

## COTTON RESPONSE TO HYDRAHUME WITH REDUCED N RATES

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**ABSTRACT:** HydraHume is a product containing humus derived organic acids. The potential benefits of HydraHume are improved uptake efficiency of applied fertilizers. Therefore, a cotton study was conducted in 2002 evaluating the influence of a preemergence application of HydraHume in combination with reduced N rates had on cotton petiole N and K levels, and yield. All N rates were applied sidedress at pinhead square. The environmental growing season was highly variable with above normal rainfall for May and July followed by no rainfall for August until the 25th of August. The HydraHume treatments had no visual effect on cotton growth and maturity. Total cotton lint yield ranged from 888 lb/ac for the check (no HydraHume or sidedress N) to 1296 lb/ac for HydraHume at 2 gpa plus 80 lb N/ac. The HydraHume at 2 gpa plus 80 lb N/ac and the standard 80 lb N/ac with no Hydra-Hume showed no difference in lint yield but both had higher yield than HydraHume at 1 gpa plus 40 lb N/ac, the check, and 40 lb N/ac with no HydraHume. However, HydraHume at 2 gpa plus 40 lb N/ac was lower in yield than HydraHume at 2 gpa plus 80 lb N/ac but was equal to the standard 80 lb N/ac with no HydraHume and the HydraHume plus Estecol at 1 gpa plus 1 gpa plus 40 lb N/ac. All treatments showed no difference in cotton petiole K levels during the growing season. No petiole N difference occurred until late July when all 80 lb N/ac treatments showed higher N levels than all others. HydraHume in combination with reduced N rates did not increase the petiole N.

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**KEYWORDS:** Cotton, HydraHume, N rates

**MATERIALS AND METHODS:** A study was conducted during the 2002 growing season evaluating preemergence broadcast applications of HydraHume effect on cotton petiole N and K levels and yield. The study was conducted as a randomized complete block design with 4 replications on a Leeper silty clay loam soil. Plot size was 4 rows x 50 ft.

Fall fertilizer (P and K) application was based on soil test recommendations. Soil test indicated high P and low K level. Potash (K<sub>2</sub>O) at 250 lb/ac was applied broadcast to the soil surface on 10/24/01. Land preparation consisted of paratilling followed by a bed-roller on 10/24/01. The study was do-alled (row conditioner) prior to planting on 5/16/02. Glyphos (glyphosate) + Clarity (banvel) at 1.0 + 0.125 lb ai/ac was applied as a burndown on 3/08/02. Gramoxone Max (paraquat) + surfactant at 1.0 lb ai/ac + 0.4 pt/ac was applied as a burndown 4/19/02 for henbit control. Sure-Grow SG 501BR cultivar was planted in 38 rows at 4 seed/ft of row on 5/16/02. Temik 15G (aldicarb) and Ridomil 11G (mefenoxam) at 0.52 and 0.88 lb ai/ac was applied in-

furrow at planting. The HydraHume preemergence broadcast applications were made at 10 gpa on 5/17/02 with the spray boom equipped with 8002VS nozzles spaced 20 inches apart.

Appropriate treatments received nitrogen as 32% N (UAN solution) at 80 and 40 lb N/ac which was applied with a colter-knife system at pinhead square, 6 inches from the row and 2 inches deep on 6/19/02 (Table 1). Petiole leaf samples were taken at matchhead square (708, DD60s), mid-bloom (1059, DD60s), and at 5 nodes above white flower (1323 DD60s). The petiole stems were frozen and then crushed with a garlic press and the sap was analyzed for nitrate nitrogen (NO<sub>3</sub>-N) and potassium (K) with a Cardy® meter. Glyphosate + pyriithiobac (Staple Plus) at 0.75 lb ai/ac + 0.5 oz ai/ac was applied postemergence on 5/28/02. Roundup Ultra Max (glyphosate) at 0.75 lb ai/ac was applied to 2-leaf cotton on 6/05/02 and repeated at 1.0 lb ai/ac on 6/18/02 on 4-leaf cotton. Roundup Ultra Max + Bladex (cyanazine) at 1.0 plus 1.0 lb ai/ac was applied post directed broadcast with hooded sprayer on 7/08/02.

The major cotton insect pests in the 2002 growing season were tarnished plant bug (*Lygus lineolaris*), budworm (*Heliothis virescens*), and bollworm (*Helicoverpa zea*). The following cotton insecticides were applied when insects were at threshold or above threshold levels, based on twice a week scouting program. All insecticide applications were made with TXVS-4 nozzle, 5 gpa carrier volume, 48 psi, and a 4 mph rate of travel. Orthene (acephate) at 0.27 lb ai/ac was applied on 6/24/02. Bidrin (dicotophos) at 0.25 lb ai/ac was applied on 7/08/02. Ammo (cypermethrin) at 0.07 lb ai/ac was applied on 7/25/02. Karate-Z (lambda-cyhalothrin) at 0.033 lb ai/ac was applied on 7/30/02. Provado (imidacloprid) at 0.047 lb ai/ac was applied on 8/10/01 for cotton aphid (*Aphis gossypii*) and banded winged white fly (*Trialeurodes abutiloneus*) control.

