

The Impact of Moisture on SCN

Soybean cyst nematode (SCN) is a devastating and yield-limiting pest of the soybean worldwide. Syngenta, as a pioneer in controlling this pathogen, offers their second SCN Education Series to help educate growers and retailers on the best practices for reducing damage and increasing soybean yields. Clariva[®] Complete Beans seed treatment, a combination of separately registered products from Syngenta, includes a revolutionary ingredient with a unique, direct mode of action that is lethal to soybean cyst nematodes, delivering immediate and long-lasting protection of plant root systems resulting in significant yield benefits.

The soybean cyst nematode (SCN) is one hardy pest, as evidenced in part by the limited control measures available for it even today. It can survive in a number of inhospitable environments, such as high pH soils. However, researchers have found one thing these roundworms don't like: wet feet. "SCN seems to thrive on drier conditions rather than super wet conditions," says Dale Ireland, seedcare technical product lead with Syngenta.

In overly wet years, nematode population growth would not be expected to reach normal levels, while in dry years this pest can reach its highest potential yield damage. Regional temperatures play a role as well. In the Midwest, depending on a grower's location north to south, SCN can produce anywhere from two to six generations in a season. "If you're up in the Dakotas or Minnesota, you're going to have a shorter growing season and may only have two or three generations of this pest," Ireland explains. "In Missouri and farther into the Deep South, growers may see five or six."

Wet weather – as well as cool conditions and soil temperatures – early in a season can shave off a generation or two regardless of geography. Excessive moisture does not allow proper lifecycle development, Ireland says. Hatched juvenile roundworms do not thrive in saturated soils, and they'll die under anaerobic (no oxygen) conditions.

Combating Survival Mechanisms

SCN overwinter in the form of eggs, both individual eggs as well as those contained in cysts (cysts are actually a previous generation's deceased female



An SCN juvenile growing to maturity within a root.

SCN bodies). They can remain intact in the soil for a long time – up to 10 years. An average cyst can contain 100 to 300 eggs. Some eggs are also carried on the female SCN's back during the later maturity stage. They hatch soonest and would be most susceptible to unfavorable weather.

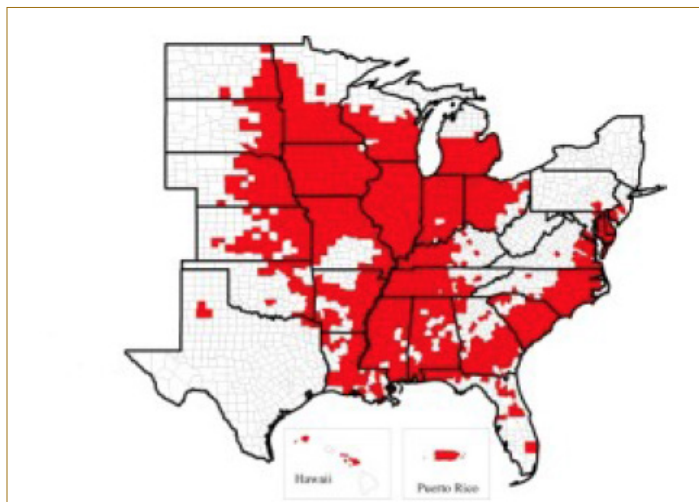
This widely differential egg hatching is one of the challenges of managing SCN, says Ireland. Areas in red show known SCN distribution in the U.S.

"Everything doesn't just cycle at the same time where every 28 days we get a new batch. Rather, these things are hatching throughout the growing season," he explains.

Perhaps ideal conditions for SCN development would be alternating dry and wet weather, which encourages plants' root systems to grow and venture into uninvestigated soil, looking for

moisture, notes Ireland. This root growth means increased root surface area for SCN to colonize.

Many pests prefer drier conditions, where their populations can explode. When the Midwest experienced a serious drought in 2012, nematologists reported “some pretty astounding



Map courtesy Greg Tylka, Iowa State University

increases in the number of SCN eggs and cysts in fields at the end of the season,” says Ireland. “But remember, this ‘explosion’ of SCN may really impact the following year.”

How does moisture impact SCN control measures? There are a handful of soil-applied nematicides and seed treatments labeled for SCN management, but most do not provide season-long control, in part because the product degrades over time and may ultimately move away from the root zone if fields experience excess moisture.

However, one seed treatment promises to “stick with” developing roots, no matter the soil moisture conditions. Clariva[®] Complete Beans seed treatment, from Syngenta, contains the bacteria *Pasteuria nishizawae*, a natural parasite of SCN. It attaches to juvenile nematodes, parasitizing them

and producing additional spores within. Clariva Complete Beans provides lethal, season-long activity.

“It’s a unique way to keep the active ingredient in that root zone throughout the growing season,” says Ireland. “Every lifecycle – 28 to 32 days under optimum conditions – additional spores are released from the parasitized SCN.”

He offers a final word of caution about wet conditions: Eggs can be carried by surface water moving across fields.

“If you experienced water moving across your fields from rivers or your neighbors’ fields in 2015, you may have a new neighbor: SCN living in your fields,” he says.

And in general, if growers know they have fields that are fairly heavily infested with SCN, they need to be careful not to allow transport of the pest to other farms nearby where it hasn’t been found. The last thing this expanding soybean threat needs is any help spreading.