K-STATE Kansas State University Research and Extension

FORAGE FACTS

Publication Series

FORAGE SAMPLING AND ANALYSIS

INTRODUCTION

Feed costs represent the lion's share of a cow/calf and stocker operator's expenses and are an ideal starting place to implement and maintain hard-nosed cost-control measures. Forage grazing systems utilized by beef producers throughout the United States are all vulnerable to unpredictable precipitation patterns as well as the seasonality of pasture and range forage quality. Simply put, forage is harvested to hedge against periods of time when the base forage supply is low or when animal nutrient requirements are elevated relative to what is available. However, forages are grown, harvested and stored under a variety of conditions that can dramatically affect feeding value. A nutrient analysis is the only means by which to properly establish the feeding value and determine if additional nutrient supplemental programs are necessary.

PROPER FORAGE SAMPLING IS ESSENTIAL

The indispensable prerequisite to feed cost control are the results of a forage analysis collected from a representative sample of the forage lot being analyzed. A forage lot consists of forage harvested from one field at the same cutting and maturity within a 48-hour period and usually contains fewer than 100 tons of hay. A forage lot should be similar for forage type, field (soil type), cutting date, maturity, variety, weed infestation, type of harvest equipment, weather during growth and harvest and storage conditions.

In the case of crude protein, improper forage sampling techniques can affect profitability and productivity from two different perspectives (1) a false high analysis of crude protein which actually is low, will result in a potential crude protein deficiency and (2) a false low analysis of crude protein, which actually is high, can result in excessive supplementation expenses. Based on a recent study conducted by Kansas State University to determine the extent of nutrient variation that can exist in a forage lot, sample sizes were determined for large round bales of various forage types to achieve various degrees of precision and confidence intervals. Table 1 contains the recommendations for the number of bales by forage lot that constitute a well-defined forage lot to be subsampled and composited into one sample for submission to a commercial analytical laboratory. The precision estimates were computed as percentage units not as fractions of the mean. For example, a forage lot of third cutting alfalfa estimated to average 20 percent crude protein would range from 19 to 21 percent with 1 percent precision and 19.5 to 20.5 percent with .5 percent precision. Users of the table on page 2 may discover that the recommended sample sizes exceed, or constitute a large proportion of the number of bales in the forage lot being sampled. Producers should subsample the recommended number of bales stated in the table as long as that number is less than 20 percent of the forage lot. If the recommended number of bales is greater than 20 percent of the forage lot, producers are advised to subsample 20 percent of the forage lot.

If sampling standing forage, it is recommended to select at least eight representative locations and clip the forage at grazing or harvest height from a 1 square foot area at each location.

SUBMITTING FEEDSTUFFS FOR NUTRIENT ANALYSIS

Many commercial hay probes are available on the market and range considerably in price. If the purchase of one is not an option, many county extension offices have forage probes available for use. Forage should be sampled as near to the time of feeding or sale as possible.

Be sure to allow time for test results to be returned for formulation of a ration or determination of supplement needs. As a general rule, allow 2 to 3 weeks for results of the analysis. Information turnaround will be affected by the particular analysis requested, methods employed and the overall number of samples received.

It is recommended to submit forage samples to an accredited laboratory of the National Forage Testing Association (NFTA). Accreditation is gained through participation in a check-sample program. Involvement in these programs indicates that the laboratory monitors its performance against that of other labs. Depending upon the nutrients being tested, a forage analysis will cost from $12 and higher. The report from the laboratory should clearly indicate the moisture (as-received) basis and dry matter basis.

When coupled with environmental variability, feed cost control represents a moving target that can only be bulls-eyed with appropriate planning and evaluation of existing options. The first step towards efficient feed cost control is knowing the quality of the forage. The key to getting that information is submitting a forage sample that is representative of the forage used in the feeding program.

Table 1. *Recommended number of large round bales to subsample and composite based upon desired degree of precision and confidence interval for crude protein content.*

Forage Type	Precision of Average Crude Protein Estimate, %	Confidence Interval 99%	95%	80%
1st Cutting Alfalfa	±1	19	11	5
	±.5	76	44	19
3rd Cutting Alfalfa	±1	12	7	3
	±.5	47	27	12
Prairie Hay	±1	4	2	1
	±.5	15	9	4
Sorghum-Sudan Hay	±1	7	4	2
	±.5	28	16	7

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