

**ARKANSAS CORN and GRAIN SORGHUM BOARD
PROGRESS REPORT FOR 2008 FIELD SEASON**

Title: Can Arkansas Corn Growers Increase their Profit Margin by Using Agrotain?

Investigator: Morteza Mozaffari, Assistant Professor, Director U of A of Marianna Soil Testing and Research Laboratory

Cooperator: Jason Kelly, Extension Agronomist, Wheat and Feed Grains

BACKGROUND INFORMATION

The project will evaluate the potential of a urease inhibitor (Agrotain) for reducing N losses (ammonia volatilization) from the surface applied urea. The growers will benefit from an increase in N-use efficiency and profit margin. The outcomes will enhance the long-term economic and environmental viability of corn production in Arkansas. The 2008 cropping season was the second year of this three-year project. Field studies were conducted to evaluate the effect of urea and urea treated with Agrotain on corn grain yield leaf N and total N uptake.

PROCEDURES

Five replicated field experiments were conducted at multiple locations on soils commonly used for corn production in Arkansas. Soil samples were collected from the 0- to 6-inch depth at each site and composited by replicate prior to planting and fertilization. Each experiment design was a randomized complete block with four or five replications of each N rate. The experimental treatments were arranged in a factorial design of two N sources (urea only and urea treated with Agrotain) and six total N rates. Nitrogen fertilizer was applied in split applications at total-N rates of 0, 60, 120, 180, 240, and 300 lb N/acre. Prior to or at planting, 20 lb N/acre as ammonium sulfate was side-dressed at all sites to all plots except the 0 N control plots. The balance of each total-N rate was sidedressed as urea only or urea treated with Agrotain by hand when plants were at the 5-to 9-leaf stage. Analysis of variance (ANOVA) was performed using the GLM procedure of SAS.

2008 RESULTS

In the 0-to 6-inch depth the soil texture was silt loam (15-25% clay), soil pH ranged from 5.9-6.8, and preplant soil NO₃-N ranged from 11 to 41 ppm. Corn grain yield response as affected by the N source by rate interaction was significant only at one site ($P=0.0605$). However, N rates, averaged across N sources, significantly ($P < 0.0001$) increased corn grain yield at all sites. Corn grain yields ranged from 39-107 bu/acre for the unfertilized controls and 185-250 bu/acre for the highest N rate of 300 lb N/acre. The N rates required to produce near maximal yields varied from 180-300 lb N/acre among N-responsive sites and were consistent with results from N-rate trials studies conducted in previous years. Currently we are working on chemical analysis of corn ear-leaf samples and grain samples. The data will be added to a database developed for this project. We will continue to collect additional data in 2009. At the end of the third year of the study we will use the results to evaluate the effect of urea and urea plus Agrotain on grain yield and grain N uptake and identify site characteristic where the growers can benefit from Agrotain use.