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Summary

Eight grazing experiments were summarized reflecting yearling performance when supplemented with 4.0 or 7.5 lb distillers grains. Daily gains were increased 0.53 and 0.89 lb/day. Subsequent feedlot performance was not influenced by distillers grains supplementation on grass. In a six-trial summary, each 1.0 lb of distillers grains decreased forage intake by 0.5 lb. Economic return for each $1.00 spent on distillers grains yielded returns from $1.41 to $1.94.

Introduction

The supply of distillers grains (DG) will triple or quadruple in the next few years as the Nebraska ethanol industry grows. The price of DG at the plant has ranged from $70 to 85/ton this past year. The price of grazing land (or rental cost) has increased steadily over the past several years. The average price for summer pasture in 2006 is about $27.31 per AUM (680 lb dry matter) or about $80/ton. We estimate that DG can be delivered to yearlings on pasture for about $138/ton dry matter ($120 as is). Therefore, DG would be about 166% the price of grass. However, DG has about 200% the energy value of grass. Therefore, we have hypothesized that it would be economical to supplement DG to yearlings on grass.

Procedure

Data were summarized from eight grazing experiments where distillers grains (DG) were supplemented to grazing yearlings on summer pasture. One experiment was conducted in southeast Kansas on smooth brome grass pasture, one in the Kansas Flint Hills, three on smooth brome grass at the Agricultural Research Development Center near Mead, Neb., two were conducted on Sandhills upland range near Stapleton, Neb., and one conducted on upland range at the Gudmundsen Sandhills Lab near Whitman, Neb. Three of the experiments were conducted with yearling heifers and five were with yearling steers. Lengths of trials ranged from 54 to 196 days. The DG supplementation levels were approximately 0.5 and 1.0% of BW.

Finishing performance of the yearlings was determined with cattle from six of the eight experiments. Feed intakes were available from 4 of the 6 experiments which enabled calculation of feed efficiency.

Six additional experiments were summarized where growing calves were fed harvested forage and supplemented with DG. Forage included alfalfa hay and silage, grass hay and grain-free sorghum silage. The DG was supplemented at a minimum of two levels. The lower level served to meet or exceed protein requirements. Higher levels of DG served primarily as an energy source. The objective was to determine the effect of DG supplementation on forage intake.

Results

Mean BW of the yearlings at the start of the grazing season was 638 lb and ranged from 437 to 811 lb (Table 1). Daily gains of nonsupplemented cattle averaged 1.60 lb/day and ranged from 1.08 to 2.31 lb/day. By feeding DG at 0.48% of BW, ADG increased to 2.13 lb/day and feeding at 0.92% of BW increased ADG to 2.49 lb/day. The response in ADG for each 1% BW supplementation was 0.95 and 0.99 lb. This suggests the response was similar with supplementation up to 0.92% BW.

The 0.48% BW level of feeding was about 4.0 lb DG/day (at 90% dry matter). The 0.92% BW level was about 7.5 lb/day. We estimate DG can be delivered to the cattle for about $120/ton ($0.06/lb). The daily costs were

(Continued on next page)

Table 1. Response to distillers grains supplement by grazing cattle.

Experiment	BW[e]	Control[f]	% BW[g]	ADG	↑[h]	% BW[g]	ADG	↑[h]
KS[a]	437	1.55	.50	2.12	1.14	1.00	2.39	.84
KS[b]	575	2.31	.41	2.81	1.22	.83	3.17	1.04
NEBR '06[c]	811	1.48	.50	2.18	1.40	.75	2.53	1.40
NEBR '04[c]	650	1.50	.50	1.70	.4	.60	1.75	.4
NEBR '07[c]	768	1.36	.55	1.96	1.08	—	—	—
NEBR '06[c]	686	1.63	.50	1.98	.7	1.00	2.42	.79
Unpub[d]	535	1.08	—	—	—	.90	2.38	1.54
Unpub[d]	645	1.94	—	—	—	1.30	2.79	.65
Mean	638	1.60	.48	2.13	.99	.92	2.49	.95

[a]Kansas State Southeast Ag. Research Center, 2006 Report.
[b]Unpublished, Kansas State University.
[c]Nebraska Beef Cattle Reports.
[d]Unpublished. University of Nebraska-Lincoln.
[e]Body Weight.
[f]Control ADG.
[g]Distillers Grains Supplementation level, dry matter as percent of body weight.
[h]Increase in ADG for each 1% body weight supplemental DG.

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$0.24 and $0.45/day at 4 lb DG/day and 7.5 lb DG/day, respectively. The average grazing period was about 100 days so 50 and 89 lb of gain was achieved with the 4.0 and 7.5 lb feeding levels.

