

Sudden Death Syndrome in Soybeans

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Soybean harvest is upon us, and with that, inevitably is the seed ordering season as well. In our crop scouting, we have been noticing a fair amount of disease damage in our customer's fields, and trying to prevent this in the future is a very important consideration prior to choosing your seed this fall. One of the more prevalent diseases we have seen is the appearance of Sudden Death Syndrome (SDS). With SDS, there are several factors to consider when making your soybean management decisions. First, let's try to understand the fungus, and how you get an infection.

Description of the Infection

SDS is part of the fusarium family, meaning it thrives under cool, moist conditions. The pathogen overwinters in soybean and corn residue, as well as in the soil. SDS is quite often encouraged by an infection of soybean cyst nematodes. For an infection of SDS to take place it needs to be able to enter the plant. This is why the damage that SCN causes to the roots makes a perfect entry point. However, the pathogen can enter the plant through any type of lesion. The fungus then remains in the roots while the plant undergoes vegetative growth. During the end of vegetative and early reproductive stages the SDS pathogen starts to produce a toxin that is xylem mobile, meaning moving upwards in the plant.

Symptomology

When looking at the symptoms of SDS, you can generally separate them into two groups: "above ground" and "below ground". With above ground symptoms, there are three different phases: the first phase is inter-veinal yellowing, which will merge into one, making the whole leaf appear yellow. The second phase is when the yellow areas from Stage 1 of the leaf become chlorotic and then necrotic. Phase 3 occurs when the plants have shut down and began premature defoliation. With below ground symptoms, you must split open the taproot and check what colour the middle is. With SDS the middle of the root is generally a gray to reddish brown discoloration. In advanced stages the fungus can be seen on the outside of the root as a blue mold.

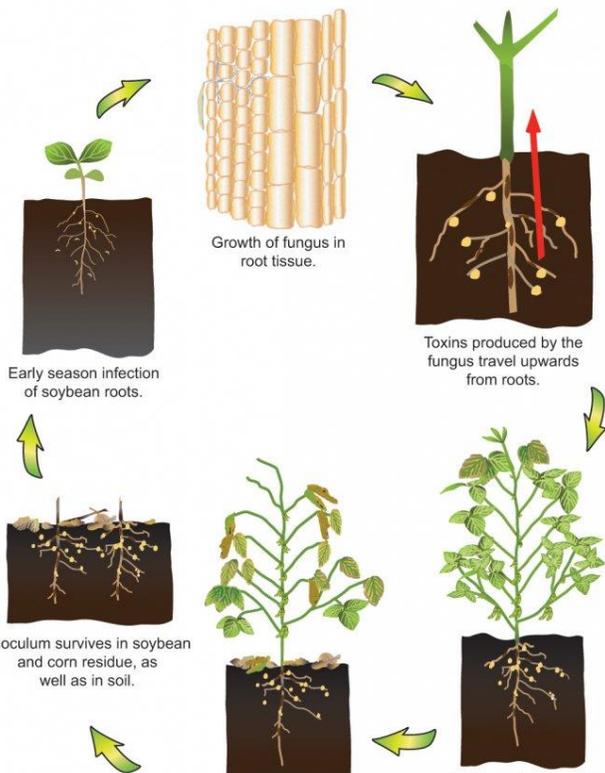


Figure 1 - The Life Cycle of SDS pathogen
<https://soybeanresearchinfo.com/soybean-disease/sudden-death-syndrome>

the outside of the root as a blue mold. The infected plants can usually be pulled from the ground without much force because of the amount of root decay.

Management

Management of SDS is accomplished through a systems approach, starting with selecting the correct variety of soybeans. It is important to look for the rating of resistance of both SDS as well as Soybean Cyst Nematode (SCN). When looking for SCN resistant varieties, most will come with some form of resistance to Race 3 SCN (R3) under the name PI 88788. Varieties such as PS 2020, PS 2555, DKB 15-54, and DKB 25-57. If there is a heavy infestation it would be recommended to move to a Peking source of resistance that controls both race 1 and 3 and can be found in PS 2720 and PS 2889. SDS resistance is reported on a scale from 1 to 10 for Dekalb with the lower the number the greater the resistance. Both DKB 15-54 and DKB 22-03 have a rating of 2 which can be considered excellent. Pride rates their soybeans from excellent to fair with PS 2444 and PS 2666 ranking as excellent.



SCN susceptible (left) and resistant (right)

Planting date can also have a large effect on the onset and severity of SDS. Since SDS thrives in cool, wet conditions, it is important that you are planting into warm, drier soil conditions. Crop rotation is important, as SDS can survive in corn residue so it is possible for it to spread year-to-year. Crop rotation also reduces the amount of SCN eggs in the soil, potentially reducing the impact of SDS as lower nematode damage limits vectors for infection.

There are two active ingredients on the market that when applied as a seed treatment, have shown positive results. Adepidyn will be sold under the trade name Saltro by Syngenta and will be available for the 2021 growing season. Saltro has been shown to protect against early season SDS without any form of plant stress. Fluopyram can be found under the name iLEVO and is sold by BASF. ILevo protects against SCN which is the main vector for infection of SDS. It also protects directly against SDS at the site of infection as well as in above ground tissue. ILevo has the potential to produce a burn “halo” around the outside of the cotyledon of soybeans at emergence but it has not shown any negative yield effects.

Other diseases/infections SDS can be confused with

Sudden death syndrome can be easily misdiagnosed as some other diseases/infections in soybeans. In order to assist with proper identification, be aware of the following:

- Brown Stem Rot: The pith of the stem will be brown but the roots will be unaffected.
- Stem Canker: the plants affected will develop cankers at the petiole and stem junction.

Triazole Fungicides: when sprayed at temperatures above 95°F it can cause leaf symptoms that look similar to those of SDS while the roots remain unaffected.