PHOSPHORUS AND POTASSIUM NUTRITION OF COTTON PRODUCED USING TWO TILLAGE SYSTEMS D.D. Howard and R.H. Roane Plant and Soil Science Department West Tennessee Experiment Station Jackson, TN

Abstract

Phosphorus (P_2O_5) and potassium (K_2O) fertilization information for conventional- (CT) and no-tillage (NT) cotton (Gossypium hirsutum L.) production systems is limited. Research was initiated in 1994 and continued through 1998 on a Loring silt loam at the Milan Experiment Station evaluating P2O5 and K2O fertilization rates for CT and NT systems. The initial Mehlich I extractable P and K levels were low and medium, respectively. Experimental design was a split plot with tillage the main plot and P_2O_5 -K₂O rates the sub-plots. The fertilization rates included 0, 40, 80, and 120 lb P₂O₅/acre with 0, 30, and 60 lb K₂O/acre, a total of 12 treatments replicated four times. These rates were broadcast before planting using triple-superphosphate and potassium chloride. N was applied at 80 lb/acre after planting using ammonium nitrate. D&PL 50 was planted 1995 and 1996 with D&PL 5409 planted 1997 and 1998. The ANOVA showed a tillage-by-P-fertilization-by- year interaction effect on yields. The data will be presented by tillage system. Yearly CT and NT yields were increased by P_2O_5 fertilization. Surface broadcasting 40 lb P_2O_5 /acre was sufficient for increasing CT and NT vields for three of the five years. The 1995 and 1997 CT yields were increased with 80 lb P₂O₅/acre while the 1997 and 1998 NT yields were increased with 120 and 80 lb P₂O₅/acre, respectively. The 1998 yield increased with P2O5 fertilization were expressed by: Y (CT) = $1155.2838 + 4.104 P_2O_5 - 0.0234$ $(P_2O_5)^2$ and Y (NT)= 10007.5863 + 6.3006 P_2O_5 - 0.0363 $(P_2O_5)^2$. Broadcasting 60 lb K₂O/acre increased CT yields three of the five years while NT yield were increased two years of the five years from broadcasting 30 lb K₂O/acre. For the other years, yields were unaffected by K fertilization.

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