

# A Summary of Monthly Nutrient Values for Stockpiled Forages in Iowa State University Research Studies

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### Summary and Implications

It appears from this summary of previous Iowa State University research results that protein and energy levels in forages stockpiled starting in August will for the most part have sufficient protein and energy to maintain a beef cow during the middle and last part of their pregnancy. Tall fescue-alfalfa stockpiled forage had two months that would not meet protein and energy requirements, but it is important to realize that selective grazing in that forage type would likely overcome those deficiencies. However, it is important to realize that sufficient forage accumulation is imperative to meeting the total nutrient demand of the beef cow.

### Introduction

Supplying nutrition to the wintering beef cow represents the largest cost element in maintaining the herd. With recent research at Iowa State University showing that it is possible to winter graze beef cattle on stockpiled forages, many producers are modifying their management systems to include this practice.

Stockpiling forages is the practice of letting the regrowth in the late summer and early fall accumulate and then utilize it by grazing beef cattle during the late fall and winter months. Most stockpiling work at ISU has been done with systems that take off two crops of hay with the last harvest occurring in late July or early August. However, this also can be done with an intensive grazing management system where one grazes down close in mid to late July the fields that one wishes to stockpile. ISU work has shown dry matter accumulations of 1000 to 2500 pounds depending on soil fertility and moisture availability.

The question that arises is; "What is the protein and energy levels of stockpiled forages and how do they change during the winter and will they maintain beef cows?"

### Material and Methods

Since the early 1990s stockpiled grazing systems have been researched by graduate students in Animal Science at Iowa State University. Three principle forage mixes have been observed; smooth bromegrass-red clover, tall fescue-alfalfa, and tall fescue-red clover. From 1992 to 2003 a total of 233 samples have been obtained and analyzed from these specie mixes during the utilization months of October through March. Standard laboratory procedures have been

done to obtain crude protein, invitro dry matter digestibility, acid detergent fiber, neutral detergent fiber, acid detergent insoluble nitrogen and estimates of energy. Statistical analysis on the database was done using SAS General Linear Models.

### Results and Discussion

Table 1 shows the nutrient value averages by month for the forage types in the ISU experiments. As should be expected, crude protein begins at a higher level and declines through the winter months due to weathering. Important to notice is the difference in crude protein and adjusted crude protein. On average adjusted crude protein is 2.2% lower than crude protein. As the forage goes through the winter months the amount of acid detergent insoluble nitrogen increases, which is a direct measure of unavailable crude protein. However, it is worthy of notation that only tall fescue-alfalfa drops below the requirements of the March calving cow weighing 1400 pounds producing 20 pounds of milk at peak lactation. But keep in mind these protein values are from forages that were stockpiled starting in August, don't expect forages stockpiled earlier in the summer to have as high of protein values.

The second part of table 1 is the listing of the fiber and energy analysis of the stockpiled forages. Like protein, ADF and NDF increases from mid-fall through the winter, resulting in invitro dry matter digestibility and total digestible nutrients (TDN) being highest in mid-fall and then declining as weathering takes place.

Included in the table are protein and energy requirements of a 1400 pound cow at 20 pounds of peak lactation. Notice that only a few months have problems in supplying protein and energy requirements of this type of beef cow. However, it is important to know that grazing animals do not eat what the average clipped sample has for nutrient analysis. Instead grazing animals selectively graze forages and consume a significantly higher quality diet, if it is available.

In a study published in 2000 by Schlegel et al., it was found that grazing steers selected forages that had 9.7% greater crude protein and 23.0% greater energy than the clipped pasture samples would indicate. This is supported by other studies reported by Coleman and Barth (1973) and Fisher et al. (1991) who reported steers grazing grass-legume pastures selected forage 18 to 30% greater in crude and protein and 3% greater in digestible dry matter. With these results in mind it is quite likely that all of these forage combinations would meet protein and energy needs throughout the winter months provided there is sufficient quantities of dry matter.

**Acknowledgments**

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**References**

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Fisher, D.S., et al. 1991. Effects of grass species on grazing steers: I. Diet composition and ingestive mastication. J.Anim.Sci. 69:1188.

**Table 1. Nutrient value averages by month for Iowa stockpiled forages.**

	October	November	December	January	February	March
<i>Crude Protein Averages</i>						
Brome-Red Clover	12.1	10.1	10.5	11.8	11.8	12.3
Tall Fescue-Alfalfa	12.3	9.4	9.1	8.3	9.9	11.2
Tall Fescue-Red Clover		11.3	11.6	11.2	10.5	11.7
<i>Adjusted Crude Protein Averages</i>						
Brome-Red Clover	10.0	7.8	7.6	9.8	8.6	9.9
Tall Fescue-Alfalfa	10.8	7.7	6.9	7.0	6.2	9.2
Tall Fescue-Red Clover		9.8	9.6	9.2	8.4	9.2
March Calving Cow*	6.0	6.2	6.5	7.0	7.8	8.9
<i>Acid Detergent Averages</i>						
Brome-Red Clover	38.9	44.4	41.0	41.6	41.1	35.2
Tall Fescue-Alfalfa	34.5	43.0	46.3	46.0	47.7	43.5
Tall Fescue-Red Clover		34.5	34.2	34.3	36.3	39.0
<i>Neutral Detergent Fiber Averages</i>						
Brome-Red Clover	61.7	37.6	64.5	64.2	64.3	58.7
Tall Fescue-Alfalfa	57.6	67.0	67.4	70.1	71.3	70.3
Tall Fescue-Red Clover		55.5	55.7	55.9	58.0	61.8
<i>Invitro Dry Matter Digestibility Averages</i>						
Brome-Red Clover	49.2	43.9	42.0	42.5	39.9	42.9
Tall Fescue-Alfalfa	55.9	47.9	44.0	42.7	40.0	42.4
Tall Fescue-Red Clover		46.5	52.2	50.4	47.0	46.3
<i>Calculated TDN Averages</i>						
Brome-Red Clover	58.2	51.9	55.8	55.2	55.7	62.5
Tall Fescue-Alfalfa	63.2	53.5	49.8	50.2	48.2	53.0
Tall Fescue-Red Clover		63.3	63.6	63.5	61.1	58.2
March Calving Cow*	45.0	45.8	47.3	49.5	52.6	56.6
*1400 lb Cow with 20 lb peak milk production						