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Summary

A five-year study from 2005-2009 was conducted to evaluate differences in three grazing management strategies for backgrounding calves on smooth bromegrass pastures. Economic budgets were used to calculate profit differences. Steers supplemented an average of 5.3 lb/day of distillers grains were 90 lb heavier than either of the unsupplemented groups, which resulted in increased revenue of $49.38 for supplemented steers. Land costs were the same per AUM for all treatments but were decreased on a per head basis for pastures with supplemented cattle because cattle were stocked at higher rates than the control. Profit was greatest for the supplemented steers, although the relationship between prices for land, N fertilizer, and DDGS affects the relative profitability of the treatments.

Introduction

Supplementing cattle with dry distiller's grains with solubles (DDGS) supplies the cattle with excess N in their diet, which is excreted in the form of urea in the urine. Supplementing with DDGS also increases ADG of the cattle and allows pastures to be stocked at the same rate as pastures fertilized with 80 lb N/acre in the spring (*2009 Nebraska Beef Cattle Report*, pp. 22-24). The objective of this study was to examine the relationship between input costs and effects of different grazing management strategies utilizing DDGS on the profitability of backgrounding calves.

Procedure

Biological data were collected over a five-year period (*2011 Nebraska Beef Cattle Report*, pp. 24-25). Three grazing strategies were evaluated: 1) Pastures fertilized in the spring with 80 lb/N acre and stocked at 4 AUM/acre; 2) Nonfertilized pastures with calves supplemented daily with DDGS at 0.6% of their BW and stocked at 4 AUM/acre; and 3) Control pastures with no fertilizer applied or cattle supplementation and stocked at 2.8 AUM/acre.

Economics

All prices were based on averages from 2005-2009 (Table 1). Initial steer cost was based on average Nebraska sale barn prices in April for 700-750 lb steers. Yardage was included at $0.10 per steer daily to account for labor in building and maintaining fences as well as daily checking of animals 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 for pastures was based on $23.86/AUM, the Nebraska average pasture rent. Fertilizer prices of $419.20/ton were based on urea prices in April compiled by the National Agricultural Statistics Service (USDA, 2010) plus a $4.00/ton application fee. Interest rates were obtained from the Federal Reserve Bank of Kansas City and averaged 7.6%. Simple interest was charged on initial steer cost and cash rent cost for one-half of the grazing period. DDGS prices in Nebraska from April through September were reported by USDA-AMS and averaged $116.80/ton on a 90% DM basis, plus a $24/ton delivery and handling fee. Prices for feeders in October at Nebraska sale barns were used to determine final live value on the steers. Because of the price slide associated with feeder cattle, different values were used for the unsupplemented steers compared to the supplemented steers because the supplemented steers gained more weight over the grazing season. Costs of gain (COG) over the grazing period were 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 final 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.

Results

Initial cost of the steers was not different by treatment ($P = 0.96$) and averaged $794.69/head. Distillers grain costs for the supplemented cattle equaled $59.14/head based on steers

Table 1. Economic evaluation of grazing management and supplementation strategies for steers grazing smooth bromegrass.

	CON	FERT	SUPP[1]	SEM	*P*-value
Initial BW, lb	718	716	713	12.78	0.96
Ending BW, lb	959[a]	954[a]	1046[b]	15.4	<0.01
Head days	868	912	898	19.24	0.26
Initial Cost, $/head	796.95	795.63	791.50	14.20	0.96
DDGS, $/head			59.14		
Fertilizer, $/head		35.48			
Land Cash Rent, $/head	105.71	69.65	70.78		
Yardage, $/head	15.84	15.84	15.84		
Health and Processing, $/head	8.33	8.33	8.33		
Death Loss, $/head	3.98	3.98	3.96		
Interest, $/head	23.16	22.23	22.14		
Total Cost, $/head	953.97	951.14	971.69	14.63	0.56
Total Revenue, $/head	947.77[a]	942.43[a]	994.48[b]	14.97	0.03
Profit, $/head	-6.20[a]	-8.71[a]	22.79[b]	8.11	0.02
COG, $/cwt gained	56.48[a]	56.86[a]	47.93[b]	0.02	<0.01
Breakeven, $/cwt ending weight	99.46[a]	99.72[a]	92.89[b]	0.01	<0.01

[a,b]Means within a row with unlike superscripts differ ($P < 0.05$).
[1]Pastures were either nonfertilized (CON), fertilized with N at 80 lb/acre (FERT), or nonfertilized and steers were supplemented with 0.6% of BW of DDGS daily for the entire grazing period (SUPP).

Table 2. Effects of varying N fertilizer and land prices on costs of gain for steers grazing fertilized smooth bromegrass in eastern Nebraska.

