Reducing Beef Production Costs by Reducing Nutrient Costs

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A major concern for the beef production industry in the Northern Plains is low profit margin. A major increase in prices appears unlikely because competition from poultry and hogs is not diminishing and consumer demand for beef is weak. The beef production industry requires true reductions in costs to remain competitive. Beef production is the last remaining meat industry to seriously evaluate input costs as a system. The future of the beef production industry depends on the development of long-term whole-farm management systems that are biologically efficient and ecologically and economically sound.

Annual forage costs, which include the costs of pasture and harvested feed, are the major expense for a cow-calf operation, and feed costs represent the major expense of adding weight to growing calves from weaning to finish. Traditionally, beef producers have based evaluation of production costs on the rent value per acre for pasture and the market value per ton of dry matter for harvested forages. These market values do not determine the profit or loss from forages. The profitability for forages can be accurately determined from the costs and returns per unit of nutrient consumed, and total profits from forages and beef animals can be determined from the quantities of nutrients required daily by the livestock. The nutrients beef animals require are energy, protein, minerals, vitamins, and water.

Most beef producers in the Northern Plains have not determined their unit costs of nutrients. Unit costs of required nutrients must be determined to allow evaluation of production costs and identify management practices that can be modified to reduce input costs. Determining the unit cost of the required nutrients is important to reducing production costs.

Crude protein will be used in the following examples to illustrate the method of calculating unit costs of nutrients derived from purchased and harvested forage. Two values are needed to determine costs per pound of protein for harvested forages: the cost of the bulk forage per ton and the percentage of crude protein contained in the forage.

Example #1

Purchased crested wheatgrass hay has a value of $30.00 per 1000 lb bale, or $60.00 per ton. The crude protein content of forage tested from this hayfield is 6.0%.

The quantity of crude protein (CP) in pounds per ton can be determined by the following procedure.

2000 lbs (one ton) x 6.0% = 120 lbs CP/ton

The cost per pound of crude protein can be determined by the following procedure.

$60.00 per ton ÷ 120 lbs CP = $0.50/lb of CP

Example #2

Purchased alfalfa hay has a value of $120.00 per ton. The crude protein content of hay tested from this truckload is 18.0%.

The quantity of crude protein in pounds per ton can be determined by the following procedure.

2000 lbs (one ton) x 18.0% = 360 lbs CP/ton

The cost per pound of crude protein can be determined by the following procedure.

$120.00 per ton ÷ 360 lbs CP = $0.33/lb of CP

Management decisions based on the bulk cost of harvested forage will be different from management decisions based on per unit of nutrient costs. An illustration of the potential for reduction of production costs by prudent selection and carefully timed use of forage types at different stages of the year can be made with 3 types of hay used for feed for a 1200 lb cow during the 3rd trimester. A 1200 lb cow in the 3rd trimester requires 24 lbs dry matter (DM) per day at 7.8% crude protein (CP) (1.9 lbs

CP/day). The standard cost rates used were tame-hay land rent at $14.22/acre and cropland rent at $22.07/acre. The standard custom farm work rates were $16.08/acre and production of round bales at $5.36 per 1000 lb bale.

Crested wheatgrass cut at a mature plant stage and having the average dry matter yield of 1600 lbs/acre and 6.4% CP (102 lbs CP/acre) would cost $34.80 per ton of dry matter and $0.28 per pound of crude protein. This late-cut hay would need to be fed at 24.0 lbs DM/day to provide 1.5 lbs CP/day. This crested wheatgrass forage would cost $0.52 per day, or $46.80 for the 90-day period of the 3rd trimester. Production of this amount of crested wheatgrass hay would require 1.35 acres. An additional 0.33 lbs of crude protein per day would need to be provided, at a cost of $9.02 per period. Total forage and supplement costs would be $55.82 per period, or $0.62 per day.

Crested wheatgrass cut early, at the boot stage, and having the average dry matter yield of 1300 lbs DM/acre and 14.5% CP (189 lbs CP/acre) would cost $40.80 per ton of dry matter and $0.14 per pound of crude protein. This early cut hay would be fed at 12.9 lbs DM/day to provide 1.9 lbs CP/day. This crested wheatgrass forage would cost $0.26 per day, or $23.40 for the 90-day period of the 3rd trimester. Production of this amount of crested wheatgrass hay would require 0.89 acres. An additional 11.1 lbs of roughage per day would need to be provided, at a cost of $17.48 per period. Total forage and supplement costs would be $40.88 per period, or $0.45 per day.

Forage barley that has seed costs of $4.69 per acre, is cut at the milk stage, and has the average dry matter yield of 4733 lbs DM/acre and 13.0% CP (606 lbs CP/acre) would cost $28.80 per ton of dry matter and $0.11 per pound of crude protein. The forage barley hay would be fed at 14.4 lbs DM/day to provide 1.9 lbs CP/day. This forage barley hay would cost $0.21 per day, or $18.90 for the 90-day period of the 3rd trimester. Production of this amount of forage barley hay would require 0.27 acres. An additional 9.6 lbs of roughage per day would need to be provided, at a cost of $14.96 per period. Total forage and supplement costs would be $33.86 per period, or $0.38 per day.

These simple illustrations show that when the amount of crude protein harvested per acre increases and standard costs remain constant, the cost per pound of crude protein decreases, the land area needed for forage production per animal decreases, and the cost of feed for an animal during a production period is reduced. The cost per pound of crude protein is a reliable indicator of relative forage costs. The cost per ton of dry matter for the forage types is not a very reliable indicator of the actual feed costs. Improvements in harvest efficiency of the nutrients produced on a land base will reduce the costs per unit of nutrient and the size of the land area needed for forage production per animal and offer considerable opportunity for reductions in beef production costs.

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