POTENTIAL USEFULLNESS OF NEWLY AVAILABLE STATISTICAL METHODS FOR MODELING MELOIDOGYNE INCOGNITA, THIELAVIOPSIS BASICOLA AND INFLUENTIAL SOIL FACTORS ON YIELD Scott Monfort, Craig Rothrock, and Andronikos Mauromoustakos

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Meloidogyne incognita and *Thielaviopsis basicola* population densities and soil factors that influence their densities and distribution were evaluated in 2001 and 2002 in a commercial cotton field in southeastern Arkansas to evaluate their effects on yield. The 15-acre field was subdivided into 512 grid plots (30.5 meters x 3.9 meters) and sampled for *M. incognita* in April, May, July, and October. The April and October samples were also assayed for *T. basicola*. Soil fertility at planting and soil texture were also determined from each grid plot. The fumigant nematicide, 1,3-dichloropropene (Telone II) was applied in strips through the field at 14.2, 28.4, and 42.6 liters/ha. to create zones within the field with differential population densities of the nematode. Grid plots were aggregated and averaged based on four soil textural ranges (0-30 % sand, 31-45 % sand, 46-60 % sand, and > 60 % sand) and on the nematicide treated zones within each textural class. Statistical analyses were conducted in JMP SAS software utilizing three different methods: multiple regression, neural networks, and partitions. Data variables that were important in explaining cotton yield differences were percent sand, nematicide application, *M. incognita* (April 2002 density), and *T. basicola* (October 2001 density). Using these variables, all three models explained at least 89 % of the variability of the 2002 yield.