Fertilizer prices,	Land prices, $/AUM										
$/lb N	20	21	22	23	24	25	26	27	28	29	30
0.30	0.45	0.46	0.47	0.49	0.50	0.51	0.52	0.54	0.55	0.56	0.57
0.35	0.46	0.48	0.49	0.50	0.51	0.53	0.54	0.55	0.56	0.58	0.59
0.40	0.48	0.49	0.50	0.52	0.53	0.54	0.55	0.57	0.58	0.59	0.60
0.45	0.49	0.51	0.52	0.53	0.54	0.56	0.57	0.58	0.59	0.60	0.62
0.50	0.51	0.52	0.53	0.55	0.56	0.57	0.58	0.59	0.61	0.62	0.63
0.55	0.52	0.54	0.55	0.56	0.57	0.58	0.60	0.61	0.62	0.63	0.65
0.60	0.54	0.55	0.56	0.57	0.59	0.60	0.61	0.62	0.64	0.65	0.66
0.65	0.55	0.56	0.58	0.59	0.60	0.61	0.63	0.64	0.65	0.66	0.67
0.70	0.57	0.58	0.59	0.60	0.62	0.63	0.64	0.65	0.66	0.68	0.69
0.75	0.58	0.59	0.61	0.62	0.63	0.64	0.65	0.67	0.68	0.69	0.70
0.80	0.60	0.61	0.62	0.63	0.64	0.66	0.67	0.68	0.69	0.71	0.72
0.85	0.61	0.62	0.63	0.65	0.66	0.67	0.68	0.70	0.71	0.72	0.73
0.90	0.62	0.64	0.65	0.66	0.67	0.69	0.70	0.71	0.72	0.73	0.75

Table 3. Effects of varying DDGS and land prices on costs of gain for steers supplemented with DDGS while grazing smooth bromegrass in eastern Nebraska.

DDGS prices,	Land prices, $/AUM										
$/ton	20	21	22	23	24	25	26	27	28	29	30
50	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.38	0.39	0.40	0.41
60	0.34	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.41	0.42
70	0.35	0.36	0.37	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44
80	0.36	0.37	0.38	0.39	0.40	0.40	0.41	0.42	0.43	0.44	0.45
90	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.43	0.44	0.45	0.46
100	0.39	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.46	0.47
110	0.40	0.41	0.42	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49
120	0.41	0.42	0.43	0.44	0.45	0.45	0.46	0.47	0.48	0.49	0.50
130	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.49	0.50	0.51
140	0.44	0.45	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.52
150	0.45	0.46	0.47	0.48	0.48	0.49	0.50	0.51	0.52	0.53	0.54
160	0.46	0.47	0.48	0.49	0.50	0.51	0.51	0.52	0.53	0.54	0.55
170	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.54	0.55	0.56
180	0.49	0.50	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.57
190	0.50	0.51	0.52	0.53	0.53	0.54	0.55	0.56	0.57	0.58	0.59
200	0.51	0.52	0.53	0.54	0.55	0.56	0.56	0.57	0.58	0.59	0.60

eating on average 5.3 lb/steer/day of DDGS. Fertilized pastures had an increased cost of $35.48/head for the application of 80 lb N/acre in the spring.

Cash rent values for land differed by treatment because of the different stocking rates used. The control pastures were stocked at 3.39 AUM/acre on average over the entire five years. Multiplying this by the average Nebraska cash rent price of $23.86/AUM results in a price of $80.89/acre for all treatments. Multiplying this by the number of acres, then dividing by the number of head days, and then multiplying by the average number of grazing days gives the cost of land per steer for each treatment. Cash rent was $105.71/head for the control, $69.65/head for the fertilized pastures, and $70.78/head for the supplemented steers.

Revenue was equal to final BW of the steers multiplied by $98.81/cwt for the unsupplemented cattle and multiplied by $95.01/cwt for the heavier, supplemented cattle. Total revenue was greatest for supplemented steers ($P < 0.05$). Profitability was greatest for supplemented steers at $22.79/head, while both of the unsupplemented treatments lost money at -$8.71/head and -$6.20/head for the fertilized and control treatments, respectively. Cost of gain and breakeven prices were lowest for the supplemented steers ($P < 0.01$).

As prices for land, N fertilizer, and DDGS fluctuate over time, profitability of these treatments will be impacted. In Tables 2 and 3, all input costs are held constant while land, N fertilizer, and DDGS prices vary, showing the resulting effect on COG. All prices above and to the left of the dividing line represent profitable COGs, assuming a constant cattle price. Prices below and to the right of the dividing line represent COGs where producers would lose money. For the fertilized treatment, in order to breakeven, producers need to keep COG at or below $0.53/lb (Table 2); for the supplemented treatment it is $0.54/lb (Table 3). As land prices increase, the incentive to use either N fertilizer or DDGS supplementation increases. The supplemented treatment is the most profitable, with current N fertilizer prices above $400/ton for urea and DDGS prices below $100/ton.

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