TIFTON 85 BERMUDAGRASS DRY MATTER RESPONSE TO NITROGEN, POTASSIUM, CHLORIDE, AND SULFUR FERTILIZER TREATMENTS

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Background. Coastal bermudagrass is the standard against which other hybrid bermudagrasses are evaluated. Volumes of data exist about the response of this grass to plant nutrients applied as fertilizer, manure, and limestone. 'Tifton 85' is a more recently introduced hybrid bermudagrass that is reported to have better nutritive value and greater yield potential than Coastal bermudagrass. Data on response of Tifton 85 bermudagrass to applied plant nutrients is sparse. Forage growers increasingly are planting test meadows of Tifton 85 bermudagrass. This field research, under rain-fed conditions, is designed to evaluate the effects of potassium, chloride, and sulfur at two nitrogen rates on Tifton 85 bermudagrass yield and possible stand decline that frequently is reported as a symptom of potassium deficiency in Coastal bermudagrass. The experiment is located on Darco loamy fine sand near the Texas A&M University Agricultural Research and Extension Center at Overton.

The Darco soil was treated with two tons of ECCE 72% limestone and 180 pounds of P_2O_5/acre in April 2001. These treatments were incorporated by disking about six inches deep and the soil was packed with a roller to conserve available soil water. On 24 Apr. 2001 Tifton 85 sprigs were planted by hand in rows about three feet apart with about three feet between plants within each row. In the next two days, we applied 1/2 inch of water to the experimental site after applying 200 pounds of ammonium nitrate per acre. Potassium (K) and chloride (Cl) treatments were applied as KCl (0-0-62). Sulfur (S) treatments were applied as K_2SO_4 (0-0-50) and compared to S treatments applied as elemental S at KCl rates equivalent to those applied with no added S. The K rates increase from zero to 402 lb K_2O/acre in increments of one-third of each rate/acre, applied three times during the growing season. These K, S, and Cl treatments were applied to split plots in strip plots that received 60 or 120 lb N/acre. The N rates were main plots and K, Cl, and S rates and sources were subplots in a strip, split-plot experimental design. Individual plot size was 10 x 18 feet. Harvests from 59-inch-wide strips of variable, but measured lengths were made using a Hege 211B forage plot harvester. Plot weights were recorded in the field and a sample was collected for dry matter determination and chemical analysis.

Research Findings. No differences in total dry matter yield were measured for the four harvests in 2003 due to N rate, KCl, K_2SO_4, or KCl plus S (Table 1). There was a significant yield response to increasing the N rate from 60 to 120 lb/acre in the first harvest only. Statistically significant yield differences ($p = 0.05$) were measured due to K_2O rate at each

harvest and in the yearly total. The zero rate of K_2O showed a yield reduction in harvest four, and the 402 lb K_2O rate produced a significant yield increase compared to the 134 lb/acre rate. Dry matter yields were increased approximately one ton per acre by all applied rates of K_2O compared to the zero check treatment.

A pale yellow chlorosis was apparent in bermudagrass growing in the minus-sulfur plots. This chlorosis remained from initiation of regrowth in spring throughout the growing season. No decline in yield, however, was measured due to this apparent sulfur deficiency. There was a response to the initial potassium treatment compared to the zero potassium treatment.

Table 1. Tifton 85 hybrid bermudagrass yield response to K, Cl, S, and N rates in 2003.

	Dry matter yield									
N rate	Harvest 1		Harvest 2		Harvest 3		Harvest 4		Total	
lb./acre	lb/acre		lb/acre		lb/acre		lb/acre		lb/acre	
60	2872	b†	3713	ns	3342	ns	2634	ns	12,562	ns
120	3661	a	3568		3572		2902		13,703	
K_2O rate (lb./acre)										
0	2745	b	3146	b	2884	b	2057	c	10,831	b
134	3254	a	3589	a	3460	a	2680	b	12,983	a
268	3314	a	3708	a	3438	a	2878	ab	13,338	a
402	3407	a	3791	a	3663	a	2984	a	13,844	a
K_2O Source										
KCl	3284	ns	3611	ns	3394	ns	2808	ns	13,097	ns
K_2SO_4	3293		3752		3654		2799		13,498	
KCl + S	3397		3724		3514		2935		13,570	
R^2	0.73		0.63		0.56		0.72		0.76	
c.v.	12.2		8.7		16.3		11.4		7.8	

† Yields followed by a dissimilar letter are significantly different statistically (a = 0.05).

Application. These data are from the first full year of production. In the initial year following sprigging of the Tifton 85, only one harvest was made. The second year, three harvests were taken. Until several years of research under full production have been completed, it will be difficult to make definite decisions regarding the fertilizer requirements of Tifton 85 bermudagrass. From these data and yield data from the second year when three harvests were made, we know that this bermudagrass must be fertilized with potassium (potassium chloride, also known as muriate of potash.) Based on the chlorotic color of grass that received no S, this nutrient also is needed, especially on deep sandy soils. There were no differences in total forage dry matter produced in plots fertilized with 60 or 120 lb N/acre for each cutting in these early years of this experiment. This study will continue to be treated with N, K, Cl, and S to evaluate the long-term effects of these plant nutrients on Tifton 85 bermudagrass production.