2005 Project Summary
C.I. Project # 03-166AL

TITLE: "Fertilization of Cotton on Black Belt Soils"

INVESTIGATORS:
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OBJECTIVES: (1) Determine the need for additional N, P, and K fertilization for high-yielding cotton on Black Belt soils; (2) Determine if cotton will respond to other fertility treatments on Black Belt soils; (3) Evaluate existing soil test methodologies for evaluating K for cotton on Black Belts soils.

SUMMARY: A large soil fertility experiment was established on a Vaiden clay (very-fine, montmorillonitic, thermic Vertic Hapludalfs) at the Black Belt Research & Extension Center in West-Central Alabama. Treatments included 6 N rates, 5 P rates, 6 K rates, and 2 additional treatments. The soil tested "low" in P and "very high" in K which is very typical of many Black Belt soils. This was the first cotton experiment on this station in many years and the worst cotton growing season for this area in many years. Cotton was planted using no till into a rye residue. A crop that was planted late due to dry weather, had to be replanted, experienced excessive rainfall all summer, 3 hurricanes, and an early frost resulted in very disappointing yields of less than 400 pounds lint per acre in the best treatments. Nevertheless, there was a quadratic response to N rates with the highest yields at a total N rate of 90 pounds per acre in split application, the standard N rate for these soils. Although the site tested "low" in P, only the highest P rate (100 lb. P_2O_5/acre) resulted in a significant yield response. With such low yields and a "very high" soil test K rating, a linear yield response to increasing rates of K was a surprise. Potassium nutrition of cotton on these montmorillonitic soils was one of the primary reasons for establishing this study. Farmers often report yield increases from K application even though soil test K may be high or very high, as at this site. Stressed cotton with a weak root system as we had in 2005 may be unable to obtain adequate K for high yields. Plans for 2006 include changing tillage practices so we can plant on raised beds with minimum cover crop residue.