Program 2SB-2

Soybean Response To Poultry Litter In A Rotation

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Soybean yield response to annual poultry litter rates (0, 1.0 and 3.4 tons/acre) on a Leeper silty clay loam soil in corn (M), cotton (C) and soybean (B) rotation system were evaluated. The rotation systems from 2010-2014 were: CMBBMR; CMCBM and CCMMB. This study site had high levels of soil test Phosphorous (P) and Potassium (K) when the study was initiated. The poultry litter was surface applied on beds in March/April and incorporated with a Doall (rolling cutter bars with harrow) implement. Soybeans were planted late April/early May. The soybean crop in these rotations occurred in 2012 (CMBBM), 2013 (CMBBM, and CMCBM) and 2014 (CCMMB).

The results showed that soybean benefited from 1 or 3 ton/acre poultry litter application. The 1.0 ton/acre annual rate increased yields over the check (no fertilizer) by 7% or more every year except when soybean followed soybean in 2013. The 3.4 ton/ac litter increased yield by 11% or more relative to the no fertilizer check. But the yield difference between the 1 ton/acre and 3.4 ton/acre poultry litter generally was only slight (3 to 5 bu/acre). In the no fertilizer check, the 2013 soybean that followed the 2012 soybean (CMBBM) had higher yield than the 2013 soybean that followed 2012 cotton (CMCBM). This difference was eliminated or reversed if 1 or 3 tons/acre litter was applied. Chlorophyll index as measured by a SPAD meter indicated higher readings during the growing seasons where poultry litter had been applied than the no fertilizer check. The 3.4 ton/acre annual application of litter generally supplied more P and K nutrients than the soybean crop used and resulted in a slight build up of soil P, K, Cu, and Zn. The 3.4 ton/acre poultry litter in the corn and cotton rotation has not resulted in a buildup of P or K. Overall the results suggest that applying litter as much as 3 ton/ac may not be necessary to gain the full benefit of litter for soybean yield in this soil. Only 1 ton/acre may provide the yield benefits without causing excess nutrient build up in the soil.