

# NEWS & VIEWS

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## Pump-up Bermudagrass Production with Potash

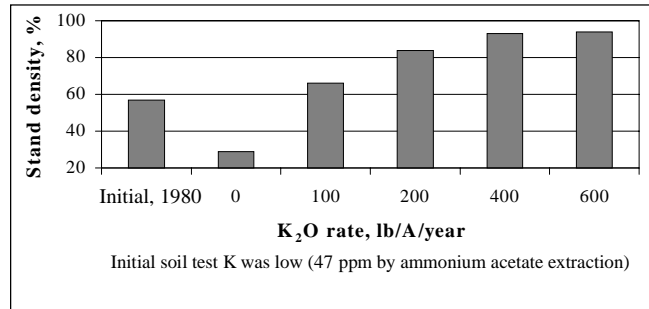
**BERMUDAGRASS** (common and hybrid) is the predominant summer perennial grass used for livestock grazing and hay production in the South. It is an excellent forage when managed properly, with most of its production available May through September. It is highly responsive to nitrogen (N) fertilization and requires comparable amounts of potash (**Table 1**).

**Table 1. Total nutrient uptake by hybrid bermudagrass.**

| Yield,<br>tons/A | N     | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | S     | Mg    |
|------------------|-------|-------------------------------|------------------|-------|-------|
|                  | ----- | -----                         | lb/A             | ----- | ----- |
| 6                | 258   | 60                            | 288              | 20    | 20    |
| 8                | 368   | 96                            | 400              | 44    | 24    |
| 10               | 460   | 120                           | 500              | 55    | 32    |

Summer heat and drought stresses the last few years, coupled with the cold winter, have taken a toll on many bermudagrass pastures and hay meadows. In some areas, both summer and winter forage production was low, and the limited supply of hay was exhausted. These conditions have placed increased demands on bermudagrass forage production in 2001. Many southern forage producers are wondering how to revive weak stands and maximize forage and hay yields this summer.

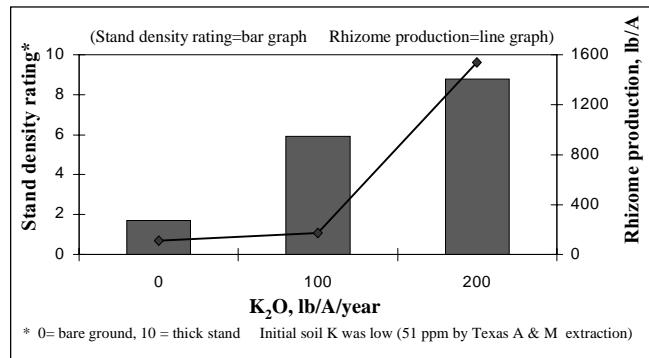
One key to reviving stands is to be sure that potassium (K) nutrition is not limiting. According to research by Dr. Marcus Eichhorn at the Louisiana State University (LSU) Hill Farm Research Station, stand density will be optimized when forage tissue levels are maintained above 1.7 to 2.0 percent K. Dr. Eichhorn's research showed that stand density (**Figure 1**) and yields were optimized with 400 lb K<sub>2</sub>O/A, applied once per year, near the first of April. Splitting the annual K rate into two or four increments during the season did not provide a significant yield advantage over the single spring application on the Shubuta fine sandy loam soil [ammonium acetate extractable K at 0 to 6 inches less than 47 parts per million (ppm)]. Research by Texas A&M University scientists also



**Figure 1. Effect of K fertilization on spring stand density of Coastal bermudagrass in 1985.** Eichhorn. LSU Ag. Exp. Sta. Bulletin. No. 782. 1987.

showed that K increases stand density and the number of rhizomes (thickened, below-ground stems that store food reserves) by late fall (**Figure 2**). Root vigor generally parallels rhizome production. Maintenance of adequate K fertility is critical to the manufacture of carbohydrates for storage and root growth.

Depletion of soil test K is most likely on hay meadows,



**Figure 2. Effects of K fertilizer on stand density and rhizome production of Coastal bermudagrass in late fall.** Keisling et al. Agron. J. 71: 892-894. 1979.

as opposed to pastures, because of the large K removal (50 lb K<sub>2</sub>O/ton) in the hay harvest. In grazed pastures, as much as 85 percent of the ingested K is returned to the pasture as feces and urine. Much of this recycled K is available to bermudagrass the same year. Potassium can leach in sandy soils with low cation exchange capacity (CEC less than about 5 meq/100 grams). So, it is important to check both pasture and hay meadow fertility levels by collecting and analyzing representative soil samples

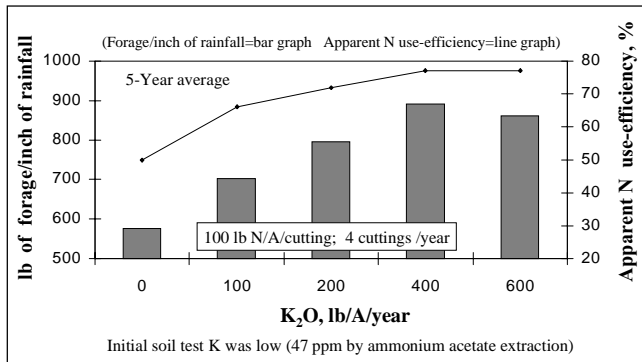


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every two to three years. This sampling and testing strategy will enable forage producers to monitor fertility trends, to ensure plant nutrition does not limit yearly forage production. Plant tissue analysis is recommended as an additional diagnostic tool in monitoring fertilization programs.

