PRECISION FARMING TECHNOLOGIES FOR USE FOR COTTON NEMATICIDE APPLICATIONS IN GEORGIA

R.E. Baird
Plant Pathology Department
University of Georgia
Tifton, GA
D. Waters
Gold Kist Inc.
Precision Farming Division
Tifton, GA
C. Kvien
NESPAL, CPES
University of Georgia
Tifton, GA

Abstract

Geographic information system (GIS), global position system (GPS), and variable rate technology (VRT) are the new precision agriculture or site specific technologies being adopted when appropriate in agricultural management systems. The potential for their use in cotton nematode management is unknown. Crucial to the application of site-specific nematode mangement is the ability to sample nematode populations within the field so that reliable maps depicting population levels can be created for variable rate application of nematicides. It is important to investigate nematode sampling strategies to determine if reliable maps can be constructed from the samples. Currently, most pest sampling strategies are simply designed to minimize sample size while estimating the population means from sampling specific points in the field ande inferring information on unsampled areas by interpolation. Several obstacles must be overcome before precision farming methods can be employed in cotton production systems in the southeastern United States and Georgia. Often reliable mapping of pests requires intensive sampling which may prove to be cost prohibitive. It is important to investigate the physical and biological characteristics of a field which may correlate with nematode population levels and be used to direct sampling in a more bio-rational method. Remote sensing provides easily acquired information about growing conditions of cotton on a whole field scale. While aerial images can indicate crop vigor across a field, they do not necessarily indicate the specific causes of the detected stress. Because nematodes cause numerous growth problems in cotton as a result of root damage, nematode induced plant stress is anticipated to be detectable aerial images taken of the crop during the growing season. In addition to plant stress, uneven growth can be found in nematode infested fields which complicates decision-making on defoliation and date of harvest. Therefore, the objectives of this project are to determine the use of aerial photography, soil maps, yield data and other field information in a GIS for guiding nematode sampling to reduce man-hours for sampling, total numbers to be analyzed, and total costs. The study also is evaluating the effectiveness of variable rate nematicide applications of Temik 15G and Telone II for treating infestations, but still maintaining acceptable cotton yields in nematode infested fields. Three field trials located in southwestern Georgia have been established to determine the potential of precision agriculture for use in site-specific nematicide applications. Root-knot nematode (*Meloidogyne incognita*) is present at each of the three sites which consist of 99 acres near Moultrie, 178 acres near Camilla, and 107 acres near Newton. Infrared or aerial images have been obtained for all three sites. Due to heavy rains through the harvest season, yield monitor data could not be obtained except at the Newton site.

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