

IMPACTS OF NITROGEN RATES AND ENHANCED EFFICIENCY PRODUCTS ON KANSAS COTTON

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ABSTRACT

The purpose of this experiment was to determine the effect that different nitrogen fertilizer rates and additives have on cotton. Response parameters included seed cotton yield and gin turnout (lint percentage), as well as fiber quality factors such as length, uniformity, micronaire, strength, and color. Nitrogen management is crucial for Kansas cotton, given its indeterminate growth and relatively short growing season. Conducting nitrogen fertilizer studies across environments to develop region-specific and effective nutrient management practices in Kansas for cotton production is beneficial for optimizing nitrogen management for irrigated and dryland scenarios. A baseline of nitrogen response was assessed using five N rates, including a control, using urea broadcast at planting. The range of N rates was established based on historical yields and typical N response in the region and for the production system. A set of enhanced efficiency plant nutrition products (EEPNePs) was added at one N rate, targeting suboptimal rates, at one location. These included urease inhibitors, nitrification inhibitors, slow-release N fertilizer, and improved (streamed) placement. Treatments were replicated four times at each location and applied at pinhead square, the developmental stage where N uptake begins increasing significantly. Over three site years, two of which were irrigated and one of which was rainfed, none showed a statistically significant response to any tested level of nitrogen application. Additionally, of the four EEPNePs evaluated, there were no statistically relevant differences. Statistical meaningfulness was calculated based on whether the p-value was less than 0.05. Weed pressure, harvest timing, harvest conditions, and soil NO₃-N are some of the factors that could have limited response in the trials. Future research will utilize sites with lower soil NO₃-N and assess a wider range of N rates. Different cropping rotations that integrate cotton will also be studied to identify how nitrogen management differs across cropping systems (corn-cotton vs. soybean-cotton vs. sorghum-cotton, etc.).