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Nix The Cyst

John Pocock, Corn and Soybean Digest
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Soybean yields dropped so low on Carl Miller's corn and soybean farm near Cedarburg, WI, in 2003 due to soybean cyst nematode (SCN) that he almost gave up planting soybeans entirely. After Miller planted a Latham CystX soybean variety in 2004, however, his confidence in raising beans was restored.

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That year, CystX soybeans out-yielded other varieties that Miller and his son, Stan, had planted with traditional SCN resistance by nearly two to one. As a result, they decided to plant almost 100% of their soybean acreage to CystX varieties in 2005, and are glad they did.

"Because it was a dry summer this year, I was only expecting about 35 bu. beans, but the CystX varieties yielded close to 50 bu./acre," says Miller. "In some spots CystX yielded 65-70 bu./acre. They were the most beautiful beans I've seen in years."

The Millers planted three CystX varieties in 2005, ranging from 1.7 to 2.6 maturities, and each one yielded well. "We are 100% no-till, and we plant in 30 in. rows, but the CystX varieties were so healthy they looked as if they'd been planted with a drill," says Miller. "We have a lot of marginal, rocky land, but at the end of August we could see that there wasn't a bit of shrink. They showed no sign of cyst nematode."

Dry years tend to magnify problems with SCN, not reduce them, points out Jamal Faghihi, a Purdue University Extension nematologist who helped develop the CystX technology. Thus, the dry weather in many parts of the Midwest this year underscored both the need for SCN control and the ability that CystX soybean varieties have to overcome this troublesome pest.

Whenever soybeans are under stress, any problems with SCN become magnified, says Faghihi. "In a dry year, cyst symptoms show more, particularly on sandier soils," he adds. "It was a dry year for many parts of the Midwest, but as far as I know, most of the CystX really did well."

CystX soybean varieties did do well in 2005, confirms John Gerard, president of Access Plant Technology, which licenses CystX technology to seed companies. "This year, we are starting to see some excellent results in a lot of different maturity groups," he says. "What we'd been missing is high-yielding CystX varieties in the 1.5 to 1.9 maturity range with iron deficiency chlorosis (IDC) tolerance, which is a major problem in Minnesota. Now it looks like we have them."

There are currently 68 seed companies, including Garst, Syngenta and Golden Harvest, with

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CystX in their product lines, says Gerard. There will likely be more to come at the end of this year, which could include some Monsanto varieties, he adds.

Gerard says the first soybean varieties with the CystX trait became commercially available in 2003, but as CystX is incorporated into more and more germplasm, farmers will have more choices, and yields should increase. "This year," he says, "we've heard a lot of reports of 80 bu./acre CystX soybean varieties."

There are 16 companies currently developing CystX varieties, adds Gerard. "Some will yield better than others, and some will yield better in different growing environments," he says. "It's up to the farmer to sort out the genetics and decide what will work best on which farm."

Gerard also emphasizes that CystX is not a variety — it's a trait. "The trait is what's important," he says. "It's the trait that has been incorporated into all different varieties and genetics."

Yet a CystX trait doesn't necessarily guarantee top yields. "We haven't yet seen CystX varieties perform consistently as the top-yielding varieties, but they have always been comparable in yield to traditional resistant varieties," says Greg Tylka, Iowa State University Extension nematologist. "Sometimes they are among the top yielding varieties and sometimes they are not. Not all CystX varieties yield the same."

A 20-acre test plot in strip trials near Radcliffe, IA, in 2004 is a case in point. Dennis Friest and his son, Brent, compared a 2.6 maturity Latham CystX variety to a susceptible 2.6 maturity Latham variety through the Iowa Soybean Association On-Farm Network. The field had been in corn for three years, and as a result the nematode egg counts had dropped from 20,000 eggs/100 cc of soil in 2002 to 7,300 eggs/100 cc of soil before planting the test plot in 2004.

Although Friest says he had some good yields with a small trial of CystX in 2003, his experience with CystX in 2004 proved disappointing. "The CystX plant was healthier, but the yields were not as good," he explains. "The nematode-susceptible soybeans averaged about 3 bu./acre more than the resistant soybeans over the entire test plot that year."

