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***Fact Sheet 93-23***

# ALFALFA FOR BEEF COWS

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## Introduction

Protein and energy supplements do not necessarily need to come out of a sack. Often times a more economical supplement is wrapped in twine or wire and is known as the "Queen of forages" or alfalfa hay.

Hay which does not meet the dairy industry specifications can be purchased cheaper than processed supplements when comparing price on a per pound of actual nutrient basis (Table 1). A combination of home grown hay, purchased alfalfa hay and a mineral supplement can be used to balance the nutritional needs of the cow herd during critical periods of the year. This fact sheet discusses the advantages, disadvantages, and limitations of feeding alfalfa hay to beef cows.

## What Is Alfalfa?

Alfalfa is a legume, a nitrogen fixing plant that can extract nitrogen from the atmosphere and incorporate it into plant proteins. Other legumes include clovers, vetches, peas, beans, and birdsfoot trefoil. Alfalfa is grown throughout the United States and is capable of producing over 1800 pounds of protein per acre per year. Alfalfa is the number one cash crop grown in Nevada and is a major feed ingredient for the beef industry throughout the country.

## Alfalfa As A Protein Source

Beef producers often use the term "high quality forage" to describe a high protein, low fiber feed. Table 1 shows the protein, energy, fiber and mineral content of various feeds commonly available to beef producers. Early cut alfalfa (late bud, early bloom stage) may vary from 16 to 20% crude protein. Even late cut alfalfa will contain 12 to 15% crude protein. Fiber content of alfalfa hays range from 20 to 28%.

In contrast, the average grass hay averages 8.4% crude protein and 31.4% fiber. Ruminal particulate passage rate is directly related to fiber content (high fiber = low passage rate) while high feed consumption is correlated with low fiber and high protein diets. Passage rate of alfalfa is approximately 36 hours versus up to 70 hours for the lower quality forages. The quality of alfalfa protein is excellent with more than 70% of it's total protein being digestible.

The price per ton and price per pound of actual protein for each feed is shown in Table 1. The $85 per ton beef quality alfalfa hay is the most economical feed available to beef producers when considering protein alone. The $0.28/ pound of actual protein is $0.08 cheaper than the average grass hay listed and significantly cheaper than the packaged supplements listed.

**Table 1. Average Quality and Price of Feeds Commonly Available to Northern Nevada Beef Producersa.**

| Feed | CP % | TDN % | Crude Fiber % | Phos. % | Ca % | Mg % | K % | Price Per Ton | **$/Lb. Protein** |
|---|---|---|---|---|---|---|---|---|---|
| Alfalfa, Dairy Quality | 18 | 60 | 23 | 0.22 | 1.41 | 0.33 | 2.52 | $110 | **$0.31** |
| Alfalfa, Beef Quality | 15 | 55 | 28 | 0.25 | 1.40 | 0.14 | 2.45 | $85 | **$0.28** |
| *Average Grass Hay | 8.44 | 53 | 31.4 | 0.19 | 0.54 | 0.12 | 1.66 | $60 | **$0.36** |
| *Late Cut Non-Fertilized Grass Hay | 6.71 | 50.1 | 32.6 | 0.17 | 0.50 | 0.11 | 1.35 | $55 | **$0.41** |
| *Fertilized Grass Hays Superior Quality | 10.1 | 55.1 | 30.9 | 0.21 | 0.45 | 0.14 | 2.33 | $75 | **$0.37** |
| ** Range Cube | 18 | 80 | -- | -- | -- | -- | -- | $138 | **$0.38** |
| Wheat-Mid Pellet | 16 | 79 | 9.2 | 1.13 | 0.11 | 0.52 | 1.33 | $168 | **$0.53** |
| ** Range Block | 13 | 72 | -- | -- | -- | -- | -- | $155 | **$0.60** |
| **Molasses Tubs | 16 | 76 | 4.0 | 1.0 | 2.0 | 0.50 | 7.0 | $380 | **$1.19** |
| **Liquid Molasses | 11 | 76 | 4.0 | 1.0 | 2.0 | 0.50 | 7.0 | $240 | **$1.09** |

*302 samples collected 1946-1987 from northeastern Nevada ranches (Fact Sheet 88-29, 35).
**Contains additional NPN sources of protein not included in table. High energy diets are required to utilize those sources of protein.
aReference to a company or trade names does not imply approval or endorsement.

