please consult with your local agronomist if you have concerns about SDS in your soybean fields.

Sources: ¹Robertson, A. and L. Leandro. 2010. Answers to questions about soybean sudden death syndrome in Iowa 2010. ICM NEWS, Iowa State University Extension, www.estension.iastate.edu (11/3/11).
²Agronomic Spotlight. 2010. Sudden Death Syndrome in soybean – South. Monsanto Technology Development.
³Yang, X. B. 2010. ISU updates SDS management recommendations, <http://farmprogress.com> (11/4/11).
⁴Bradley, C.A. 2010. Sudden Death Syndrome being observed in Illinois. The Bulletin, Issue 18, <http://bulletin.ipm.illinois.edu> (11/9/11).
⁵VanMeter, N. 2010. Managing SDS? plan for high yield first. Soybean Review, <http://soybeanreview.com> (11/7/11).

IDENTIFICATION

Watch for foliar symptoms

Split stems & determine if the center is white

Dig roots & look for blue colored structures

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. **ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Asgrow and the A Design®, DEKALB and Design®, Growing Knowledge and Design®, Monsanto and Vine Design® and Technology Development by Monsanto and Design® are registered trademarks of Monsanto Technology LLC. All other trademarks are the property of their respective owners. ©2011 Monsanto Company. SMK111411