

NEWS & VIEWS

A regional newsletter published by the
Potash & Phosphate Institute (PPI) and the
Potash & Phosphate Institute of Canada (PPIC)



Dr. W.M. Stewart,
Great Plains Director
May 1999

Make Balanced Bermudagrass Fertility a Priority This Summer

BERMUDAGRASS has characteristics that make it one of the most popular warm season forage grasses in the southern United States. It has high yielding ability, drought resistance, and can tolerate relatively acidic soil conditions. It can be produced for grazing, hay, or a combination of the two. Hybrid bermudagrass is generally more productive than common bermudagrass.

One of the most important factors affecting the quality, yield, and stand longevity of bermudagrass is fertility. Hybrid bermudagrass can remove relatively large quantities of nitrogen (N), phosphorus (P), potassium (K), and other nutrients from soils (**Table 1**). Fertilization based on soil tests and plant removal prevents depletion of soil nutrients and helps insure high bermudagrass yields and good quality forage when sufficient water is available for optimum production.

Table 1. Total nutrient uptake by hybrid bermudagrass.

Yield, ton/A	N	P ₂ O ₅	K ₂ O	S	Mg
6	258	60	240	20	20
8	368	96	400	44	24
10	460	120	500	55	32

From: Eichhorn, LSU. 1996.

Bermudagrass will take up almost 50 lb N for each ton of hay harvested. Proper N fertilization is associated with improved shoot and root growth, stress tolerance, resiliency, and protein content. Nitrogen levels in bermudagrass tissue should be maintained at 2.2 percent of the dry matter or higher to obtain optimum yields. With good N nutrition and timely harvest, crude protein levels will usually range from 12 to 14 percent, total digestible

nutrients will range from 64 to 67 percent, and dry matter digestibility will range from 54 to 58 percent. Common hay meadow fertilizer recommendations call for the application of 100 lb N/A at initial green-up in the spring, followed by application of similar rates of N after each harvest except the final harvest. Proper balance of N with P, K and other nutrients is important in maximizing N use efficiency.

As much as 100 lb P₂O₅/A per year will be taken up in the production of top bermudagrass yields. In a rapidly growing, high yielding crop, uptake can equal 1.2 lb P₂O₅/A per day. Sufficient P fertility is commonly associated with increased root growth and branching, increased N use-efficiency, and improved drought tolerance and recovery.

The importance of P fertilization was demonstrated in a Texas A&M study conducted at Overton (**Figure 1**). Phosphorus applications were made in the first 2 years of this 3-season study. The 92 lb P₂O₅/A application increased the 3-year average production by almost 1 ton/A. Within 2 seasons after P applications ceased, soil test P levels had declined substantially under all P application treatments. The decline in soil test P was caused by crop removal, and soil acidification promoted by the nitrification of ammoniacal N fertilizer. A 7-year study at the LSU Hill Farm Research Station at Homer, Louisiana, revealed that 120 to 180 lb P₂O₅/A should be applied annually to Coastal bermudagrass where hay yields of 6 to 8 ton/A are expected.

Approximately 50 lb of potash (K₂O) is required to produce each ton of bermudagrass. Uptake can equal 4 lb K₂O/A/day in a rapidly growing crop. Reserves of soil K may be rapidly reduced under intensive production. The

Coauthors:

Dr. W.M. (Mike) Stewart, Great Plains Director
Potash & Phosphate Institute (PPI)
P.O. Box 6827
Lubbock, TX 79493
Phone: (806) 795-3252
Fax: (806) 795-5997
E-mail: mstewart@ppi-far.org

Dr. Vincent Haby, Professor
Texas A&M University
Research & Extension Center
P.O. Box E
Overton, TX 75684-0290
Phone: (903) 834-6191
Fax: (903) 834-7140
E-mail: v-haby@tamu.edu

Dr. Monte Rouquette, Professor
Texas A&M University
Research & Extension Center
P.O. Box E
Overton, TX 75684-0290
Phone: (903) 834-6191
Fax: (903) 834-7140
E-mail: m-rouquette@tamu.edu

Dr. Larry Redmon, Professor
Texas A&M University
Research & Extension Center
P.O. Box E
Overton, TX 75684-0290
Phone: (903) 834-6191
Fax: (903) 834-7140
E-mail: l-redmon@tamu.edu

maintenance of adequate K levels through the summer months up to the onset of dormancy is important in the manufacture of carbohydrates for root growth and carbohydrate storage. Potassium also improves water and N use efficiency and helps maintain good stand density. In addition, adequate K fertility is associated with increased disease resistance and improved winterhardiness.

