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## 1995 Corn Gluten Meal Rate Weed Control Study - Year 14-2008

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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 ft<sup>2</sup> (equivalent to 4 lb N/1000 ft) 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 ft<sup>2</sup>, split applications of 20 lb/1000 ft<sup>2</sup>, an initial application of 30 lb plus a sequential of 10 lb/1000 ft<sup>2</sup>, a single application of 40 lb/1000 ft<sup>2</sup> and an untreated control.

Initial applications in 2008 were made on April 22 before crabgrass germination. The second application of treatment 2 was made on June 17. 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 5.

The experimental plot was screened for phytotoxicity after each treatment. Turf quality data were taken monthly from spring greenup in April 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 21, and August 22 (Table 2).

Broadleaf data were taken from April 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.** Visual quality<sup>1</sup> of Kentucky bluegrass treated in the 1995 Corn Gluten Meal Weed Control Study.

Material	lbs CGM/1000 ft <sup>2</sup>	April	May	June	July	Aug.	Sept.
1 Untreated Control	NA	4.3	3.7	4.7	5.0	5.0	5.0
2 Corn gluten meal	10-10-10-10	5.7	7.0	7.0	7.0	7.3	7.3
3 Corn gluten meal	20-20	5.7	5.7	6.3	6.3	6.0	6.0
4 Corn gluten meal	30-10	4.7	6.3	7.3	6.7	6.3	6.0
5 Corn gluten meal	40	5.7	5.7	7.0	7.0	6.0	5.3
LSD <sub>0.05</sub>		NS	NS	1.4	NS	0.7	1.1

<sup>1</sup>Turf quality was assessed using a 9 to 1 scale with 9 = best, 6 = lowest acceptable, and 1 = worst quality.

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

**Table 2.** Crabgrass percentage cover<sup>1</sup> in Kentucky bluegrass treated in the 1995 Corn Gluten Meal Weed Control Study.

Material	lbs CGM/1000 ft <sup>2</sup>	July	Aug.
1 Untreated Control	NA	15.0	39.0
2 Corn gluten meal	10-10-10-10	1.2	6.7
3 Corn gluten meal	20-20	0.6	7.0
4 Corn gluten meal	30-10	0.0	3.0
5 Corn gluten meal	40	2.1	8.3
LSD <sub>0.05</sub>		NS	NS

<sup>1</sup>Values represent percentage cover of crabgrass.

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

**Table 3.** Dandelion counts<sup>1</sup> of Kentucky bluegrass treated in the 1995 Corn Gluten Meal Weed Control Study.

Material	lbs CGM/1000 ft <sup>2</sup>	April	May	June	July	Aug.	Sept.
1 Untreated Control	NA	83.3	87.7	117.7	124.7	110.0	113.3
2 Corn gluten meal	10-10-10-10	18.0	20.0	32.3	49.0	36.0	43.7
3 Corn gluten meal	20-20	30.7	29.7	47.3	58.0	65.7	70.0
4 Corn gluten meal	30-10	17.7	17.3	29.7	57.0	72.3	72.0
5 Corn gluten meal	40	45.3	53.7	63.7	93.3	98.7	99.7
LSD <sub>0.05</sub>		31.2	NS	NS	48.7	NS	NS

<sup>1</sup>Values represent the number of dandelion plants per plot.

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

**Table 4.** Percentage clover cover<sup>1</sup> in Kentucky bluegrass treated in the 1995 Corn Gluten Meal Weed Control Study.

Material	lbs CGM/1000 ft <sup>2</sup>	April	May	June	July	Aug.	Sept.
1 Untreated Control	NA	25.0	41.7	38.3	70.0	28.3	58.3
2 Corn gluten meal	10-10-10-10	14.0	16.7	15.7	36.7	5.7	8.3
3 Corn gluten meal	20-20	14.3	17.7	9.0	33.7	14.0	20.0
4 Corn gluten meal	30-10	30.7	35.7	8.3	36.7	17.3	35.0
5 Corn gluten meal	40	11.0	19.3	25.0	43.3	24.3	33.3
LSD <sub>0.05</sub>		NS	NS	NS	NS	24.6	34.0

<sup>1</sup>Values represent the area per plot covered by clover.

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