Research has clearly demonstrated a response in ADG of grazing cattle supplemented with ruminally undegradable protein. That response is about 0.3 lb/day and is greater with younger, lighter BW cattle. Some of the response to DG in the summary presented here is likely due to the response to the protein in the DG. The overall response is due to a combination of protein and the concentrated energy in DG.

In three experiments, ADG and feed efficiency in the feedlot, following grazing were not affected by DG supplementation on grass (Table 2). In the fourth experiment, feed efficiency was reduced due to supplementation of DG on grass. In this experiment the yearlings grazed for 196 days before entering the feedlot. Those supplemented at 1% BW of DG were 168 lb heavier entering the feedlot and 150 lb heavier at slaughter. They were also fatter which may account for some of the reduced feed efficiency. In two other experiments where feed intake was not measured, ADG in the feedlot was not influenced by DG supplementation on grass. We therefore conclude that extra gain produced by supplementing DG on grass does not have a negative effect on subsequent feedlot performance, if the grazing period is not more than 150 days and cattle are slaughtered at equal fatness.

Calves fed harvested forages supplemented with low levels (about 1.5 lb/d) of DG (controls) gained 1.62 lb/day (Table 3) which is comparable to gains of the yearlings on grass. The mean substitution rate was 0.48 lb of forage per lb of DG supplemented. The range was relatively large (0.268 to 0.622) but the calculation is by difference which exaggerates the variation (includes variation from both the control and supplemented cattle). We conclude that in a grazing situation at a moderate stocking rate one can expect to have a reduction in grazed forage intake of 0.5 lb for each lb of DG (dry matter) supplemented. Calves fed harvested forage increased gain by 0.18 lb/day for each 1.0 lb of DG dry matter supplemented. The grazing yearlings increased gain somewhat less (0.13 lb/day) in response to supplementation of 1.0 lb of DG. This might suggest a slightly larger reduction in grazed forage intake — perhaps 0.6 to 0.7 lb rather than 0.5 lb as stated above. Measuring intake on pasture is very difficult and has not been demonstrated with DG supplementation on pasture. The 0.5 lb substitution rate may be conservative. Yearlings supplemented with 4.0 lb DG gained 53.0 additional lb in 100 days at a cost of $24. Using five-year average prices, the value of the additional gain was $31.10. Approximately 189 lb of forage would be saved at a value of $7.60 for a total return of $38.70. At the 7.5 level of supplemented DG, the cost would be $45 for DG. An additional 89 lb of gain worth $49.96 would be obtained plus $13.66 for reduced forage use for a total of $63.62. Alternatively, the breakeven price one could pay for the DG would be $185 and $133/ton for the 4.0 and 7.5 lb supplementation levels respectively.

Because the yearlings that were finished after supplementation on grass gained at similar rates and efficiencies, we can assume the extra weight gain on grass is maintained to market with no additional costs. The five-year average price for that gain is $78/cwt. With the value of the extra gain and forage savings, the yearlings supplemented with 4.0 lb/day DG would return $48.94 for $24.00 invested in DG. Those supplemented with 7.5 DG/day would return $83.08 for $45.00 invested in DG. It would be necessary to retain ownership through the feedlot to realize these returns.

Table 2. Feedlot performance after distillers grains supplementation on grass.

Experiment	%BW[d]	G/F[e]	BW[f]	%BW[d]	G/F[e]	BW[f]
KS[a]	.50	-6.2%	+92	1.00	-9.6%	+150
NEBR '06[b]	.50	+3.7%	+40	1.00	+4.3%	+41
Unpub[c]	—	—	—	.90	+2.4%	+65
Unpub[c]	.58	+2.0%	+22	—	—	—

[a]Kansas State Southeast Ag. Research Center, 2006 Report.
[b]Nebraska Beef Cattle Reports.
[c]Unpublished.
[d]Distillers grains supplementation level while grazing.
[e]Percentage change in G/F for supplemented vs controls.
[f]Body weight difference at slaughter compared to controls.

Table 3. Substitution rate of distillers grains for forage.

Experiment	Control ADG	lb forage/lb DG[b]
NEBR '03[a]	.99	.268
NEBR '05[a]	1.79	.531
NEBR '05[a]	1.08	.492
NEBR '06[a]	1.83	.600
NEBR '07[a]	2.03	.364
NEBR '07[a]	1.99	.622
Mean	1.62	.480

[a]Nebraska Beef Cattle Reports.
[b]lb forage replaced by supplementing 1 lb dry matter from distillers grains.

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