

Alabama Farmers Cotton Commission Committee

Title: Maximizing Cotton Potassium Fertility on Blackbelt Soils of Alabama

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Location: Blackbelt Area

Objective: Determine cotton potassium uptake and availability in Blackbelt soils

**2007 Summary Report**

Even though there was a historic drought in the whole state of Alabama during 2007, we executed the project as planned by collecting soil and/or cotton leaf samples on 4/11, 7/6, 7/16/, 7/23, 7/30, 8/6, 8/15 and 8/29, 2007. The potassium treatments were 0, 20, 40, 60, 80 and 100 K<sub>2</sub>O/A. Soil samples were analyzed for pH and K while cotton leaf sample were analyzed for K using standard lab methods.

The lint yields were 585, 784, 803, 922, 806 and 1076 (lbs/A) for 0, 20, 40, 60, 80 and 100 K<sub>2</sub>O fertilizer rates, respectively. In general, potassium tissue concentration increased as K<sub>2</sub>O rates increased, and the absolute values decreased with time after cotton bloomed. Potassium tissue concentrations were below the established sufficiency level (1.50-3.00%) for cotton during all sampling periods (Figure 1). Significant correlation were observed during 7/6 and 7/16, 2007 sampling periods. The least R<sup>2</sup> value was for the 8/15/2007 sampling date.

