New Genetic Sources of Soybean Cyst Nematode Resistance

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In 2017, Tennessee soybean farmers produced a record 83 million bushels of soybeans with a production value of $805.1 million. An additional 1.8 million bushels are estimated to have been lost due to soybean cyst nematode (SCN), valued at over $17 million. Resistant cultivars have been an effective means of nematode control, but they have also caused major shifts in nematode populations. For decades, soybean cultivars for sale in the U.S. have primarily shared the same source of SCN resistance: a soybean called plant introduction (PI) 88788. This soybean line is native to China and was introduced into the U.S. in the early 1900’s for commercialization purposes. Over time, nematode populations in many farmer fields have shifted, rendering this source of nematode resistance much less effective than it once was.

Although soybean cultivars with the PI 88788 genetic resistance source still dominate the market because there is no yield drag, new alternatives are available for broader resistance, in part due to the USDA-ARS soybean breeding program located at the West Tennessee Research and Education Center in Jackson. USDA-ARS in Jackson has released five varieties since 2005 with nematode resistance from a different genetic source: a soybean called ‘Hartwig’. Hartwig is resistant to SCN Races 2 & 5, the most common populations in Tennessee fields. This technology has already been transferred to major seed companies and public universities, and varieties with the Hartwig genetic source of SCN resistance are commercially available for purchase from a variety of different companies.

In the future, we expect nematodes to adapt to and overcome the Hartwig genetic source of resistance, just as has occurred with the PI 88788 genetic source. In anticipation of this outcome, the USDA-ARS program in Jackson is developing soybean lines from several different new sources. Soybean lines JTN-5316, JTN-5416, and JTN-5516 combine the Hartwig genetic source with that of PI 567516C, for a broad base of SCN resistance. Soybeans JTN-4118, JTN-4218, and JTN-4318 are earlier maturing lines developed from the PI 494182 genetic source, and are undergoing their first round of regional yield testing in 2018. Soybean lines from genetic sources PI 437655 and ‘Columbia’ are also in the development pipeline.

Attendees will learn about the different genetic sources for SCN resistance available to them now and in the future, and why changing genetic sources is important. The presentation will also highlight resources that farmers can use to choose varieties with the best SCN resistance for their fields, and how to identify cultivars with genetic resistance from the Hartwig source versus the PI 88788 source.