

COTTON RESPONSE TO FOLIAR NUTRIENT APPLICATION IN UNR COTTON

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ABSTRACT: An ultra narrow row cotton 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. Foliar fertilizer treatments had no visual effect on cotton growth and maturity. The CoRoN (10-0-10, plus 0.5% B) at 1 gpa applied at first bloom and repeated 14 days after first bloom had 560 lb/ac more seedcotton than the water check. Solubor and the water check had similar but lower yield than all other treatments of foliar nutrients applied. Foliar nutrients with nitrogen and potassium in combination generally showed higher yield than nitrogen or solubor applied alone.

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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 sources as potassium nitrate and feed grade urea applied either at pinhead square or sequential applications starting at pinhead square (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 ammonia nitrate was applied surface broadcast at 80 lb N/ac 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 7/03/01. The first bloom and 9 days after first bloom applications were made 7/25/01 and 8/08/01, respectively. The 9 days after first bloom application had to be delayed due to unfavorable weather conditions until 14 days after bloom.

Land preparation consisted of disking 12/11/01; subsoiling 12/11/01; and disking 12/12/01. The study was doaled on 4/02/01 and repeated prior to planting on 5/23/01. Gramoxone (paraquat) + surfactant at 0.38 lb ai/ac + 0.4 pt/ac was applied as a burndown 4/21/01 for henbit control. Roundup Ultra (glyphosate) at 1.2 lb ai/ac was applied 5/08/01. Paymaster 1218BG/RR cultivar was planted in 9.5 rows at 100,000 seed/ac on 5/23/01. Temik 15G (aldicarb) at 0.52 lb ai/ac was applied in-furrow at planting. Roundup at 1.0 lb ai/ac was applied postemergence on 6/12/01 and repeated 6/26/01. Staple (pyrithiobac) at 1.5 oz ai/ac was applied postemergence broadcast on 7/10/01.

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 levels or higher. All insecticide applications were made with TXVS-4 nozzle, 5 gpa carrier volume, 45 psi, and 4 mph rate of travel. Bidrin (dicrotophos) at 0.25 lb ai/ac was applied 7/06/01 and repeated 7/19/01. Ammo (cypermethrin) at 0.1 lb ai/ac was applied 8/07/01. Karate-Z (lambda-cyhalothrin) at 0.03 lb ai/ac was applied at 0.5 lb ai/ac on 7/09/01. Pix (mepiquat chloride) at 0.03 lb ai/ac was applied 7/27/01 and repeated at 0.044 lb ai/ac on 8/30/01. Cotton was defoliated 9/21/01 with Finish (ethephon + cyclanilide) + Free Fall (thidiazuron) at 1.0 + 0.125 + 0.083 lb ai/ac. The center 11 rows of cotton were harvested with a stripper 10/23/01. 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 indicated a mean yield of 3914 lb/ac (Table 1). Solubor and the water check had lower yield than all other foliar nutrient treatments. Foliar N as feed grade urea (46% N) showed lower yield than treatments which contained nitrogen and potassium. One application of CoRoN (10-0-10) at first bloom produced similar yield to an application at first bloom followed by a repeat application 14 days after bloom or KNO₃ applied at first bloom and repeated 14 days after first bloom. CoRoN (25-0-0) at 0.5 gpa applied at pin head square produced similar yield to treatments which contain nitrogen and potassium, [CoRoN (10-0-10) and KNO₃ (13.5-0-45)].

Table 1. Effects of foliar nutrient applications and timing on UNR cotton stripper-seedcotton yield in 2001, Verona, MS.

| Nutrient (N-P-K) treatment | Rate/ac | Application growth stage | Seedcotton lb/ac |
|--|------------------------------|---|------------------|
| 1. CoRoN (25-0-0) | 0.5 gpa | PHS ¹ | 3952 |
| 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 14 DAB ² | 4107 |
| 3. CoRoN (10-0-10) ³ | 1 gpa | 1 st Bloom | 4091 |
| 4. CoRoN (10-0-10) ³ CoRoN (10-0-10) | 1 gpa 1 gpa | 1 st Bloom 14 DAB | 4138 |
| 5. KNO ₃ (13.5-0-45) ⁴ KNO ₃ (13.5-0-45) | 1 lb N /ac 1 lb N/ac | 1 st bloom 14 DAB | 4076 |
| 6. FG.Urea (46% N) ⁵ FG.Urea (46% N) | 1 lb N/ac 1 lb N/ac | 1 st bloom 14 DAB | 3718 |
| 7. Solubor Solubor | 0.15 lb B/ac 0.15 lb B/ac | 1 st bloom 14 DAB | 3656 |
| 8. Check (water) | 5 gpa | PHS 1 st bloom 14 DAB | 3578 |
| | | Grand mean | 3914 |
| | | LSD | 254 |
| | | % CV | 4 |

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).