

Stand damage from the reniform nematode is often misidentified.

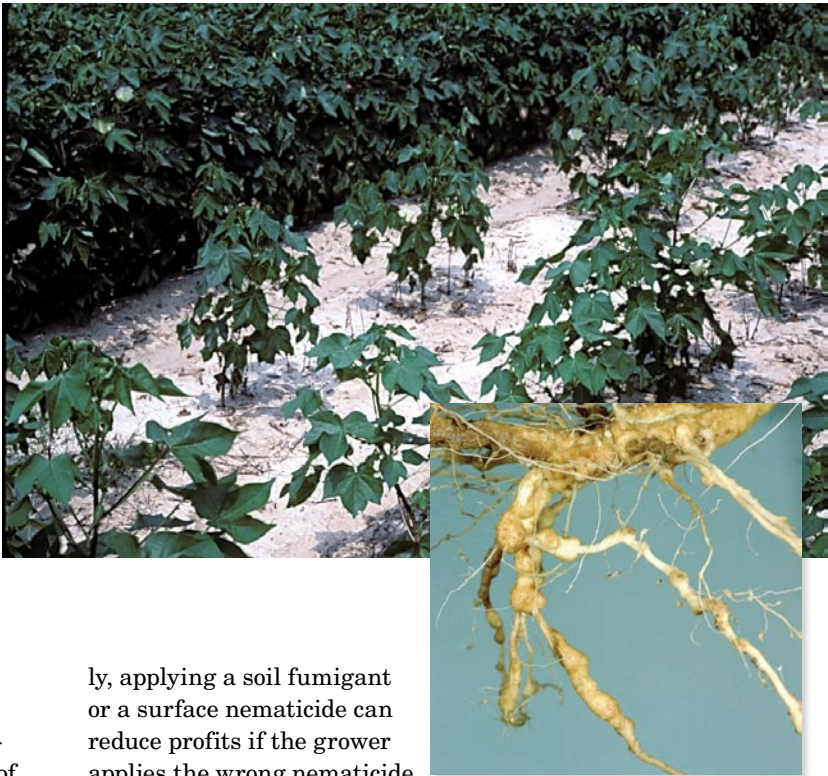
For better nematode control

Know Your Soil Types

BY ROSEMARY HALLBERG

EVERY YEAR, COTTON GROWERS face two invisible pests that strike without warning, leaving rows of stunted, withered plants. The root knot and reniform nematodes are among a cotton grower's most devastating enemies. Because they do most of their damage at the roots, they can destroy entire rows of young cotton plants before growers realize they have a problem. In fact, both species of nematodes together cause average losses of over 2% of the total U.S. cotton crop every year, valued over \$100 million.

But controlling these nematodes poses a number of dilemmas for growers. Do they use a soil fumigant or spread nematicide on the soil surface? Do some areas need more treatment than others? Because each species prefers a different soil type, and some populations are more intense than others, treatment decisions can be both complicated and costly. Scouting the field by taking soil samples to find those populations is time intensive, and lab analysis of those samples is expensive. Converse-



As the name implies, root knot nematodes cause knotty galls that interfere with moisture and nutrient uptake.

ly, applying a soil fumigant or a surface nematicide can reduce profits if the grower applies the wrong nematicide or an inaccurate amount.

Several researchers say that the key to nematode management may lie in the soil preference of each nematode species. Since root knot nematodes prefer sand, while reniform nematodes cluster in silty loam, finding the soil types present in a field may help predict locations where nematode problems will occur. To do that, researchers are testing electrical conductivity (EC) systems that analyze soil texture. (A popular example of an EC system is the Veris cart from Veris Industries.) From that analysis, soil-type maps are created.

Louisiana State University nematologist Charles Overstreet uses the maps to identify which places in a field are most likely to house root-knot and reniform nematode populations. "The lower the reading, the more sand in the field," Overstreet says. "The higher the number, the more clay you have. Once you have clay, you don't have as many problems with nematodes."

The maps provide Overstreet and his team – GIS expert Maurice Wolcott, entomologist Gene Burris and plant pathologist Boyd Padgett – with clues about why some areas of the field were unproductive even with nematicide treatments.

