

Economics of Yearling Systems

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Summary with Implications

Economic analyses were conducted to estimate the effect of management decisions on profitability of yearling production systems. Three reported experiments were analyzed where rate of winter gain and length of summer grazing were variables. Corn stalk grazing with distillers grains supplement is quite economical. Winter gains of 1.5 to 2.0 lb/day were more profitable, after grass or after feedlot, than winter gains less than 1 lb/day. Yearlings compensated for lower winter gains while on grass, but those gaining more in the winter gained better in the feedlot and produced heavier final weights. The analyses do not show a clear benefit for marketing yearlings off grass in July versus September.

Introduction

Backgrounding calves/yearlings is much more diverse than producing calves from cows or finishing cattle. Cows primarily graze and are supplemented so they reproduce and wean good calves. Finishing cattle are fed high energy diets to produce high quality beef in an efficient manner. Backgrounding is in between the cow/calf phase and the finishing phase and is partially used to supply cattle to feedyards at various times during the year. This backgrounding can be done in many ways. What are the most economical feed resources? How much should they gain? How much compensatory gain will they make? What is the target market? How does the market respond to weight and body condition? There are many years of research on backgrounding calves/yearlings. The objective was to apply current economics to some of those

studies to help the thought processes about some of the previously listed questions.

Procedure

This analysis is not intended to directly predict profit or loss. Instead, it is intended to predict the economic effects of the biological responses to management decisions.

Economic analyses were conducted on three studies previously presented in Nebraska Beef Cattle Reports (1996 *Nebraska Beef Cattle Report*, pp. 51–53; 2005 *Nebraska Beef Cattle Report*, pp. 66–67; 2014 *Nebraska Beef Cattle Report*, pp. 36–38). All of these studies used cornstalk grazing as part of the wintering period and all yearlings grazed warm or cool season pastures during the summer period. Research (2009 *Nebraska Beef Cattle Report*, pp. 43–46; 2012 *Nebraska Beef Cattle Report*, pp. 112–114; 2014 *Nebraska Beef Cattle Report*, pp. 36–38), shows that calves can be wintered on cornstalks supplemented with distillers grains up to the time when pasture is available. Grazing until mid-April has actually had positive effects on the corn field (2015 *Nebraska Beef Cattle Report*, pp. 53–55; 2017 *Nebraska Beef Cattle Report*, pp. 50–52). Therefore, for this economic analysis, it was assumed the calves were wintered on cornstalks. A cornstalk grazing spreadsheet has been developed that accounts for costs associated with fencing, feeding, etc., for cattle on cornstalks and based on that, \$0.56/day is charged for cornstalk grazing. Water was assumed to be available at the cornstalk fields and was not hauled. Supplementation level of distillers grains was varied to provide gains equivalent to those in the 3 studies and the cost added to the cornstalk grazing cost. The distillers grains was priced at 120% the price of corn (\$3.50/bu), assuming a greater cost for a backgrounding operation than a feedyard. The yearlings grazed various numbers of days on cool and warm season grasses. Grazing was charged at \$0.90/day plus \$0.10/day yardage. Wintering and summer grazing

were considered a system and marketing after winter grazing was only considered in one analysis.

In two of the three studies, the cattle were finished in the Eastern Nebraska Research and Extension Center (ENREC) feedyard and care was taken to market the cattle as close to equal degrees of finish as possible. The feedyard diet was priced equal to corn price (\$3.50/bu) and yardage was priced at \$0.50/day.

In all phases of production, interest was charged at 5.6% on the cattle and 5.6% for one half the feed cost. Death loss was assumed to be 1% during receiving and wintering, 0.5% during summer grazing and 0.25% in the feedyard. Cattle market prices were the average of 2017 and 2018 [LMICWeekly & Monthly Combined Nebraska Auction Cattle Prices. Update date January 28, 2019. Livestock Marketing Information Center. Lakewood, CO.]

Results

Morris et al. (1996 *Nebraska Beef Cattle Report*, pp. 51–53) wintered calves at 2 rates of gain (slow and fast; 0.79 or 2.04 lb/d), and then allowed the yearlings to graze grass in the summer for a full season (long) or the first half of the season (short). As expected, grass gains were greater for calves fed slow in the winter (compensatory gain) and for yearlings grazing only during the first 62 days (Table 1). Overall, grass gain the first 62 days was 1.95 lb/d and for the last 58 days was 1.13 lb/d. The net profit for the yearlings off grass was greater for those wintered at a faster rate of gain and may be better for those sold off grass after 62 days if wintered at the fast rate. This is primarily because of the price slide and lighter weight after 62 days of grazing because cost of gain and Grass BE for these calves was actually greater.

