

Harvesting More Crude Protein Per Acre Reduces Forage-Feed Costs

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Changing from traditional forage systems that try to harvest the most dry matter per acre to forage management systems that harvest the greatest weight of crude protein per acre can help beef producers reduce forage-feed costs and increase animal performance, says a North Dakota State University range scientist.

“Over the past several decades the genetic potential of beef cattle has improved and the animals now produce more pounds of beef per cow. However, profit margins have not improved proportionately because the beef industry continues to use inefficient forage management technology developed for low-performance cows rather than adopt efficient feed management practices that provide high-quality, lower-cost forages and meet the increased dietary requirements of modern animals,” says Lee Manske, a range scientist at NDSU’s Dickinson Research Extension Center. “Implementing forage management systems developed to harvest more forage nutrients per acre will help the individual operator improve profit margins and enable the industry to remain competitive.”

Today’s fast-growing, high-performance cattle are genetically different from the old-style cattle, Manske says. “Modern cattle are larger and heavier, gain weight more rapidly, produce more milk, and deposit less fat on their bodies. The greater size of modern animals increases their nutrient demand throughout the production year, and their higher production levels increase the demand further, so that the increase in required nutrients is not simply proportionate to the animals’ greater size.”

A high-performance cow that has medium milk production and is 20 percent larger than an old-style animal requires 24 percent more energy and 34 percent more crude protein per year. During the nongrazing season, from mid November to late April, the high-performance cow requires 20 percent more energy and 24 percent more crude protein than the old-style cow, he says.

“For efficient function, modern beef animals need forages with greater amounts of nutrients than the amounts in traditionally harvested forages. Simply supplying greater quantities of dry matter of the same type of forage supplied to old-style cattle on traditional forage systems is not adequate,” Manske says.

Traditional management systems place a priority on capturing as much dry matter forage weight as possible. Consequently, they are inefficient at capturing nutrients. Hay harvested for the greatest dry matter weight loses about 50 percent of its peak crude protein weight per acre. Because of this inefficiency, the forage does not contain sufficient nutrients to meet the requirements of modern livestock, and the nutrients it does contain are costly, Manske explains.

Pasture and harvested forages from traditional systems are deficient in crude protein 40 percent to 75 percent of the days in a year for modern cattle. Even with supplements provided during the period before calving, range cow diets based on forages from traditional systems are deficient in crude protein 20 percent to 50 percent of the days in a year for high-performance animals.

Harvested forage from traditional systems could sustain old-style cattle throughout their production cycles because the animals had lower nutrient demands and could store nutrients as body fat when forage quality was high and draw on fat reserves when the diet was deficient in nutrients. Modern cattle have a limited nutrient store on which to draw during times of deficiency because the animals do not build fat reserves, Manske says. With these cows, the deficiencies in a diet based on forages from traditional systems result in animal performance below potential, high forage-feed costs, and low profit margins.

Meeting the dietary requirements of modern cattle during all production periods is critical to animal performance, and meeting these requirements economically is critical to strong profit margins, Manske stresses. He explains that the nutrients in the dry matter--not the dry matter itself--are biologically necessary to support the life

and production of a beef cow. Energy and crude protein are the major nutrients and, because crude protein costs more per pound than energy (TDN), the most important cost consideration for livestock feed is the price paid per pound for crude protein.

Forage costs are affected by the efficiency of the harvest strategy and the quantity of nutrients captured per acre relative to the potential quantity of nutrients produced. Cutting hay at peak dry matter weight captures the greatest weight of dry matter per acre but not the greatest amount of crude protein per acre. Cutting forage hays at their optimum harvest times reduces livestock forage costs per production period because the prorated cost per pound of crude protein is lower when greater pounds of crude protein per acre are captured during harvest.

Domesticated perennial grass hays like crested wheatgrass and smooth brome grass yield greater pounds of crude protein per acre when harvested during early developmental stages, around the boot stage to flowering stage. Annual cereal hays like forage barley and oat forage yield greater pounds of crude protein per acre when harvested during early developmental stages, around the flowering stage to late milk stage. Annual legume hays like pea forage and forage lentil generally yield greater pounds of crude protein per acre when harvested during the middle and late stages of development, before the lower leaves dry.

The forage costs for a 1,200 pound range cow during the 167-day nongrazing season, from mid November to late April, are reduced when the animal is fed harvested forages cut at the optimum growth stage with the highest yield of crude protein per acre. During the nongrazing season, forage-feed costs for domesticated perennial grass hay cut at the boot stage are 33 percent less than the forage-feed costs of \$116.53 for mature domesticated perennial grass hay.

Forage-feed costs for annual cereal hays cut at the milk stage are 4 percent less than the forage-feed costs of \$66.89 for annual cereal hays cut at the hard dough stage. Forage-feed costs for annual legume hays cut at a late growth stage are 23 percent less than the forage-feed costs of \$97.33 for annual legume hays cut at an early growth stage.

“Annual pasture and harvested-forage costs are the major expense for a cow-calf operation. By developing and implementing biologically efficient forage management systems that reduce the costs of forage nutrients per pound, the beef industry can achieve the true cost reductions it needs to remain competitive with the poultry and hog industries,” Manske says.