ARKANSAS CORN AND GRAIN SORGHUM BOARD PROPOSAL
2004 Season

Title: Optimizing Soil Fertility Requirements for Corn

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1. To evaluate the benefits of a pre-tassel N application.

Two hybrids were seeded at 30,000 to 32,000 plants per acre, depending on the location. Hybrids were chosen based on typical test weight ("low" and "high"). Treatments included a single application, a 2-way split, and 3-way (pre-tassel) N split application. Total N rate was based on soil test recommendations. The pre-tassel nitrogen treatment was applied 1 - 2 weeks before the VT stage (tassel). Although originally planned, erratic weather patterns during the 2004 season, prevented us from applying treatments to test plots at the Cotton Branch Station and the NEREC.

PTS (Pine Tree Station)
Yields are typical of those obtained under heavier type of soils. A significant among of variability among replicates was observed, due mainly to the intensity and frequency of rainfall events that interfered with typical cultural practices. Yields were not statistically different from each other. Test weights were not affected by the treatments.

Yield response of corn to nitrogen timing at the PTS, and associated significance. Yields with different letters are statistically different at the 95% probability level.

N rate and timing	Yield	Test weight
Low Test Weight	bu/A	lb
90-90-45	121.8a	52.5a
100 – 120-0	114.9a	52.3a
220-0-0	98.19a	52.7a
High Test Weight		
90-90-45	144.4a	54.9a
100-120-0	128.8a	54.8a
220-0-0	125.2a	54.6a

SEREC (Rohwer)

A significant yield increased was observed with the pre-tassel application of nitrogen when compared to a 2-way application. The high test weight hybrid yielded lower with the pre-tassel application as compared to a 2-way split. However, the erratic weather pattern experienced during the 2004 season might have masked the effect of this practice.

Yield response of corn to nitrogen timing at the SEREC, and associated significance. Yields with different letters are statistically different at the 95% probability level.

N rate and timing	Yield
Low Test Weight	bu/A
90-90-45	138.5 a
100 – 120-0	104.7 b
High Test Weight	
100-120-0	143.5 a
90-90-45	132.2 b

2. To develop best management practices for corn in a corn:rice (heavy soils) rotation.

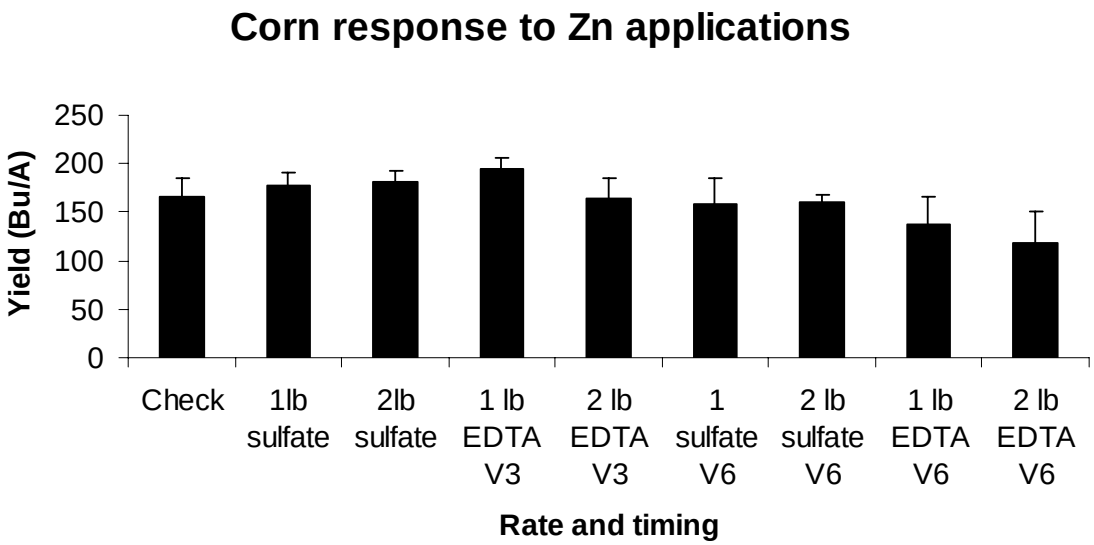
Corn was planted at NEREC (Keiser) at an intended plant density of 32,000 seeds per acre. A vacuum planter equipped with Martin fertilizer attachments (Martin Industries, Elkton, KY) was used to apply pop-up fertilize. The fertilizer was applied in-furrow, at planting, at a rate equivalent to 2.5, 6.3, and 3.1 lb/A N, P, and K respectively. Although a good stand was obtained, bird damage masked the potential effects of the treatments.

3. To develop Zn fertilizer recommendations for corn

A corn field near DesArc, Arkansas was selected for the establishment of a zinc test. Treatments consisted of;

1) Control; 2) 1 lb Zn/A as EDTA at V3; 3) 2 lb Zn/A as EDTA; 4)1 lb Zn sulfate at V3; 5) 2 lb Zn sulfate at V3; 6) 1 lb Zn/A as EDTA at V3; 7) 2 lb Zn/A as EDTA; 8)1 lb Zn sulfate at V3; and 9) 2 lb Zn sulfate at V3.

Soil pH at this location was 6.8 and soil Zn levels were 6-7 lb/A. The graph below shows the yield response to varying Zn rates and application timings



Yields obtained from plots receiving 1 lb Zn/A as EDTA were significantly higher than those from plots that received the same rate but at the V6 growth stage. Similar trends were observed for the rest of the treatments, with earlier applications of zinc yielding higher, regardless of rate and source, than later applications.

4. Fine tune corn requirement under no-till, conventional, and stale seed bed.

Corn was planted at 32,000 seeds per acre under conventional, stale seedbed, and no-till conditions, with additional fertility treatments applied to each tillage treatment. The fertility treatment consisted mainly of a pop-up fertilizer plus micronutrients. No significant differences were observed between the control and the plots receiving the pop-up fertilizer. When averaged across fertility treatments, yields from conventional tillage plots (174.6 bu/A) were not statistically different from those from stale seedbed plots (167.7 bu/A). However, yields were statistically different from no-till plots (145.12 bu/A), but this was probably a result of planter setup and not necessarily as a results of different tillage systems.