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Economic Analysis of Beef Systems

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Summary with Implications

Economic analysis of complete beef production systems is important. An analysis of 5 systems was conducted. Three of the systems were based on cows calving in March, June or August and grazing Sandhills range and corn residue. The other 2 systems were based on complete confinement feeding or confinement in the summer and corn residue grazing in the winter. The range-based systems gave similar results, however, complete confinement was not competitive. Partial confinement with stalk grazing was competitive with range-based systems. Stalk grazing is very economical and important for many cow-calf systems.

Introduction

Each individual cow-calf operation has unique feed resources available, mostly forages. How these resources are used influences both the cattle performance and the economics. Nebraska is blessed with excellent grass resources, but the acres of these resources are declining. The resources increasing are corn residues and ethanol by-products. How these resources fit into complete production systems is very important.

Beef systems research is important and useful but challenging. We are fortunate at Nebraska to have excellent facilities with which to conduct systems research. Further, there has been good support for team research at both the Gudmundsen Ranch (GSL) and the Eastern Nebraska Research and Development Center (ENREC). Our objective was to conduct an economic analysis of a range of beef systems based on research conducted at GSL and ENREC.

Table 1. Costs used in economic analysis

Grazing Pasture	$50/pair/month
Cornstalk Grazing	$18/acre
Corn Grain	$0.094/lb DM
Distillers Grains	$0.094/lb DM
Sweet Bran	$0.094/lb DM
Grass Hay	$0.044/lb DM
Stalks or Straw	$0.042/lb DM
Mineral	$10/year/pair
Cow depreciation, interest and breeding	$275/year
Feedlot Yardage	$0.45/d/calf-fed
Dry lot Yardage	$0.50/d/pair
Grazing yardage	$0.10/d/cow
Supplemental yardage[1]	$0.20/d/cow
Stalk grazing yardage[2]	$0.25/d/cow
Finishing interest	6.2%
Weaning rate	90%

[1]Cost when cows supplemented while grazing

[2]Includes fencing and supplementing

Procedure

Griffin and others reported on a 4 year systems project at GSL which included wintering system and calving date (136 cows per year). The steers were fed out at West Central Research and Extension Center (WCREC; 2010 Nebraska Beef Cattle Report, pp. 5–7). The pairs grazed Sandhill's range in the summer and corn residue in the winter. Cows were supplemented with approximately 1 lb of a distillers grains based cube daily while grazing corn residue. Cows calved in March, June or August. Calves were weaned in October (March-born) or April (June- and August-born) and preconditioned at the ranch before being shipped to the feedyard. March, June and August calves were 240, 298 and 247 days of age upon entering the feedyard.

Loeffelholz et al. (2019 Nebraska Beef Cattle Report, pp. 25–28) have reported a 3 year systems study conducted at ENREC. Cows were fed in confinement year-round or were in confinement during the summer and grazed corn residue in the winter. Pairs were supplemented with approximately 5.3 lb of a distillers grains based cube daily while grazing corn residue. Cows calved in early July and calves were weaned in April. Weaning occurred when pairs were removed from corn stalks. Calves were weaned directly into the feedyard at 276 days of age.

Only the steer calves were fed in each of the systems studied, therefore, the feedlot performance data are for the steers only. The finishing diets were similar at WCREC and ENREC with 30 to 40% Sweet Bran, 0 to 10% distillers, and dry-rolled corn or a combination of dry-rolled and high-moisture corn. After harvest, data were adjusted to a 63% dress and to 0.5 inches 12th ribfat thickness.

For the economic analysis, costs were based on a 10-year average of prices (Table 1). A 90% weaning rate was assumed for all 5 systems. Stalk intake for pairs was assumed to be 20% greater than for dry cows.

Results

Unit cost of production (breakeven) was similar for the 3 systems representing typical production in the Sandhills (Table 2). However, final body weights of the steers were greater for the calves born in June and August compared to those born in March. The extra weight is due to greater age at weaning resulting in heavier weights into the feedyard. This resulted in greater net return for the steers born in June.

Cows and calves maintained in complete confinement had greater unit costs of production and had a net loss. On average, the cost of the feed and yardage is not competitive with grazing systems. However, the least expensive source of feed is grazed corn residue. By making use of this resource, the system of confinement in the summer and stalk grazing until April in the winter was competitive with the more traditional systems.

Table 2. Economics of 5 different cow-calf production systems

	March[1]	June[1]	August[1]	Conf.[1]	Stalk[1]
Cow costs, $/cow	908.18	932.59	926.98	1133.07	974.99
Precon[2], $/calf	15.00	24.00	24.00	10.00	10.00
Feed[3], $/calf	421.40	465.77	462.95	365.38	404.58
Interest[3], $/calf	42.44	40.47	42.57	43.72	39.21
Yardage[3], $/calf	97.65	90.90	95.85	83.70	91.35
Total costs, $/calf	1484.67	1553.73	1552.35	1635.87	1520.13
Final Live BW, lb	1313	1390	1355	1382	1367
UCOP[4], $/lb live BW	1.131	1.118	1.146	1.184	1.112
Net Profit, $/calf	25.28	44.77	5.90	-46.57	51.92

[1]March = calves born in March, pairs grazed Sandhill's range in the summer and corn residue in the winter
June = calves born in June, pairs grazed Sandhill's range in the summer and corn residue in the winter
August = calves born in Aug, pairs grazed Sandhill's range in the summer and corn residue in the winter
Conf. = confinement of pairs in dry lot year round
Stalk = confinement of pairs in dry lot during the summer and grazing corn residue in the winter
[2]Preconditioning
[3]Feedyard costs
[4]Unit cost of production, 10 year average selling price = $1.15 per lb.

The availability of grass declined some in the past few years and therefore, price of grass for grazing has increased. The GSL systems research has emphasized the importance of allowing the cattle to graze minimizing harvest and feeding costs. This is very important in controlling costs, but there is still a significant cost to the grass. Alternative feedstuffs in high supply include corn, corn silage, distillers grains and harvested residues. However, there is a cost to feeding these harvested feeds as illustrated by the high costs for the complete confinement system.

The feed resource in great supply is corn residue. As corn production (acres and yield) increases, the amount of residue increases as well. Combining stalk grazing with confinement made that system competitive. This may fit in many areas of the state, but especially in high corn-producing areas with minimal pasture.

It is notable that the June, July, and August calving systems involved allowing the calves to nurse longer than 240 days while the pairs grazed stalks. This produced heavier weaning weights and slaughter weights. Further, as calf-feds, these calves came to market at a time during the year when prices are usually greater than those received from the earlier weaned (March-born) calves. This difference was not accounted for in the economic analysis.

Conclusions

There are many interacting factors in estimating the economics of beef systems. These analyses suggest that the use of grazed corn residue has the potential to increase net returns in beef systems, especially in intense corn producing areas of the state. The complete system analysis suggests delayed weaning while pairs grazed corn residue enhances net income because the fed steers weighed more at harvest.

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