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NITROGEN SOURCE AND RATE EFFECTS ON TIFTON 85 BERMUDAGRASS

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Background. Tifton 85 bermudagrass [*Cynodon dactylon* (L.) Pers.] was the test forage on a Darco loamy fine sand (Loamy, siliceous, semiactive, thermic Grossarenic Paleudults) in a comparison of 42%-N Nurea-10 with 46%-N urea at N rates from zero to 120 lb/acre applied for each forage regrowth. Both urea sources also were compared to ammonium nitrate at 60 lb N/acre/forage regrowth period. Previous limestone application raised the initial 0- to 6-inch depth pH to 7.6, and Mehlich III extractable P and K were 40 and 38 ppm, respectively. This site was randomly pre-sampled for nitrate and ammonium nitrogen (N) concentrations in 0-6, 0-12, 12-24, 24-36, and 36-48-inch depths (Table I). Soil pH by 1-ft depths was > 7.7 to 4-ft deep.

Table 1. Pre-experiment levels of nitrate N and ammonium N by depth.

N form	0-6 inches	0-12 inches	12-24 inches	24-36 inches	36-48 inches
	ppm				
Nitrate	2.61	1.64	1.17	0.74	0.51
Ammonium	16.21	9.99	3.95	4.54	3.37

This experiment included four replications of 10 treatments in a randomized complete block design using 10 x 20 ft plots. The site was uniformly fertilized with 100 lb P_2O_5, 150 lb K_2O, 25 lb Mg, and 50 lb S/ac on 13 April. Additional potassium was applied at a rate of 100 lb/ac to the experimental site on 17 July. Nitrogen treatments in Table II were applied 18 April, 25 May, 14 June, 29 July, and 16 September.

Table 2. Nitrogen sources and rates applied for each regrowth of bermudagrass.

Treatment #	N rate[1], lb/acre	N source and concentration
1	0	None
2	30	Nurea-10, 42% N[2]
3	60	Nurea-10, "
4	90	Nurea-10, "
5	120	Nurea-10, "
6	30	Urea, 46% N
7	60	Urea, 46% "
8	90	Urea, 46% "
9	120	Urea, 46% "
10	60	Ammonium nitrate, 34% N

[1]Rate of N applied for each regrowth of bermudagrass.
[2]An occluded form of urea containing 10% of the total N from Nitamin 30L.

Research Findings. Rainfall was 17 inches less than normal for the year and > 7 inches below normal during the April - September growing season (Table 3). Tifton 85 dry matter yields (DMY) were only statistically different for N sources in the June harvest and those yield

Table 3. Monthly rainfall record for 2005 at the Texas Agricultural Experiment Station- Overton

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
2005	3.58	5.15	2.62	1.34	2.64	1.53	4.11	1.93	3.39	1.01	0.65	0.69	28.64
Avg.	3.63	4.20	4.06	3.82	4.40	4.38	2.72	2.04	3.60	4.26	4.25	4.24	45.6

differences were < 200 lb/acre (Table 4). At the 60 lb N/acre rate, there also were no DMY differences due to sources of N, including ammonium nitrate.

Statistically significant DMY increases occurred as the N rate applied for each regrowth of bermudagrass was increased from zero to 120 lb/acre. These N-rate results occurred regardless of the time the N sources and rates were applied relative to the length of time before or after rain in any amount fell on the research site.

Table 4. Tifton 85 bermudagrass yield response to main effects of N sources and rates[1,2].

N source\ Harvest date	May 24	June 13	July 21	Sept. 12	Season total
Avg. over all N rates	----------DM lb/acre----------				
Nurea-10, 42% N	769	2,420 b	2,199	2,096	7,484
Urea, 46% N	826	2,605 a	2,132	2,211	7,773
@ 60 lb N/acre					
Nurea-10, 42% N	742	2,281	1,768	1,846	6,637
Urea, 46% N	795	2,408	1,941	2,078	7,222
Ammonium nitrate, 34% N	872	2,689	1,941	2,206	7,707
@ increasing N/ac rates					
0	237 c	402 e	522 e	675 e	1,836 e
30	443 bc	1,394 d	1,194 d	1,504 d	4,536 d
60	769 ab	2,344 c	1,854 c	1,962 c	6,930 c
90	946 a	3,008 b	2,546 b	2,409 b	8,908 b
120	1,032 a	3,303 a	3,068 a	2,738 a	10,142 a
C.V.	39.6	10.0	19.6	14.0	10.7

[1]Numbers followed by a different letter within a column and treatment combination are significantly different at alpha = 0.05. Absence of letters indicated no significant differences.
[2]Nitrogen sources and N rates applied for each regrowth of bermudagrass.

Application. Dry matter yield data indicate no great differences between the regular urea N fertilizer and the Nurea-10 test material when averaged over all N application rates. Yields were also similar among the three N sources at the 60 lb N/ac application rate. Even in this relatively dry season, >5 t DM were produced at the 120 lb N/ac/regrowth rate. It is important to maintain adequate fertilizer available for grass forage production even during a drought to allow the grass to take advantage of the available N when rainfall does occur.

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