Western Beef Resource Committee *Third Edition*

Cattle Producer's Handbook

Range and Pasture Section 594

Pasture Fertilization

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Healthy, productive pastures are financially important to the livestock industry. Proper fertility management, in combination with good pasture management, is required to maintain a sustainable forage resource, reduce production costs, and optimize livestock productivity.

Pastures are fertilized to replace nutrients needed for plant growth and to provide high quality feed for livestock. A pasture fertilization program is guided by current pasture conditions, potential productivity, and economics. This report is a fertilizer guide for irrigated pastures and/or areas with 20 inches annual rainfall or more.

Soil Analysis

A pasture fertilization program depends on the laboratory analysis of a representative soil sample. The soil analysis measures the current soil mineral components such as phosphorus (P), potassium (K), and sulfur (S). Using the soil analysis results, an appropriate fertilization program can be designed for maximum return on investment. Research-based fertilizer guides will help determine amount of fertilizer needed in your geographic region.

Soil analysis for pastures should be conducted annually until soil fertility is within recommended levels. Once fertility is at recommended levels, samples should be taken every 3 years to monitor any changes. If pastures are worked up on a rotation and planted to annual crops before perennial pasture establishment, annual soil analysis would also be beneficial.

In pasture systems, nutrients are in constant flux as they are moving among the atmosphere, soil, plants, and animals. As a result, nutrient levels do not remain constant throughout the year. Both fall and early spring are good times to take soil samples. To compare the soil nutrient profile from year to year, samples should be collected at a similar time each year. Field representatives from local fertilizer companies may offer assistance with soil sampling.

An accurate soil sample is a composite of samples taken from at least 15 to 20 locations within the pasture. A special soil testing probe is inserted into the soil at a depth of 6 or 12 inches and a core sample of soil is obtained. The sampling depth depends on the geographic location. Areas of pasture should be sampled separately if there are differences in yield, soil type, or topography (e.g., slopes, wet areas, etc.).

Each core sample should be collected in a clean plastic bucket, mixed together, and placed in a soil sample bag or 1-gallon zip-loc type bag (Robotham and Hart 1995). Some analytical laboratories will have special sample bags and may also provide specific instructions on sample collection and handling. The lab will often provide fertilizer recommendations based on yield goals and specific plants being grown. Pasture fertilizer recommendations as well as laboratory lists may also be available from your local county extension office or fertilizer supplier (Hart 1998 and 2008). In order to maintain and improve forage production, soils must be fertilized to recommended rates (Hart 1998; Hart et al. 2000).

Determine a Pasture Fertilization Plan

For pastures to be productive, the plants must be properly fed, watered, and receive adequate sunlight. If any one of these requirements is missing, forage production will suffer. Generally, pastures will require less applied fertilizer than field crops. Grazing livestock recycle as much as 85 to 95 percent of the N, P, and K consumed in grazed forages through urine and manure deposits. The distribution of recycled nutrients, however, is not always uniform across the pasture. Nutrients tend to accumulate more heavily where livestock linger the most—around water sources, bedding areas, and trails. Proper grazing management and livestock distribution can aid in depositing recycled nutrients more uniformly.

Timing of fertilizer applications varies by nutrient and stage of the growing season. Nitrogen is commonly applied in multiple, split applications over the course of the growing season. Some forms of N fertilizer are easily volatilized (i.e., change from a solid