As a result, Friest says he decided against planting CystX varieties in 2005. Still, he adds that they may consider growing the CystX trait again on some soils that don't naturally drain well and are extremely high in pH.

"On average, we lost money growing the CystX soybeans (in 2004), but a closer look at the yield information revealed that the CystX beans yielded as well if not better than the susceptible soybeans on Harps soils," says Friest. "Those are the areas where we have higher cyst counts. That's a good reason to give these soybeans another look, particularly as part of a long-term nematode management strategy."

However, 2004 might not have been the best year to test CystX soybeans in Iowa, says Tylka. "With the cooler growing season, SCN wasn't as active as in warmer years," he says. "And too, the cooler, wetter growing season put less stress on the beans, meaning they could withstand quite a bit of root damage from nematode feeding and still produce very good yields."

Tylka advises alternating CystX varieties with traditional SCN varieties in order to rely on more than one genetic source to control SCN. In other words, planting a CystX variety one year and a more traditional SCN-resistant variety in the same field the next time soybeans are grown would help to keep nematodes from overcoming either source of resistance in the future, he says.

Alternating sources of resistance is an essential component of integrated pest management, agrees Faghihi. "It is a good practice to change the source of resistance, but if you can't change the source of resistance, then at least change resistant varieties," he says. "The problem is that we only have a few different sources, and right now more traditional resistant varieties are not holding up very well. So, you might have no choice but to plant CystX."

Planting CystX varieties may also help to reduce cyst nematode populations so that other varieties can be grown in subsequent years without experiencing as much yield loss. "After planting CystX varieties, we see a very dramatic reduction in cyst nematode," Faghihi says. "Purdue research shows that the average reduction is almost 75% in the numbers of SCN eggs."

Planting corn in two consecutive years is another way to reduce SCN egg counts in fields. "If you have the option to plant corn for two years, it's a good option, if you can afford to do it," he says. "Under corn, soybean cyst nematode numbers go down."

However, dropping soybeans and growing continuous corn on infested fields won't eliminate SCN populations. "We get the biggest impact from corn in reducing SCN populations in the year right after soybeans," says Tylka. "A second year away from beans gives you a little less of a

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drop in numbers, and a third year reduces them even less. But that first year is by far the most effective.”

Research in Iowa has yet to show a dramatic drop in SCN egg numbers after growing CystX compared to the drop attained after growing more traditional SCN resistant varieties, adds Tylka.

“Just as with traditional resistant varieties, we have seen a drop in SCN numbers, but our field experiments haven't shown a greater drop in SCN numbers with CystX varieties than with traditional varieties,” he says. “Maybe this happens in fields with really high SCN numbers, and we typically do our experiments in fields with moderate SCN population densities.”

Still, no matter what a farmer's past experience with SCN, it's always a good idea to conduct soil tests to monitor SCN numbers, says Tylka.

“If farmers have never checked their fields, I would advise checking them in the fall before growing soybeans again,” he says. “For fields that have already been checked, I would check them again every 4-6 years to make sure that you're keeping SCN numbers in control.”

Only Three Sources Available To Resist SCN

Soybean growers who encounter problems with soybean cyst nematode (SCN) basically have only three sources of resistance to choose from, says Greg Tylka, Iowa State University nematologist.

- “The real common type of resistance is PI88788,” he says. “There are several hundred SCN resistant varieties, and more than 90% have PI88788 resistance.”
- Hartwig resistance is another source, he adds. Hartwig was developed from the soybean breeding line PI437654, and CystX was derived from Hartwig.
- Peking is the third type of resistance — and the most uncommon. “It's a really good source of resistance,” says Tylka, “but it's hard to get into high-yielding varieties.”

As part of a good integrated pest management approach, Tylka recommends alternating soybean genetics with different sources of SCN resistance.

“CystX is a nice second choice to alternate with the PI88788 varieties,” he says. “It's a great new tool for the toolbox, but we don't want growers to throw out all the other existing tools and use it exclusively.”

— John Pocock

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