Folmer et al. (2005 *Nebraska Beef Cattle Report*, pp. 66–67) compared a “normal” system to an intensive system. In the normal system, the calves were managed

Table 1. Rate of winter gain and length of grazing reported in 1996 Nebraska Beef Cattle Report, pp. 51–53

	Slow ¹ Short ³	Slow ¹ Long ⁴	Fast ² Short ³	Fast ² Long ⁴
<i>Winter Performance</i>				
Winter gain, lb/d ^{5,6}	0.79	0.79	2.04	2.04
Winter BW, lb	627	627	785	785
Winter COG ⁷ , \$/cwt	133.18	133.08	79.21	79.21
Winter BE ⁷ , \$/cwt	177.66	177.66	149.56	149.56
<i>Grass Performance</i>				
Grass gain, lb/d	2.45	2.01	1.44	1.29
Grass BW, lb	779	866	867	938
Grass COG ⁷ , \$/cwt	72.40	74.58	125.15	117.41
Winter Plus Grass BE, \$/cwt ⁸	157.06	149.22	148.04	144.31
Market, \$/cwt	164.17	155.50	156.05	150.73
System Net Profit, \$/hd	55.40	54.43	69.46	60.21

¹2 lb distillers grains daily (DM)

²5 lb distillers grains daily (DM)

³Short-62 days of summer grass grazing

⁴Long-120 days of summer grass grazing

⁵Purchase wt-500 lb

⁶127 d grazing cornstalks

⁷COG is cost of gain

⁸Breakeven (BE) is for the total system including winter

Table 2. Normal and intensive backgrounding systems reported in 2005 Nebraska Beef Cattle Report, pp. 66–67

	Normal ¹	Intensive ²
<i>Winter Performance</i>		
Winter gain, lb/d	1.66	1.96
Winter BW, lb	803	850
Winter COG ³ , \$/cwt	83.05	78.81
Winter BE ³ , \$/cwt	151.39	145.96
<i>Grass Performance</i>		
Grass gain, lb/d	1.72	1.98
Grass BW, lb	1023	1004
Grass COG ³ , \$/cwt	86.45	84.67
Grass BE ³ , \$/cwt	137.41	136.55
Market, \$/cwt	146.06	146.57
Winter plus Grass Net Profit, \$/hd ⁴	88.45	100.57
<i>Feedlot Performance</i>		
Feedlot gain, lb/d	4.27	3.96
End BW, lb	1449	1447
Feedlot COG ³ , \$/cwt	74.81	75.34
Feedlot Net Profit, \$/hd	-15.60	-89.87
System BE ³ , \$/cwt	118.17	117.80
Market, \$/cwt	123.33	118.67
System Net Profit, \$/hd ⁵	74.81	12.59

¹Normal-moderate winter gain (4.8 lb DM distillers grains supplemented daily) and full season summer grass grazing (128 d)

²Intensive- greater winter gain (6 lb DM distillers grains supplemented daily) and 78 days summer grass grazing

³COG is cost of gain and BE is breakeven

⁴Net includes the winter phase

⁵Net income for complete system

to gain 1.66 lb/d in the winter and then as yearlings grazed grass for the entire summer grazing season. In the intensive system, the calves were managed to gain 1.96 lb/d in the winter and then as yearlings allowed to graze grass for only 78 days. The goal was to produce yearlings of comparable weight off grass in the two systems. When fed in the feedyard, the yearlings in the intensive system were marketed in November, and those in the normal system, in January.

The net profit off grass was about \$12 greater (\$100.57 vs. \$88.45) for the yearlings in the intensive system (Table 2). Thus if selling after the grass phase the intensive system was more favorable. However, the market for finished cattle was nearly \$5/cwt greater in January (normal system) than November (intensive system). This caused the finished system net profit to be much greater (\$62 per animal) for the cattle off grass in September in the normal system than in the intensive system. The 10-year average is \$3.66/cwt higher price for fat cattle in January than November.

