

1991 Corn Gluten Meal Crabgrass Control Study - Year 13-2003

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Corn gluten meal (CGM) has been screened for efficacy as a natural product herbicide and fertilizer in turf on the same plot since 1991. The study is being conducted at the Iowa State University Research Station north of Ames, IA in an area of 'Parade' Kentucky bluegrass. The soil in this experimental area is a Nicollet (fine-loamy, mixed, mesic Aquic Hapludoll).

Individual experimental plots are 5 x 5 ft and there are 5 treatments with 3 replications. The experimental design is a randomized complete block. Corn gluten meal is applied once per year in April to the same plots at 0, 20, 40, 60, 80, 100, and 120 lbs/1000 ft² (Table 1). Because corn gluten meal is 10% N, these rates are equivalent to 0, 2, 4, 6, 8, 10, and 12 lb N/1000 ft². The CGM is applied each year in a single early-spring preemergence application using 'shaker dispensers'. The materials are watered-in with the irrigation system. Supplemental irrigation is used to provide adequate moisture to maintain the grass in good growing condition. In 2003, applications were made on April 25.

Turf quality was monitored from May through September (Table 1). It was assessed using a 9 to 1 scale with 9 = best, 6 = lowest acceptable, and 1 = worst turf quality.

Weed populations were measured by either counting the number of plants or by estimating the percentage cover per individual plot. Crabgrass infestations were determined by counting the number of plants per individual plot on August 4 and Sept. 17 (Table 2). Dandelion populations were assessed by counting the number of plants per individual plot (Table 3). Clover populations were determined by estimating the percentage area of each plot covered by clover (Table 4).

Data were analyzed with the Statistical Analysis System (SAS) and the Analysis of Variance (ANOVA) procedure. Effects of CGM on turf quality and weed control were examined using Fisher's Least Significant Difference (LSD) means comparison tests.

Table 1. Visual quality¹ of Kentucky bluegrass treated in the 1991 Corn Gluten Meal Weed Control Study.

| Material | lbs CGM /1000 ft ² | lbs N /1000 ft ² | May 21 | June 19 | July 10 | August 4 | Sept 17 |
|---------------------------|----------------------------------|--------------------------------|--------|---------|---------|----------|---------|
| 1 Untreated control | 0 | 0 | 3 | 4 | 4 | 3 | 3 |
| 2 Corn gluten meal | 20 | 2 | 5 | 5 | 6 | 5 | 4 |
| 3 Corn gluten meal | 40 | 4 | 7 | 6 | 6 | 6 | 5 |
| 4 Corn gluten meal | 60 | 6 | 7 | 6 | 7 | 6 | 5 |
| 5 Corn gluten meal | 80 | 8 | 8 | 7 | 8 | 7 | 5 |
| 6 Corn gluten meal | 100 | 10 | 8 | 7 | 7 | 6 | 5 |
| 7 Corn gluten meal | 120 | 12 | 8 | 7 | 7 | 7 | 5 |
| LSD_{0.05} | | | 1.6 | 1.9 | 1.5 | 1.2 | 1.4 |

¹Turf 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 in the 1991 Corn Gluten Meal Weed Control Study.

| Material | lbs CGM /1000 ft ² | August 4 | Sept 17 |
|---------------------------|----------------------------------|----------|---------|
| 1 Untreated control | 0 | 16 | 14 |
| 2 Corn gluten meal | 20 | 4 | 6 |
| 3 Corn gluten meal | 40 | 0 | 0 |
| 4 Corn gluten meal | 60 | 0 | 0 |
| 5 Corn gluten meal | 80 | 1 | 0 |
| 6 Corn gluten meal | 100 | 2 | 1 |
| 7 Corn gluten meal | 120 | 0 | 0 |
| LSD_{0.05} | | NS | NS |

¹These values represent the number of crabgrass plants per plot covered. NS = means are not significantly different at the 0.05 level.

Table 3. Dandelion counts¹ in Kentucky bluegrass treated in the 1991 Corn Gluten Meal Weed Control Study.

| Material | lbs CGM /1000 ft ² | May 21 | June 19 | July 10 | Aug 4 | Sept 17 |
|---------------------------|----------------------------------|--------|---------|---------|-------|---------|
| 1 Untreated control | 0 | 54 | 31 | 33 | 26 | 31 |
| 2 Corn gluten meal | 20 | 21 | 20 | 17 | 14 | 14 |
| 3 Corn gluten meal | 40 | 6 | 3 | 4 | 1 | 1 |
| 4 Corn gluten meal | 60 | 4 | 1 | 2 | 0 | 0 |
| 5 Corn gluten meal | 80 | 2 | 1 | 0 | 0 | 1 |
| 6 Corn gluten meal | 100 | 3 | 0 | 1 | 1 | 1 |
| 7 Corn gluten meal | 120 | 1 | 0 | 0 | 0 | 0 |
| LSD_{0.05} | | 27.9 | NS | 16.7 | 14.4 | 14.5 |

¹These values 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 in the 1991 Corn Gluten Meal Weed Control Study.

| Material | lbs CGM /1000 ft ² | May 21 | June 19 | July 10 | Aug 4 | Sept 17 |
|---------------------------|----------------------------------|--------|---------|---------|-------|---------|
| 1 Untreated control | 0 | 38 | 31 | 47 | 23 | 9 |
| 2 Corn gluten meal | 20 | 23 | 8 | 16 | 4 | 2 |
| 3 Corn gluten meal | 40 | 22 | 5 | 30 | 13 | 8 |
| 4 Corn gluten meal | 60 | 27 | 6 | 16 | 10 | 14 |
| 5 Corn gluten meal | 80 | 6 | 4 | 5 | 2 | 1 |
| 6 Corn gluten meal | 100 | 5 | 8 | 10 | 3 | 4 |
| 7 Corn gluten meal | 120 | 2 | 2 | 3 | 5 | 1 |
| LSD_{0.05} | | NS | NS | NS | NS | 8.8 |

¹These values represent the area per plot covered by clover.
NS = means are not significantly different at the 0.05 level.