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TIFTON 85 BERMUDAGRASS RESPONSE TO NITROGEN, POTASSIUM, CHLORIDE, AND SULFUR FERTILIZER TREATMENTS IN 2005

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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 has better nutritive value and greater yield potential than Coastal bermudagrass. Data on response of Tifton 85 bermudagrass to applied plant nutrients is sparse. This field research, under rain-fed conditions, was designed to evaluate the effects of potassium, chloride, and sulfur at two nitrogen rates on Tifton 85 bermudagrass yield and stand decline that frequently is reported as a symptom of potassium deficiency and cold temperatures 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 April 2001, Tifton 85 sprigs were planted by hand. We applied one-half inch of water to the experimental site after applying 70 lb of nitrogen (N)/ac as ammonium nitrate. 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. These K, Cl, and S treatments were applied as K_2O at rates of 134, 268, and 402 lb/acre in increments of one-third of each rate applied three times during the growing season. These K, S, and Cl treatments were applied to split plots in major plots that received 80 or 160 lb N/acre for each regrowth of the Tifton 85 bermudagrass. The N rates were main plots and K, Cl, and S rates and sources were subplots (10 x 18 ft) in this split-plot experimental design. Harvests from 60-inch-wide strips of variable, but measured lengths were made using a Swift Machine self-propelled forage plot harvester. Yield and weight of samples for dry matter and chemical analysis were recorded. The sample was dried at 60 °C, reweighed, and ground to < 20 mesh.

Research Findings. Dry matter yield was significantly increased in the 1st, 2nd, and 4th harvests and in total yield as the N rates applied for each bermudagrass regrowth period were increased from 80 to 160 lb N/ac. The total yield increase was 1.1 t/ac at the high N rate. As occurred in 2004, dry matter production was increased > 36 % by potash (K_2O) rates of 268 lb/ac compared to the zero K_2O check. An additional 134 lb K_2O/ac slightly increased dry matter

production, but differences were not statistically significant. An additional increase in total yield occurred when elemental S was applied with KCl compared to KCl with no sulfur. A severe drought occurred in 2005 leaving this area 21 inches short of the normal annual average of 45 inches. Four cuttings and yields exceeding 5 t/ac in a drought year indicate that Tifton 85 is relatively drought tolerant, and that even in a dry year, reasonable dry matter production can be obtained if fertilizing in continued on hay meadows to provide needed plant nutrient availability for the grass when it does receive moisture.

Table 1. Tifton 85 bermudagrass dry matter yield response of to K, Cl, S, and N rates in 2005.

N rate	**Dry matter yield**[†]				
lb/ac/harv.	Harvest 1	Harvest 2	Harvest 3	Harvest 4	Total
	---lb/ac---				
80	1,316 b	2,775 b	2,352	2,163 b	8,605 b
160	2,249 a	3,062 a	2,530	2,985 a	10,826 a
K_2O rate					
lb/acre					
0	1,319 c	2,296 b	1,891 c	2,027 b	7,533 c
134	1,504 c	2,808 a	2,279 b	2,329 b	8,920 b
268	1,838 b	3,136 a	2,554 ab	2,762 a	10,290 a
402	2,160 a	3,019 a	2,674 a	2,813 a	10,665 a
K Source					
KCl	1,885 a	2,775 b	2,329 b	2,466	9,454 b
K_2SO_4	1,644 b	3,104 a	2,414 b	2,732	9,894 ab
KCl + S	1,972 a	3,084 a	2,765 a	2,706	10,527 a
R^2	0.80	0.54	0.62	0.70	0.75
c.v.	22.6	15.5	17.9	18.7	13.0
Interactions	N x K rates $\alpha = 0.01$	N x K Source $\alpha = 0.05$		N x K rates $\alpha = 0.05$	N x K rates $\alpha = 0.05$

[†] Yields within a treatment group and column followed by a dissimilar letter are significantly different statistically ($\alpha = 0.05$).

Application. An additional one ton of dry forage was produced by increasing the N rate from 80 to 160 lb/ac for each bermudagrass regrowth. For hay production, the additional 320 lb of N/acre for four cuttings is probably not economical. However, the additional 1.1 ton/acre dry matter yield from 320 lb additional N might be economical if grazed by high-rate-of-gain stocker cattle. In addition to N and phosphorus, Tifton 85 bermudagrass must be fertilized with K (potassium chloride, also known as muriate of potash) and S on deficient soils. Sulfur deficiency is most likely to occur on low organic matter, deep sandy soils. This study will continue to evaluate the long-term effects of these plant nutrients on Tifton 85 bermudagrass production.