

CORN YIELD RESPONSE TO N RATES IN COMBINATION WITH HYDRAHUME

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ABSTRACT: Improving fertilizer efficiency in row crop production is a major consideration. HydraHume is a humus derived organic acid product for improved uptake efficiency of applied fertilizers. The purpose of this study was to evaluate corn yield response to HydraHume in combination with reduced soil applied N rates. Growing conditions were very favorable for good corn yield with above normal rainfall in May and July. First year results indicate HydraHume has the potential to increase fertilizer N efficiency and maintain yield. HydraHume at 1 or 2 gpa in combination with 135 lb N/ac produced yield equal to the recommended rate of 175 lb N/ac with no HydraHume. The 175 lb N/ac with no HydraHume produced higher yield than 135 lb N/ac with no HydraHume. Estecol in combination with HydraHume did not improve yield when compared with HydraHume alone.

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KEYWORDS: HydraHume, N rates, corn

MATERIALS AND METHODS: A field study was conducted on a Leeper silty clay loam soil, Verona, Mississippi, during the 2002 growing season to evaluate corn yield response to HydraHume in combination with selected soil applied N rates (135 and 175 lb N/ac). The study was conducted as a randomized complete block design with 4 replications. Plot size was 8 rows (30-inch) by 50 ft.

Fertilizer P and K were applied based on soil test recommendations. Soil test results indicated high levels of P with a medium level of K. Therefore, 250 lb/ac of potash (K_2O) was applied broadcast on the soil surface on 10/24/01 and repeated at 100 lb/ac on 5/15/02. Land preparation treatments included a fall disking (10/25/01) followed by do-all (10/26/01), bedding (10/28/01), paratilling (11/02/01), bed-roller (11/04/01), and rebed-roller on 3/15/02. Pioneer 3223 at 28,000 seed/ac in 30-inch rows was planted no-till on 4/16/02. Lorsban (chlorpyrifos) at 1.32 lb ai/ac was applied in-furrow at planting for seedling insect control.

Gramoxone Max (paraquat) + Guardsman Max (dimethenamid-P + atrazine) + surfactant at 0.75 + 0.64 + 1.24 lb ai/ac + 0.5 pt/ac was applied preemergence for weed control on 4/17/02. Nitrogen fertilizer (32% UAN) at either 175 lb N/ac or 135 lb N/a was applied with a colter-knife applicator, 6 inches from the row and 2 inches deep, on 5/16/02. Corn was 10-14 inches in height at the time of N application. Intrepid (methoxyfenozide) at 0.0625 lb ai/ac was applied on 6/25/02 for southwestern corn borer (*Diatraea grandiosella*) control.

HydraHume alone at either 1 or 2 gpa or HydraHume + Estecol at 1 gpa + 1gpa, were applied post emergence over-top of corn at the V5 to V6 growth stage on 5/16/02. The applications were made with 8002VS nozzles on 20 inch spacing with 10 gpa spray volume. Twenty corn ear-leaf mid-ribs were collected at random from plants in the V12 growth stage and frozen. The mid-ribs were thawed, crushed with a garlic press and the sap was analyzed for nitrate nitrogen (N) and potassium (K) with a Cardy® meter.

The center two rows of each plot were harvested with a plot combine equipped with a cornhead. Harvested samples were weighed and moisture was measured with a Dickey John® 2000 grain analysis computer. Yields were adjusted to bu/ac at 15.5% moisture and the data were statistically analyzed using analysis of variance. The treatment means were separated using Fisher's Protected LSD at the 5% probability level.

RESULTS AND DISCUSSION: Rainfall during the growing season was above normal for May and July, which was favorable for good corn yield. The corn ear-leaf mid-rib analysis indicated higher N concentrations for the standard (recommended) 175 lb N/ac with or without HydraHume at 2 gpa than the 135 lb N/ac with HydraHume at 1 gpa or 135 lb N/ac with HydraHume + Estecol at 1 gpa + 1 gpa. The 135 lb N/ac with HydraHume at 2 gpa, however, had N concentrations equal to the standard 175 lb N/ac without HydraHume. Levels of K ranged from 2767 to 3183 parts per million. The 175 lb N/ac with HydraHume at 2 gpa and 135 lb N/ac with HydraHume + Estecol at 1 gpa + 1 gpa had lower K levels than 135 lb N/ac with no HydraHume, but were equal to all of the other treatments.

The standard 175 lb N/ac with no HydraHume produced the highest yield of 189.9 bu/ac and was higher than the 135 lb N/ac with no HydraHume. However, the 135 lb N/ac with HydraHume at 1 or 2 gpa or with HydraHume + Estecol at 1 gpa + 1 gpa, produced yield equal to the standard 175 lb N/ac with no HydraHume or with HydraHume at 2 gpa. The 135 lb N/ac with no HydraHume yield, however, was equal to 135 lb N/ac + HydraHume at 2 gpa, and 135 lb N/ac with HydraHume + Estecol at 1 gpa + 1 gpa. The preliminary results indicate that HydraHume has the potential to increase corn yield with reduced soil N rates.

COOPERATORS: None

PUBLICATIONS: None

Table 1. Corn yield response to HydraHume and soil N rates on a Leeper silty clay loam soil in 2002, Verona, MS.

Treatment	Rates	Application method	6/13/02 NO ₃ -N ¹	K ¹	Yield bu/ac
-----ppm-----					
1. No HydraHume 175 lb N/ac	-----	----- SD	122	3033	189.9
2. HydraHume 175 lb N/ac	2 gpa -----	EPOT (V5) SD	143	2850	184.4
3. No HydraHume 135 lb N/ac	----- -----	----- SD	104	3183	163.9
4. . HydraHume 135 lb N/ac	2 gpa -----	EPOT (V5) SD	112	3117	175.2
5. . HydraHume 135 lb N/ac	1 gpa -----	EPOT (V5) SD	103	2958	181.9
6. . HydraHume Estecol 135 lb N/ac	1 gpa 1 gpa -----	EPOT (V5) EPOT (V5) SD	100	2767	177.0
Mean			114	2985	178.7
LSD (.05)			18	328	15.1
% CV			10	7	5.6

¹ Corn-ear leaf NO₃-N (nitrate) and potassium (K) at V12 stage of growth 6/13/02.