



Result Demonstration Report

2013 Nutritional Balance Analyzer (NUTBAL) Demonstration

Price Ranch

Chad A. Coburn, County Extension Agent – Ag/NR Sterling County

Jim Bob Ellisor, Natural Resource Conservation Service (NRCS), Sterling-Glasscock Counties

Summary

A Nutritional Balance Analyzer (NUTBAL) demonstration was established on the Price Ranch in Sterling County, Texas. NUTBAL is a user-friendly decision support system designed to help producers make effective decisions about the nutritional management of their livestock. The program combines expert advice with user input to produce customized plans that are unique to a producer's situation.

Objective

The objectives of this demonstration were to:

- 1). Assist stock managers record and analyze vast amounts of information to determine the economic and nutritional benefits of introducing feeding regimes.
- 2). Demonstrate the ability to make effective decisions about the nutritional management of livestock based on analyzed results.

Materials and Methods

Sixty-seven (67) medium-framed Angus crossbred cows averaging 69 months of age were used for demonstration purposes. Cows weighed an average of 1233 pounds and were 185 days pregnant. In addition, cows had an average body condition score (BCS) of 6. BCS was determined by fat deposit evaluation over the animal's 12th and 13th rib, spine and tail head region. Cattle were grazing on native range with intermediate grasses indicative of Sterling County.

Fecal samples were collected and analyzed for performance, daily nutritional status, daily dry matter intake, diet quality and daily fecal output.

Results and Discussion

Performance

This section shows the requested and expected daily weight gain, weight after 30 days, body condition after 30 days, and the most severely deficient nutrition.

Performance results are noted in Table 1. According to the data, cattle increased average daily gain (ADG) and BCS grazing native pasture alone with no supplemental feeding.

Table 1. Cattle performance on native pasture with no supplemental feed

Daily Weight Change Goal:	0.0 lbs.
Predicted Weight Change:	2.06 lbs.
Weight in 30 Days:	1295 lbs.
Body Condition in 30 Days:	6.6
Performance Limited By:	Energy

Nutritional Status

The requirement describes how many pounds of crude protein and mega calories of Net Energy for Maintenance (NEm) is needed by these animals given their breed type, physiological status, environmental conditions, etc. Net Energy for gain (NEg) is the amount of energy consumed above NEm that can be applied toward gain. The Balance row indicates whether or not nutritional intake is sufficient for that animal's nutritional requirements.

Table 2 illustrates the daily nutritional status of cattle. According to the data, cows exceeded their crude protein requirements by consuming native pasture alone, thus there was no need for supplemental feeds.

Table 2. Cattle daily nutritional status

	Crude Protein	NEm	NEg
Intake:	3.05 lbs.	20.2 Mcal	6.33 Mcal
Requirement:	1.55 lbs.	9.84 Mcal	0.0 Mcal
-----	-----	-----	-----
Balance:	1.5 lbs.	10.37 Mcal	6.33 Mcal

Daily Dry Matter Intake

This section breaks down total intake by concentrates (currently feeding or what you are considering to feed), roughage (see note), and forage (the pasture). Note: If you are currently feeding hay, silage, etc., this is read in the NIR analysis, thus reflected in the lab results ~ pasture+hay fed=lab results. NUTBAL allows you to hypothetically feed a hay, etc.; to see how your cattle may perform~the roughage row would reflect that situation. These numbers are reported in dry matter basis instead of "as fed" or "wet weight".

Table 3 shows the daily dry matter intake of cattle grazing native pasture. Cattle are consuming approximately 29 lbs. of grass (dry matter) per day which is roughly 2.5% of their body weight.

Table 3. Daily dry matter intake

	Intake	% of Std. Ref. Wt.	AUE
Concentrates:	0.0 lbs.	0.0 %	0.0
Roughage:	0.0 lbs.	0.0 %	0.0
Forage:	29.11 lbs.	2.56 %	1.12
-----	-----	-----	-----
Total	29.11 lbs.	2.56 %	1.12

Diet Quality

This section takes an overall (pasture+feed) look at Crude Protein (CP) and Digestible Organic Matter (DOM) as well as just the forage. DOM is a measure of energy. DOM multiplied by 1.05 approximates Total Digestible Nutrients (TDN). The DOM/CP ratio is an indicator of rumen efficiency. The acceptable range for this ratio is 4 to 7 with 4 being optimal. A ratio of 4 or less usually coincides with very lush, cool season or early spring pastures and very runny feces. Most warm season and native range grazing has a ratio of 5 to 6. Late summer or drought stressed forage, some stockpiled grasses, and very mature, dry grass often has a ratio greater than 7.

Table 4 indicates that pastures in this demonstration are indicative of warm season and native range grazing.

Table 4. Diet quality

	Overall	Forage
CP Consumption:	10.49 %	10.49 %
DOM Consumption:	63.57 %	63.57 %
DOM/CP Ratio:	6.06 %	6.06 %

Daily Fecal Output

This describes the amount of feces that is deposited on the ground per day, including the proportion of phosphorus and nitrogen. Note that cattle recycle nutrients, they do not manufacture nutrients.

Table 5. Daily fecal output

Total:	9.68 lbs.
Phosphorus:	0.02 lbs.
Nitrogen:	0.14 lbs.

Conclusions

The GAN Lab uses near infrared spectroscopy (NIRS) to evaluate the forage component of the diet and predict the quality of the grass and hay the animals were consuming for the past 36 to 48 hours. Therefore, the analyses do not reflect supplements that may have been fed.

Crude protein (CP) analysis measures grams of crude protein per gram of dry matter in the manure.

Digestible organic matter (DOM) measures grams of digestible organic matter per gram of dry matter in the manure.

The DOM/CP ratio is an indicator of rumen efficiency. The acceptable range for this ratio is 4 to 7 with 4 being optimal. A ratio of 4 or less usually coincides with very lush, cool season or early spring pastures and very runny feces. Most warm season and native range grazing has a ratio of 5 to 6. Late summer or drought stressed forage, some stockpiled grasses, and very mature, dry grass often has a ratio greater than 7. This sample's ratio of 6.1 is inside the ratio for positive rumen efficiency.

Fecal nitrogen (FN) is a direct measurement of the amount of nitrogen in the manure and is not necessarily correlated to dietary nitrogen. FN can be used to roughly quantify the amount of nitrogen going back onto the pasture where the animals were grazing.

Fecal phosphorus (FP) analysis measures the percent of phosphorus (P) in the manure itself. FP can be used to roughly gauge whether dietary P is adequate. An FP value greater than 0.3 generally indicates that dietary phosphorus intake is adequate. A value between 0.3 and 0.2 is borderline and may need attention. A value less than 0.1 indicates a potential deficiency. This sample's value of 0.19 indicates that phosphorus intake is currently inadequate for the dietary requirements.

Data from this demonstration indicate that the producer will not have to supplemental feed cattle thus saving money.

NUTBAL can be an important economic tool in assisting producers with supplemental feeding decisions.

Acknowledgements

Sincere appreciation is expressed to Frank and Sims Price, landowners.

Trade names of commercial products used in this report is included only for better understanding and clarity. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by Texas AgriLife Extension Service and the Texas A&M University System is implied. Readers should realize that results from one experiment do not represent conclusive evidence that the same response would occur where conditions vary.

