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Economic Analysis Update: Supplementing Distillers Grains to Grazing Yearling Steers

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Summary

A seven-year study from 2005-2011 was conducted to evaluate four grazing management strategies for backgrounding yearling steers on smooth bromegrass pastures. Economic budgets were used to calculate profit differences with current (April 2012) market prices. Overall, cattle receiving supplement had greater net returns, lower cost of gain, and lower breakeven prices. In recent years fertilizer prices have increased at a greater rate than land costs in Nebraska, making it more economical to use a lower stocking rate instead of fertilizing pastures. As land prices increase, the incentive to use either N fertilizer or DDGS supplementation increases.

Introduction

Over the past two years, prices for land, fertilizer, distillers grains, and cattle have all increased dramatically. Past data from a long-term grazing study show that from 2005-2009 supplementing grazing cattle at 0.6% of BW with distillers grains throughout the summer was more profitable than not supplementing cattle and fertilizing pastures (*2011 Nebraska Beef Cattle Report*, p. 26). The objective of this study was to re-evaluate the economics of these treatments using more recent prices. Net returns for four grazing management strategies were compared after seven years of collecting pasture and cattle performance data with yearling steers on smooth bromegrass pastures.

Procedure

Biological data were collected during two time periods: 1) a five-year period from 2005-2009 (*2011 Nebraska Beef Cattle Report*, p. 24) and 2) a two-year period from 2010-2011 (*2013 Nebraska Beef Cattle Report*, p. 31). Over the seven-year study, three grazing strategies were evaluated: 1) paddocks fertilized in the spring with 80 lb N/acre and stocked at 4 AUM/acre (FERT); 2) nonfertilized paddocks with steers supplemented daily with dried distillers grains plus solubles (DDGS) at 0.6 % of BW and stocked at 4 AUM/acre (SUPP); and 3) control paddocks with no fertilizer applied or cattle supplementation and stocked at 2.8 AUM/acre (CONT). During the two-year period, an additional grazing strategy was evaluated: 4) nonfertilized paddocks where steers were strategically supplemented with DDGS at increasing amounts over the grazing season and stocked at 4 AUM/acre (STRAT).

During the 2010 and 2011 grazing seasons, steers were implanted with Revalor®-G while no implant was used during 2005-2009. The initial five-year period was used to compare management strategies without any confounding effects due to implanting. During the following two-year period, cattle were managed the same and a response to the implant was seen across all treatments.

Economics

All prices were based on current markets (April 2012) in Nebraska (Table 1). Total costs for each system included initial steer price plus interest, yardage, health and processing fees, death loss, cash rent plus interest, and fertilizer or DDGS cost for FERT, SUPP, and STRAT treatments. Yardage was included at $0.10/steer/day to account for checking animals, maintenance of fences, and watering. An $8.33/steer health and processing fee was charged over the grazing period. Death loss of 0.5% was charged, based on initial steer cost. Cash rent was $30/AUM, the 2012 average cash rent price for eastern Nebraska. Fertilizer prices of $630/ton urea were used plus a $4/acre application fee. Dried DGS supplement was valued at $182/ton on a 90% DM basis. An additional $24/ton was added for delivery and handling of DDGS. Interest on calves and cash rent averaged 7.6%.

Cattle prices for initial costs and final live value were chosen in order that the CONT steers would break even over the seven-year study.

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Table 1. Input costs for economic analysis.

Initial steer cost	$1.58; 675-725 lb $1.62; 625-675 lb
Final steer value	$1.29; 1045-1095 lb $1.38; 950-1000 lb
Yardage	$0.10/steer/day; $15.81/steer
Health and processing	$8.33/steer
Death loss	0.5%
Implant	$2/steer for years 2010 – 2011
DDGS	$182/ton plus $24/ton delivery and handling fee
Fertilizer	$630/ton urea plus $4/acre application fee
Land cash rent	$30/AUM

Table 2. Economic evaluation of grazing management and supplementation strategies for steers grazing smooth bromegrass pastures. All values are reported as $/steer.

Treatment[1]	CONT	FERT	SUPP	STRAT	SEM	*P*-value
Two-year, 2010-2011						
Initial cost	1071.61	1066.34	1067.47	1069.70	11.80	0.98
Ending value	1356.03	1328.62	1395.03	1354.04	23.57	0.17
DDGS			79.81	79.81		
Fertilizer		64.08				
Land cash rent[2]	169.35	109.83	109.22	107.70		
Total cost	1304.28	1301.92	1318.21	1318.95	14.93	0.72
Net return	51.75[ab]	26.71[b]	76.82[a]	35.09[b]	15.43	0.07
Cost of gain, $/cwt gained	64.76[a]	68.85[a]	52.87[b]	57.13[b]	2.45	< 0.01
Breakeven, $/cwt end wt	132.75[a]	135.15[a]	121.76[b]	125.58[b]	1.51	< 0.01
Seven-year, 2005-2011						
Initial cost	1112.25	1109.20	1105.76		14.77	0.95
Final value	1333.76	1319.37	1364.00		15.24	0.12
DDGS			84.06			
Fertilizer		64.08				
Land cash rent[3]	158.51	104.17	101.60			
Total cost	1333.76	1338.99	1352.8		14.80	0.65
Net return	0.00	-19.62	11.20		12.72	0.23
Cost of gain, $/cwt gained	73.65[a]	78.85[a]	61.31[b]		2.36	< 0.01
Breakeven, $/cwt end wt	138.01[a]	139.92[a]	127.94[b]		1.22	< 0.01

