9-7-2010

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Abstract
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Plant Pathology

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Answers to Questions About Soybean Sudden Death Syndrome in Iowa 2010

By Alison Robertson and Leonor Leandro, Department of Plant Pathology

Sudden death syndrome (SDS) is now among the top four yield robbing diseases in soybeans. From 1999 to 2004, average losses in the U.S. were estimated at $190 million a year, and the disease is spreading and intensifying. SDS has been widespread and severe in Iowa this growing season, generating many questions of researchers. The most frequently asked questions are included in the following series of questions and answers.

Field foliar symptoms of soybean sudden death syndrome. Photo by Daren Mueller.

What has caused soybean sudden death syndrome (SDS) to be so severe in Iowa this year?

• SDS is caused by a fungus present in many Iowa soils that infects soybean roots and produces a toxin that moves up the plant and kills the leaves.
• The occurrence of SDS is greatly affected by soil and weather conditions; the disease will not develop if the weather conditions are not favorable.
• The weather in 2010 was ideal for development of the SDS disease.

Is SDS severe in other states this year, too?

• Yes. Extension plant pathologists are reporting widespread and severe cases of SDS in Illinois, Indiana, South Dakota, Minnesota, and Wisconsin.

Has Iowa State University's recommendation to plant soybeans in late April-early May resulted in the severe outbreak of SDS in Iowa?

• No. The severe SDS occurring in Iowa this year is not the result of any single factor.
• There has been a gradual buildup of SDS in Iowa over the past ten years, and the unique weather conditions in Iowa in 2010 were ideal for severe SDS disease development.

• Results of soybean checkoff-funded research at ISU conducted in years when environmental conditions are not favorable for development of SDS indicate that early planting maximizes the ability of the soybean crop to produce yield.

What weather and soil conditions favor SDS?

• Temperatures below 60 F at planting favor infection of soybean roots by the SDS fungus. However, greenhouse research has shown that infection can occur at temperatures up to 82 F.
• Moderate temperature (about 80 F) during the growing season leads to SDS symptoms developing on the leaves.
• Wet weather and soil compaction favor SDS disease development.

What are the symptoms of SDS?

• Soybean roots will appear rotted and plants will be easily pulled from the soil.
• The fungus that causes the disease may appear as blue fungal growth (spore masses) on the main or tap root of the soybean plant.
• When split lengthwise with a knife, the internal tissue of the main or tap root will be gray to reddish brown, not healthy white.
• The areas between the leaf veins will turn bright yellow, then eventually brown. The dead, brown tissue between veins may fall out, leaving large ragged holes in leaves.
• The leaf blades will fall off of the petioles (petioles are the thin “stems” that connect the leaf blades to the main stem), but the petioles remain attached to the stem.

How much soybean yield loss is expected from SDS in Iowa this year?

• This year’s yield losses to SDS are expected to exceed 20 percent in some fields.

Is Iowa State University conducting research on SDS?

• ISU has a strong team of plant pathologists, agronomists and soybean breeders working on various aspects of SDS and the fungus that causes the disease.
• The ISU scientists collaborate with scientists at other universities to find solutions for SDS management.
• Most of the SDS research at ISU is funded by soybean checkoff dollars from state, regional and national organizations, namely the Iowa Soybean Association, the North Central Soybean Research Program and the United Soybean Board.

What can growers do differently to prevent SDS from happening again next year?

• An integrated, multifaceted approach is needed to manage SDS.
• The foundation of an SDS management program is use of resistant soybean varieties. Consult with seed company personnel and agribusiness agronomists for information on varieties that are resistant to SDS.
• Grow soybean varieties with the greatest resistance to SDS in the fields with the greatest history of SDS problems.
• Take measures to avoid or reduce soil compaction.
• Fields with a history of SDS should be planted later, rather than earlier in the spring. But do not delay planting to the point of compromising yield potential.
• Consider improving soil drainage, if possible, in fields with recurring SDS problems.

Is there a spray or seed treatment that growers can use to prevent or control this disease?

• Unfortunately, no. Currently there are no seed treatments or foliar sprays that can be applied to protect plants from SDS.

Can SDS be confused with other diseases on soybeans?

• Yes. Soybean sudden death syndrome leaf symptoms look very similar to symptoms of a disease called brown stem rot (BSR).
• To distinguish SDS from BSR, split a soybean stem lengthwise with a knife. The center of the stem (called the pith) will be brown with brown stem rot but it will remain white with SDS.

Can SDS affect corn too?

• No. Sudden death syndrome does not occur on corn.

• However, recent soybean checkoff-funded research at Iowa State University revealed that the SDS fungus survives on corn kernels and other corn debris.

Will the SDS disease reduce grain quality and cause grain storage problems after harvest?

• No. Plants that are severely affected by SDS will produce smaller seeds. But the fungus does not infect the soybean seed, so it does not cause any grain storage problems.

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This article was published originally on 9/7/2010 The information contained within the article may or may not be up to date depending on when you are accessing the information.