



**Cattle Nutritional Management Analysis  
Using Fecal Sampling, Computer Software,  
and Body Condition Scoring**

Triangle Cross Livestock 2004

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**Summary:**

Nutritional status of grazing cows depends on forage quality, protein and digestibility, and amount of forage available for grazing. NIRS fecal analysis was used to estimate crude protein and digestibility of forage selected by grazing cows. NutBal-PRO decision support computer software was used to estimate cow body condition score over a 30-day period and analyze nutritional management options for the cows. Across the duration of this study, availability of preferred forages appeared to be more limiting to cow performance than forage quality. Average apparent forage intake was 73% of potential intake. Grazing beef cattle nutritional management should be based on forage quality and quantity. Beef cattle producers have not had the ability to estimate quality or quantity of forage selected by grazing cattle to help them make decisions about nutritional management.

**Objective:**

This project was established to demonstrate the use of a nutritional management analysis system. Use of this system can help beef cattle producers determine whether forage quality or forage quantity is the cause of nutritional problems and establish records concerning critical periods for future management use.

**Materials and Methods:**

This project was started in June, 2002. Monthly fecal samples were collected from mature cows and sent to the Grazing Animal Nutrition Lab at Texas A&M University in College Station. Crude protein and digestibility of the forage consumed by the grazing cattle was estimated using NIRS analysis of these fecal samples. Fecal samples contain residue of the forage eaten. The characteristics of this residue are used to estimate the crude protein and digestibility of the forage eaten.

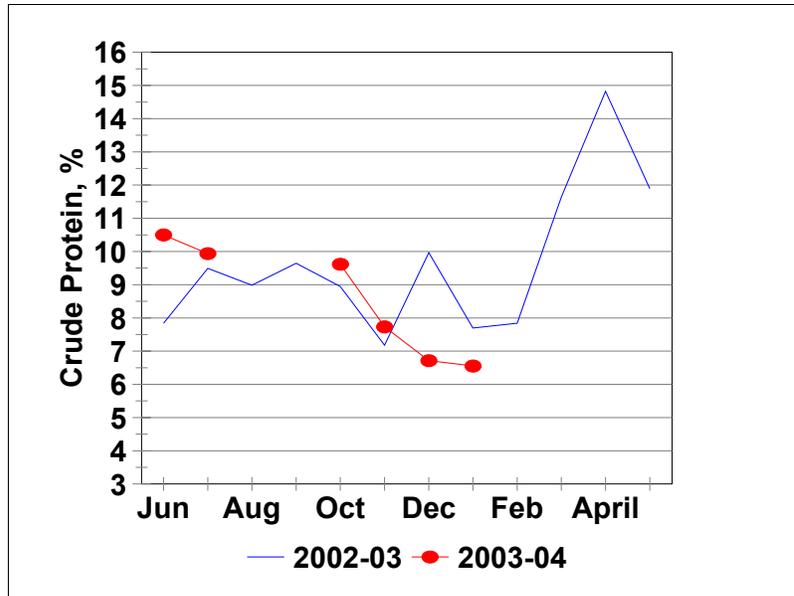
The Nutritional Balance Analyzer-PRO (NutBal-PRO) decision support computer software was used to estimate the 30-day nutritional status of the cows providing the fecal sample. This nutritional status is estimated by entering the following information in NutBal-PRO: 1) forage crude protein and digestibility estimates from the NIRS fecal analysis, 2) previous and expected minimum and maximum temperatures and relative humidities, 3) a description of the cows including breed, age, days of gestation, days lactating, current body condition score, and calf weaning weights, and 4) any supplemental feed currently used.

At each monthly fecal sampling period, cattle were body condition scored. Each month, these scores were compared to body condition scores estimated by NutBal-PRO from the previous month. If NutBal-PRO estimates were higher than the observed condition scores, and no other reason for the over-estimate could be found, it was assumed that the forage available to cows was less than expected. Apparent forage intake was then estimated by reducing intake estimated by NutBal-PRO until the estimated body condition score matched the observed body condition score. A continuous average apparent forage intake was used to try to improve body condition score estimates over each 30-day period. As apparent forage intake was determined for each month, this value was added to apparent forage intake values for all previous months and then recalculating a new average apparent forage intake which was used to estimate body condition over the next 30 days.

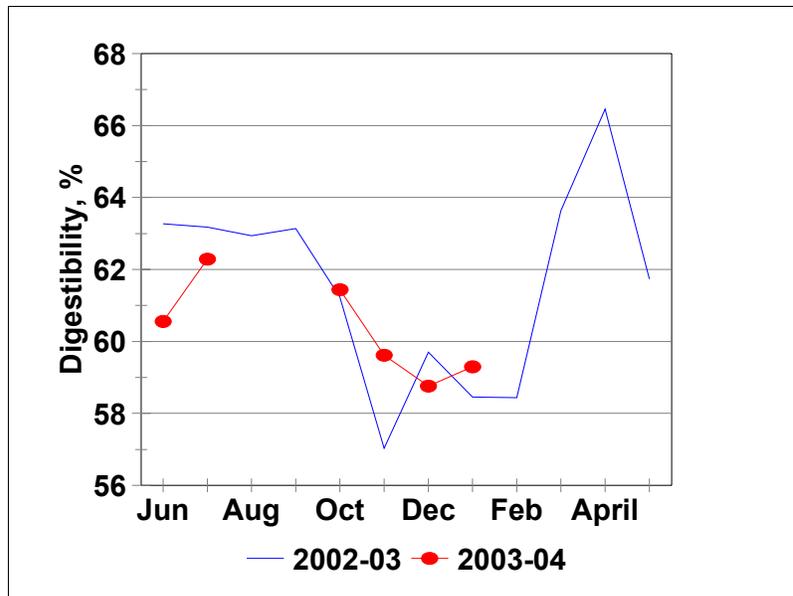
Two different herds have been used in this study. The first herd was monitored from June, 2002 through July, 2003. The second herd has been monitored since October, 2003.