Pix (mepiquat chloride) Plus (3.1 x 10 *Bacillus cereus* per fluid oz) at 0.022 lb ai/ac was applied 7/08/02 and repeated at 0.0328 lb ai/ac on 7/26/02. Cotton was defoliated 9/09/02 with Cotton Quik (ethephon) + Dropp (thidiazuron) at 0.85 + 0.05 lb ai/ac. Folex (phosphorotrithioate) at 0.75 lb ai/ac was applied 9/19/02. The center 2 rows of cotton were harvested with a spindle picker on 9/24/02. A second pick harvest was done 10/17/02. Plot seedcotton weights were recorded. Grab samples from each plot of first pick seedcotton were collected and ginned with small gin to determine percent lint and calculate lint yield. All data were analyzed with SAS analysis of variance procedure and treatment means were separated with Fisher Protected LSD at the 5% significance level.

**RESULTS AND DISCUSSION:** Rainfall during the growing season was highly variable with above normal rainfall for May and July, followed by no rainfall until August 25. However, cotton yield was above average. The HydraHume treatments had no visual effect on cotton growth and maturity. The mean lint percent was 38 and the total lint mean yield was 1117 lb/ac (Table 1). The HydraHume at 2 gpa plus 80 lb N/ac had the highest lint yield of 1296 lb/ac, but was not different from the standard 80 lb N/ac applied sidedress without HydraHume, and HydraHume at 1 gpa plus 1 gpa of Estecol plus 40 lb N/ac. However, the HydraHume at 2 gpa plus 40 lb N/ac and HydraHume plus Estecol at 1 gpa plus 1 gpa plus 40 lb N/ac showed yield equal to the standard 80 lb N/ac with no HydraHume. The Check, HydraHume at 1 gpa plus 40 lb N/ac, and 40 lb N/ac with no HydraHume showed lower yield than the standard 80 lb N/ac. The percent lint data indicated no differences between treatments (Table 1).

Cotton petiole leaf analysis for K during the growing season indicated no difference in treatments (Table 2). The petiole leaf analysis for N only indicated differences between treatments in late July where all 80 lb N/ac treatments showed higher levels of nitrate N than the 40 lb N/ac and check treatments. HydraHume in combination with reduced N rates did not increase petiole N.

**COOPERATORS:** None

**PUBLICATIONS:** None

**Table 1.** HydraHume and reduced N sidedress rates effect on lint turnout, lint yield, and seedcotton yield in 2002, Verona, MS.

Treatment	Rate/ac	Application growth stage	Lint %	1 <sup>st</sup> pick lb/ac	Total lb/ac
----- Lint -----					
1. HydraHume 80 lb N/ac	2 gpa -----	PRE <sup>2</sup> PHS	37.9	1151	1296
2. No HydraHume 80 lb N/ac	----- -----	----- PHS <sup>1</sup>	37.7	1090	1234
3. HydraHume Estecol 40 lb N/ac	1 gpa 1 gpa -----	PRE PRE PHS	37.7	1038	1167
4. HydraHume 40 lb N/ac	2 gpa -----	PRE PHS	38.0	1004	1116
5. HydraHume 40 lb N/ac	1 gpa -----	PRE PHS	37.3	942	1059
6. No HydraHume 40 lb N/ac	----- -----	----- PHS	37.3	935	1059
7. Check (No nitrogen/ HydraHume)	----- -----		37.3	798	888
	Grand mean		37.6	993	1117
	LSD		NS	120	134
	% CV		1.8	8	8

<sup>1</sup> PHS means pinhead square N application applied sidedress 6 inches from row and 2 inches deep.

<sup>2</sup> PRE means application was made after planting before seedlings emerged.

**Table 2.** HydraHume and reduced N sidedress rates effect on ammonium nitrate and potassium levels in cotton petioles in 2002, Verona, MS.

Treatment	Rate/ac	Appli. G. stage	----NO <sub>3</sub> -N (PPM)----			-----K (PPM)-----		
			7/01	7/18	7/29	7/01	7/18	7/29
1. HydraHume 80 lb N/ac	2 gpa -----	PRE <sup>2</sup> PHS	1467	1483	573	4817	3608	5558
2. No HydraHume 80 lb N/ac	----- -----	----- PHS <sup>1</sup>	1575	1633	577	4708	3492	5683
3. HydraHume Estecol 40 lb N/ac	1 gpa 1 gpa -----	PRE PRE PHS	1675	960	254	4567	3467	5483
4. HydraHume 40 lb N/ac	2 gpa -----	PRE PHS	1358	795	288	4358	3367	5133
5. HydraHume 40 lb N/ac	1 gpa -----	PRE PHS	1397	748	185	4833	3742	5658
6. No HydraHume 40 lb N/ac	----- -----	----- PHS	1263	945	291	4578	3275	5250
7. Check (No nitrogen/ HydraHume)	----- -----		1213	319	175	4550	3742	5317
	Grand mean							
	LSD		NS	NS	179	NS	NS	NS
	% CV		21	23	36	8	14	8

<sup>1</sup> PHS means pinhead square N application applied sidedress 6 inches from row and 2 inches deep.

<sup>2</sup> PRE means application was made after planting 5/16/02 before seedlings emerged.