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

Vincent Haby and Allen Leonard

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
P₂O₅/acre in April 2001. These treatments were incorporated by diskin 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 K₂SO₄ (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 K₂O/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, K₂SO₄, 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 K₂O rate at each
The harvest and in the yearly total. The zero rate of K₂O showed a yield reduction in harvest four, and the 402 lb K₂O 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 K₂O 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.

<table>
<thead>
<tr>
<th>N rate (lb/acre)</th>
<th>Harvest 1 (lb/acre)</th>
<th>Harvest 2 (lb/acre)</th>
<th>Harvest 3 (lb/acre)</th>
<th>Harvest 4 (lb/acre)</th>
<th>Total (lb/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>2872 b</td>
<td>3713 ns</td>
<td>3342 ns</td>
<td>2634 ns</td>
<td>12,562 ns</td>
</tr>
<tr>
<td>120</td>
<td>3661 a</td>
<td>3568</td>
<td>3572</td>
<td>2902</td>
<td>13,703</td>
</tr>
<tr>
<td>K₂O rate 0</td>
<td>2745 b</td>
<td>3146</td>
<td>2884 b</td>
<td>2057 c</td>
<td>10,831 b</td>
</tr>
<tr>
<td>134</td>
<td>3254 a</td>
<td>3589 a</td>
<td>3460 a</td>
<td>2680 b</td>
<td>12,983 a</td>
</tr>
<tr>
<td>268</td>
<td>3314 a</td>
<td>3708 a</td>
<td>3438 a</td>
<td>2878 ab</td>
<td>13,338 a</td>
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<tr>
<td>402</td>
<td>3407 a</td>
<td>3791 a</td>
<td>3663 a</td>
<td>2984 a</td>
<td>13,844 a</td>
</tr>
<tr>
<td>K₂O Source</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KCl</td>
<td>3284 ns</td>
<td>3611 ns</td>
<td>3394 ns</td>
<td>2808 ns</td>
<td>13,097 ns</td>
</tr>
<tr>
<td>K₂SO₄</td>
<td>3293</td>
<td>3752</td>
<td>3654</td>
<td>2799</td>
<td>13,498</td>
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<tr>
<td>KCl + S</td>
<td>3397</td>
<td>3724</td>
<td>3514</td>
<td>2935</td>
<td>13,570</td>
</tr>
<tr>
<td>R²</td>
<td>0.73</td>
<td>0.63</td>
<td>0.56</td>
<td>0.72</td>
<td>0.76</td>
</tr>
<tr>
<td>c.v.</td>
<td>12.2</td>
<td>8.7</td>
<td>16.3</td>
<td>11.4</td>
<td>7.8</td>
</tr>
</tbody>
</table>

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.