

Evaluation of various urea-based nitrogen sources for their effect on creeping bentgrass and Kentucky bluegrass color, Purdue University: 2006.

Cale A. Bigelow and Glenn A. Hardebeck

Objective:

To evaluate the effects of various foliarly applied urea nitrogen (N) sources on creeping bentgrass and Kentucky bluegrass leaf color.

Experimental Procedures:

This field study was conducted at the W. H. Daniel Turfgrass Research and Diagnostic Center at Purdue University, West Lafayette IN, during the spring of 2006. The study areas consisted of mature monostands of creeping bentgrass (*Agrostis stolonifera* 'Penncross') and Kentucky bluegrass (*Poa pratensis* 'Blue Carpet Blend') grown on a Starks-Fincastle silt-loam (fine-silty, mixed, mesic Aeric Ochraqualf) with pH of 7.2. The study areas had been fertilized the previous autumn but had not received any spring N applications. All treatments were applied with a pressurized CO₂ (35 psi) sprayer equipped with a TeeJet 8010E tip calibrated to deliver 2.0 gallons of spray volume per 1000 ft². Treatments were initiated on 11 May, and subsequently applied on 6 June for the creeping bentgrass area as dictated by the research protocol. Plots were 5 x 5 ft and arranged in a randomized complete block with three replications of each treatment. Irrigation, approximately 0.25 inches, was applied via an overhead irrigation system within 24 hours of application and the areas were regularly irrigated throughout the study to supplement rainfall and promote turfgrass growth. Kentucky bluegrass and creeping bentgrass was maintained at 2.0 and 0.5 inches, respectively, with clippings returned.

Plots were visually assessed on a regular basis throughout the study for turfgrass color response. Color was assessed on a 1-9 scale with 1=brown turf, 5= moderately chlorotic turf and 9=dark green. All data was subjected to analysis of variance using the SAS system (Statistical Analysis Systems Institute Inc., Cary, N.C.) and mean separation performed using Fisher's protected least significant difference test at the (P<0.05) level.

Results:

As expected N fertilization significantly enhanced the color of both Kentucky bluegrass and creeping bentgrass (Tables 1 and 2). For Kentucky bluegrass all plots had acceptable color ratings at the initiation of the study (>7), and the untreated plots fluctuated the most throughout the observation period with the lowest color rating (6.5) occurring on 30 May (Table 1). When averaged over the entire rating period all N treatments resulted in superior color (> 8.0) values compared to the untreated control (7.3). The most consistent urea product for producing a greener color was urea alone, which resulted in a visually greener turf on seven of the eight rating dates. However, both UFLEXX and urea combined with HYAdditionally, the urea plus HYDREXX at 0.2 oz resulted in superior color compared to urea plus HYDREXX at 0.4 and the methylene urea product. However, urea plus HYDREXX at 0.2 oz was not different than urea alone or UMAXX. Among treatments, urea alone, UMAXX, and urea plus HYDREXX at 0.2 oz provided superior color on seven of eight post-fertilization rating dates and urea plus HYDREXX at 0.4 oz and methylene urea was superior on six of eight ratings. Urea plus HYDREXX was superior to urea alone for color on two rating dates, 13 and 27 June. An example of the color response from these products is shown in Figure 1. Both HYDREXX treatments had superior color ratings compared to the methylene urea product on 16 June. No tip burn or phytotoxicity was observed with any of these treatments on either turfgrass species.