## Alfalfa As An Energy Source

Alfalfa has one of the highest feeding values of forages. It has always been perceived as an excellent source of protein, but is sometimes underestimated as an energy source. A ton of alfalfa hay contains as much TDN as 25 bushels of corn (and as much protein as 2/3 ton of soybean meal). Beef cows are more likely to be fed rations more deficient in energy than in protein, particularly during the last trimester of pregnancy and postpartum. A beef cow needs high energy hay to regain body weight after calving, produce milk for her calf, and rebreed in 40 to 90 days after calving.

Some grass hays may be as high in digestible dry matter as alfalfa; however, those hays will be digested

slower than alfalfa. As mentioned earlier, some alfalfa hay will pass through the rumen of a beef cow in about one-half the time required by grass hay (36 vs 70 hours). Therefore, animals fed alfalfa hay tend to gain faster, produce more milk, and maintain themselves in better condition than those fed other forages. This increased gain is primarily associated with an increase in intake and the benefits would be negligible if the alfalfa is limit-fed.

## Alfalfa as a Source of Minerals and Vitamins

Alfalfa can provide most minerals and vitamins at less cost than if supplied from processed sources.

Minerals. If one pound of alfalfa hay is fed per 100 pounds of body-weight, the beef animal will meet its daily requirements for calcium, magnesium, potassium, sulfur, iron, cobalt manganese and zinc. Phosphorus levels of alfalfa are more moderate, but still high enough that if fed at the above rates will supply about 2/3 of the daily requirements needed. The high level of calcium in alfalfa is especially important for lactating cows, young developing replacement heifers and bulls. Mineral content of alfalfa is related to fertilization and local soils. Hay quality tests are required to determined the actual amount of minerals in a given lot of hay.

Vitamins. Leafy, green alfalfa hay is unusually high in carotene, the precursor of Vitamin A. Vitamin A is the most common beef cow vitamin deficiency. Good quality alfalfa hay can furnish all the Vitamin A needs of beef animals. In addition to the many dietary functions of Vitamin A, this vitamin also may have some therapeutic value, and be a contributing factor in preventing "shipping fever complex" and other disorders associated with animal stress. Vitamin A will leach out of hays stored over extended periods of time. Freshly harvested alfalfa is richer in Vitamin A.

Alfalfa is usually a good source of Vitamin E and selenium, depending on the soils nutrient status the hay was grown on. "White muscle disease" which sometimes causes serious losses of calves is caused by a deficiency of Vitamin E and selenium. Sun-cured alfalfa hay is also a source of Vitamins D and K as well as riboflavin and niacin.

Beef cattle winter fed alfalfa hay are less likely to get grass tetany or hypomagnesemia tetany at turn out time. The elevated magnesium levels of alfalfa seems to curb the problem.

## Alfalfa as a Fall Supplement

Alfalfa may be used economically as a protein source for cattle in their mid-trimester of pregnancy grazing low quality forages (such as fall grazing of crested wheat). Table 2 shows the nutrient content of dormant crested wheatgrass and nutrient requirements of the beef cow in her mid and last trimesters of pregnancy. Protein supplementation is essential to maintain the body condition of the cow prior to entering the winter months and her last trimester of pregnancy. Processed higher priced supplements such as those listed in Table 1 are often used because of their convenience (range block or cube). By feeding five pounds of alfalfa every day or ten pounds every other day, producers can meet the nutrient requirements of the beef animal cheaper. Not only does alfalfa furnish the needed protein, but it also stimulates the rumen to increase the consumption and digestibility of the lower quality forages.

**Table 2. Nutrient requirements of a 1000 pound mature non-lactating cow and nutrient value of dormant crested wheat.**

| Nutrient | Nutrient Requirements Mid-Trimester | Nutrient Requirements Last Trimester | Nutrient Value Dormant Crested Wheatgrass* | Combined Rationsa |
|---|---|---|---|---|
| Crude Protein, % | 1.3 lbs. or 7.0% | 1.6 lbs. or 7.9% | (5.0%) | 8.0% |
| TDN, % | 8.8 lbs. or 48.8% | 10.5 lbs. or 53.6% | (45.0%) | (49.0%) |

[a]Combined nutrient value of dormant crested wheatgrass and 5 pounds alfalfa hay.
*Figure in parenthesis do not meet the nutrient requirements of a 1000 lb., non-lactating pregnant cow in the last trimester.

