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Nutrient Demand High In Bermudagrass

Studies show yield benefits of proper fertilization on southern dairy pastures.

Summary: *Numerous experiments have shown that applications of NPK, plus secondary nutrients can significantly enhance yields and quality of bermudagrass on southern dairy pastures. Ag scientists have found that the warm, high rainfall climate of this geographic region of the United States is conducive to acid soils and low soil fertility. Thus the abundant opportunities to apply sound fertilization practices that produce efficient, profitable production.*

Perennial warm season forages are grown on 50 to 60 million acres of cropland in the South. There are approximately 15 million acres of Coastal bermudagrass, about 2 million acres in Texas alone. Hybrid bermudagrasses are high-yielding forages with acceptable quality, if managed properly, for both beef and dairy animals. Because dairy animals are especially sensitive to fluctuations in forage quality, an agronomically sound fertilization program is essential for bermudagrass production. The two most important factors affecting forage quality are fertility and age of the bermudagrass at harvest.

Soil tests and a knowledge of crop nutrient requirements for targeted yield goals are two first steps in determining fertilizers needed for optimum bermudagrass production and highest profits. An important axiom to remember is "a fertile soil is not always productive, but a productive soil is always fertile." Figure 1 dramatically shows what a big appetite Coastal bermudagrass has for nitrogen (N) and potassium (K). Large applications of these nutrients are required if forage yield levels and quality are to be maintained. Adequate amounts of sulfur (5), calcium, magnesium (Mg) and micronutrients are also required to assure optimum forage yield and quality.

We'll briefly review the more important inputs.

Nitrogen

Nitrogen stimulates plant growth and increases crude protein content of forage. With adequate moisture, bermudagrass will respond to high rates of nitrogen. Studies have shown that several applications of N prove more efficient than a single large application. The quantity of N and frequency of application will depend on how the crop is used—for grazing or hay—and how intensively it is managed.

As bermudagrass management improves and yields increase, crop demands for and responses to nitrogen fertilization increase. Figure 2 shows that under good management, yield response of bermudagrass to 400 lbs/A or more of N per year is dramatic. Nitrogen also has a similar effect on forage quality and water-use efficiency as shown in Figure 3. Nitrogen applications have to be specific to crop need and growth stage in order to get the best use efficiency from the applied N.

Phosphorus/potassium

While nitrogen alone is effective in improving the yield and quality of bermudagrass, it is even more effective in combination with phosphorus and potassium.

Phosphorus is essential for early vigorous root and shoot growth. It promotes early growth, especially when soils are cool. It helps resist winterkill and overcome drought stress. High forage P content improves forage quality and animal performance. It is vital to seedling establishment, crop persistence and longevity.

Potassium promotes N-use efficiency, root growth, cold and drought tolerance, stand longevity and density, protein formation, and forage digestibility.

Sulfur

Research in the South is showing greater need for sulfur. One study showed S applied with N increased yields of Coastal bermudagrass up to a ton per acre. Arkansas research has shown it improved N recovery as much as 72 percent, as well as palatability, digestibility, and intake.

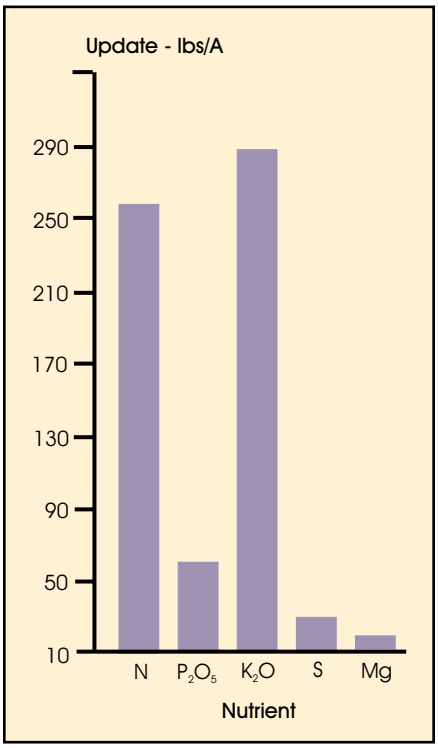

Figure 1. A 6-ton yield of Coastal bermudagrass takes up large quantities of nutrients, especially N and K; PPI Plant Food Uptake (PFU) Folder for Southern Crops.

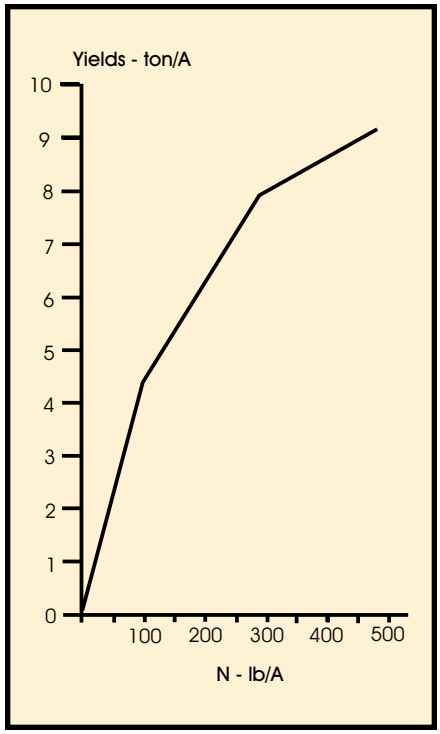

Figure 2. Nitrogen fertilization has a dramatic impact on Coastal bermudagrass yields; Cooperative Extension Service, University of Georgia, College of

