TIFTON 85 BERMUDAGRASS RESPONSE TO NITROGEN, POTASSIUM, CHLORIDE, AND SULFUR FERTILIZER TREATMENTS IN 2004

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Background. Volumes of data exist about the response of Coastal bermudagrass 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 but 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 (K), chloride (Cl), and sulfur (S) at two nitrogen (N) rates on Tifton 85 bermudagrass yield and possible stand decline that is frequently reported as a symptom of potassium deficiency in Coastal bermudagrass. This study was located on Darco loamy fine sand near the Texas A&M University Agricultural Research and Extension Center at Overton.

Two tons of ECCE 72% limestone and 180 pounds of P_2O_5/acre were incorporated into the Darco soil in April 2001, and the soil was packed with a roller to conserve available soil water. Tifton 85 sprigs were planted in late Apr. 2001. We applied one-half inch of water to the experimental site after applying 200 pounds of ammonium nitrate per acre. Potassium and Cl treatments were applied as KCl (0-0-62). Sulfur 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 to split plots as K_2O rates of 134, 268, and 402 lb/acre in increments of one-third of each rate applied three times during the growing season. Nitrogen rates of 80 or 160 lb/acre, applied for each of five harvests of bermudagrass were main plots and K, Cl, and S rates and sources were subplots in this split-plot experimental design. Individual plot size was 10 x 18 feet. Harvests from 60-inch-wide strips of variable, but measured lengths were made using a Swift Machine self-propelled forage plot harvester. Yield and fresh weight of dry matter samples were recorded in the field. The sample was dried at 60 °C, reweighed, and ground to < 20 mesh for chemical analysis.

Research Findings. Dry matter was significantly increased in the fourth and fifth 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 134 lb potash (K_2O) rate significantly increased bermudagrass dry matter yield compared to the zero check at each harvest. Total dry matter production was increased about 38 % by K_2O rates of 268 lb/ac compared to the zero K_2O check. An additional 134 lb K_2O/ac slightly increased total dry matter production, but differences were not statistically significant. Addition of potassium sulfate (K_2SO_4) significantly increased bermudagrass yield compared to muriate of potash (KCl, 0-0-62). An additional increase in total yield occurred when elemental S was applied with KCl compared to K_2SO_4 and KCl with no S. The KCl + S treatment significantly increased dry matter yield 1.0 t/ac compared to KCl without S.

Table 1. Tifton 85 hybrid bermudagrass yield response to K, Cl, S, and N rates in 2004.

N rate	**Dry matter yield†**					
lb/ac/harvest	Harvest 1	Harvest 2	Harvest 3	Harvest 4	Harvest 5	Total
	lb/ac					
80	1,032	1,438	2,638	3,372 b	3,213 b	11,693 b
160	1,220	1,612	2,628	4,169 a	4,227 a	13,856 a
K_2O rate, lb/ac						
0	935 b	1,127 b	1,842 b	2,683 b	3,028 b	9,614 c
134	1,096 a	1,485 a	2,548 a	3,714 a	3,626 a	12,469 b
268	1,173 a	1,599 a	2,791 a	3,940 a	3,743 a	13,246 a
402	1,174 a	1,622 a	2,824 a	4,019 a	4,022 a	13,662 a
K Source						
KCl	1,114	1,447 b	2,288 b	3,566 b	3,588 b	12,002 c
K_2SO_4	1,138	1,633 a	2,928 a	3,947 a	3,655 b	13,301 b
KCl + S	1,191	1,627 a	2,948 a	4,160 a	4,148 a	14,074 a
R^2	0.64	0.69	0.70	0.78	0.76	0.83
c.v.	14.8	11.6	13.8	12.1	12.9	8.5

†Values in a column/group followed by a dissimilar letter are significantly different statistically ($\alpha = 0.05$).

Application. An additional one ton of dry forage/ac was produced by increasing the N rate from 80 to 160 lb/ac for each bermudagrass regrowth. For hay production, the additional 400 lb of N/acre for five cuttings is not economical. In addition to nitrogen and phosphorus, Tifton 85 bermudagrass must be fertilized with potassium and sulfur on soils such as this Darco loamy fine sand that are deficient in plant-available levels of these nutrients. Sulfur may be needed especially on deep sandy soils. Additional sulfur may be applied as ammonium sulfate, potassium sulfate, potassium magnesium sulfate, or elemental sulfur. This study will continue in order to evaluate the long-term effects of these plant nutrients in Darco soil and on Tifton 85 bermudagrass production.