

**MAXIMIZING ALFALFA HAY IN BEEF FEEDING PROGRAMS**

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Beef cattle comprise the largest group of forage and hay users in Kentucky. Because of their ability to utilize large amounts of low quality roughage, they are sometimes relegated to that role exclusively. There are many instances in beef production when alfalfa hay can be utilized because of its high protein content. The value of alfalfa hay in a beef operation can be estimated by the protein and energy that it furnishes.

The value of alfalfa hay can be calculated relative to the amount of soybean meal and corn that it can replace. For example, assuming a general value of 18% crude protein and 60% Total Digestible Nutrients (TDN) for alfalfa hay; one-hundred pounds of alfalfa hay will equal 28 lb of soybean meal and 42 lb of corn. Alfalfa hay of this quality would then be worth the following variable amounts depending upon the price of SBM and corn:

Value of Alfalfa Hay (18% CP; 60% TDN) Relative to SBM and Corn

		Soybean Meal (\$/ton)					
		240	220	200	180	160	140
Corn (\$/bu)	3.50	119.60	114.00	108.40	102.80	97.20	91.60
	3.25	116.00	110.40	104.80	99.20	93.60	88.00
	3.00	112.20	106.60	100.00	95.40	89.80	84.20
	2.75	108.40	102.80	97.20	91.60	86.00	80.40
	2.50	104.70	99.10	93.50	87.90	82.30	76.70
	2.25	101.00	95.40	89.80	84.20	78.60	73.00

The preceding values can be used as a guide for determining whether to sell alfalfa or feed it to beef animals during times when stored feed is needed. Beef cattle also represent an outlet for the commercial hay grower since hay that isn't sold for whatever reason can generally be utilized in his own operation.

**Feeding Alfalfa**

The most efficient use of alfalfa can be made by feeding this high quality forage to animals when their nutritional needs are the greatest. Beef cattle vary tremendously in their nutrient needs depending upon factors such as age, stage of production, etc. In discussing the various classes, let's start with animals with the lowest nutrient needs.

Dry, beef cows: The dry beef cow can utilize large amounts of relatively low quality hay. This is fortunate for us, since it represents a place where we can use the abundance of low quality hay that we produce. While the protein requirement increases as the dry cow approaches parturition they have the lowest protein requirements of any species of livestock on most farms. Here, energy requirements are also relatively low. Since the mature cow has a relatively large rumen capacity, her nutrients can generally

be met with the poorest quality hay that is produced. But, in some cases it is beneficial to supplement with protein just to stimulate intake and to have better utilization of poor quality roughage. A limited amount of alfalfa could be used for this purpose.

The dry cow has her lowest nutrient requirements immediately after weaning her calf. As parturition nears, the size of the unborn calf increases rapidly. As the cow approaches lactation she also needs to replenish body stores of fat so that early lactation can be adequate to sustain a healthy fast-growing calf. Thus, requirements for protein and energy increase and the demand on the quality of hay increases. This makes the practice of sorting hay on quality, and feeding good quality hay during the calving/breeding season an important practice for the producer who practices spring calving.

A condition referred to as "weak calf syndrome" sometimes occurs when cows receive low levels of protein during the last 60 days of pregnancy. This condition has been studied in Idaho and they observed that herds had no problem when protein intake was 2 pound or more per day. For every 0.1 lb decrease in consumption of protein below 2 lb per day, the incidence of weak calf syndrome increased by approximately 1 percent. When cattle are being fed hays with less than 10 percent crude protein, it should either be supplemented with alfalfa or another protein source.

Lactating beef cows: We should not be only concerned about how much milk a lactating beef cow gives during the first three months after calving. We also need to be concerned about the chances of her getting rebred so as to have another calf in twelve months. The chances of the beef cow milking adequately and re-breeding quickly are improved as quality of ration increases. In most beef management schemes the lactating cow is grazing high quality forages, either spring pasture or accumulated fescue in the fall. But, if late fall calving is practiced for some reason, breeding would occur during mid-winter. Cows in this situation should require the highest quality cow hay available.

**Nutrient Requirements of a 1100 lb Beef Cow at Various Stages of Production<sup>a</sup>**

	Nutrient Requirement					
	Dry matter (lbs)	Crude protein (%)	TDN (%)	Ca (g)	P (g)	Vit. A (1,000 IU)
Dry pregnant mature cow						
Middle third of pregnancy	19.5	7.0	48.8	17	17	25
Dry pregnant mature cow						
Last third of pregnancy	21.0	7.8	53.2	25	20	26
Cows nursing calves--avg. milking ability (10 lb milk/day)						
First 3-4 months postpartum	21.6	9.4	56.0	27	22	38
Cows nursing calves--superior milking ability (20 lb milk/day)						
First 3-4 months postpartum	22.3	11.9	65.2	38	27	40

<sup>a</sup>NRC, Nutrient Requirements of Beef Cattle, 1984.

