

Program 3C-2

▶ Cotton Nematodes – What’s Changing And What Should You Do

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There have been considerable changes with nematodes that are damaging to cotton during the past 20-30 years. Producers really need to be paying attention to what is going on in their cotton fields with these pests.

The southern root-knot nematode has historically been recognized as a long time pest of cotton. This nematode can be readily identified since it produces fairly distinctive galls on the roots of plants. This nematode is particularly damaging by itself but when combined with the Fusarium wilt organism can cause severe dam-

age. There is a new race of the Fusarium wilt (Race 4) that damages seedling cotton which does not require the presence of the nematode. Fortunately, this race is not currently present in the MidSouth. Across the U.S., root-knot is still the most important nematode to cotton with losses estimated at 432 thousand bales or 187 million dollars during 2013. There has been a new root-knot species found in cotton in North Carolina (the guava root-knot nematode). It is somewhat similar to our common root-knot nematode on cotton but is considered to be more pathogenic and damaging. It is still not clear how much of a threat to cotton this nematode will be.

Reniform nematode has rapidly developed into an important nematode in cotton production. It has progressed from a relatively minor pest 30 years ago to an extremely important pest in many states including Alabama, Arkansas, Georgia, Louisiana, Mississippi and Tennessee. Losses from this nematode were estimated at 194 thousand bales or 84 million dollars during 2013. Reniform nematode seems to spread readily since this nematode is very resistant to drying conditions and can move around by any means that can move soil whether it is tractors or flooding. One of the problems that I have observed with this nematode is that it often replaces root-knot nematode. You may have had problems with root-knot nematode in a field in the past, but now reniform nematode has become the dominant pest. An additional problem that I am seeing more of today is the presence of both nematodes in fairly large numbers. Where producers are rotating with resistant plants such as corn, reniform nematode declines but allows root-knot to increase.

Crop rotation has been a major factor in changing the nematode situation for many producers. Declining cotton acreage in many areas of the mid-South has allowed extensive rotation that was not present just a few years ago. Corn has become a much more widely grown crop along with soybeans. Corn is effective in reducing reniform nematode. Soybean is more variable since varieties can range from very susceptible to very resistant against either reniform or root-knot nematode. A big concern now is that many acres of soybean are being planted in fields which had previously been planted in cotton that supported large numbers of reniform nematode.

Nematicides have certainly changed in the past 10 years. Temik 15G was the standard chemical that was used for many years. Temik is no longer available. Seed treatment nematicides have recently become the dominant chemicals used by producers. They can certainly be helpful but cannot stand up to serious pressure from nematodes especially in soils that are prone to severe damage. Avicta Complete Cotton or Acceleron INT-210 and Aeris Seed Applied Insecticide/Nematicide or Acceleron INT-710 use either Abamectin or Thiodicarb to control nematodes. Poncho/Votivo is a biological that protects plant roots using a *Bacillus* bacterium. Several other chemicals or biologicals are being evaluated at this time as possible nematicides for use in cotton with some of them showing promise especially when combined with other seed treatments.

Fumigant nematicides such as 1,3-dichloropropene (Telone) are another option for production fields with serious nematode problems. Although the chemicals we are still using were developed in the 1940's and 1950's, the method of application has certainly changed. Rather than treating entire fields with the fumigant, a more site-specific method is currently being used by producers. The use of apparent electrical conductivity (ECa) that is generated from soil sensing devices such as used from Veris Technologies is now widely used to detect differences in soil texture within a field. These differences in soil texture can be used to predict where nematode problems are likely to occur. Damage is usually greater in coarse-textured soils and especially those which have this texture through the soil profile. When combined with

some soil samples to establish nematode types and levels, these differences in soil texture can be used to make effective management zones across the field. Nematicide application equipment that is used for these fumigants can use these maps and apply a nematicide only in the areas of a field where you need them.

Cotton varieties have certainly changed drastically in the last twenty-five years. Until very recently, most varieties were considered to be very susceptible to both root-knot and reniform nematodes. A few varieties like STN 887 had some moderate levels of root-knot resistance back in the 1990's. More recent varieties such as STN 5599BR, Phytogen 367WRF, Stoneville 4288B2RF, Stoneville 5458B2RF, and Deltapine 174RF have been available but only with moderate levels of resistance. The cotton variety Deltapine 1454NRB2RF has recently been released that has good resistance. Phytogen 427WRF is the first variety that appears to have excellent resistance against root-knot nematode using resistance from two sources. There currently are not any varieties that have been released with reniform resistance. Since germplasm such as Lonren, Barbren, M713, and MT2468 have been released, resistant varieties are likely to be developed and released in the near future. A few varieties appear to have some tolerance against this nematode possibly due to breeders selecting high yielding lines adapted for the Midsouth. Tolerance can best be described as sustaining the effects of the nematode without suffering serious injury or loss of yield.

There are some cultural practices that may help out with nematode problems. Irrigation was not nearly as common for most of the Midsouth in the past but has become increasingly more widespread. Irrigated cotton is not as likely to be as severely damaged from nematodes as dry land cotton would be. Fertility is important to cotton production with adequate nutrients being needed to provide high yields. Some of our work at Louisiana has shown that increasing nitrogen rates increased yields when used in conjunction with the fumigant Telone but didn't when the Telone was absent. Deep tillage or subsoiling has also been found to be especially beneficial against root-knot nematode. Deep tillage allows adequate tap root development especially in soils that may have shallow hardpans. Galling from root-knot on cotton roots has been reported to be less in strip tillage compared to conventional tillage. Cropping patterns are much more likely to influence nematode populations and ultimately to damage potential from nematodes than tillage practices.