

1995 Corn Gluten Meal Rate Weed Control Study - Year 13-2007

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Corn gluten meal (CGM) is being screened for efficacy as a natural herbicide for turf. This long-term study began in 1995 at the Iowa State University Horticulture Research Station north of Ames, IA. The experimental plot is in established 'Ram 1' Kentucky bluegrass. The soil is a Nicollet (fine-loamy, mixed, mesic Aquic Hapludolls). Prior to treatment in 1995, the percentage broadleaf weed cover within the study perimeter exceeded 50%.

The experimental design is a randomized complete block design. Individual experimental plots are 10 x 10 ft with three replications. Each year corn gluten meal is applied to the same plots at a yearly rate of 40 lb CGM/1000 ft² (equivalent to 4 lb N/1000 ft²) using four different regimes of single and split applications for a total of five treatments (Table 1). Treatments include: four applications of 10 lb/1000 ft², split applications of 20 lb/1000 ft², an initial application of 30 lb plus a sequential of 10 lb/1000 ft², a single application of 40 lb/1000 ft² and an untreated control.

Initial applications in 2007 were made on April 26 before crabgrass germination. The second application of treatment 2 was made on June 11. The third application of treatment 2 and the second of treatments 3 and 4 were made on August 6. The final application of treatment 2 was made on Sept 20.

The experimental plot was screened for phytotoxicity after each treatment. Turf quality data were taken monthly from spring greenup in May through September. Visual quality was measured using a 9 to 1 scale with 9 = best and 6 = lowest acceptable, and 1 = worst quality (Table 1).

Crabgrass plant populations per plot were recorded on July 31, and August 31 (Table 2).

Broadleaf data were taken from May through September. Dandelion and clover were the predominate broadleaf weed species within the experimental plot. Dandelion populations were measured by counting the number of plants per plot (Table 3). Clover infestations were estimated by determining the percentage area in each individual plot covered by clover (Table 4).

Data were analyzed with the Statistical Analysis System (SAS) and the General Linear Model (GLM) procedure. Means comparisons were made with Fisher's Least Significant Difference test (LSD). The lack of statistically significant differences in spite of large differences in weed counts is likely due to a high degree of variability among the control plots.

Table 1. Turf quality¹ of Kentucky bluegrass treated with corn gluten meal for the 1995 Corn Gluten Meal Rate Weed Control Study.

Material	Rate lb product/1000 ft ²	May 7	June 4	June 30	July 31	August 31	October 3
1. Untreated control	NA	3.3	3.0	4.0	4.7	5.3	5.0
2. Corn gluten meal	10-10-10-10	6.3	6.0	6.3	6.7	7	6.7
3. Corn gluten meal	20-20	6.0	6.3	6.3	6.0	6.7	6.3
4. Corn gluten meal	30-10	6.7	7.0	7.7	7.0	5.7	6.3
5. Corn gluten meal	40	5.0	6.7	7.0	6.7	7.0	6.3
LSD_{0.05}		NS	1.7	NS	NS	NS	NS

¹Visual quality was assessed using a 9 to 1 scale with 9 = best, 6 = lowest acceptable, and 1 = worst turf quality.

NS = means are not significantly different at the 0.05 level.

Table 2. Crabgrass counts¹ in Kentucky bluegrass treated with corn gluten meal in the 1995 Corn Gluten Meal Rate Weed Control Study.

Material	Rate lb product/1000 ft ²	July 31	August 31
1. Untreated control	NA	30.7	107.7
2. Corn gluten meal	10-10-10-10	3.7	16.0
3. Corn gluten meal	20-20	3.7	13.7
4. Corn gluten meal	30-10	3.3	7.0
5. Corn gluten meal	40	3.3	11.7
LSD_{0.05}		NS	NS

¹Values represent the number of crabgrass plants per plot.

NS = means are not significantly different at the 0.05 level.

Table 3. Dandelion counts¹ in Kentucky bluegrass treated with corn gluten meal in the 1995 Corn Gluten Meal Rate Weed Control Study.

	Material	Rate lb product/1000 ft²	May 7	June 4	June 30	July 31	August 31	October 3
1.	Untreated control	NA	111.3	111.7	138.3	108.7	116.7	122.0
2.	Corn gluten meal	10-10-10-10	26.0	21.3	20.3	34.0	34.3	32.7
3.	Corn gluten meal	20-20	40.3	28.0	32.0	58.0	53.0	56.3
4.	Corn gluten meal	30-10	27.0	24.3	30.3	33.7	45.3	39.3
5.	Corn gluten meal	40	53.3	35.3	44.3	63.3	64.0	66.0
LSD_{0.05}			NS	53.2	57.3	NS	NS	NS

¹Values represent the number of dandelion plants per plot.

NS = means are not significantly different at the 0.05 level.

Table 4. Percentage clover cover¹ in Kentucky bluegrass treated with corn gluten meal in the 1995 Corn Gluten Meal Rate Weed Control Study.

	Material	Rate lb product/1000 ft²	May 7	June 4	June 30	July 31	August 31	October 3
1.	Untreated control	NA	46.7	25.0	38.3	75.0	51.3	46.7
2.	Corn gluten meal	10-10-10-10	21.0	12.0	20.3	45.3	13.7	18.3
3.	Corn gluten meal	20-20	15.0	13.0	20.0	35.0	14.0	17.3
4.	Corn gluten meal	30-10	30.0	22.0	28.3	49.0	24.7	33.3
5.	Corn gluten meal	40	26.7	17.3	28.0	41.7	16.3	17.7
LSD_{0.05}			NS	NS	NS	NS	NS	NS

¹Values represent the percentage of each plot covered by clover.

NS = means are not significantly different at the 0.05 level.