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Economics of Forage Fertilization

Fertilizing improved pastures can be a big part of the expense involved in growing forage for hay and/or grazing. Yet forage growth of bermudagrass will not be achieved without adequate fertilization. Proper fertilization over the years will not only provide maximum growth per inch of rain, but also will insure good root development for better drought tolerance and winter hardiness. The question often is asked "Can I afford to fertilize when there is such a limited chance of rain?". The demonstration site pictured below was fertilized with 60 pounds of nitrogen two weeks earlier (when conditions were very dry). The site received 0.5 inch of rain about seven days later.

The response to fertilization was better for Tifton 85 than for Tifton 78 or Jiggs in these droughty conditions. In addition, the plots in the foreground demonstrate the effects of fertilizing when the soil is dry and waiting for rain versus fertilizing after a rain. The plot fertilized prior to rain (left) responded much better indicating less loss of nitrogen due to volatilization, or enhanced movement of nitrate into the rootzone than the plot fertilized one day after the rain.

The economics of forage fertilization depend largely on how the forage is utilized over the years. It takes specific amounts of nutrients to produce a ton of grass (Table 1).

An unfertilized pasture may have enough natural fertilizer to produce about 1 ton of grass per acre (if weeds are controlled and some rainfall occurs). In contrast, well-fertilized bermudagrass can produce from 6 to 8 tons/acre with sufficient rainfall. In hay production, the nutrients (N, P, K, Mg, S, micronutrients) contained in the grass are removed from the field in the harvested hay. They are mined from the soil! The more hay produced and removed, the more nutrients removed from the field. Hence, hay fields must be fertilized each year after each cutting to replenish the nutrients removed in the hay. In a grazed pasture, however, most (£ 60%) of the nutrients con-

Table 1. Pounds of Fertilizer Nutrient Contained

Nutrient	1 Ton of Grass	6 Tons of Hay	In a #500 Calf
N	50	300	12
P	10	60	3
K	45	270	1
Mg	3	18	.75
S	6	36	.75

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tained in the grass pass through the animal's digestive system and are recycled back to the pasture in urine and feces. When a 500-pound weaned calf is removed, only a small portion of the nutrients consumed by the animal in forage are contained in its body. Under high stocking rates in intensely managed pastures, this nutrient recycling is very effective.

Fertilizer recommendations, therefore, are based on the use of the pasture. For example a soil sample that tests low in N and medium in P and K, would have the fertilizer recommendations and cost/acre as shown in Table 2.

When fertilized according to soil test recommendations, P and K levels will be increased by the recycling effects of grazing over time. Thus, the recommendation for grazing without clover would be only 45-0-0 in spring plus 60-0-0 in mid-summer ($30/acre); with clover it could be further reduced to 0-0-0 in spring, with 50-0-0 in midsummer ($15/acre). Being aware and taking advantage of nutrient usage and cycling can make forage fertilization more effective and economical.

Table 2. Fertilization Recommendations Per Acre for Hybrid Bermudagrass

Forage Use	N-P-K Recommendations	Cost Per Acre
Grazing Only	45-20-20 plus 60-0-0	$43
1 Hay Cutting & Grazing	75-20-40 plus 60-0-0	$58
3 Hay Cuttings	75-30-60 plus 100-0-0 plus 100-0-0	$110
Clover	0-50-60 plus 50-0-0	$30