[a,b]Means within a row with unlike superscripts differ ($P < 0.10$).
[1]Pastures were either nonfertilized (CONT), fertilized with N at 80 lb/acre (FERT), or nonfertilized and steers were supplemented with 0.6% of BW of DDGS daily (SUPP), or strategically supplemented at increasing incremental amounts (STRAT). Over the entire grazing period SUPP and STRAT cattle consumed the same amount of supplement.
[2]2010-2011 CONT = 7.16 acres stocked at 2.98 AUM/acre; FERT = 4.96 acres stocked at 4.60 AUM/acre; SUPP = 4.96 acres stocked at 4.64 AUM/acre; STRAT = 4.96 acres stocked at 4.74 AUM/acre.
[3]2005-2011 CONT = 7.16 acres stocked at 3.27 AUM/acre; FERT = 4.96 acres stocked at 4.96 AUM/acre; SUPP = 4.96 acres stocked at 5.11 AUM/acre.

When comparing stocker programs, the price slide used for buying and selling feeder calves becomes very important in order to appropriately value cattle gain. For 2010-2011, steers were 40 lb lighter, compared to calves from 2005-2009, entering the system and were bought for an additional $0.036/lb. Cattle receiving supplement throughout the summer were approximately 100 lb heavier at the end of the grazing season and were docked $0.09/lb.

Cost of gain (COG) over the grazing period was calculated by dividing total costs, minus initial steer cost and interest, by the total weight gained by the animal during the grazing season. Breakeven prices were calculated by dividing total costs by the ending shrunk BW of the animal at the end of the grazing season. Profitability was calculated as total live value of the animal in October minus total costs during the grazing season and was set at $0 for CONT steers over the seven-year period.

Results

Over the seven-year period, supplemented cattle consumed an average of 5.2 lb DDGS per steer daily which cost $84.06/steer. Each year fertilizer was applied at 80 lb N/acre and cost $64.08/steer. Cash rent values were based on stocking rate and differed among year and treatments (Table 2). Over the five-year period, all treatments had negative net returns (data not shown). In contrast, all treatments had positive net returns over the two-year period (Table 2). Initial cattle costs were lower for the two-year period because cattle were lighter. These cattle were then heavier at the end of the grazing season leading to greater ending live value. This increase in cattle performance was because of the use of implants and good moisture conditions for smooth bromegrass growth, and was the difference between positive or negative net returns over the seven years. These year effects emphasize the importance of good grass management and timely moisture for smooth bromegrass growth in order to improve cattle gains.

There were no statistical differences between treatments for profit in the seven-year analysis ($P = 0.23$; Table 2). Numerically, the SUPP cattle had the greatest returns every year, followed by CONT cattle with STRAT and FERT cattle having the lowest returns. The STRAT treatment was only evaluated during the two-year period. Cost of gain was lower ($P < 0.01$) for cattle supplemented with DDGS on either the SUPP or STRAT treatment compared to CONT or FERT cattle. Breakeven prices were also lower for supplemented cattle ($P < 0.01$).

If fertilizer prices are manipulated in order to make FERT and CONT have equal profits, a ratio of fertilizer price to grass price demonstrates when it is economical to fertilize grass instead of buying more grass. Using 2005-2009 prices and cattle

performance data, the price ratio of fertilizer to grass was 16.3. Using the five-year performance data, in conjunction with 2012 prices, gives a price ratio of 15.0. This means that if fertilizer prices are more than 15 times the price of grass, it is more economical to buy more grass instead of fertilizing existing pastures. Using the two-year performance data and 2012 prices further decreased the price ratio to 12.3. This suggests that cattle performance greatly affects the profitability of these treatments. Urea fertilizer prices have increased at a greater rate than land costs in Nebraska making it more economical to use a lower stocking rate on more acres instead of fertilizing pastures. However, this may not be a sustainable system and some N fertilizer may be required to maintain smooth bromegrass pastures in the long run. Also, pasture rent might increase substantially in the future.

Using the five-year performance data, and changing DDGS price in order to make SUPP and CONT have equal profits gives a price ratio of 6.3 for DDGS and grass price. Using the two-year performance data gives a ratio of 8.2. With grass prices of $30/AUM, this corresponds to DDGS prices of $190 or $247/ton, on a 90% DM basis. A price ratio of 2.7 for fertilizer and DDGS gives equal profits for FERT and SUPP cattle in the five-year analysis. This ratio decreases to 2.0 for the two-year analysis. The DDGS compared more favorably to grass price and fertilizer price with greater cattle gains in the 2-year analysis.

Current economics in the cattle industry are unlike any seen before. With high input costs, it is more important than ever to maximize cattle performance and trim costs where possible. In this study, an additional 80 lb gain on each animal, because of good forage growth and the use of implants, led to a $45 profit instead of $30 loss, emphasizing the importance of both cattle and forage management in backgrounding systems.

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