cotton pistil are strong determinants of genotypic thermotolerance in cotton.

Influence of Water Stress

High temperatures can have both direct inhibitory effects on growth and yield, and indirect effects due to high evaporative demand causing more intense water stress. Plant water deficit stress often coincides with high temperatures, but with irrigation and adequate precipitation this is not always a problem. It is difficult to separate the exacerbating effects of water deficit on temperature stress.

Conclusions

The cotton crops experience periods of high temperatures during flowering and boll development in excess of the optimal range for growth, and this places a stress on reproductive development resulting in lowered yields. The sensitivity of pollen tube growth to high temperature, and not pollen germination or subtending leaf photosynthesis, is concluded to be a major cause of low yields. In addition, it appears that innate reproductive thermotolerance in cotton is closely associated with elevated pre-stress antioxidant enzyme activity in the pistil.

Program 12C-2

▸ Management Strategies And Zone Creation For Site-Specific Application Of Nematicides In Fields With Multiple Nematode Pests

Presented by Dr. Charles Overstreet

Professor and Specialist, LSU AgCenter

Cotton producers in the mid-South have been experiencing serious nematode problems for many years. The Southern root-knot nematode and reniform nematodes are our two most important nematode pests of cotton. Usually, there are only one of these two pests present in a field. In recent years, a lot more fields are showing up with fairly large populations of both nematodes in the same field. Rotation to corn is suspected of being the primary reason for some of these changes that are occurring in production fields. In the past, cotton was not rotated very often. Reniform nematode is likely to be an invasive species from the tropics that came to the U.S. in the early to mid-1900's. Problems with this nematode didn't start showing up in cotton until about the 1960's. Reniform nematode seemed to displace Southern root-knot in a number of fields and locations where it had been previously found to cause problems. However, the root-knot did not disappear but remained at lower levels. Corn is a poor host for reniform nematode but seems to be a fairly good host for the Southern root-knot. Rotation with corn enabled root-knot nematode to resurge in these fields and develop into a serious problem again.

There does appear to a strong impact of soil texture to either nematode occurrence and distribution or damage potential to cotton. Soils that are very sandy are the most favored for Southern root-knot and also require the fewest nematodes to cause injury. As the sand content decreases or clay content increases, higher levels of Southern root-knot are needed to cause considerable damage. Soil profile has turned out to be extremely important. The deep sands are the ones most damaged by nematodes. Sand that overlays a heavier clay soil may not be as seriously impacted. Reniform nematode is not nearly as particular about soil texture. It occurs in the lightest soils and can be found in high populations in soils that have a fairly high percentage of clay. The amount of damage caused by reniform does follow a similar trend to Southern root-knot nematode except the damage range does extend to a much higher percentage of clay.

When trying to decide what to do in one of these fields that have both types of nematodes present, management zones may offer the best solution. First, determine where in the field nematodes are occurring and have some idea of population levels. Zone sampling based on soil texture is one of the best methods to determine types and levels of nematodes. Either the Veris 3100 Soil EC Mapping System or EM 38 can be used to accurately divide fields into different soil zones. Both systems measure electrical conductivity (EC) of the soil which approximates soil texture. The higher the number, the greater the amount of clay present in the soil. With sand, lower EC numbers represents a higher level. Although the numbers may vary from field to field and especially from different regions based on soil formation, EC still provides an excellent method of determining soil texture within a field. A field can be divided into a number of zones (anywhere from 3-7 would be average) based on the ranges of EC detected within that field. Nematode samples can be collected from the different zones to obtain some idea of nematode types and populations. If similar zones are widely separated within a field, you may need to collect soil samples from each area. Grid sampling doesn't take into consideration soil texture but could at least give you some idea of nematode presence and levels within a field.

Usually, the zones with the lowest EC reading are the most likely to be damaged by Southern root-knot nematode. Producers are likely to already be aware of these areas in a field since they have likely seen damage occur in the past. Depending on the field, this may be only the first zone or may even several zones. The lightest texture zones are likely to require the addition of an extra nematicide or even a fumigant. Most of our producers are currently using only seed treatment nematicides which may not be very effective if nematode populations are very high. In fields which have additional problems with reniform nematode, damage may extend into additional zones that have more clay or even are so heavy that root-knot doesn't occur there. The problem is to determine where damage is occurring in a field. Yield monitors can be a great indicator of where the problems are occurring in a field. Simply look at yield maps of the field from previous years to determine where high and low yielding areas occur. In this heavier soils that seem to be yielding well (field average or better), nematicides may not pay off. The use of verification strips (nematicide-treated and untreated rows running through the various soil zones) can be used to verify that you have determined the best zones.

You may need to consider your crop rotation scheme when determining zones to treat. Cotton after cotton will likely give you the greatest number of zones to treat since it will build up both types of nematodes. Rotation behind corn will help against reniform and may give you considerable benefits especially in zones that may be slightly heavier in soil texture. Two years in corn are the best for reducing reniform nematode but even one year seems to help considerably. Soybeans can either help or hurt you depending on the variety that you select. There are some resistant varieties against Southern root-knot that would reduce levels of this nematode. Very few varieties have any resistance against reniform. Soybean can be an excellent host for reniform nematode and leave extremely high levels after even one year.

Program 7C-2

Are Multi-Cropping Systems Less Risky Than Mono-Cropping Systems?

Presented by Dr. Kenneth W. Paxton
Professor, LSU AgCenter

Shrinking margins in farming during recent years have heightened the need for farmers to not only increase net returns, but to seek ways to minimize the variation in those returns. The LSU AgCenter has conducted a number of experiments that evaluate alternative production systems. These systems were designed to not only protect and enhance the environment, but also to potentially increase returns to the producer. The studies reported on here include an evaluation of various double-cropping combinations of cotton, corn, soybeans, and wheat along with mono-cropping of those crops. The basic objective of the study was to compare the performance of the various double-crop systems with mono-crop systems for the same crops. While previous studies have evaluated the average returns from the various experiments, this report evaluated how the systems perform from a perspective of risk.

Double-crop systems have some appeal because they offer an opportunity to obtain revenue from two crops during a single year. This may help spread risk because if one crop falters (either production or price) the other may help offset those losses. While the year-long dou-