Gillespie et al. (2014 Nebraska Beef Cattle Report, pp. 36–38), summarized six studies that compared the effect of winter rates of gain on overall growing-finishing system. The low winter gain was achieved with 2 lb (dry matter) of distillers grains on cornstalks and the high winter gain was 5 lb distillers grains. Profit after wintering on cornstalks was greater for calves wintered at the higher rate. Net profit off grass was greater (\$54.09 vs. \$42.34) for the yearlings that had gained at a higher rate over the winter (Table 3). Profit was greater for the winter phase for calves wintered at the higher rate of gain. Profit for the grass phase was greater for those wintered at the lower rate of gain. While the yearlings compensated on grass for lower winter gains, the yearlings that had higher winter gains and lower grass gains appeared to compensate in the feedyard. Those wintered at 1.4 lb/d had heavier carcasses and much greater system net profit when finished.

This summary of 6 studies covering 7 years is good because of the numbers of years, cattle, and environmental conditions included. The limitation is the relatively low pasture gains. During 2 of the years, steers gained more (1.95 and 1.32 lb/d on grass, low and high winter gain respectively) than the averages used in this economic analysis. However, the outcomes for the economic

analysis when using these greater summer grains were similar to those for the 6 study average with somewhat greater profit responses for those steers wintered at the higher rate of gain.

Generalizations will be made from these analyses. First, the availability of distillers grains has a large impact on the nutrition and economics of backgrounding cattle. Other than grazed cornstalks, it is often the least expensive source of energy and is an excellent source of bypass protein (RUP) to supply needed metabolizable protein. Producers cannot supply rumen degradable protein and expect similar results. Second, winter gains should likely be targeted at 1.5 to 2.0 lb/d. All of the studies indicated that the net effect of more rapid winter gains was positive even though the yearlings made compensatory gain on grass when wintered at lower rates of gain. The overall performance and final weights seem to be more important than grass gains. Third, while daily gains on warm season grasses decline as the season progresses, from these studies, it does not seem to be especially advantageous to sell yearlings off grass in July versus September. The perception is that the yearling price off grass in July is greater than that in September. The 2017 and 2018 price for 950–1000 lb yearlings was not different for yearlings in July vs. September. The 10-year average was \$2.45/cwt greater in July than September, but this was due to higher July prices in 2015 and 2016 and the other years the September price was similar to the July price. In the study reported in the 1996 *Nebraska Beef Cattle Report*, pp. 51–53, the yearlings were 79 lbs heavier in September than July. Because of the price slide, the price for 79 lb lighter yearlings would be higher in July. The income was \$67.20 higher for the yearlings in September and the cost of grazing would make the net similar, thus it is not clear that selling cattle off grass in July is more profitable than selling later in the season. If the yearlings are retained through the feedyard, it is advantageous to leave them on grass until September because of higher finished prices in January. Admittedly, there can be weather risks in December and January. Gains on cool season grasses may respond with later season grazing because of late summer, early fall regrowth, which would seem to be even more advantageous for allowing grazing into September or October.

Table 3. Effect of rate of winter gain in backgrounding systems reported in 2014 *Nebraska Beef Cattle Report*, pp. 36–38

	LO ¹	HI ²
<i>Winter Performance</i>		
Winter gain, lb/d	0.57	1.40
Winter BW, lb	610	741
Winter COG ³ , \$/cwt	176.73	101.48
Winter BE ³ , \$/cwt	166.32	143.69
Market, \$/cwt.	165.78	147.86
Net Profit, \$/hd	-3.29	30.90
<i>Grazing Performance</i>		
Grass gain, lb/d	1.39	1.06
Grass BW, lb	819	900
Grass COG ³ , \$/cwt	101.27	133.65
Grass BE ³ , \$/cwt	149.76	141.92
Market, \$/cwt	154.93	147.93
Grass Net Profit, \$/hd ⁴	42.34	54.09
Grass Net Profit, \$/hd ⁵	45.63	23.19
<i>Feedlot Performance</i>		
Feedlot gain, lb/d	4.0	4.18
End BW, lb	1275	1360
Feedlot COG, \$/cwt	74.56	72.82
Feedlot Net Profit, \$/hd	-41.71	7.52
System BE, \$/cwt	122.86	118.55
Market, \$/cwt	123.33	123.33
System Net Profit, \$/hd ⁶	5.99	65.01

