SOIL DEPTH DISTRIBUTION OF POTASSIUM IN COMMON AND COASTAL BERMUDAGRASS PASTURES UNDER 30 YEARS OF GRAZING AT DIFFERENT STOCKING RATES

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Background. A detailed description of stocking rates and fertility regimens from 1969 through 2005 are presented in a companion 2006 Field Day Report by Rouquette et al. The objective of this study was to evaluate changes in soil potassium (K) distribution in bermudagrass pastures under different stocking rates and fertility regimens.

Research Findings. Soil K concentrations in lower soil depths were slightly increased from 1975 to 2004, especially on Coastal bermudagrass pastures (Figure 1). This pattern suggested that K has accumulated at low concentrations in the soil in response to continuous stocking and applications of potash (~ 0-0-62) fertilizer. Common bermudagrass pastures receiving K fertilizer, overseeded with clover, and stocked at a high stocking rate unexpectedly showed the lowest K concentration among the treatments. Low stocked common bermudagrass pastures (no N +K +Clover) showed greater soil K concentrations than pastures receiving N+K+ryegrass pastures. At high stocking rates, however, no clear effect of overseeding with K +clover versus N +ryegrass was observed. This indicated that bermudagrass pastures fertilized with N, overseeded with ryegrass and receiving no K fertilization for more than 13 years (1985-1997) can exhibit relatively similar soil K concentrations to those in pastures annually fertilized with K and overseeded with clovers. From 1998 through 2004, all pastures received equal amounts of K_2O (Rouquette et al). Clover has much greater requirements for K than does ryegrass.

Soil K concentrations, in general, ranked between very low (0-90 ppm) to low (91-130 ppm) levels. Relatively greater K levels (above 130 ppm) were observed in deep horizons (24-80") on Coastal bermudagrass pastures sampled in 2004. Although soil test indicated that K levels were low for optimal bermudagrass growth, no forage stand losses were observed. There was no significant effect of stocking rates on K distribution in soil. Nutrient cycling via animal excreta and plant recycling is presumably supplying adequate amounts of K to sustain bermudagrass stands.

Applications. Coastal Plain soils can exhibit very low available K levels. Annual fertilization seemed to have little effect on soil K concentrations in bermudagrass pastures. Nutrient cycling in grazing system was an important pathway to re-supply K to the soil and maintain forage stands for more than 19 years. From an economic and agronomic perspective, K

fertilization rates based on soil test levels should be carefully examined in bermudagrass pastures under continuous stocking. In contrast, bermudagrass that is used primarily for hay will require annual applications of K, and on Coastal Plain soils these N-P_2O_5-K_2O ratios may range from 5-1-5 to 4-1-3.

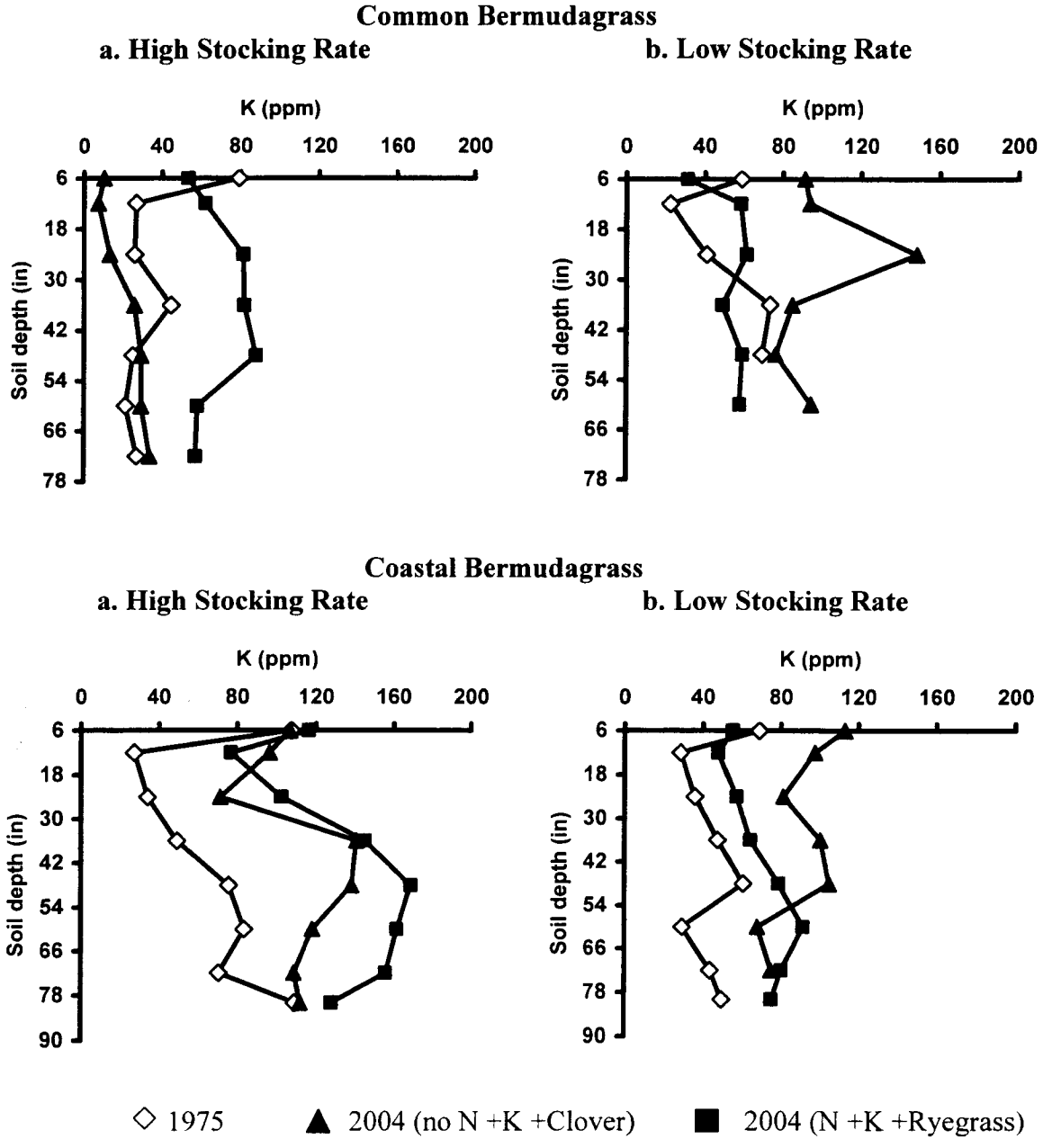

Figure 1. Soil K distribution with depth in common and Coastal bermudagrass pastures under long-term stocking and varying fertility management.