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POTASSIUM...STILL IMPORTANT IN BERMUDAGRASS FORAGE PRODUCTION

Bermudagrass is an important warm-season perennial grass for livestock grazing and hay production in tropical and subtropical regions of the world. In the southern U.S., it has been estimated that there are more than 6 million acres of bermudagrass pasture or hay. Coastal was long the standard bermudagrass hybrid throughout much of the southern U.S.; however, other hybrids, especially Tifton 85, have made inroads over the past few years.

According to IPNI's *PlantCalc* app, each ton of bermudagrass removes 46 lbs N, 12 lbs P_2O_5 , and 50 lbs K_2O (roughly a 4-1-4 ratio). But, a recent paper¹ on Tifton 85 fertilization on two soils in Georgia suggested that the actual K uptake proportion varies with N fertilizer rate. They found that when annual N fertilizer rate (averaged over 2 sites and 4 years) was 200, 300, or 400 lb/A, the corresponding N- P_2O_5 - K_2O uptake ratios were 3-1-4, 4-1-5, and 5-1-5, respectively. Thus K uptake may vary with N rate, but at minimum it is on par with N uptake.

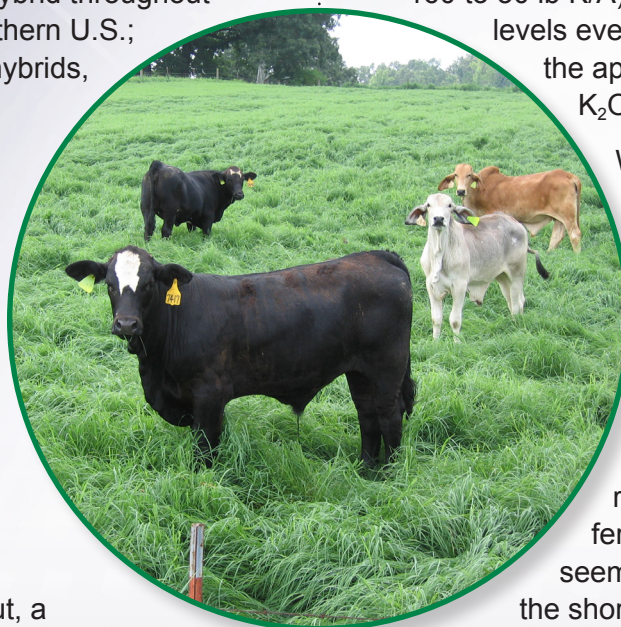
In a pasture situation, most of nutrient uptake (as much as 85%) is returned to the soil in animal excrement, but in a hay meadow practically all of it

is exported from the field. Therefore, soil K may be rapidly depleted under intensive bermudagrass hay production. This was quintessentially demonstrated in an east Texas study² where soil test K decreased after three years of Coastal bermudagrass production to about one-third the initial levels (from 160 to 50 lb K/A), and soil test levels even declined with the application of 300 lb K_2O /A/yr.

Whenever prices of fertilizer, hay, and livestock fluctuate, fertilizer comes under scrutiny in forage systems. At times reductions in fertilizer input may seem expedient over the short term, but the potential consequences of such reductions should be carefully considered. For example, consider that K nutrition affects bermudagrass stand density and longevity, N input use efficiency, and of course yield level.

K and Stand Density

Potassium input can impact bermudagrass stand density, which in turn affects factors such as yield, weed encroachment, and stand longevity. Stand deterioration is frequently attributed to winter kill, disease pressure, and lack



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of “physiological hardening”—all factors that are associated with K nutrition. A classic demonstration of the impact of K input on bermudagrass stand density can be seen in a study conducted in northeast Texas³, where stand density and rhizome production were measured in the year after a 3-year K fertilizer rate study was discontinued. The stand density rating (two-site average) was improved by as much as 162% with K input. There was a direct relationship between stand density and rhizome production—on average rhizome production was increased by as much as 194% with K fertilization. The amount of rhizomes and the associated stored energy reserves are important factors in stand maintenance and the regeneration of top growth. These results demonstrate that what is seen above-ground is often a reflection of what’s happening beneath the surface.

K and N Interaction

To get the most out of N fertilizer inputs it is necessary to have an adequate supply of

available K. In a Tifton 85 study⁴ that evaluated rates of N, and rates and sources of K, the authors observed that “A significant interaction between N and K illustrated that larger amounts of K are required to obtain the higher yields expected when greater amounts of N are applied and plant available water and other nutrients are adequate for increased yields.”

Indeed, complete and balanced nutrition is essential for forage production systems to function at optimal efficiency.

References

1. Anderson, W., M.B. Parker, J.E. Knoll, and R.C. Lacy. *Agron. J.* 108:1542-1550.
2. Nelson, L.R., T.C. Keisling, and F.M. Rouquette. 1983. *Soil Sci. Soc. Am. J.* 47:963-966.
3. Keisling, T.C., F.M. Rouquette, and J.E. Matocha. 1979. *Agron. J.* 71:892-894.
4. Haby, V.A., W.M. Stewart, and A.T. Leonard. 2008. *Great Plains Soil Fert. Conf. Proc.* pp.134-139.

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