Implications

When a dairy farmer commits to an intensive system, he has to get his pastures up to standard. Many southern pasture and hay crops are planted on soils that were unproductive for row crops. Soil and plant analyses often indicate a need for fertilization. This usually means higher than normal rates of P and K must be applied the first year or two to thicken stands, build strong root systems, and improve drought tolerance. Short-term in-season droughts are common in the South. Efficient moisture use is critical during these times. Studies have shown as much as a fivefold increase in yield when adequate fertilization was applied to grasses subjected to moisture stress.

Potassium levels in common bermudagrass decline in the first year when there are three weeks or more between rains. Building soil test levels helps to avoid this problem. K concentrations should be maintained at 2 percent so milking cows can better tolerate sum-mer heat. This is extremely important at temperatures of 85°F and higher, and with high humidities. In addition, because grains and concentrates fed in the milking parlor are low in K, K concentrations in forages become even more important.

Clipping bermudagrass (at 14-day intervals) can enhance nutrient recycling and help maintain high leaf-to-stem ratios. A drag or other implement behind mowers will help minimize “manure spots?’ Use weekly forage analyses to monitor mineral concentration and deter-mine fertilizer applications.

Applications of both P and K should be split, not applying all in the spring. Currently, dairy producers are split-applying 60 lbs/A of N plus other nutrients at 21-day intervals. Typical analyses contained N, P, K, plus 5, Mg, Zn and other micronutrients shown to be deficient in the weekly forage analyses. Total seasonal applications can exceed 2,400 lbs/A or more.

Particular care should be taken to fit nutrient needs to the variety or hybrid being grown. Research has shown that new cultivars can vary significantly in yield and nutrient requirements.

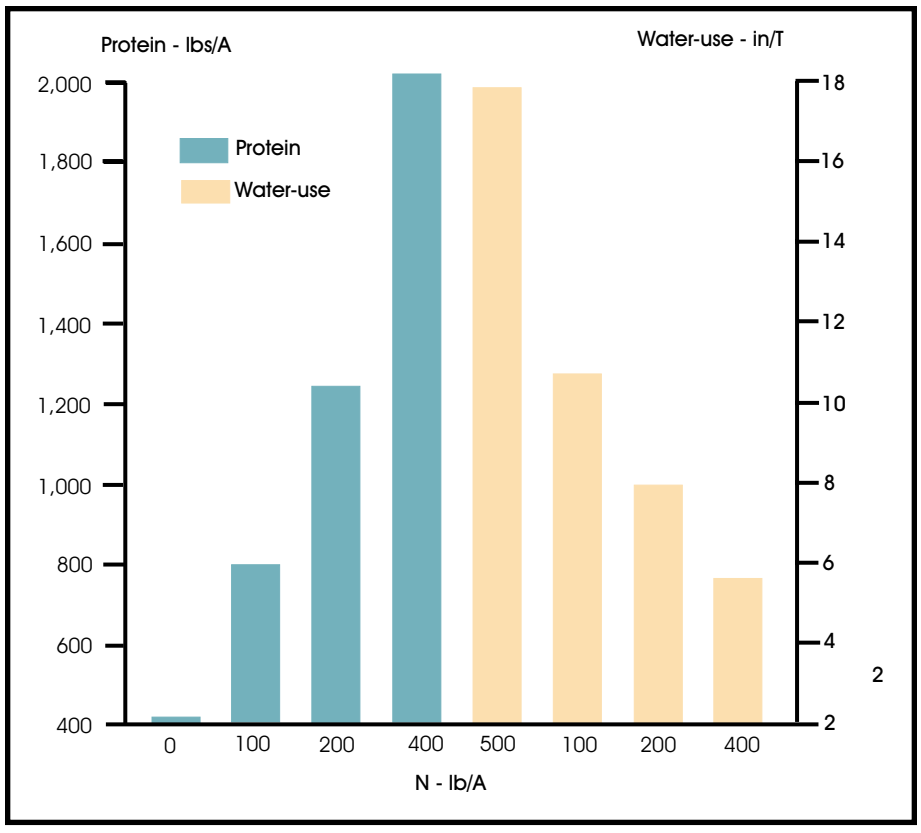

Figure 3. Nitrogen influence on protein and water-use efficiency of Coastal bermudagrass, Fisher and Caldwell, Texas Agricultural Experiment Station, Progress Report 2035.

Useful tips

Following are general guidelines that should be helpful in managing dairy pastures in the South for profitability:

- soil test and monitor nutritional needs through plant analyses
- balance NPK with secondary and micronutrients to optimize yield and quality
- maintain adequate nutrition at all times
- apply nutrients at short, uniform intervals to keep management simple and stabilize milk production
- provide nutrition to fit specific cultivars being grown and use weekly forage analyses.

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