

NUTRITION OF COTTON FERTILIZED WITH POULTRY LITTER VERSUS AMMONIUM NITRATE**Haile Tewolde****Ardeshir Adeli****USDA-ARS****Mississippi State, MS****K. R. Sistani****USDA-ARS****Bowling Green, KY****D. E. Rowe****J. R. Johnson (retired)****Mississippi State, MS****Abstract**

Poultry litter has proven to be an effective fertilizer for cotton in the upland soils of the southeastern US. Fertilizing with poultry litter often results in better lint yield than fertilizing with single-nutrient synthetic fertilizers. This superiority of litter to synthetic fertilizers for cotton production may be related to the ability of litter to supply many of the essential metal and non-metal mineral nutrients, but this has not been well investigated. A field research was conducted at the Mississippi Agricultural and Forestry Experiment Station in northern Mississippi in 2002 to 2004 in a Loring silt loam to determine if the cotton yield increasing effect of litter may be related with better mineral nutrition. The results showed that cotton fertilized with broiler litter out-yielded cotton fertilized with ammonium nitrate, a yield performance which was not related the N nutrition. Analysis of nutrient concentration in aboveground plant parts showed that the yield advantage of the litter-fertilized cotton may be related to the nutrition of Mn, K, and other mineral nutrients. The results showed that applying ammonium nitrate to supply N to this soil reduced soil pH and elevated Mn concentration in aboveground plant parts which may have detrimentally affected lint yield. Applying litter had the opposite effect on soil pH and, therefore, did not elevate tissue Mn concentration. Cotton fertilized with litter also had better K nutrition than cotton fertilized with ammonium nitrate. Concentrations of P, Cu, and Fe in plant parts were not affected by the fertilizer type suggesting that the yield difference between ammonium nitrate and litter may not be due to differences in the nutrition of these nutrients. Overall, the research showed that poultry litter may be a preferred fertilizer over ammonium nitrate for cotton in this marginally productive soil, because fertilizing with litter maintained a more ideal level of manganese and potassium nutrition and resulted in greater lint yield than fertilizing with ammonium nitrate.