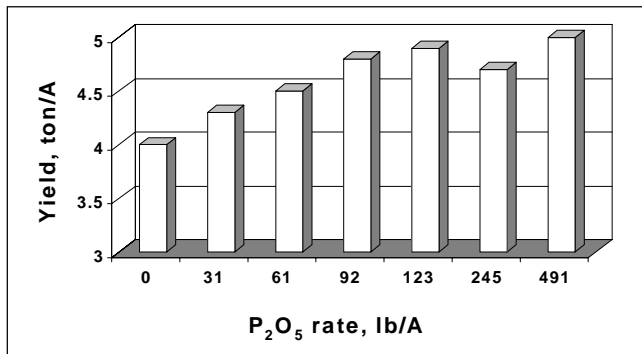


Figure 1. Three-year average Coastal bermudagrass yield response to P fertilization. Rates shown are for annual applications applied over the first 2 years of the study. Averaged across three lime rates. (east Texas, Lillbert soil series)

The effects of K fertilization on the 3-year average yield and soil K levels are shown in **Figure 2**. The 300 lb K₂O/A per year rate increased average production by about 2 ton/A in this study conducted at the Texas A&M University Agricultural Research and Extension Center at Overton. However, it was not enough to maintain the initial soil test level. In other words, annual fertilization rates greater than 300 lb K₂O/A were necessary to prevent soil K depletion and to maintain optimum hay production in non-grazed areas. Research conducted at the LSU Hill Farm Research Station has demonstrated that at least 400 lb K₂O/A per year is needed to achieve bermudagrass hay production of about 8 ton/A per year and maintain soil test K levels in hay meadows.

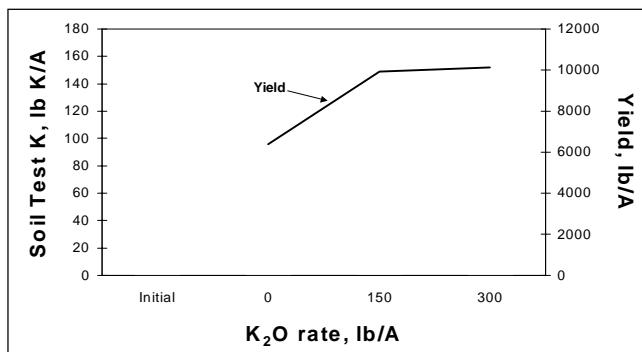


Figure 2. Influence of K fertilization on the 3-year average Coastal bermudagrass yield and on soil test K level after 3 years of production. (east Texas, Cuthbert soil series)

Adequate K fertility is important in bermudagrass rhizome production and stand density and longevity, as shown in **Figure 3**. In this Texas A&M study, rhizome production measured after 3 years of K applications was increased by about 14-fold with the highest K application rate. Also, stand density was much higher with K than where none was applied.

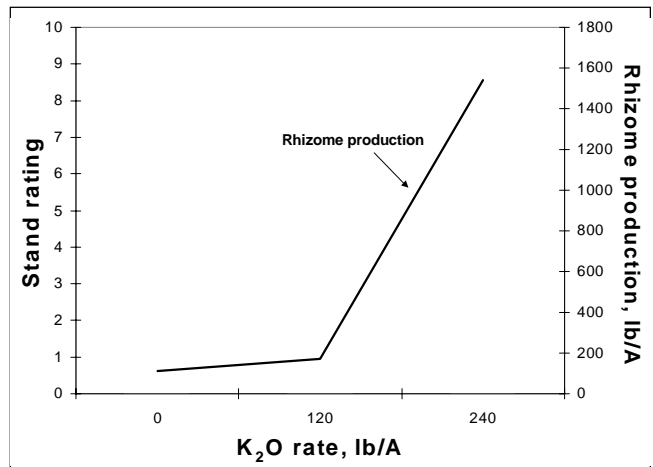


Figure 3. Effect of K fertilization on Coastal bermudagrass rhizome production and stand rating the first summer after 3 years of K applications were terminated. Stand rating: 0= bare ground, 10= best. (east Texas, Cuthbert soil series)

The secondary nutrients should not be neglected in bermudagrass production. High yields may require more than 20 lb of magnesium (Mg) and 40 lb of sulfur (S) per acre. Sufficient aglime should be applied to maintain soil pH at 5.6 or greater. Liming is important in acid soil environments to insure maximum efficiency of residual and applied nutrients. Also, liming helps maintain sufficient calcium (Ca) in the forage for optimum milk production in lactating cows and weight gain in calves (Source: *Nutrient Requirements of Beef Cattle*, 1996). Micronutrient fertilization may also be necessary in high yielding bermudagrass production.

Balanced fertility management that is based on soil and tissue tests and considers nutrient removal is a best management practice that helps ensure optimum bermudagrass yield and forage quality, stand longevity, and maximum profit. ■