2006 Project Report

Title: Evaluation of Variable-Rate Seeding for Corn

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Objective: To evaluate opportunities for increased yield or profits through variable-rate seeding.

Procedures:
This on-farm study was continued with the same cooperative farmer from 2005 located in Northern Alabama. The farmer utilizes a corn and corn rotation while also managing center pivot irrigation on a select portion of managed farmland. Irrigation permitted the comparison of irrigated and dryland corn production. An irrigated and non-irrigated (dryland) field were selected to conduct this research. Selected seeding rates included 18K, 22K, 26K, and 30K seeds/ac for the dryland field and 22K, 26K, 30K, and 34K seeds/ac for the irrigated field. These differed from 2005 in the fact that lower seeding rates were added to the study due to the prior year's results.

A 24-row planter equipped with a VR drive system was used to plant the plots. The planter was calibrated based on the manufacturer's operators manual. The plot within each field was blocked to provide 4 replications for each of the corn treatments. Treatments were then randomly assigned within each block with a single pass of the planter representing a specific population treatment within the block.

Subsequent to planting, stand counts were measured to determine the actual germinated population. These were collected by measuring the number of plants for two adjacent rows over a 10-ft length. Count measurements were gathered on each 12-row section of the planter and collecting counts at 3 places along each 12 rows within each treatment. A combine equipped with an AgLeader yield monitor was used to obtain spatial performance data for the plots. Analyses included summarizing stand counts along with spatially segregating yields based on the various seeding treatments to determine the effect of seeding rate on corn yields. A Least significant Different (LSD) analyses was conducted to compare treatments and populations at a significance level of 0.10.

Results:
Results from the stand counts indicated that populations were lower than the target rate in all plots except for the 26K within the irrigated plot. The higher actual seed population could be contributed to the planter setup. However, the stand counts were not significantly different from the intended treatment rates except the highest rate, 34K, in the irrigated plot. Thus, only one intended seeding rate did not statistically meet the desired seeding rate for this study.

Statistical comparisons between the measured (actual) population rates for each field indicated that the seeding rates for field 1 were significantly different except for the 22K and 26K treatments. The actual seeding rates for these two treatments were not significantly different. Conversely, the only actual population which was significantly

different for field 2 (irrigated) was the 22K population. These population indifferences for field 2 may explain to the yield results.

The highest yields for 2006 were 112 and 175 bu/ac for fields 1 and 2, respectively. However, analyses indicated no significant difference in corn yields between the 4 seeding treatments for either the dryland or irrigated plots.. The irrigated plots produced significantly higher corn yields by 45% to 60% over the dryland plots. These results were similar to those reported in 2005. Results for 2005 or 2006 have not provided statistical trends for establishing variable-rate seeding protocol but have indicated the potential for seed cost savings without sacrificing corn yields even when considering soil type. Plans are to continue and conclude this study during the 2007 growing season while considering terrain attributes and economics in the final analyses.

Field 1 Results – Non-Irrigated.

Treatment (Population - seeds/ac)	Actual Population (seeds/ac)[1]	Yield (bu/ac)*
18,000	15,682 d	101.2 b
22,000	19,820 bc	102.1 b
26,000	21,417 b	111.5 b
30,000	25,192 a	110.3 b

Field 2 Results – Irrigated.

Treatment (Population - Seeds/ac)	Actual Population (seeds/ac)[2]	Yield (bu/ac)*
22,000	21,417 b	163.4 a
26,000	26,281 a	169.5 a
30,000	26,063 a	163.5 a
34,000	30,405 a	175.2 a

[1] Means with similar letters in this column for field 1 indicates they are not statistically different at the 90% confidence level.
[2] Means with similar letters in this column for field 2 indicates they are not statistically different at the 90% confidence level.
* Mean yields with similar letters in each column for fields 1 and 2 indicates they are not statistically different at the 90% confidence level.