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The Basics of Fertilizing Pasture

By Martha Thomas
Lake County Livestock/Natural Resources Agent

Pasture management is the key to economically feeding livestock and horses. Forages are typically the least expensive and most effective way to supply nutrients, protein and energy to livestock animals. However, for pastures to become productive and supply adequate amounts of nutrients to livestock, soil fertility need to be carefully managed and monitored. Liming and fertilization are common management practices that can increase both forage production and nutritive value.

This article will outline the basics of fertilizing pasture whether you are fertilizing for grazing, seed harvesting, or hay production. To begin with what is N-P-K and what does it do for the pasture?

These are thirteen essential nutrients that plants require to survive. Some essential nutrients are found in adequate amounts in the soil, while others need to be added as fertilizer. Nitrogen (N), phosphorus (P) and potassium (K) are known as primary nutrients because plants require them in large amounts. These nutrients are typically applied when using fertilizer mixes. When reading the fertilizer bag the ratio tells the % basis by weight of N-P-K in the mix. The chemical symbols used on the fertilizer tag to designate various constituents may be confusing to readers who have no introduction to chemistry. For example, nitrogen is listed on the tag as the element N; phosphorus is given as the oxide P_2O_5; and potassium is listed as the oxide K_2O and called potash.

For example 20-5-10 in a 100 pound bay contains 20% N, 5% P_2O_5 and 10% K_2O. The remainder is filler which is often sand and/or organic materials. When buying you can get custom blends depending on your fertilization needs.

It is essential to test the soil to determine the liming and fertilizer needs. Soil should be tested every two to three years to determine the amount of P and K needed. Fertilizer application rates are calculated based on the forage crop needs and soil test results. Do not apply fertilizer if the soil test indicates the nutrient level is adequate in the soil.

Unlike P and K, N application rates are typically based on expected yields. It is important to determine realist yield expectations to avoid excessive costs associated with N fertilization. Nitrogen is the most limiting nutrient on Florida soils, therefore N fertilization usually result in an increase in forage yield and crude protein. Fertilizer should be applied in early spring for maximum growth and a decrease in feed costs. If applying a second application it should be done after the first cutting of hay. The more nitrogen you apply the more P and K will be needed. If grass produces high yields, it will also utilize more nutrients from the soil.

Example:
If a producer wants to fertilize a 40 acre pasture with 100 pounds of N, 25 pounds of P_2O_5 and 50 pounds of K_2O, he/she could select a common blend (20-5-10) and calculate the pounds per acre of fertilizer needed.

100 pounds N per acre / 0.20 N = 500 pounds of 20-5-10 per acre
25 pounds P_2O_5 per acre/ 0.05 P_2O_5 = 500 pounds of 20-5-10 per acre
50 pounds of K_2O per acre/ 0.10 K_2O = 500 pounds 20-5-10 per acre

Therefore, 500 pounds per acre of a 20-5-10 will provide the desirable amounts of N, P, and K. As you can see this can be very expensive therefore, you need to only fertilize for your production needs and that is why custom blends are important.

Fertilizer recommendations can vary according to the forage management system. For instance, if you are only grazing you do not need as much fertilizer as a hayfield. Similarly, some forage crops such as bahiagrass require less nutrients

than other forage grasses. Considering the high fertilizer costs, it is important to consider all the factors discussed above when developing cost-effective fertilization programs for forage crops in Florida.

Table 1: Pounds per acre of Nitrogen needed of forage growth

Forage Growth	N
Low	50-60
Medium	100
High	80+80 split application

Sources of Nitrogen:
Below are examples of N fertilizers typically used in forage production:
Ammonium Nitrate (33 to 34% N)
Ammonium Sulfate (21%N:24% S)
Urea (46% N)
Organic sources (biosolids, animal manure, chicken litter)

Besides the differences in N concentration, different N sources may not be equally effective when applied to established pastures in Florida. A number of factors, including soil type, rate and method of application, forage management (haying versus grazing), and environmental conditions can impact the effectiveness of different fertilizer sources to provide N to pastures. Another important aspect to consider is the acidifying potential of different N sources. Ammonium sulfate, for instance, has a greater acidifying potential than ammonium nitrate and urea and will require additional lime.

Soil Acidity:
This important soil property can also be determined by testing the soil. Soil testing should be repeated at least every 3 years. Bahiagrass and other improved perennial grasses require a target pH of 5.5. Fertilization does not work properly if the soil pH is to low or excessively high. The rule of thumb for raising the pH is 1 ton per acre will approximately raise the pH one degree. This is only valid for mineral soils, since organic matter and soil texture may also affect the recommended lime application rates. Only soil test can tell you the adequate lime rate. The purpose of liming is to improve fertilizer efficiency, nutrient availability, and root system development, and, ultimately increase crop yields. Dolomitic or calcitic lime should be incorporated 3 to 6 months prior to planting. If surface-applied, lime material should be allow to react in the soil for at least 3 to 6 months before spring fertilization.

Taking a soil sample and submitting.

Develop a plan to collect a sample that will represent the area being tested. Be sure the samples are of the same soil type, appearance, or cropping history. Separate samples should be taken from problem areas. Collect at least 15 to 20 soil samples from each area, mix these samples in a clean plastic bucket. Sample from soil surface to depth of tillage, which is usually 0 to 6 inches. Spread the soil on clean paper or other suitable material to air dry. Do not send wet samples. Mix the dry soil, and place about one pint of soil in a labeled sample bag. A soil test will be mailed to you within 5 to 10 days after your sample arrives at the testing laboratory. For maintenance of established bahiagrass pastures, tissue and soil samples should be submitted to the laboratory for analysis.
Forms are available at http://soilslab.ifas.ufl.edu/pdf%20files/SS18600.pdf or at your local extension office. 1