

A CASE STUDY FOR VARIABLE-RATE SEEDING OF CORN AND COTTON IN THE TENNESSEE VALLEY OF ALABAMA

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ABSTRACT

Farmers have recently become more interested in implementing variable-rate seeding of corn and cotton in Alabama due to increasing seed costs and the potential to maximize yields site-specifically due to inherent field variability. Therefore, an on-farm case study was conducted to evaluate the feasibility of variable-rate seeding for a corn and cotton rotation. A randomized complete block design with four seeding rates randomly assigned to each block and replicated four times was utilized for this study. Irrigated and dryland locations were selected for both crops. Cotton seeding rates were the same for dryland and irrigated sites; corn seeding rates were higher at the irrigated locations. Plant population data was collected early season with crop yield measured using yield

monitors. Management zones were generated for each field using various terrain attributes, soil EC, and soil survey data to determine if these parameters could be used as a basis for development of seeding prescription maps. Preliminary results indicated that irrigated cotton yields were significantly different between the treatments for two of the three years. There were no statistical differences in the non-irrigated cotton yields. For corn, the higher seeding rate for both irrigated and dryland generated the highest yields. Initial results from the spatial analyses indicates that terrain and soil type impact yield with the optimal seeding rate varying between developed management zones. Final analyses will determine if variable-rate seeding of corn and cotton is feasible.

Keywords: variable-rate seeding, management zones, seeding population

SUMMARY

The objective of this study is to evaluate variable-rate (VR) seeding for cotton and corn production in Alabama. Irrigated and non-irrigated fields were selected for this project in 2006, 2007 and 2008. Seeding rates were selected based on the seed manufacturer's recommendations and the farmer's traditional planting rates. Corn rates included dryland rates of 18,000, 22,000, 26,000, and 30,000 and irrigated rates of 22,000, 26,000, 30,000 and 34,000, respectively. Seeding rates utilized for cotton were 35,000, 50,000, 65,000 and 80,000. A 24-row planter equipped with a VR drive system was used. A plot within each field was blocked to provide four replications for each seeding treatment. Treatments were then randomly assigned within each block with a single pass of the planter representing a specific population treatment within the block. Stand count measurements were gathered on each 12-row section of the planter. Counts were collected at three or more locations along each of the two sections, depending upon terrain variability, to determine actual germinated population. Yield monitors were used to obtain spatial performance data for each plot. Management zones were generated for each field using various terrain attributes, soil EC, and soil survey data to determine a basis for development of seeding prescription maps. Initial results from the spatial analyses indicates that terrain and soil type impact yield with the optimal seeding rate varying between developed management zones. Yield and stand count data were statistically analyzed for each year individually, using T-tests and Least Significant Difference ($\alpha = 0.1$) to determine if differences existed between seeding treatments. A significant difference in seed cotton yield between the four seeding rates did not exist for both irrigated and non-irrigated treatments. A significant response in corn yield existed for the higher seeding rates during two of the three years for both the irrigated site (2007 and 2008) and non-irrigated site (2006 and 2008). Statistically, the results for the non-irrigated and irrigated cotton were similar for 2006, 2007, and 2008 suggesting that increasing seeding rates has minimal impact on yield. Corn yield results for the non-irrigated and irrigated corn sites show potential for economic benefits through the use of variable-rate corn seeding in Alabama.