

1995 Corn Gluten Meal Rate Weed Control Study - Year 9-2003

Nick Christians and Luke Dant

Corn gluten meal (CGM) is being screened for efficacy as a natural product herbicide in 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 Hapludoll). 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). 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, and a single application of 40 lb/1000 ft² are included with an untreated control.

Initial applications in 2003 were made on April 25 before crabgrass germination. The second application of treatment 2 was made on June 23. The third application of treatment 2 and the second of treatments 3 and 4 were made on August 15. The final application of treatment 2 was made on Sept 17.

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 August 4, and September 17 (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 Analysis of Variance (ANOVA) procedure. Means comparisons were made with Fisher's Least Significant Difference test (LSD).

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 21 | June 19 | July 10 | August 4 | Sept 17 |
|----------------------------|---|-----------------------------|---------|---------|----------|---------|
| | | 1. Untreated control | NA | 5 | 4 | 5 |
| 2. Corn gluten meal | 10 lb 10 lb 10 lb 10 lb | 6 | 6 | 7 | 6 | 3 |
| 3. Corn gluten meal | 20 lb 20 lb | 7 | 6 | 7 | 5 | 3 |
| 4. Corn gluten meal | 30 lb 10 lb | 7 | 7 | 8 | 6 | 3 |
| 5. Corn gluten meal | 40 lb | 7 | 7 | 7 | 6 | 3 |
| LSD_{0.05} | | NS | 1.6 | 1.2 | NS | NS |

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

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 | August 4 | September 17 |
|----------------------------|---|-----------------------------|--------------|
| | | 1. Untreated control | NA |
| 2. Corn gluten meal | 10 lb 10 lb 10 lb 10 lb | 3 | 4 |
| 3. Corn gluten meal | 20 lb 20 lb | 1 | 3 |
| 4. Corn gluten meal | 30 lb 10 lb | 0 | 3 |
| 5. Corn gluten meal | 40 lb | 1 | 2 |
| LSD_{0.05} | | NS | NS |

¹These values 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 ft ² | May 21 | June 19 | July 10 | Aug 4 | Sept 17 |
|---------------------------|---|--------|---------|---------|-------|---------|
| | | | | | | |
| 1. Untreated control | NA | 79 | 29 | 50 | 57 | 56 |
| 2. Corn gluten meal | 10 lb 10 lb 10 lb 10 lb | 19 | 18 | 12 | 14 | 15 |
| 3. Corn gluten meal | 20 lb 20 lb | 21 | 21 | 18 | 15 | 21 |
| 4. Corn gluten meal | 30 lb 10 lb | 19 | 16 | 12 | 12 | 16 |
| 5. Corn gluten meal | 40 lb | 36 | 25 | 17 | 16 | 26 |
| LSD_{0.05} | | NS | NS | NS | NS | NS |

¹These data represent the number of dandelion plants per plot.

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 ft ² | May 21 | June 19 | July 10 | Aug 4 | Sept 17 |
|---------------------------|---|--------|---------|---------|-------|---------|
| | | | | | | |
| 1. Untreated control | NA | 23 | 37 | 42 | 33 | 25 |
| 2. Corn gluten meal | 10 lb 10 lb 10 lb 10 lb | 10 | 8 | 11 | 8 | 4 |
| 3. Corn gluten meal | 20 lb 20 lb | 5 | 5 | 7 | 5 | 4 |
| 4. Corn gluten meal | 30 lb 10 lb | 11 | 12 | 10 | 15 | 9 |
| 5. Corn gluten meal | 40 lb | 14 | 7 | 9 | 8 | 3 |
| LSD_{0.05} | | NS | NS | NS | NS | NS |

¹These figures represent the percentage of each plot covered by clover.