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Summary

A three-year study evaluated supplementing ethanol co-products mixed with low-quality forage to cow-calf pairs grazing smooth bromegrass as a method to replace grazed forage intake. Supplementing a 30:70 modified distillers grains plus solubles:cornstalks mixture reduced estimated grazed forage intake by approximately 40%. Doubling the stocking rate and supplementing did not impact cow or calf performance. A summer supplementation program designed to reduce grazed forage intake is a viable strategy for increasing stocking rate if forage for grazing is limited.

Introduction

As grass for summer grazing becomes more limited, investigating alternative management strategies to increase stocking rate is warranted. A practical approach to increasing stocking rate is to replace a portion of the grazed forage consumption of cattle on pasture with supplementation of low-quality crop residues mixed with co-products. Grazed forage intake may be limited due to the fiber and bulk from residues, and adding co-products to such forages improves residue palatability. Historically, co-products and residues are economical sources of energy, which favor their use as a supplement. Therefore, the objectives of this experiment were to evaluate the effect of supplementing modified distillers grains plus solubles (MDGS) mixed with low-quality forage to cow-calf pairs grazing smooth bromegrass on: 1) grazed forage intake and 2) cow and calf performance.

Procedure

Multiparous, nonpregnant, crossbred (Simmental × Angus), lactating beef cows (n = 48) with spring-born calves at side were utilized in a three-year experiment conducted on smooth bromegrass pastures at the University of Nebraska–Lincoln Agricultural Research and Development Center (ARDC) located near Mead, Neb. In a randomized complete design, cow-calf pairs (n = 16/year; 4/pasture) were stratified by total pair BW and assigned randomly within strata to one of two treatments with two replications (pasture) per treatment per year (total n = 12). Treatments consisted of pastures stocked at: 1) the recommended stocking rate of 3.82 AUM/ac without supplementation (CON), or 2) double the recommended stocking rate (7.63 AUM/ac) with supplementation (SUPP). Pairs continuously grazed smooth bromegrass pastures from early-May until mid-September annually (130 days). Data are reported as pooled across all years for 2011, 2012, and 2013.

The supplement fed in all years was a 30:70 MDGS:ground cornstalks (DM) mixture designed to replace approximately 50% of the grazed forage DM intake, thereby allowing for the twofold increase in stocking rate by the SUPP pairs. Ground cornstalks (1-inch grind) were used to provide rumen fill while MDGS was added at a minimal level necessary to encourage consumption of the low-quality forage. Based on data with confined cow-calf pairs fed average quality (IVDMD = 53%) forage, predicted total forage DMI was calculated as 2.58% of average pair BW throughout the grazing period (*The Professional Animal Scientist*, 28:664-669). Therefore, total estimated DMI was calculated retrospectively based on average pair BW for each treatment. It was anticipated grazed forage intake would be greatest early in the grazing season. As a result, pairs were supplemented at 0.6% of BW (DM) at trial initiation with increasing levels throughout the season on a weekly basis to account for 1) declining grazed forage quality and quantity and 2) increasing consumption by the calf. The supplement was mixed fresh daily and water was added to reduce the DM content to 30% to enhance palatability. To encourage pairs to begin consuming the supplement, a 50:50 MDGS:cornstalks mixture was initially fed with cornstalks increasing and MDGS decreasing by 2 percentage unit increments daily until the 30:70 ratio was obtained.

Two-day consecutive cow and calf BW measurements were recorded to determine cow BW change and calf gain throughout the grazing period. Prior to collecting weights, pairs grazed a common pasture for a minimum of five days prior to initiation and upon completion of the trial to minimize variation in gastrointestinal tract fill. All pairs were group fed once daily in metal feed bunks with at least 3 feet of bunk space per pair. Bunks were evaluated and feed refusals (if present) were removed and sampled daily. Refusals were sampled for DM determination using a 60°C forced air oven for 48 hours, and DMI was subsequently calculated on a pasture basis.

