

Stealthy Yield Robber (SDS)

Sudden death syndrome (SDS) is increasing in Iowa soybean fields.

Sudden death syndrome (SDS) is a soybean disease of major concern for Iowa producers because of its potential ability to reduce yields significantly. It is rapidly becoming Iowa's second pathogenic yield robber of soybeans, second only to SCN — and researchers are finding the two diseases are closely connected.

"It's one of those things farmers often don't know they have until harvest, when their yields are dramatically reduced in the diseased areas," observes Sheila Hebenstreit, a soybean grower, ISA director and agronomist for West Central Cooperative. SDS has become quite prevalent in her territory between Jefferson and Ames since it first appeared 10 years ago. "Ironically, what would normally be the most productive soil in the field often has the most SDS."

Hebenstreit makes a strong plea for continued ISA funding of SDS research. "Farmers are losing millions of dollars to these diseases," she says. "We must get our arms around this issue quickly, with continued aggressive research, in order to make a positive impact." This past year, SDS had the highest prevalence in Iowa to date.

Iowa State University (ISU) scientists have since joined with other Midwest researchers in a coordinated, aggressive research effort to find solutions to this devastating pathogen. While scientists continue to screen germplasm to identify the varieties that are most resistant, the soybean checkoff also has taken an aggressive approach to discovering how the disease enters the plant and what triggers the rapid leaf death and yield loss.

Leonor Leandro, assistant professor at ISU, is investigating how the timing and severity of root infection affect foliar symptoms. "We have found that soybean roots are much more susceptible to infection during the first week after germination, and after that, susceptibility is greatly reduced," says Leandro. "Roots infected later will develop root rot but will display few or no foliar symptoms. The continuation of this work will clarify how early-season soil temperatures affect the duration of this susceptibility period. Our study will provide insights about the potential effectiveness of management practices aimed at reducing

the window of opportunity for root infection."

Pathologists have recently learned that SDS and soybean cyst nematodes are directly connected. "Previously, researchers felt that the presence of the fungus was hit or miss," says X.B. Yang, a professor of plant pathology at ISU. "We now understand there is a very short window, early in the life of the plant, when the conditions must be just right for the SDS fungus to enter the plant. When the nematode nibbles at the plant's roots, it allows the fungus to enter. In order to have an effect, the toxin must move up to the leaves through the vascular system. If the toxin is

just around the outside of the plant, it doesn't affect it."

The key to managing SDS is variety selection, says Yang. "Good management of soybean cyst nematode is very important to keep the SDS toxin from breaking into the vascular system of the plant. Begin with choosing varieties with SCN resistance."

ISU's Extension Agronomist Palle Pedersen says research from across the United States shows SDS is found at higher levels in compacted areas and where

we use no-tillage practices. "High soil moisture and cool soil are often found in these situations, which are optimal conditions for this pathogen," he says.

This, he explains, is why SDS was severe in Iowa 2007 growing season. "We 'mudded' in our soybeans because it was so wet in late April and early May, and we were desperate to get it planted," he says. "When you plant soybeans in a wet seedbed, you get sidewall compaction. In addition to the compacted area around the seed furrow, it was cool and wet, which combined with the wet conditions in August to cause the worst outbreak of SDS ever in Iowa."

Hebenstreit agrees, noting anecdotally that she saw a strong relationship between areas where machinery was stuck in the wet fall of 2006 and where SDS was present in 2007. She notes some producers have gone to corn-on-corn in fields that are particularly affected. However, she has observed, and Pedersen agrees, that crop rotation doesn't eliminate SDS. In fact, Yang says ISU is doing research to see if corn actually harbors the fungus and whether a rotation with wheat or oats might help.



Photo: Karen Simon

SDS is rapidly becoming one of Iowa's most prevalent yield robbing diseases.