

Evaluation Of Surface Application Of Nitrogen Fertilizer Sources In A Conservation Tillage Cotton System

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Surface application of nitrogen (N) fertilizer sources were evaluated for two seasons on cotton grown in a conservation tillage system. The tests were conducted at the Tennessee Valley Research and Extension Center in Belle Mina Alabama. Cotton was planted in late April each season into a heavy rye residue that was terminated approximately three weeks prior to cotton planting. The test area received 20 and 30 pounds per acre of preplant N fertilizer in 2006 and 2007 respectively.

At early squaring, all N fertilizer sources were surface applied. In 2006, 60 and 90 pounds per acre rates of N fertilizer were applied, while in 2007 N fertilizer rates were reduced to 50 and 80 pounds per acre because of an increase in pre-plant N fertilizer. The rye cover crop provided an almost solid cover over the soil when the N fertilizer sources were applied. In both seasons no rainfall occurred and no irrigation was applied for at least 7 days following fertilizer application. These conditions and warm temperatures each year provided ideal conditions for possible ammonia (NH₃) volatilization losses after fertilizer application. In 2006 all N fertilizer sources tested were granular fertilizer products that were weighed and hand applied to all plots. In 2007, two liquid N fertilizers were added that were sur-

face dribbled beside each row using a CO₂ pressurized sprayer. Fertilizer sources tested in these experiments include: 1) ammonium nitrate, 2) urea, 3) urea + Agrotain (1 gallon per ton), 4) urea + 4.5% calcium thiosulfate, 5) urea + 7.0% calcium thiosulfate, 6) UAN, 7) UAN + Calcium Chloride, 8) UAN + Agrotain (1 gallon per ton), 9) GP 30-0-0.

Cotton was irrigated and cotton yields were excellent both seasons. Lint yields ranged from 1200 to 1500 pounds per acre each season. Increasing N fertilizer rates increased cotton leaf-N and yields with all fertilizer sources tested in 2006 and 2007. In 2006, ammonium nitrate produced significantly higher cotton yields than urea. Cotton yields with ammonium nitrate, however, were not significantly different than yields produced with urea plus Agrotain or urea plus calcium thiosulfate. In 2007 cotton yields were slightly higher, but significant yield differences between ammonium nitrate and the granular urea fertilizers were not found. Cotton yields with the liquid N fertilizers were also not significantly different than yields with ammonium nitrate in 2007. This data indicates that although there appeared to be significant N loss from surface applied urea in 2006, these results were not repeated in 2007. Lower rainfall in 2007 may have kept the soil surface drier and reduced possible N volatilization losses after application. Δ