Data were analyzed as a randomized complete design with pasture serving as the experimental unit. All analyses included the fixed supplementation treatment effect with year considered a random effect. Since the

Table 1. Performance of cow-calf pairs grazing smooth bromegrass pastures by treatment.

Item	Treatment		SEM	*P*-value
	CON[1]	SUPP[2]		
Pastures (n)	6	6		
Cow				
Age, year	8.6	9.0	0.7	0.69
Initial BW, lb	1241	1235	25	0.73
Ending BW, lb	1296	1316	41	0.46
ADG, lb	0.42	0.62	0.13	0.19
Calf				
Age, day	47	50	3.3	0.48
Initial BW, lb	177	194	12	0.18
Ending BW, lb	470	502	41	0.08
ADG, lb	2.27	2.37	0.17	0.31
Grazed forage intake[3], lb DM/pair	41.0	26.3		
Supplement intake[3], lb DM/pair	—	15.7		
Total DMI[3], lb/pair	41.0	42.0		

[1]Pairs grazed at recommended stocking rate (3.82 AUM/ac) without supplementation.
[2]Pairs grazed at double the recommended stocking rate (7.63 AUM/ac) and received 50% of estimated daily intake of 30:70 MDGS:cornstalks mixture, DM.
[3]Predicted values.

proportion of steer and heifer calves was not equal between treatments, calf sex was initially included as a covariate in the model statement, but was ultimately removed as it was not significant for all variables tested. Significance was declared at $P \leq 0.05$.

Results

Cattle performance and supplement intake data are presented in Table 1. By design, initial cow BW was not different between treatments. Although not statistically significant, both ending cow BW and gain were numerically greater for SUPP than CON cows. Cows receiving supplement had 0.20 lb/day greater ADG than CON cows. Initial calf BW and gain were not significantly different. However, a numerical improvement in ADG resulted in a tendency for greater ending BW for SUPP calves. The small numerical increase in performance by SUPP pairs is logical, given the supplement would contain slightly more energy than the grass it is replacing. While no attempt was made to measure the amount of supplement consumed by the calves, they were observed at the bunk with their dams and appeared to be eating supplement daily.

Across all three years, average total pair BW was 1,592 and 1,624 lb for CON and SUPP pairs, respectively. Based on these weights, total estimated DMI was calculated to be 41 and 42 lb per pair daily for CON and SUPP, respectively. For SUPP pairs, supplement DMI averaged 15.7 lb daily throughout the season, and by difference grazed forage intake was 26.3 lb per day. This suggests the supplement reduced estimated grazed forage intake by 37%, or 1.0 lb of supplement replaced 0.94 lb of grazed forage. Similar research conducted in the Nebraska Sandhills (*2010 Nebraska Beef Cattle Report*, pp. 21-23) with cow-calf pairs demonstrated grazed forage replacement values of approximately 40 to 50% when a 30:70 wet distillers grains plus solubles:wheat straw (DM) supplement was fed. However, grazed forage intake was not reduced when yearling steers were supplemented only dried distillers grains plus solubles (*2008 Nebraska Beef Cattle Report,* pp. 28-30). This indicates using fibrous low-quality forages in the supplement is essential to reducing DMI and achieving significant forage replacement rates. The pastures in the current study received the same treatments for four consecutive years, and little difference between treatments was observed visually in condition or residual forage at the end of the grazing season each year. Additional N and P from the supplement that is returned to the soil via urine and feces are also beneficial for pasture productivity.

Supplementing cow-calf pairs grazing smooth bromegrass pastures with a mixture of MDGS and corn residue reduced estimated grazed forage intake without impacting animal performance. This may be a feasible management practice to increase stocking rate when pasture is limited by drought or demand. This technique may be more appropriate in Eastern Nebraska than on upland Sandhills range because there are likely fewer risks associated with potentially overgrazing smooth brome pasture. Likewise, distillers grains and crop residues are more abundant and may be more economically supplemented in Eastern Nebraska. This area of the state is also where greater competition for grazing acres may exist.

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