It is apparent from these figures that a mature cow's protein, energy and mineral needs increase dramatically from the middle third of pregnancy to lactation. The following figure graphically depicts the changes in a cow's protein needs during the year. Dry matter intake, energy and calcium needs follow a similar pattern.

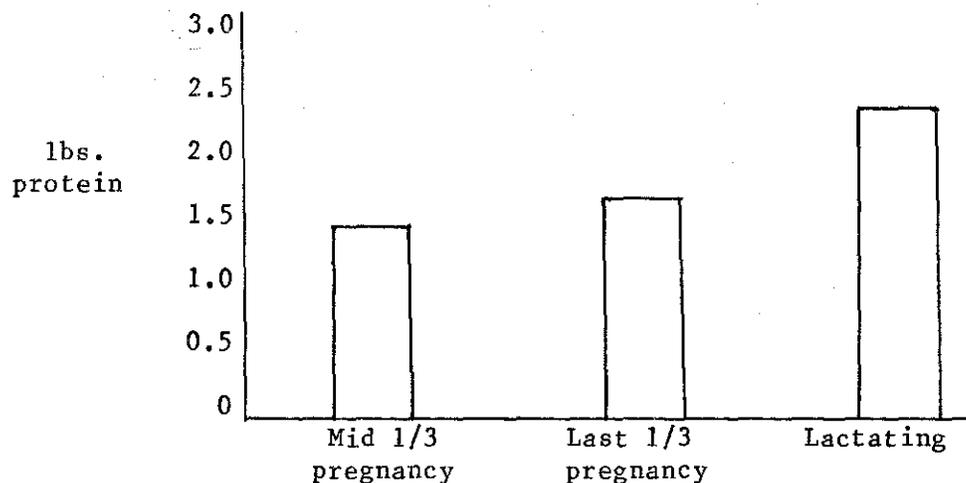


Figure 1. Crude protein intake in pounds required during a cow's productive year.

Alfalfa hay can also play a prominent part in the beef cow's nutrition after calving. In many cases alfalfa hay and grass hay can be fed together so that the protein needs of the cow are not exceeded.

Replacement heifers and stocker cattle: The growth requirements for replacement heifers and stocker cattle may be very

similar. Replacement heifers should be raised using the "target-weight" concept, that is fed to achieve a weight specific to their breed and mature size so as to reach puberty at 13 to 15 months of age.

Stocker cattle that are backgrounded must gain rapidly without fattening to have a reasonable probability of making a profit. When ownership cost (such as purchase price and interest rates) and feed costs are high, rapid gains are directly related to profitability. Some concentrate supplementation of hay rations for replacement rations for replacement heifers and stocker cattle is required. But the higher quality the hay the lower the need for supplementation. These young cattle provide a very dramatic response to nutrient quality. This is illustrated in the following table from the University of Tennessee. The relationship between quality and stage of maturity is also evident.

The Effect of Alfalfa Quality on Performance of 550 lb. Beef Steers

<u>Item</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>
<u>Analyses</u>			
Crude protein	18.7	15.9	13.7
Crude fiber	29.4	35.4	46.7
<u>Animal Performance</u>			
Hay consumed, lb/da	17.1	16.5	13.8
A.D.G., lb	1.85	1.49	-0.06

Good quality alfalfa hay can form the basis of many diets for growing cattle. It can be used to supplement corn or corn silage where an increase in protein quantity and quality is needed.

**Summary**

Maximum, or perhaps optimum, use of alfalfa hay can be made in beef operations by:

1. Feeding best quality alfalfa to young, growing calves.
2. Feeding some alfalfa during the beef cow's critical feed periods - which are: (a) 60 days prior to calving to assure proper fetal growth, a healthy calf at birth and a mother that can milk. (b) 90 days post-calving to assure that a cow will give a maximum amount of milk and rebreed efficiently.

Alfalfa hay should always be analyzed (as any other stored forage should be) to determine its nutritive quality so that it can be fed for maximum economic results. It has tremendous potential to correct protein deficiencies of many feedstuffs. Yet because of its high, and somewhat variable, protein content - it can easily be fed at levels which exceed the beef animal's needs.