

NUTBAL: In's and Outs of a Rancher's Profit

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Would you scoop some poop to lower your feed costs? You bet!—that's exactly what many ranchers across the country are doing to help them support the decisions they make to meet the nutritional needs of their livestock. Are you feeding too much? Not enough? How do you know? It is no mystery that diet plays an important role in livestock development. Every cattleman knows the importance of good grass and supplements. What's not so obvious is how well grass and supplements work, or to put it another way, how well forage and feed meet animal nutritional demands. One way to obtain this information is to collect fecal samples and have a lab analyze the percentage of dietary crude protein (CP) and digestible organic matter (DOM). Many ranchers then use the Nutritional Balance Analyzer Program, called NUTBAL to help them make these decisions.

Economically meeting the nutritional requirements of livestock on grazing lands has always been a major problem for stockmen. Problems occur when forage quality does not meet the nutritional demands of the stock. Especially critical are the winter months and at calving. In 1994 the monitoring technique, NUTBAL, was offered to the ranching industry to help stockmen recognize when this situation exists and how to economically correct the problem. This system consists of two parts, NIRS and NUTBAL. Near Infrared reflectance spectroscopy (NIRS) provides an estimate of forage diet quality and NUTBAL provides a way to evaluate that diet quality relative to a group of animals under specific conditions. The combined NIRS/NUTBAL program is designed to monitor the changes in forage quality over time and match the nutritional needs of the livestock to the most economical feedstuff currently available.

Researchers have developed this method, which analyzes fecal samples of free-ranging livestock using near infrared reflectance spectroscopy (NIRS) to predict the dietary crude protein and the digestible organic matter of the animals diet. The NIRS process utilizes prediction equations that were developed from diet and fecal samples of livestock over a large variety of forage conditions. These equations have proven to be very reliable in predicting nutritional values under numerous conditions. Currently the Grazingland Animal Lab in the Rangeland Ecology and Management Dept. of the Texas A & M University performs nutritional profiling on livestock such as cattle, sheep, goats, bison and is working on equations for elk and deer management. These profiling, shipping and handling methods have been tested throughout the U.S. and the world.

Texas rancher, Kevin Spreen was looking for a way to make his ranching operation more efficient and cheaper. His large pastures and year-round continuous grazing systems were not providing the most effective use of his grazing land and he also was looking for a way to reduce his winter feed costs. A workshop put on by the Natural Resources Conservation

Service (NRCS) introduced Mr. Spreen to NUTBAL and the benefits of crossfencing and pasture deferment to improve forage quantity and quality.

Mr. Spreen owns a hereford-brangus cross herd on native rangeland in Runnels County. His winter feed program was based on 20% breeder cubes like the majority of ranchers in the area. He uses a fall calving season and was looking for a way to find out what his cows were getting from his grass and what they needed in the way of supplements. He also wanted a way to monitor the quality of his forage as he went forward with his planned grazing system. The NIRS-NUTBAL system has provided this service for him. In 3 years, Spreen has been able to shave \$1300–1500 a month from his feed bill by using NUTBAL to fine tune when he fed protein supplements and when he needed to switch to high energy supplements. He has maintained a 95+% calf crop and kept his impressive weaning weights.

Let's explore the basics of the NIRS/NUTBAL system:

First, the stockman must collect fresh fecal samples from free-ranging animals that have been off of supplemental feed for 48-72 hours. The sample can easily be collected early in the morning prior to feeding. Locate 5 to 10 dung piles that are very fresh and still moist inside. Just gather a "heaping tablespoon" from each pile and combine in a plastic sealed bag. By mixing the samples together you can achieve a more accurate reading for the herd. Freeze and label the sample.

Completely **fill out** the Fecal Sample Information Form, that can be obtained at the NRCS office, with the client name, ranch name and location, sample id, date collected, vegetation etc. Place the form in the box along with the sample and ice pack. Always use a mail service that guarantees two-day delivery.

The lab will then **analyze** the information using NIRS equipment and determine the dietary crude protein and digestible organic matter values for each sample. This forage diet quality estimate is used in the NUTBAL program with animal and environmental information to estimate animal nutritional status.

Next, the rancher must provide **livestock case information** for nutritional profiling. This could be done by himself or a trained resource specialist. The case information includes the kind, class, breed and body condition of the animal to be monitored. Environmental conditions and the weight performance goals that the producer has for his livestock must also be entered.

The frame score or the skeletal cow size is determined by breed and height from the ground to the top of the hip bone. The height can easily be determined by using a set gauge on a fence or vehicle. This score needs to be as accurate as possible as it is used to estimate body condition score weight which is used to calculate maintenance requirements. Frame score is also used with calf weaning weight and age to calculate milk production requirements.

To successfully use NUTBAL, understanding Body Condition Scoring is necessary to set and monitor performance goals. It is important not to let a cow drop down below a body score of 4 before the next breeding season. When determining the Body Condition Score of a cow, if the 12th and 13th rib are still noticeable to the eye this would be considered a score of 4. When the 12th and 13th ribs are not visible to the eye and the backbone can only be felt with firm pressure this is considered to be a score of 5 or the optimum condition.

NUTBAL uses maximum daily temperature as a measure of temperature stress. Temperatures above and below the animal's comfort zone have a major effect on forage intake. Animals subjected to muddy, rainy or snowy conditions depress intake as temperatures decrease. The NUTBAL program allows adjustments for these conditions.

Finally, the sample results are entered into the program and used to create a nutritional balance report for protein and net energy. If a nutritional deficiency is apparent, NUTBAL is then used to develop a least-cost feeding alternative based on a supplemental feed list provided by the rancher.

The results have helped Spreen so much that he bought his own NUTBAL program. By owning his own program he sends off the sample to be analyzed and then can do all the calculating himself. He is now able to monitor two very important aspects of his operation—forage quality and livestock response to this quality.

One of the most frequently asked questions is how often should the samples be taken and when would be the best time to take them. The recommended schedule is to collect a sample once a month for the first year or two. During that time four additional samples may be necessary to detect unexpected events or transitional periods. Transitions occur with seasonal drying, cooling or warming trends. Unexpected events include an early freeze, mid-summer rainfall, ice storms, or exceptionally high acorn or mesquite bean drop. Costs per sample range from \$23.50 for DOM and CP Analysis to \$38.50 per sample for DOM and CP Analysis plus a printout of Crude Protein balance and net energy of maintenance with feeding recommendations. After the first year or two of monitoring it is recommended that routine sampling be continued but less frequently. Sampling in the second or third year should focus on transition periods and unexpected events that occur during traditionally high forage quality. After the second year, it is recommended that you only sample when major deviations are noted from the first 2 years. The key is to monitor the condition of the animal and the availability of the forage and keep good historical records to recognize significant deviations. The beauty of the system is that you can use the NUTBAL system to play "what if" games to help assess if the perceived conditions really matter or if you should collect a sample because you are too close to the edge of a problem.

The NIRS/NUTBAL nutritional management system allows the manager to assess a problem, formulate a solution, and move on to other pressing issues which occupy a manager's time. The "worry factor" in management is greatly reduced with a system that takes some of the guesswork out of one of the major items in the variable costs of raising livestock.

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