## Winter Feeding Cows Alfalfa and Grass Hays

Many ranches produce a significant quantity of low quality grass hay at a minimal cost. Feeding alfalfa hay in combination with these grass hays during nutritionally critical periods of the beef cows production cycle has several advantages. Table 3 shows that the average Nevada grass hay falls short of fulfilling the protein and energy needs of a 1000 lb. cow postpartum (right after calving). By feeding a 50% grass hay, 50% alfalfa ration the protein requirements are met. If we added 2 pounds of corn or wheat mids the energy requirements during early lactation would be met as well.

**Table 3. Nutrient requirements of a 1000 pound mature cow and nutrient value of common feeds.**

| Nutrient | Mid Trimester | Last Trimester | Postpartum | Average Grass Hay | Alfalfa | 50% Grass 50% Alfalfa |
|---|---|---|---|---|---|---|
| Crude | 1.3 lbs. or 7.0% | 1.6 lbs. or 7.9% | 2.0 lbs. or 9.6% | (8.4%) | 15% | 11.7% |
| Protein, % TDN, % | 8.8 lbs. or 48.8% | 10.5 lbs. or 53.6% | 11.5 lbs. or 56.6% | (53.0%) | (55.0%) | (54.0%) |

*Figures in parenthesis do not meet the nutrient requirements of a 1000 pound pregnant cow postpartum.

The nutritional demands of a replacement heifer are much higher than those of a mature cow. Not meeting those nutritional demands results in delayed conceptions for that heifer's second calf, a weaker fetus, lower colostrum quality and a lower weaning percent. Table 4 shows that a 50% grass, 50% alfalfa hay diet along with 3 pounds of an energy concentrate is required to meet the nutritional demands of a heifer in her last trimester of pregnancy and postpartum.

**Table 4. Nutrient requirements of an 850 pound pregnant two year old heifer in last trimester of pregnancy and postpartum and nutrient value of common feeds.**

| Nutrient | Last Trimester | Postpartum | Average Grass Hay | Alfalfa | 50% Grass 50% Alfalfa |
|---|---|---|---|---|---|
| Crude | 1.6 lbs. or 8.6% | 1.9 lbs. or 10.6% | (8.4%) | 15% | 11.72% |
| Protein, % TDN, % | 10.5 lbs. or 59.3% | 11.6 lbs. or 63.2% | (53.0%) | (55%) | (54%) |

*Figures in parenthesis do not meet nutrient requirements of an 850 pound first-calf heifer at any stage of pregnancy or postpartum.

Bloat Problems Associated With Feeding Alfalfa

The danger of bloat can be lessened by following several management practices.

- Do not feed dairy quality alfalfa hays to beef cattle.
- Do not allow leaves to build up in the feed bunk.
- Allow plenty of feed space for all animals to have access at once.
- Feed alfalfa in conjunction with a higher fiber feed such as grass hay. Never introduce hungry animals to leafy alfalfa.
- Remove and sell animals that are chronic bloaters.
- During wet weather take extra precautions on the aforementioned points.
- Bloat control may also be aided by feeding an antifoaming agent (i.e. polaxalene). Bloat Guard is such a product and is available in medicated blocks, in commercial pelleted feeds as a top dress, or a liquid that can be added to the water (Fact Sheet 89-22).

## Feedability of Alfalfa

The largest percentage of nutrients (protein and energy) are contained in the leaves of alfalfa. The stems are similar in nutrient content of grass hay. Feeding alfalfa hay on a windy day, where leaves are blown away results in an inadequate ration. The passage rate of alfalfa hay is approximately 36 hours vs. 70 hours for grass hay. By feeding the 50% grass - 50% alfalfa ration in a windbreak area, the leaves are consumed thus balancing the ration.

## Summary

Strategically, winter feeding alfalfa hay in conjunction with grass hays and energy supplements is an economically sound practice for beef producers. Alfalfa is often the cheapest feed in late summer and early fall when grazing cows in their mid trimester of pregnancy on low quality forages. Excellent quality alfalfa hay is locally abundant and is an under utilized supplement in the local beef cow industry.

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