

1995 Corn Gluten Hydrolysate Weed Control Study - Year 2

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Corn gluten hydrolysate (CGH) was screened for efficacy as a natural herbicide in turf. This trial is a long-term study started in 1995 that will be continued in the same experimental area for several years. It is being conducted at the Iowa State University Horticulture Research Station north of Ames, Iowa. The experiment is located in an area of 'Ram 1' Kentucky bluegrass. The soil in this experimental area is a Nicollet (fine-loamy, mixed, mesic Aquic Hapludoll) with an organic matter content of 3.7% a pH of 7.1, 4 ppm P, and 100 ppm K.

The experimental design is a randomized complete block with three replications. Individual experimental plots are 5 x 5 ft with 3 ft barrier rows between replications. Corn gluten hydrolysate was applied at 5, 10, 15, and 20 lbs product/1000 ft² (Table 1). These rates are equivalent to 0.5, 1.0, 1.5, and 2.0 lbs N/1000 ft² as CGH contains 10% N. The CGH was dissolved in water and the volumes applied were 700, 1400, 2100, and 2800 ml for the 5, 10, 15, and 20 lb rates, respectively. An untreated control was included for comparisons. The CGH was applied using a carbon dioxide backpack sprayer equipped with #8006 nozzles at 20 psi.

All treated plots received a single application on May 14. Supplemental irrigation was used to provide adequate moisture to maintain the grass in good growing condition.

Visual quality data were taken May 22 and June 10. Visual quality was measured using a 9 to 1 scale: 9 = best quality, 6 = lowest acceptable quality, and 1 = poorest quality (Table 1). Data for individual weed species were not taken because weed populations were very high especially in the untreated controls. The cool, wet spring delayed crabgrass germination until the broadleaf weed species (i.e. dandelion and clover) were well established. Weed control was assessed by making visual estimations of the percent of area per plot covered by broadleaf and grass weed species (Table 2). Representative species included dandelion, clover, black medic, and spurge. Weed control data were taken May 22, June 10, July 10, July 30, and August 23.

Data were analyzed with the Statistical Analysis System version 6.10 (SAS Institute, 1989) using the Analysis of Variance (ANOVA) procedure. Fisher's Least Significant Difference (LSD) means comparison tests were used to assess CGH effects on bluegrass quality and weed control.

No phytotoxic symptoms were detected in any of the treated plots. Turf quality was improved by CGH as compared with the untreated control plots through June 10. After this date, there were no quality differences among the plots (Table 1).

Weed populations were not significantly reduced by CGH (Table 2). On some of the data collection dates, percentage weed cover was higher in bluegrass treated with CGH than in the untreated controls. The majority of the weed cover consisted of dandelion and clover with only small sporadic populations of black medic and spurge. The absence of crabgrass could possibly be explained by the competition at the time of germination from dense populations of dandelion and clover.

Table 1. Visual quality¹ of Kentucky bluegrass treated with corn gluten hydrolysate for the 1995 Corn Gluten Hydrolysate Weed Control Study.

Material	lbs product /1000 ft ²	May 22	June 10	Mean Quality
1. Untreated control	NA	6	5	6
2. Corn gluten hydrolysate	5	7	6	7
3. Corn gluten hydrolysate	10	8	7	8
4. Corn gluten hydrolysate	15	8	8	8
5. Corn gluten hydrolysate	20	9	8	8
LSD _{0.05}		1	1	1

¹ Visual quality was assessed using a 9 to 1 scale: 9 = best quality, 6 = lowest acceptable quality, and 1 = poorest quality.

Corn gluten hydrolysate was applied on May 14, 1996.

Table 2. Percentage of weed cover¹ in Kentucky bluegrass treated with corn gluten hydrolysate for the 1995 Corn Gluten Hydrolysate Weed Control Study.

Material	lbs product /1000 ft ²	May 22	June 10	July 10	July 30	Aug 23	Mean % cover	Percent cover reduction
1. Untreated control	NA	53	47	60	58	67	57	--
2. Corn gluten hydrolysate	5	63	55	65	55	65	61	0
3. Corn gluten hydrolysate	10	60	53	72	58	65	62	0
4. Corn gluten hydrolysate	15	53	47	45	40	55	48	16
5. Corn gluten hydrolysate	20	53	47	65	55	60	56	2
LSD _{0.05}	NS	NS	NS	NS	NS	NS	NS	NS

¹Percent cover is the percentage of area per plot covered by all broadleaf and grass weed species.

Corn gluten hydrolysate was applied on May 14, 1996.

NS = not significantly different at the 0.05 level.