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1999 Corn Gluten Meal/Urea Crabgrass Control Study - Year 10-2008

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This study was initiated in 1999 to determine if the levels of annual grass and broadleaf weed control provided by corn gluten meal (CGM) treatments can be explained by the nitrogen response of treated bluegrass and not herbicidal activity of CGM. 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 Hapludolls) with an organic matter content of 4.2%, a pH of 6.75, 17 ppm P, and 103 ppm K.

The experimental design is a randomized complete block with three replications. Individual experimental plots are 5 x 5 ft with five treatments. Corn gluten meal and urea are applied yearly to the same plots at an annual rate of 4 lbs N/1000 ft² (Table 1). Treatments include split applications of 2 lb N/1000 ft² and four applications of 1 lb N/1000 ft² each. The CGM and urea are applied using cardboard containers as '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 2008, initial applications of all urea and CGM treatments were made on April 22. Sequential applications of 1 lb N/1000 ft² were made on June 17, August 6, and September 5. The second applications of 2 lb N/1000 ft² for urea and CGM (Treatment 3 and 5) were made on August 6.

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

Crabgrass data represent the percentage of plants per individual plot. Crabgrass assessments were made on July 21 and August 22 (Table 2).

Broadleaf weed populations were measured by either counting the number of plants or estimating the percentage cover per individual plot. Data for dandelion and clover were taken beginning in April and ending in September. Dandelion infestations were determined by counting the number of plants per individual plot. Clover populations were estimated by assessing the percentage area of each plot covered by clover.

Data were analyzed with the Statistical Analysis System (SAS) and the General Linear Model (GLM) procedure. Effects of CGM and urea on bluegrass 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 1999 Corn Gluten Meal Weed Control Study.

Material	lbs N /1000 ft ²	Number of Applications	April	May	June	July	Aug.	Sept.
1 Untreated Control	NS	NA	6.0	5.0	5.3	4.7	5.3	5.3
2 Corn gluten meal	4	4	5.3	6.3	6.3	6.7	6.7	6.7
3 Corn gluten meal	4	2	5.0	6.7	6.3	5.7	5.7	5.7
4 Urea (46-0-0)	4	4	5.7	6.0	6.7	6.3	6.3	6.3
5 Urea (46-0-0)	4	2	5.7	7.0	7.0	6.3	6.0	6.7
LSD _{0.05}			NS	0.9	0.9	NS	NS	NS

¹Turf 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 cover¹ in Kentucky bluegrass treated in the 1999 Corn Gluten Meal Weed Control Study.

Material	lbs N /1000 ft ²	Number of Applications	July	Aug.
1 Untreated Control	NS	NA	4.7	26.7
2 Corn gluten meal	4	4	2.7	21.3
3 Corn gluten meal	4	2	13.3	36.7
4 Urea (46-0-0)	4	4	12.7	24.7
5 Urea (46-0-0)	4	2	6.3	20.0
LSD _{0.05}			NS	NS

¹Values represent percentage cover of Crabgrass.

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

Table 3. Dandelion counts¹ of Kentucky bluegrass treated in the 1999 Corn Gluten Meal Weed Control Study.

Material	lbs N /1000 ft ²	Number of Applications	April	May	June	July	Aug.	Sept.
1 Untreated Control	NS	NA	13.3	16.7	16.3	21.3	21.0	18.7
2 Corn gluten meal	4	4	8.7	13.0	8.7	17.0	15.7	16.7
3 Corn gluten meal	4	2	9.3	12.3	8.3	15.3	14.3	11.0
4 Urea (46-0-0)	4	4	7.0	9.3	9.7	12.3	13.7	14.0
5 Urea (46-0-0)	4	2	7.3	6.0	6.7	11.7	17.0	11.7
LSD _{0.05}			NS	8.5	8.8	8.3	9.6	8.9

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 in the 1999 Corn Gluten Meal Weed Control Study.

Material	lbs N /1000 ft ²	Number of Applications	April	May	June	July	Aug.	Sept.
1 Untreated Control	NS	NA	1.3	4.3	2.3	15.0	12.3	25.0
2 Corn gluten meal	4	4	1.0	3.0	1.7	13.3	13.7	12.3
3 Corn gluten meal	4	2	1.0	2.3	0.7	7.0	11.7	9.7
4 Urea (46-0-0)	4	4	3.3	5.7	3.7	16.7	20.0	15.0
5 Urea (46-0-0)	4	2	1.3	7.3	4.0	16.7	26.0	30.0
LSD _{0.05}			NS	NS	NS	NS	NS	NS

¹Values represent the area per plot covered by clover.

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