



From the field day: How to battle stressors, corn nematodes

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Compiled by Successful Farming magazine Crops Technology Editor Gil Gullickson.

Raising a bumper crop despite pests

You could hear growing corn crackle at a mid-June Syngenta Seed Care plot tour held near York, Nebraska. Nearly ideal temperatures combined with abundant moisture have keyed excellent crop progress so far this growing season.

To get there though, crops have had to battle early-season diseases and in the case of corn, corn nematodes. University and Syngenta officials discussed ways to manage them at the plot tour.

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No control over weather

What's the most important factor in influencing corn production and yields? Hybrid selection? Population? Planting date? Pests like weeds, insects, and diseases? Weather?

All are important. Of all these, though, there's one in which you have zero control over.

"Weather is what really drives things," says Wayne Pedersen, professor emeritus of plant pathology at the University of Illinois. "You have no control over it."

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Early-season killers

Early spring cold and wet weather can prompt diseases like Pythium infections in corn and soybeans, says Pedersen. Pythium infections kill plants at or shortly after emergence, and can quickly clip yield potential by up to 10%.

Pythium is persistent, as Pythium spores can survive in soils for 10, 15 and 20 years. In cases like these, fungicide seed treatments fit well. "For early planting, you need a seed treatment," says Pedersen.

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Seed treatment coating challenges

It's more of a challenge to apply a treatment on seed with soybeans than with corn. "With corn, seed treatments can be put on the seed, and the seed coat pretty much stays on the young emerging plant," says Pedersen. "But with soybeans, the seed coat breaks off. You want enough treatment on the seed coat to get into the plant, but not leach into the soil."

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Which one is it?

Chlorosis. Stunting. Root damage. Yield loss. So which one of many maladies can cause these symptoms?

Could be herbicide damage. Could be soil compaction. Or, it could be a relative newcomer that's actually been around a lot longer than you think -- corn nematode.

Changing production practices are causing this pest to infest and damage more corn these days.

"We are using less organophosphate and carbamate (soil-applied) insecticides and more pyrethroids," says Tamra Jackson, University of Nebraska Extension plant pathologist. A side benefit of organophosphate and carbamate soil-applied insecticides applied for corn rootworm is they also control corn nematodes. With the move toward pyrethroid insecticides and corn rootworm traits, that side benefit is erased.

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Why corn nematodes are increasing

More no-till and continuous corn are also prompting corn nematodes to thrive. Numerous species of corn nematodes thrived in undisturbed U.S. native grasslands before European settlers tilled them. No-till mimics the natural state under which corn nematodes thrived.

More corn-on-corn -- also a grass -- give corn nematodes what they prefer to eat. "It's what we consider ice cream for corn nematodes," says Jackson.

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Coming to a county near you

Corn nematodes are more common than you might think. In 2007, Syngenta Seed Care took three random soil/root samples in each Midwestern Corn Belt county that grew at least 25,000 acres of corn. "Every county had corn nematode present," says Kurt Jones, Syngenta Seed Care technical crop manager.

The survey divided nematode density areas into low, moderate, and high areas. "In a lot of areas, there was more risk for nematode injury than previously thought," says Jones.

There also can be hotspots in fields in counties with light infestations, Jones reminds. Even within fields, there can be hotspots, Jones says.

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Avicta Complete Corn coming

Currently, just 3% of corn farmers treat for corn nematodes, with another 6% aware of the problem says Mark Jirak, crop manager with Syngenta Seed Care. It's likely a good share of the remaining corn farmers also suffer corn nematode damage also. Next year, farmers will be able to control corn nematodes under a seed treatment combination Syngenta Seed Care calls Avicta Complete Corn. Its five components include:

- Avicta seed treatment nematocide
- Cruiser seed treatment insecticide
- Seed treatment fungicides Apron XL, Maxim XL and Dynasty

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What to expect in yield gains

In 35 large-block non-replicated side-by-side on-farm trials in six Midwestern states conducted by private consultants in 2008, Syngenta officials say corn treated with Avicta Complete Corn yields yielded a median 6.7 bushels per acre above corn treated with Cruiser Extreme 250. (Cruiser Extreme 250 contains all of the above components except Avicta.) Syngenta officials say the average yield gain was 8.7 bushels per acre for Avicta vs. Cruiser Extreme 250, with a range from -11.3 to 44.4 bushels per acre.

Since federal regulators approved Avicta late in 2008, Syngenta officials note it was too late to introduce Avicta Complete Corn into seed selling channels for 2009.

"Instead, 2009 is a show-and-tell year," says Jirak. Syngenta will have 1,000 large-block, on-farm demonstrations throughout the Midwest and Southern corn growing areas during the 2009 planting season.

Avicta Complete Corn's cost will be included in the seed price. Its suggested retail price hovers around \$35 to \$40 per 80,000 seed unit, says Jirak. That's \$20 to \$25 per unit above Cruiser Extreme 250 suggested retail price of \$15 per unit, he adds.

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Nematodes are everywhere

Nematodes are found everywhere -- in water, deserts, and Arctic-type environments. Corn farmers who also raise soybeans already know about them, due to soybean cyst nematode (SCN) infestations in soybeans. Unlike SCN, though, there are 60 species of nematodes that can impact corn, says Jones.

Some top nematode species include lesion, lance, needle, sting, and dagger. Corn nematodes damage plant roots via a stylet. "It's like a syringe," says Jones.

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Sampling for corn nematodes

Corn nematodes have varying damage thresholds, depending upon the type. In the case of sting nematode, all it can take is just 1-10 per 100 cubic centimeters (cc) of soil to cause yield damage to corn. Others, such as lance, can tally between 50 to 100 per 100 cc of soil before yield damage occurs.

Corn nematodes also can be endoparasites -- within a root -- and ectoparasites -- outside a root. That's why it's important to sample at an angle to get both soil and roots. This ensures you get a good mix of nematodes from both roots and the soil in the sample. The best time to sample is within 4 to 6 weeks after corn emergence, says Jackson.

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Corn nematode misconceptions



Since corn nematodes are so new as a corn pest, there are some misconceptions about them. Tamara Jackson, University of Nebraska Extension plant pathologist, details some of them in this video.

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