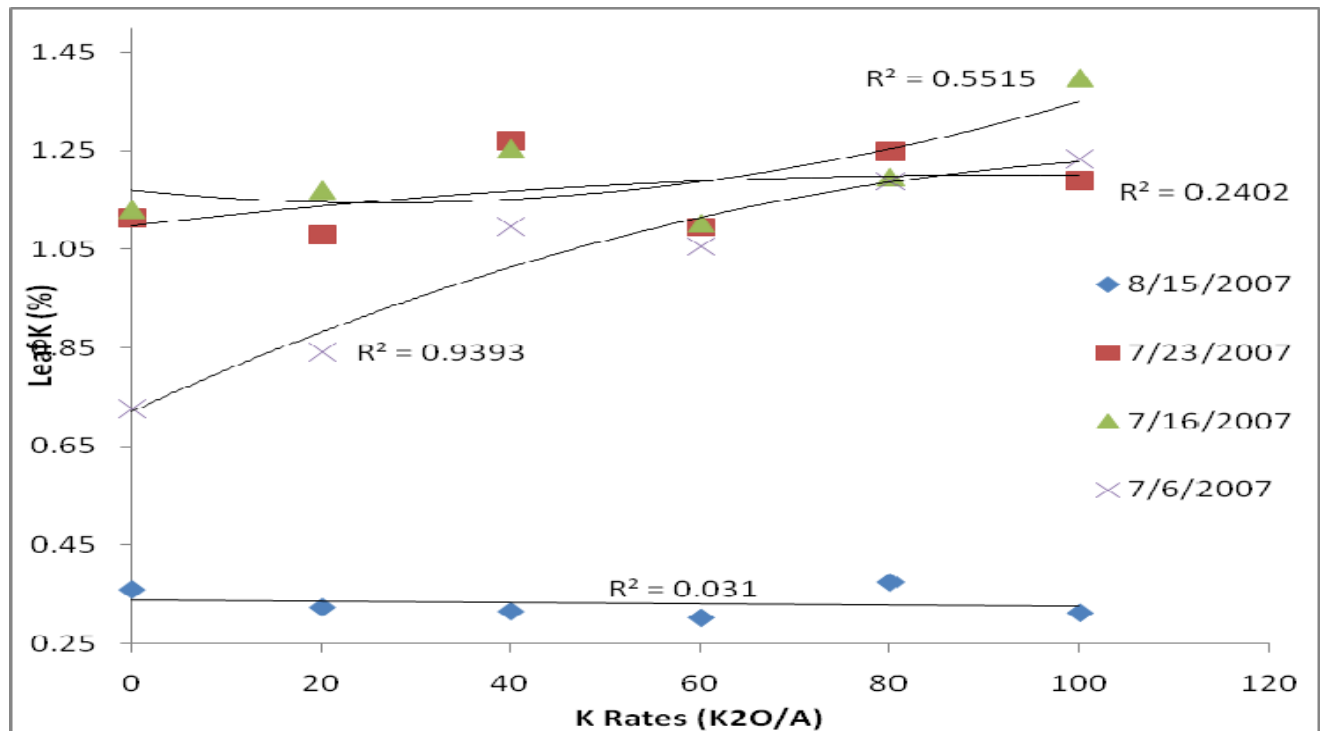


Figure 1. The relationship between cotton leaf potassium and potassium fertilizer rate.

There was a significant correlation between potassium fertilizer and extracted plant available potassium during the three sampling dates (Figure 2). There was linear relationship between potassium rate and soil test values though the test values were in the “high” or above range. These needs further investigation since no potassium will be recommended if soil test values are “high” or above for cotton.

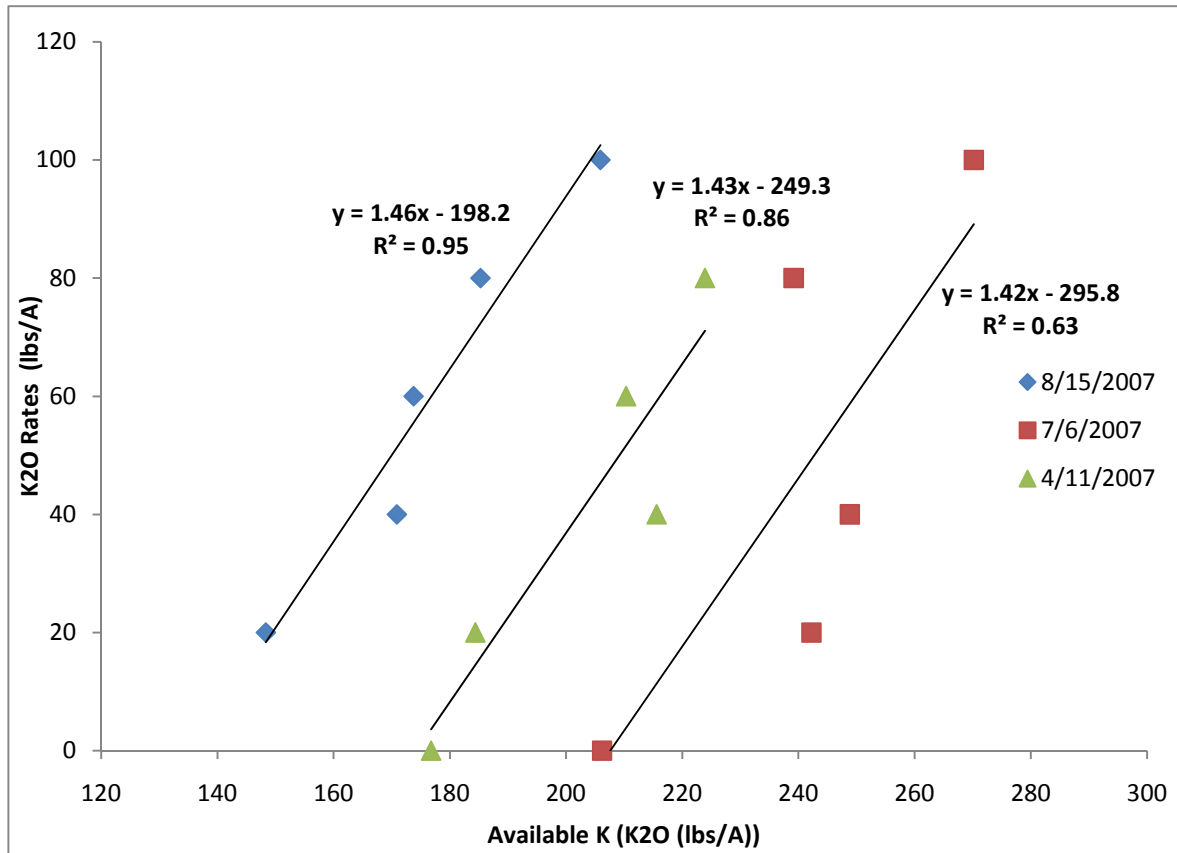


Figure 2: The relationship between potassium fertilizer rate and soil test potassium.

