

COTTON RESPONSE TO FOLIAR NUTRIENT APPLICATION

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ABSTRACT: A study was conducted evaluating the influence of foliar slow release N (CoRoN, 25-0-0, N-P-K), N + K [CoRoN, 10-0-10, (N-P-K) plus 0.5% B] liquid solutions, and conventional foliar N applications of potassium nitrate (KNO₃) and feed grade urea (46% N) applied either at pinhead square or sequential applications starting at pinhead square or first bloom. The environmental growing season for 2001 was highly variable with dry conditions from mid-July through August 6, followed by excessive rainfall in late August and early September. This resulted in a mean seedcotton yield of 2400 lb/ac. Foliar fertilizer treatments had no visual effect on cotton growth and maturity. All foliar nutrient application treatments, applied either at pinhead square or first bloom and repeated 9 days after first bloom, produced similar but higher yield than the check (water). All CoRoN and KNO₃ treatments also produced higher yield than solubor.

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MATERIALS AND METHODS: A study was conducted during the 2001 growing season evaluating foliar applications of slow release nitrogen [CoRoN (25-0-0)], slow release nitrogen + potassium + boron [CoRoN (10-0-10) plus 0.5% B] as liquid solutions, and conventional sources of foliar N applications as potassium nitrate (KNO₃) and feed grade urea (46% N). These were applied either at pinhead square or sequential applications starting at pinhead square or first bloom (Table 1). The study was conducted as a randomized complete block design with 4 replications on a Leeper silty clay loam soil.

Fall fertilizer (P and K) application was based on soil test recommendations. Soil test indicated high P and low K level. Potash (K₂O) at 200 lb/ac was applied broadcast to the soil surface 10/30/00. Nitrogen as liquid UAN (32% N) at 80 lb N/ac was applied sidedress 6 inches from the row and 2 inches deep on 6/19/01. All foliar nutrient treatments were applied at 4 mph with TXVS-4 nozzles with a 5 gpa carrier volume and 34 psi boom pressure. The pinhead square applications were made 6/28/01. The first bloom and 9 days after first bloom applications were made 7/24/01 and 8/02/01, respectively.

Land preparation consisted of paratill-bed-rolled on 11/22/00. Glyphos (glyphosate) at 1.2 lb ai/ac was applied as burndown on 4/11/01. Gramoxone (paraquat) + surfactant at 0.38 lb ai/ac + 0.4 pt/ac was applied as a burndown 4/23/01 and repeated at 1.0 lb ai/ac + 0.4 pt/ac on 5/09/01 for henbit control. The area was doaled prior to planting cotton on 5/23/01. NuCOTN 33B cultivar was planted in 38-inch rows at 4 seed/ft of row on 5/23/01. Ridomil 11G (mefenoxam) and Temik 15G (aldicarb) at 0.88 and 0.52 lb ai/ac were applied in-furrow at planting. Select (clethodim) + crop oil at 0.125 lb ai/ac + 2 pt/ac was applied postemergence on 6/30/01. Staple (pyrithiobac) + MSMA (monosodium methanearsonate) at 1.5 oz ai/ac + 2 lb ai/ac was applied post-direct broadcast on 6/12/01 and repeated on 6/21/01. Cobra (lactofen) + crop oil at 0.20 lb ai/ac + 1 pt/ac was applied post-direct broadcast on 7/09/01.

The major cotton insect pests in the 2001 growing season were tarnish plant bug (*Lygus lineolaris*), budworm (*Heliothis virescens*), and bollworm (*Helicoverpa zea*). The following cotton insecticides were applied when insects were at threshold or higher. All insecticide applications were made with TXVS-4 nozzle, 5 gpa carrier volume, 45 psi, and 4 mph rate of travel. Bidrin (dicotophos) at 0.5 lb ai/ac was applied 7/02/01 and repeated 7/19/01. Ammo (cypermethrin) at 0.1 lb ai/ac was applied 8/03/01 and repeated 8/16/01. Pix (mepiquat chloride) at 0.022 lb ai/ac was applied 7/13/01 and repeated at 0.044 lb ai/ac on 8/14/01. Cotton was defoliated 9/21/01 with Finish (ethephon + cyclanilide) + Free Fall (thidiazuron) at 1.0 + 0.125 + 0.083 lb ai/ac. Folex (phosphorotrithioate) + Gramoxone Max at 0.75 + 0.09 lb ai/ac was applied 10/02/01. The center 2 rows of cotton were harvested with a 2-row spindle picker 10/08/01. Plot seedcotton weights were recorded. Grab samples from each plot of seedcotton were collected

and ginned with small sample gin to determine percent lint turnout and lint yield. All data were analyzed with statistical analysis and treatment means were separated with Fisher Protected LSD at the 5% probability level.

RESULTS AND DISCUSSION: Rainfall during the growing season was highly variable with normal rainfall in May, followed by no rainfall from July 13 to August 6 and excessive rainfall in late August and early September. However, cotton yield was about normal. During the growing season, no observable differences in treatments were noted. Seedcotton yield results indicated a mean yield of 2400 lb/ac. All foliar nutrient treatment applications except Solubor (20% boron) applied either at pinhead square (PHS) or first bloom and repeated 9 days after first bloom produced 183 to 355 lb/ac more yield than the check (water). All CoRoN and KNO₃ foliar application treatments also produced higher yield than Solubor applied at first bloom and repeated 9 days after first bloom. CoRoN (10-0-10) at 1 gpa applied at first bloom or CoRoN (25-0-0) at 0.5 gpa applied at pinhead square produced yield equal to repeated applications

Table 1. Effects of foliar nutrient applications and timing on cotton production on a Leeper silty clay loam soil in 2001, Verona, MS.

Foliar Treatment	Rate/ac	Application growth stage	Seedcotton lb/ac
1. CoRoN (25-0-0)	0.5 gpa	PHS ¹	2450
2. CoRoN (25-0-0) CoRoN (10-0-10) ³ CoRoN (10-0-10)	0.5 gpa 1 gpa 1 gpa	PHS 1 st Bloom 9 DAB ²	2508
3. CoRoN (10-0-10) ³	1 gpa	1 st Bloom	2532
4. CoRoN (10-0-10) ³ CoRoN (10-0-10) ³	1 gpa 1 gpa	1 st Bloom 9 DAB	2434
5. KNO ₃ (13.5-0-45) ⁴ KNO ₃ (13.5-0-45) ⁴	1 lb N/ac 1 lb N/ac	1 st bloom 9 DAB	2522
6. FG.Urea (46% N) ⁵ FG.Urea (46% N) ⁵	1 lb N/ac 1 lb N/ac	1 st bloom 9 DAB	2360
7. Solubor	0.15 lb B/ac 0.15 lb B/ac	1 st bloom 9 DAB	2219
8. Check (water)	5 gpa	PHS 1 st bloom 9DAB	2177
Grand mean			2400
LSD			176
%CV			5

¹ PHS means pinhead square.

² DAB means days after first bloom.

³ Contains 0.5% boron.

⁴ KNO₃ is potassium nitrate which was applied at 1 lb N/ac and 3.3 lb K₂O/ac.

⁵ FG. Urea is feed grade urea (46% N).