EFFECT OF UREA AND AN ENHANCED EFFICIENCY N FERTILIZER ON SEEDCOTTON YIELD

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Abstract

Nitrogen fertilizer is usually required for producing optimum cotton (*Gossypium hirsutumn* L.) yields in Arkansas. Improving N use efficiency will increase the growers' profit margin and reduce potential environmental risks of excessive N application. Enhanced efficiency N fertilizers are developed to meet that dual need. A polymer-coated urea is currently being marketed in Arkansas under the trade name of Environmentally Smart Nitrogen or ESN. In 2010 we conducted a field experiment to evaluate the effect of five preplant incorporated N rates applied as urea or ESN on seedcotton yield. Urea and ESN were each applied at 30, 60, 90, 120, and 150 lb N/acre and compared to a no N control. The study design was a randomized complete block with five blocks of treatments arranged in a factorial structure of two N sources and five N rates. Nitrogen treatments were surface applied and incorporated with a Do-all before planting, the beds were hipped with a hipper-roller and cotton was planted on 2-June. The two center rows of cotton in each plot were harvested with a spindle-type picker on 9-Sep. Other nutrients were applied as recommended for irrigated cotton production. Nitrogen source significantly (P=0.0429) influenced seedcotton yield. Averaged across N rates, cotton fertilized with ESN (2053 lb/acre, LSD0.10 = 195) produced numerically greater and statistically similar seedcotton yields as urea (1932 lb/acre), but both yielded greater than cotton receiving no N (1264 lb/acre). Application of 30 lb. N/acre, the lowest N rate, maximized cotton yield producing a 675 lb seedcotton/acre increase compared to the no N control. The results suggest that ESN provided equal or slightly better N availability than urea at this site in 2010. The 2010 summer was drier than normal making fertilizer N losses from denitrification less likely than in wet years. Cotton yields were not different between urea and ESN. These results indicate that under the conditions of this experiment, preplant incorporated ESN was a suitable, alternative N fertilizer (to urea) for cotton. Additional research, encompassing several years and various field and weather conditions common to Arkansas is needed to determine the frequency and magnitude of yield increases benefits that may be realized when ESN is used in place of urea for preplant N applications.

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