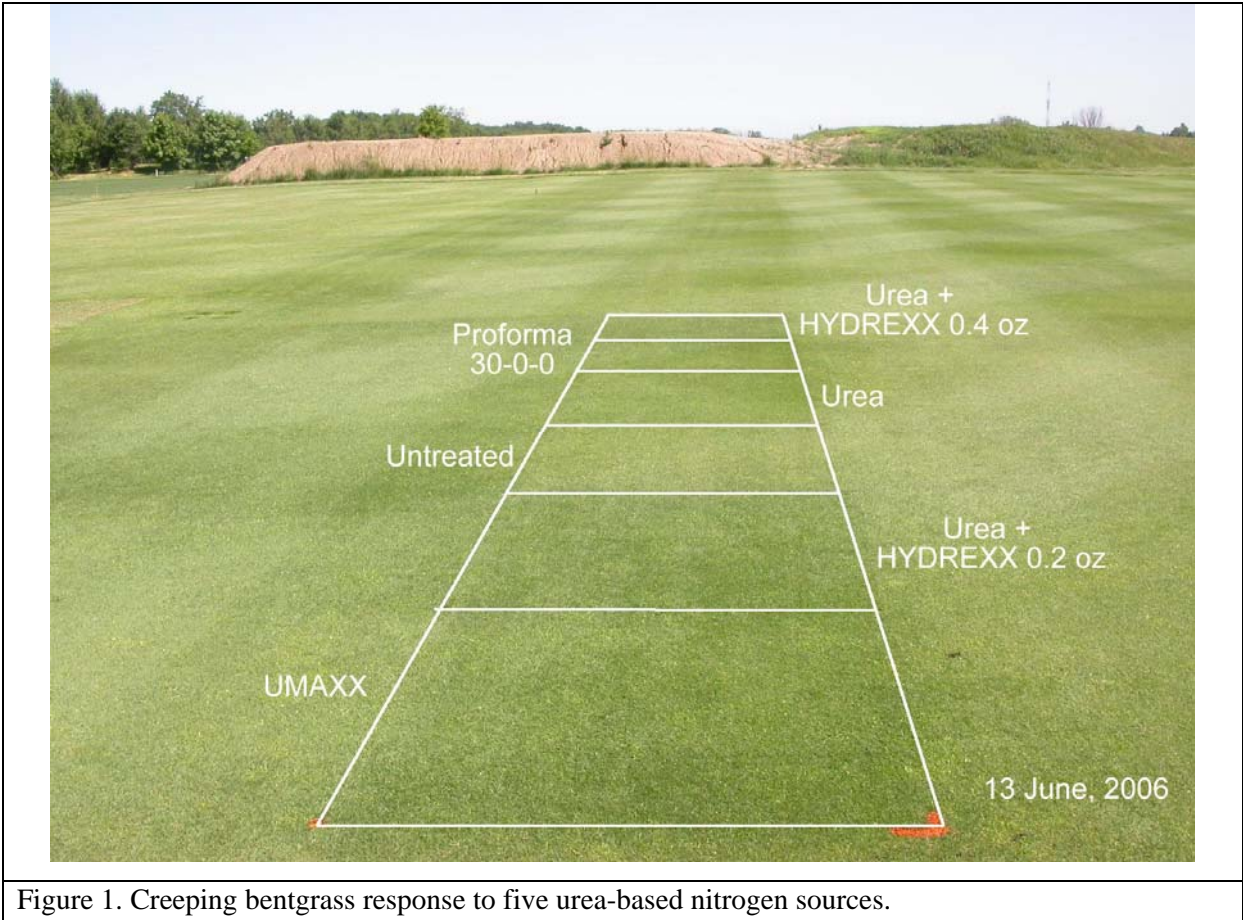


Figure 1. Creeping bentgrass response to five urea-based nitrogen sources.

Table 1. Kentucky bluegrass lawn turf color ratings as affected by various spring applied urea nitrogen (N) sources, Purdue University, 2006

Treatment [†]	Application Rate	Visual color rating [‡]								Mean
		11 May	18 May	24 May	30 May	6 June	13 June	20 June	27 June	
		----- Color rating (1-9 scale) -----								
Urea (46-0-0)	1 lb. N	7.5 a*	8.2 a	8.0 a	8.0 a	8.2 a	8.2 a	8.5 a	8.2 a	8.2 a
UFLEXX (47-0-0)	1 lb. N	7.5 a	8.0 a	7.7 ab	8.0 a	8.2 a	8.3 a	8.6 a	8.2 a	8.1 a
Urea + Hydrex	1 lb. N	7.5 a	8.0 a	7.7 ab	8.3 a	8.2 a	8.3 a	8.3 a	8.3 a	8.2 a
0.2 oz										
Urea + Hydrex	1 lb. N	7.5 a	7.8 a	7.5 b	8.2 a	8.0 ab	8.3 a	8.2 a	8.2 a	8.0 a
0.4 oz										
Untreated	---	7.5 a	7.3 b	7.3 b	6.5 b	7.2 b	7.7 b	7.8 b	7.0 b	7.3 b

[†] Color was visually assessed on a 1-9 scale where 9 = extremely dark green.

[‡] All fertilizer products were applied in 2 gallons of water carrier per 1000 ft² on 11 May, 2006 and watered into the turf that evening with approximately 0.25 inches of water.

*Means in the same column followed by the same letter are not significantly different according to Fisher's protected LSD (P=0.05).

Table 2. Creeping bentgrass ‘Penncross’ color ratings as affected by various spring applied urea sources, Purdue University, 2006.

Treatment [‡]	Application Rate	Visual color rating [†]									
		11 May	18 May	24 May	30 May	6 June	13 June	16 June	20 June	27 June	Mean
		----- Color rating (1-9 scale) -----									
Urea (46-0-0)	½ lb. N + ½ lb. N	7.5 a*	8.2 a	8.0 ab	8.3 ab	8.2 ab	8.2 b	8.7 ab	8.3 a	8.0 b	8.2 ab
UMAXX (47-0-0)	½ lb. N + ½ lb. N	7.5 a	8.2 a	8.2 a	8.3 ab	8.0 ab	8.3 ab	8.3 bc	8.3 a	8.2 ab	8.2 ab
Urea + Hydrex 0.2 oz	½ lb. N + ½ lb. N	7.5 a	7.8 ab	8.0 ab	8.8 a	8.5 a	8.8 a	8.8 a	8.5 a	8.5 a	8.5 a
Urea + Hydrex 0.4 oz	½ lb. N + ½ lb. N	7.5 a	8.0 a	7.7 ab	8.2 bc	8.0 ab	8.7 ab	8.5 ab	8.5 a	8.3 ab	8.2 b
Proforma 30-0-0	½ lb. N + ½ lb. N	7.5 a	8.0 a	7.5 bc	8.3 ab	8.2 ab	8.3 ab	8.0 c	8.2 a	8.2 ab	8.1 b
Methylene urea § Untreated	---	7.5 a	7.3 b	7.0 c	7.7 c	7.8 b	7.2 c	6.5 d	7.1 b	7.0 c	7.2 c

[†] Color was visually assessed on a 1-9 scale where 9 = extremely dark green.

[‡] Fertilizers were initially applied on 11 May, 2006 and reapplied on 6 June 2006, in 2 gallons of water carrier per 1000 ft².

§ The Proforma 30-0-0 product contains 18 % methylene urea.

*Means in the same column followed by the same letter are not significantly different according to Fisher’s protected LSD (P=0.05).