**POPULATION ESTIMATION OF THE RENIFORM NEMATODE
USING HYPERSPECTRAL REFLECTANCE DATA AND
APPLICATIONS TO VARIABLE RATE NEMATICIDE APPLICATIONS**

Gary W. Lawrence, R. King, G.R. Ellis and R. Doshi
Mississippi State Universtiy
Mississippi State, MS
K. S. Lawrence
Auburn University
Auburn, AL
J. Caceres and S. Samson
Mississippi State Universtiy
Mississippi State, MS

Abstract Only

Site-specific management of cotton pests is practiced in Mississippi using remote sensing to direct spatially variable pesticide applications. Remotely sensed imagery is correlated with nematode population levels to obtain an accurate estimation of the infield nematode distribution. This technology is being examined using the spatial distribution of the reniform nematode (*Rotylenchulus reniformis*). Reflectance properties exhibited by *R. reniformis* infected cotton plants are being acquired with hyperspectral spectroradiometers using both airborne and ground platforms. Specific reflectance data are using to develop self-organized maps (SOMs). SOMs are used to determine relationships between cotton plant stress and nematode populations numbers. A Matlab based hyperspectral toolkit (MTHK) operating with SOM analysis is used to identify the specific spectral bands associated with *R. reniformis*. This will be instrumental in providing nematode numbers for use in generating nematode contour maps for global position systems (GPS) directed variable rate technology (VRT) nematicide applications. Hyperspectral data may provide useful remote-sensing tools reducing the time consuming and costly grid sampling process required in precision nematicide applications.