

Sudden Death Syndrome of Soybean

Travis Faske and Terry Kirkpatrick
Plant Pathologist

Sudden death syndrome (SDS) was first reported in Arkansas in 1971 and since then has been found in most major soybean production regions of the U.S. This disease is often observed in well-managed, high-yield potential, irrigated fields growing under optimal conditions. Yield losses range from slight to 100% depending on the time of infection, cultivar susceptibility, and disease severity.

Symptoms are most pronounced at mid-reproductive stages of development. Initial foliar leaf symptoms are scattered, chlorotic blotches between the main leaf veins that become necrotic, leaving mid-vein and major lateral veins green. Severely infected leaves detach from the petiole while the petioles remain green and attached to the stem long after leaf defoliation. Leaf symptoms of SDS may be confused with those seen with stem canker because they look so similar. However, with stem canker, leaflets remain attached to the petiole on plants after they die. In addition to leaf symptom, flower and pod abortion, which is associated with the greatest yield losses, are symptoms of SDS.

Although there are no external symptoms of SDS on stems in contrast to visible stem lesions with stem canker, the vascular tissue of SDS-infected plants is gray to brown on plants expressing foliar symptoms. The pith (central portion of the stem) in infected plants, however, remains white or slightly cream colored. Vascular discoloration often extends up the stem progressing farther on plants expressing higher disease severity.



Figure 1. Chlorotic and necrotic blotches between central leaf veins on plants infected with SDS.



Figure 2. Green petioles without leaves remain attached on plants severely infected with SDS.

Sudden death syndrome is caused by a soilborne fungus, *Fusarium virguliforme*, which overwinters as thick-walled spores (chlamydospores) in soil or crop residue. Infection may occur early as seedlings development, but symptoms are not visible until plants have reached mid-reproductive stages of development. Symptoms are most severe at 68 to 77 °F. Hot, dry weather appears to slow SDS although severe disease has been reported under these conditions. Disease development can be especially severe in fields that are also infested with soybean cyst nematodes, and disease is most problematic in cultivars that are susceptible to both the fungus and the nematode. Sudden death syndrome is usually most severe in saturated soils, and is often most severe near the header pipe in furrow irrigated fields or in low-lying areas in fields that are prone to standing water. Other factors that increase disease severity are high fertility and soil compaction.

Management options are limited for SDS and foliar fungicides are not effective at suppressing this disease. Currently, there are no highly resistant cultivars available to producers, but some soybean cultivars are less susceptible. Delayed planting of fields with a history of SDS may be beneficial if saturating rains do not occur during early reproductive stages. Cultural practices that improve field drainage and crop rotation (2 yr.) with a non-host crop for soybean cyst nematodes may reduce severity of SDS.