2003 BELTWIDE COTTON CONFERENCES, NASHVILLE, TN – JANUARY 6-10

SITE-SPECIFIC DETECTION AND MANAGEMENT OF *Meloidogyne incognita* IN AN UPPER MISSISSIPPI DELTA COTTON FIELD

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Abstract

Site-specific application of a nematicide to areas of fields infested with nematodes would be less costly and more environmentally sound than uniform application. However, the development of nematode distribution maps through analysis of grid collected soil samples for site-specific application of nematicides is very expensive. Evaluation of plants for *M. incognita* root galls at harvest may be an alternative to soil sample analysis for predicting distribution of this nematode. The objectives this project were to determine: (i) the correlation between harvest root gall severity due to *M. incognita* in control plots with the yield increase for a 5 gpa Telone II treatment compared to the control (not treated), and (ii) the variability in root gall severity among plants in a plot, among plots and among evaluators. A 4.5-ha portion of a field near Buckeye, AR was selected as the study site. The site was partitioned with a global positioning system. The spacing between grid intersection points was 15.25m. Two treatments were established at each grid point, 5 gpa of Telone II applied 7 days before planting and a control. Treated plots were two rows wide (0.97-m row spacing) and 10m long. Soil samples were collected from each control plot at planting to determine initial population density (Pi). The plant parasitic nematodes were identified to genus. The crop was harvested when mature with a 2-row picker. Roots of ten plants arbitrarily selected from each control plot were dug immediately after harvest and rated for galls due to root-knot nematodes using a 0 to 7 rating system. The PROC CORR procedure (SAS Institute, Cary, NC) was used to determine the correlations for Pi, and root gall rating for control plots and the differences in yields between paired Telone II treated and control plots. All of the roots from nine select control plots were evaluated for gall severity by six individuals, two had experience and four did not, to determine variability in gall severity within plots, among plots and among evaluators. There was a significant, positive correlation between yield increase for the nematicide treatment over the control and root galling (Pearson Correlation Coefficient = 0.86213 and probability = 0.0003). The cost for the 5 gpa Telone II treatment was $60/acre and a yield increase of 350 lbs of seed cotton for treated over the control plot was necessary to pay for this treatment [(350 lbs seed cotton x .35% turnout) x $0.50/lb of lint]. For this site, the nematicide treatment was not economical in areas of the field where the harvest gall index was 2.5 or less. Application of nematicide to areas of this site where the root gall severity was at this level or greater would pose less environmental risk and may result in greater producer profits than uniform application. We found that the roots of at least 10-plants/200ft^2 area should be rated for galls to accurately predict the level of root galling in the area. When the roots of only 3 plants were rated, the half width of the 95% confidence interval (HWCI) averaged 18.9 in severe and moderate *M. incognita* infested areas. When roots of 10 plants were examined the HWCI decreased to 2. There was significant variability in gall severity ratings among inexperienced evaluators. Grid sampling cotton fields after harvest to determine root galls may be useful for site-specific detection of *M. incognita.*