Cotton lint (lbs/A) was not related to potassium soil test values for the 4/11, 7/16 and 8/15, 2007 sampling periods (Figure 3). This could be due to the drought condition that was prevalent during this cropping season and/or just the nature of the Blackbelt soils. Cotton leaf potassium was correlated to cotton yield only during the 7/6/2007 sampling period (Figure 4). The highest potassium tissue content did not correspond to the highest cotton yield. This may lead to a wrong conclusion since the highest yield was obtained at a relatively low potassium tissue content. Under normal and adequate nutrient conditions such phenomenon will be rare. Even though these data are invaluable to determine how potassium fertility affects cotton yield on Black belt soils, better inferences could be gained if the experiment is conducted under optimum conditions. Thus, we believe continuation of this project with less natural limitations would benefit growers who may use the product of this research.

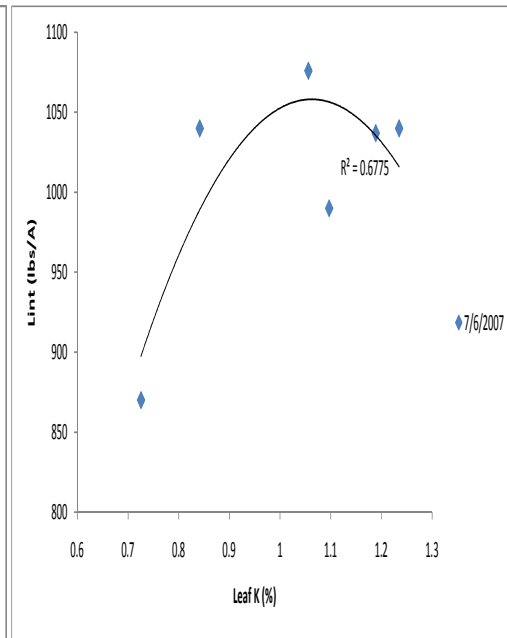
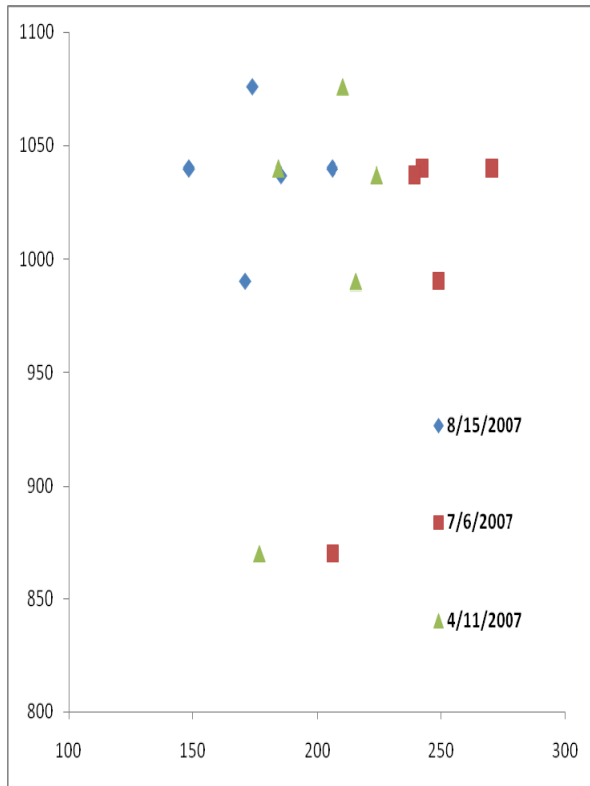


Figure 3: Cotton yield and soil test potassium

Figure 4: Cotton yield and cotton leaf potassium