Energy and Protein Supplementation Strategies to Improve Summer Weight Gains for Stocker Cattle Grazing Summer Tall-Grass Prairie

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Story in Brief

Forty-eight spring born steers (509 lb) grazing tall grass prairie were utilized to evaluate the use of energy, protein and the combination of the two on summer weight gains. Cattle were individually fed and offered corn (2.0 lb daily) or no corn during the first half of the grazing season (April 15 – July 15), and either protein (1 lb pelleted cotton seed meal) or no protein during the second half of the grazing season (July 16 – Sept 22). There was no interaction between corn and protein supplementation for any variable measured in this study. Energy offered early in the grazing season improved animal performance during that time by 13%, and increased ($P<.05$) mid summer weights by 26 lbs. Additionally, protein supplementation improved ($P<.05$) late summer daily gains by 18% compared to non supplemented steers. Both supplement strategies increased ($P<.10$) final body weight compare to non supplemented steers. Overall both supplementation practices improved body weight gain for steers consuming summer tall-grass prairie. Additionally, there was no interaction between the two supplementation treatments suggesting that the treatments are additive in nature.

Key Words: Stocker Cattle, Tall-Grass Prairie, Summer Supplementation, Energy, Protein

Introduction

Supplementation practices for stocker cattle grazing native range typically involve some form of protein supplementation during the late summer or winter periods. Protein supplementation during these times is used to overcome the first limiting nutrient and typically yields high supplementation efficiencies. Energy in the form of corn is less commonly used in supplements for cattle on grass due to the impact of starch on fiber digestion, possible substitution issues, digestive upsets, and interactions with other nutrients (Bodine et al., 2001), which ultimately impact animal performance. However, strategically utilizing energy supplementation when forage has a high DIP:TDN ratio may improve utilization of available forage and positively impact animal performance (Basurto et al., 2000, La Manna et al., 2001). The purpose of this study was to evaluate early season energy supplementation in conjunction with traditional practices of late season protein supplementation on the weight gains of stocker cattle grazing summer tall-grass prairie.

Materials and Methods

Animals. Forty-eight spring-born, English x Continental steers were received at the OSU Bluestem Research Range and grazed a common tall-grass pasture prior to and during the study. All animal weights during the study were collected following an overnight (14 h) removal of access to feed and water.

Diets and Feeding. During the first half of the grazing season (April 15 - July 15) half of the steers received either 2.0 lbs of corn (CORN) or no corn (NOCORN). Following the first half of

the grazing system (July 16 – September 22) steers assigned to the protein supplement treatment were offered 1.0 lb of pelleted cottonseed meal (PROT) or no protein (NOPROT). Steers were individually fed supplements in a covered stall barn at 0800. While on pasture, steers had adlibitum access to water, loose salt, and mineral mix for the complete duration of the study.

Statistical Analyses. Experimental design for the study was a completely randomized design with a 2 x 2 factorial arrangement of treatments and was steer considered the experimental unit and included in the model as a random variable. Fixed effects included in the model were supplemental treatments. Response variables were analyzed using PROC MIXED (SAS Inst. Inc., Cary, NC). Means were calculated using LSMEANS and separated using least significant difference.

Results and Discussion

Animal Performance. There was no corn x protein interaction for any variable measured in the study therefore only main effects are reported. The average weight for the steers at the initiation of the study was 509 lbs. During the first half of the grazing season CORN steers had greater (P<.01; Table 1) ADG than steers not receiving corn. Therefore, body weight at the end of the corn supplementation was greater (P<.10) for the CORN than NOCORN. Additionally, while late summer gains were similar between the corn treatments overall ADG and final body weight were greater (P<.10) for the CORN compare with NOCORN.

Table 1. Summer weight gains for steers grazing summer tall-grass prairie supplemented with or without corn for the first half (April 15 – July 15) of the grazing season

	CORN[1]	NOCORN	SE[2]	P- value
Number of steers	24	24		
Initial weight, lb (April 15)	510.5	508.3	10.1	.87
Mid Weight, lb (July 15)	681.4	655.8	11.5	.09
Ending Weight, lb (September 22)	761.6	739.4	12.2	.10
Early season ADG, lb (April 15 – July 15)	1.74	1.50	.04	.01
Late season ADG, lb (July 16 – September 22)	1.43	1.49	.08	.59
Overall ADG, lb (April 15 – September 22nd)	1.74	1.60	.04	.03

[1] CORN = 2.0 lbs of corn daily, NOCORN = no corn supplement

[2] SE = Standard Error of the means

Protein supplementation increased (P<.05; Table 2) ADG during the late season for PROT compared with NOPROT. Additionally, final body weight and overall ADG was greater (P<.05) for the protein supplemented cattle.

Overall the addition of supplemental energy and/or protein increased summer weight gains of beef steers. Therefore, use of energy supplements in the early growing season can improve animal performance which may be a viable option to increase overall gains in operations that typically utilize a season long grazing system. Additionally, supplementation facilitates the use of feed additives that might not be available in a mineral mix or offered during this time of year via supplemental feeding. Efficiency of supplement conversion for the corn was 8.3 lbs of corn per pound of supplement, and 3.8 lb of supplement per pound of gain for the protein supplement which is similar to previous reported supplement conversions for cattle grazing tall-grass prairie. Obviously economics dictate supplementation strategies, however there was no interaction between these two variables suggesting that they are additive in nature and can increase total season weight gain over using a single supplemental strategy alone.

Table 2. Summer weight gains for steers grazing summer tall-grass prairie supplemented with or without protein during the second half (July 16 – September 22) of the grazing season

	PROT[1]	NOPROT	SE[2]	P- value
Number of steers	24	24		
Initial weight, lb (April 15)	517.3	501.3	10.2	.25
Mid Weight, lb(July 15)	674.7	662.7	11.5	.46
Ending Weight, lb (September 22)	763.5	737.5	11.2	.09
Early season ADG, lb (April 15 – July 15)	1.60	1.64	.08	.54
Late season ADG, lb lb (July 16 – September 22)	1.59	1.33	.08	.04
Overall ADG, lb (April 15 – September 22)	1.72	1.63	.04	.05

[1] PROT = one pound pelleted cottonseed meal, NOPROT = no supplemental protein

[2] SE = Standard Error of the means

Literature Cited

Bodine et al. 2001. Okla. Ag. Exp. Sta. Res. Rep P- 986:10.

Basurto et al. 2000. Okla Ag. Exp. Sta. Res. Rep P-980:28.

La Manna et al. 2001. Okla. Ag. Exp. Sta. Res. Rep P- 986:18.