¹ 2 lb distillers grains (DM) daily while grazing cornstalks

² 5 lb distillers grains (DM) daily while grazing cornstalks

³COG is cost of gain and BE is breakeven

⁴Net income including winter phase

⁵Profit for only grass phase

⁶Net income for complete system

While cornstalk grazing is an economical system for wintering calves, alternative systems may fit some operations. Table 4 shows a comparison of wintering methods. The estimate for cornstalk grazing to obtain 1.66 lb/d gain is \$0.95/d cost of feed and yardage. In the Sandhills where cornstalks are not readily available, winter range priced at one-half of summer range rates would give a cost of \$1.12/d. In a system where hay is fed on a pasture and calves are supplemented with distillers grains to achieve the same gain, the cost is estimated at \$1.05/d. Costs for two systems of backgrounding in a feedyard are estimated. Corn silage supplemented with distillers grains costs \$1.29/day and high levels of distillers grains with straw or cornstalks would cost about \$1.34/d to achieve the

same gains as the calves on cornstalks. The extensive systems of stalk grazing, winter range, or hay feeding, appear more economical than the feedlot systems. Over the wintering period, the 4 alternative systems (winter range, grass hay, corn silage in the feedlot, straw cornstalks/distillers in the feedlot) would increase costs \$25, \$15, \$51, and \$59 compared to cornstalk grazing for 150 days.

Cornstalk grazing may be more variable and present more weather risks than other systems. Some producers have experienced lesser cornstalk grazing gains than those measured in the UNL research program over 35 years. Recently, Welchons et al. (2018 *Nebraska Beef Cattle Report*, pp. 40–44), measured 1.8 lb/d daily gain over 2 years on cornstalks with 5.5 lb (DM) of

Table 4. Comparison of methods of wintering calves

Scenario	Feeds and Yardage	Amount ¹ , lb/d	Cost, \$/d	Total Cost, \$/d
<i>Grazing cornstalks</i>	Cornstalks		0.56	
	Distillers grains	4.8	0.39	0.95
<i>Winter range</i>	Grass		0.45	
	Distillers grains	5.8	0.47	
	Yardage		0.20	1.12
<i>Grass hay</i> ²	Grass hay	13	0.64	
	Distillers grains	2	0.16	
	Yardage		0.25	1.05
<i>Feedlot limit fed</i>	Corn silage	11	0.58	
	Distillers grains	2.8	0.21	
	Yardage		0.50	1.29
<i>Feedlot limit fed</i>	Straw/cornstalks ³	5.5	0.22	
	Distillers grains	8.3	0.62	
	Yardage		0.50	1.34

¹ Dry matter basis

² Fed in round bale feeder or unrolled on the ground (\$80/ton).

³ Blend of 60% distillers grains and 40% straw or cornstalks.

distillers grains provided daily. In the 1980s, measurements indicated about 4.2% down corn left in the field while in recent years that has been 0.5% to 1%. As indicated above, cattle still maintain good performance on cornstalks even with less down corn to consume. Weighing conditions are important and in commercial production, calves may be weighed with minimal fill. Watson et al. (2012 *Nebraska Beef Cattle Report*, pp. 45–46) reported that when calves were driven in the morning 1 mile, and weighed, they were 27.5 lb. lighter than when weighed 3 days later after being limit fed a diet in the feedlot and weighed before feeding in the morning. Over the last 8 years, 7493 UNL calves have been wintered on rented cornstalks near ENREC in groups of several hundred, much like a commercial operation. Initial weights were off the truck at receiving and the calves were received on pasture for 3 to 4 weeks before going to cornstalks. End weights were after a couple miles drive from cornstalk fields. Calves were supplemented with 5 lb. (dry matter) of Sweet Bran daily. Calves grazed

an average of 105 days and daily gains from receiving through cornstalk grazing averaged 1.45 lb/day. Stocking rate, system of supplement feeding, amount of supplement fed, field rotation and weather are all factors influencing gains on stalks.

Conclusions

Backgrounding is an important segment of the beef production system. Cornstalk grazing and distillers grains are economical resources for wintering calves. Rates of gain for the winter should be above 1.5 lb/d to provide most economical production of finished cattle or yearlings sold off grass.

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