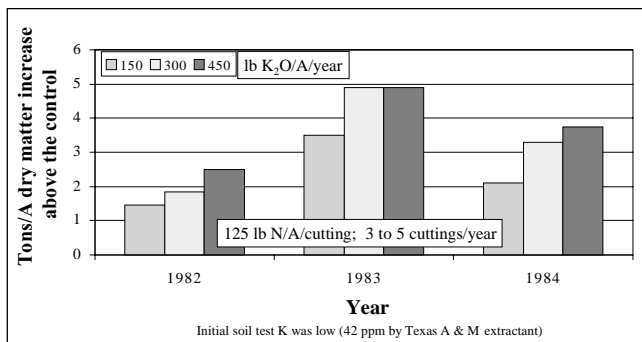
Potassium fertilization increases forage production per inch of rainfall received (water use efficiency). It also increases N use efficiency (Figure 3). This enables producers to get more benefit from each dollar spent on N fertilizer, while minimizing the potential for N loss to the environment. With optimum soil K levels, forage can better withstand stresses from diseases, heat, and drought than where K needs have been neglected.

Adequate K increases bermudagrass yields on both

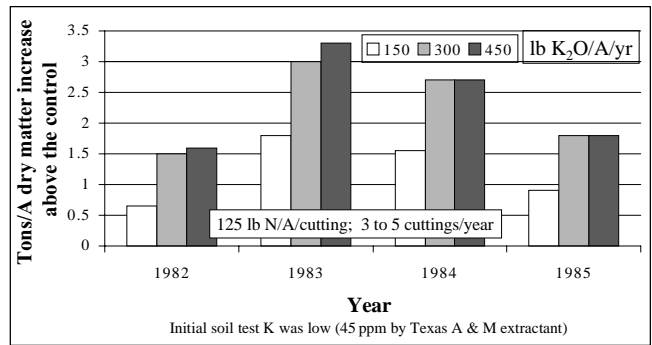


**Figure 3. Potassium increases Coastal bermudagrass production per inch of rainfall and improves N use-efficiency.** Eichhorn. Agronomy Research Report. Hill Farm Research Station (LSU). 1996.

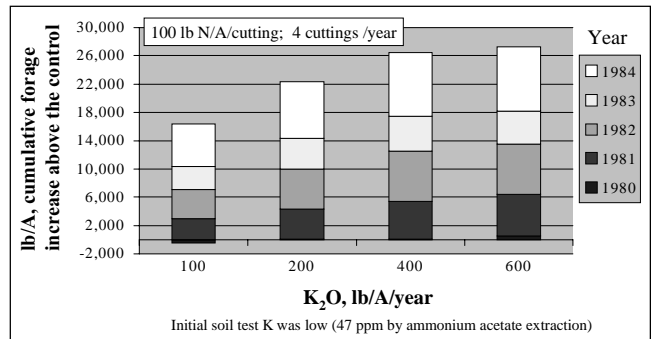
sandy and clayey soils (Figures 4 and 5). Over a five-year period, proper K fertilization increased cumulative yields above the control (no K) by more than 13 tons/A on a low K soil in Louisiana (Figure 6). The yield of forage quality components was also markedly enhanced (Table 2). The combined effect of K on forage production and nutritive value yield raised the potential for increased livestock production. For example, a lactating beef cow requires about 24 lb of TDN/day, or about 4.4 tons of TDN/year, to maintain her nutritional requirements. Based on the response in Table 2, the potential carrying capacity was



**Figure 4. Coastal bermudagrass yield increase with K on a Darco sandy loam in Texas.** Cripps et al. J. Produc. Agric. 1:309-313. 1988.



**Figure 5. Coastal bermudagrass yield increase with K on a Nacogdoches clay loam in Texas.** Cripps et al. J. Produc. Agric. 1:309-313. 1988.



**Figure 6. Increase in Coastal bermudagrass forage yield with K on a Shubuta sandy loam in Louisiana.** Eichhorn. LSU Ag. Exp. Sta. Bulletin. No. 782. 1987.

increased by almost one cow/A with adequate K fertilization on a low K soil.

**Table 2. Potassium fertilization effects on Coastal bermudagrass forage and nutritive value yields (six-year average).**

| K <sub>2</sub> O, lb/A/year    | Yield, tons/A/year |      |      |      |      |
|--------------------------------|--------------------|------|------|------|------|
|                                | Forage             | CP   | DP   | DDM  | TDN  |
| 0                              | 4.92               | 0.67 | 0.42 | 2.70 | 2.77 |
| 400                            | 7.16               | 0.94 | 0.60 | 4.02 | 4.02 |
| Increase with K <sub>2</sub> O | 46%                | 40%  | 43%  | 49%  | 45%  |

Eichhorn. 1996 Agronomy Research Report. Hill Farm Research Station (LSU). Averaged across two sites. CP=crude protein, DP=digestible protein, DDM=digestible dry matter, and TDN=total digestible nutrients.

The net effect of proper bermudagrass K fertilization is greater profits...through improved stands, increased yields, greater resistance to diseases, forage tolerance of drought and temperature extremes, increased efficiency from N fertilization, and increased livestock production and performance potential.

Plan to fertilize with K and keep rates balanced with other essential plant nutrients. **An ideal N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O-sulfur (S) ratio in fertilizers for bermudagrass would be 4-1-4-1 on many southern soils.** ■