"Growers assume the areas of low yield are those where the nematodes are," Overstreet says. "But low yields may be just from other soil problems, or they may be from nematodes."

The maps help Overstreet's team create "management zones" based on soil type. These zones indicate where nematicide may be needed, and where it won't have any benefit.

USDA soil scientist Dana Sullivan has had similar results in Georgia, where she and University of Georgia researchers Calvin Perry and George Vellidis, Extension

Something Old, Something New

In early July, Weldon Shook gazed across his cotton field ravaged by adverse weather and nematodes.

But like most farmers, he was looking on the bright side. "For all it's been through with weather and nematodes, I'm actually proud of this cotton field. If this field makes two bales average, I'll be pleased," said Shook, a Seagraves, TX, producer who's always on the lookout for new crop management ideas. Much of the optimism he expressed that day in early July was based on how much better the cotton was progressing where he had tested a new combination of old and new – his usual Temik in-furrow application, along with N-Hibit Seed Treatment.

"It seemed to give the treated cotton an added ability to withstand stresses like the cool, wet, and windy weather we experienced right after planting and emergence of the cotton," he explained.

Replicated trials in Southern and Midwestern states have shown that the Harpin protein in N-Hibit reduces the number of nematode eggs among plant roots by an average 50% or more. Harpin does not act directly on the disease organism, according to EPA information, nor does it alter the DNA of treated plants, but instead activates a natural defense mechanism in the host plant.

The Texas A&M Cooperative Extension Service has been soil testing on farms in two counties to the north of Seminole for 10 years, and finds that 80% of the surrounding acreage has some level of nematode infestation, with 60% of those acres requiring a nematicide. "We need more tools to help us manage nema-



Weldon Shook

todes, so I will try new technologies as they come along," Shook said. "I heard about N-Hibit at the Sandyland Ag Conference in Seminole in 2006, and decided this year I would test it."

The test field made just under four bales per acre in 2006, but this year it looked as though it might have been on another planet. At planting on May 7, the weather was nice and warm. Then came the trifecta of bad weather: an extended cold snap, high winds for three straight days, and rain (including a hail storm that came with it on May 25) for days on end. Heat units quickly fell far behind normal.

Shook's test field is minimum-till and received 130 units of nitrogen with a pre-plant herbicide. He planted 40 acres of FiberMax FM 9063 B2RF treated with N-Hibit Hopper Box Seed Treatment. (N-hibit also is available as an on-seed, dealer-applied treatment.) The remaining seed was not treated with N-Hibit, but all the seed was accompanied in-furrow by Temik at a 4½ pound per-acre rate. After emergence there were two trips over the field with glyphosate. Shook makes all the applications himself with his own sprayer.

"I think I've found the right at-planting nematode combination with Temik and N-hibit," said Shook. "... I've been told that N-Hibit is not a stand-alone product for nematodes, but it seems to give me an edge in combination with Temik; and for now, maybe this is how to get the best out of both. After seeing these results, I'll expand this nematode management program next year."

What is N-Hibit?

N-Hibit®

The active ingredient in N-Hibit Seed Treatment is harpin protein, which is produced by disease-causing bacteria that attack plants. N-Hibit does not contain pathogens, but the presence of harpin protein turns on internal plant signals that activate natural self defense and growth systems as though the plant was under attack.

Harpin proteins do not enter the plant. They bind with the plant's external harpin protein receptors, which are present on seed as well as foliage. After binding, the harpin proteins harmlessly disintegrate.

In cotton, according to data from Plant Health Care, Inc., marketers of N-Hibit, growth responses with N-Hibit typically produce increases in root volume and length, plant weight, overall plant vigor and nodes per plant.

The company says N-Hibit complements other nematode management tools.

the pests are the primary cause of any crop loss. "We still don't know where the transition zones are; that's where the verification strips come into play," Overstreet says. "Some farms we worked with had four or five textures in a field; that makes it very difficult to break it down without knowing where the textures change." ■

Editor's Note: Rosemary Hallberg is with the Southern Integrated Pest Management Center at North Carolina State University

Example of nematode data from a field, broken down into 4 classes