### **Results and Discussion:**

Forage quality (Figures 1 & 2) was, as expected, highest in April. Lowest forage quality was observed around December and January. Year-1 and 2 crude protein was similar with the greatest difference in June and December. Year-1 and 2 digestibility were also similar with greatest differences occurring in June and November. Because of changes in herds, there were no forage quality estimates in August and September, 2003.

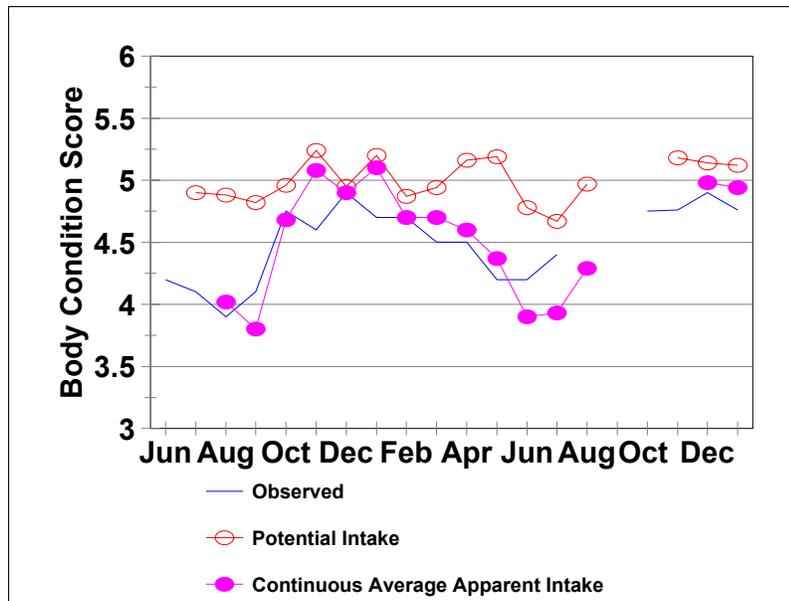


**Figure 1.** Forage crude protein estimated from NIRS fecal analysis.

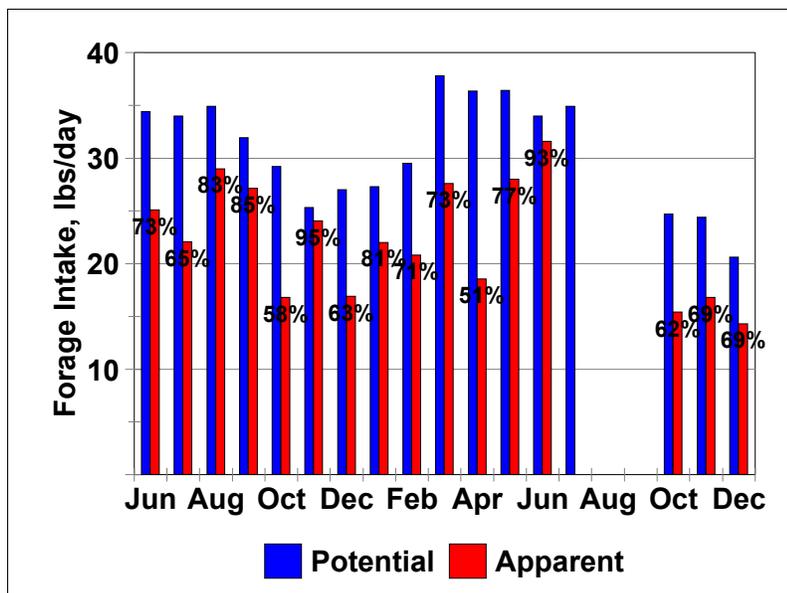


**Figure 2.** Forage digestibility estimated from NIRS fecal analysis.

Over the course of this study, average estimated body condition score estimates using potential forage intake were one-half condition score higher than observed body condition score. Using the continuous average apparent forage intake values, average estimated body condition score was not different from average observed body condition score (Figure 3).



**Figure 3.** Comparison of observed and estimated body condition score using potential and continuous average apparent forage intake.



**Figure 4.** Comparison of potential and apparent forage intake. Numbers on bars indicate apparent forage intake as a percent of potential intake.

Apparent forage intake varied from 51 to 95% of potential intake with an average of 73% of potential over the study. Only in November, 2002, and June, 2003 was apparent forage intake 95 and 93%, respectively, of potential intake (Figure 4). Although forage quality was greatest in April, 2003, cows lost condition (Figure 3). Apparent forage intake for April was only about 51% of

potential. Forage available to a cow is not the total standing crop. It is only the portion of the standing crop that the cow chooses to eat. Studies have shown that 80 to 90% of the diet can come from as little as 1 to 6% of the standing crop.

In 11 of 16 months, apparent forage intake was less than 80% of potential intake. This result suggests that the quantity of preferred forage available to cows was more limiting to cow performance than forage quality. Using a continuous average apparent forage intake value improved computer model body condition score estimate. Estimates within 0.5 condition score of observed should be acceptable because judging condition scores more accurately is unlikely. Each body condition score averages about 80 to 100 pounds of weight. Therefore, judging condition scores to an accuracy of less than 0.5 condition score would mean judging a difference of less than 40 to 50 pounds.

**Acknowledgments:**

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