EFFECT OF A REVALOR-G® IMPLANT AND SOURCE OF SUPPLEMENTAL PROTEIN ON WEIGHT GAIN OF STEERS WINTERED ON DORMANT TALLGRASS PRAIRIE OR OLD WORLD BLUESTEM

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Story in Brief

A study was conducted to evaluate the effects of a single Revalor-G® implant on live weight gains of steers grazing either dormant native tallgrass prairie (TP) or old world bluestem (OWB) range and receiving one of two protein supplements. Four hundred steers were assigned to eight pastures (4 pastures TP, 4 pastures OWB), fifty steers per pasture. Twenty-five steers in each pasture were implanted and 25 were not. Steers were fed either 41% crude protein cottonseed meal (CON) or a 41% crude protein urea-containing supplement. The urea-containing supplement consisted of 65.6% cottonseed meal, 28.5% wheat midds, 2.5% urea, and 3.3% limestone. All supplements were fed at a rate of 2.25 lb/day and were prorated for a 3 d/wk feeding schedule. All steers had free access to water and salt throughout the trial. Implanted steers had higher average daily gains than non-implanted steers (.42 vs .31 lb/day). Final weights and ADG of steers did not differ between the two types of forage or sources of supplement.

(Key Words: Growing Cattle, Supplementation, Winter, Implant.)

Introduction

Growing cattle grazing dormant native tallgrass prairie and(or) old world bluestem are usually fed supplemental crude protein and often the target gain of these cattle is .5 lb/day. However, cattle grazing dormant forage and gaining this amount of weight per day are not implanted in most operations. Thus, research conducted during forage dormancy with implanted cattle is limited. Horn et al. (1978) observed increased average daily gains of light weight heifers from .57 lb/day for non-implanted heifers to .74 lb/day for heifers receiving an implant. Heifers grazed wheat pasture in which forage availability was very low. Net returns could be increased from implanting if the value of increased weight gain exceeded the cost of implanting.

Cost of protein supplement is a major input cost in dry wintering programs. A supplement that contained a portion of the crude protein as urea could decrease the cost of protein supplements. Koster et al. (1995, 1996) fed protein supplements in which several different levels of urea were used to replace degradable intake protein (DIP) from natural protein sources to steers consuming native tallgrass prairie. Koster et al. (1996) reported that urea could replace up to 40% of the supplemental DIP in a supplement of 30% total CP without altering forage intake or digestion of steers fed low quality tallgrass prairie hay.

The objective of this study was to determine the effect of a Revalor-G® implant and source of protein supplement on weight gain of steers grazing either dormant tallgrass prairie or old world bluestem range.

Materials and Methods

Study Site. The study site was located at the Bluestem Research Range 11.3 km southwest of Stillwater, OK. Cattle were allowed to graze either native tallgrass prairie (TP) or plains old world bluestem (Bothriochloa ischaemum var. Plains: OWB) from December 16, 1996 through March 31, 1997 (105 days). Old world bluestem pastures received 100 lb of N applied early in the growing season and were stocked at very light rates throughout the summer. As a result, forage was abundant prior to initiation of the winter trial. Forage availability was adequate throughout the trial in all TP and OWB pastures.

Cattle. Four-hundred mixed age and breed stocker steers (avg BW 476 $\pm$ 48.3 lb) originated in Mexico were randomly allotted in equal groups of 50 steers to one of eight separate pastures (4 TP, 4 OWB) of approximately 50 acres per pasture. An estimation of age of steers was made by examination of tooth development. Approximately 44% of the steers were 18 months of age or younger, 53% were 18 months to 2 years of age, and 3% were 2 years of age or older. Steers received either 2.25 lb/d of 41% crude protein cottonseed meal (CON) or 2.25 lb/d of a 41% crude protein, urea-containing supplement (UREA; Table 1). The urea-containing supplement consisted of (DM basis); cottonseed meal (65.6%), wheat midds (28.6%), urea (2.5%), and limestone (3.3%). Two groups of steers received UREA and 2 groups received CON within each forage type. Urea was added to provide 26% of the supplement degradable intake protein (DIP) in the UREA supplement.

All supplements were pelleted and prorated to a 3 d/wk feeding schedule. Twenty-five steers in each group were implanted with Revalor-G® on December 16, and 25 steers were not implanted.

All cattle were weighed December 16, 1996, and April 1, 1997. In an attempt to minimize fill and equalize it across all treatments, all cattle were placed in the same tallgrass prairie pasture four to five days prior to both weigh dates. Steers were allowed to consume forage and a common supplement during this time period. Approximately 12-16 hours prior to weighing, cattle were moved to a small trap devoid of grass. After steers were placed in the trap, water was withheld until weighing.

Forage. Diet samples were collected once on January 21 (Table 2), using eight ruminally cannulated animals. Four ruminally cannulated animals were assigned to each forage type in two separate pastures (two animals per pasture). Eight days after placement of these animals on pasture, diet quality samples were collected by removing ruminal contents, allowing animals to graze for 1.5-2 h, then removing the masticate from the rumen and replacing ruminal contents (Lesperance et al., 1960). Diet quality samples were taken prior to feeding of supplements. All diet quality samples were analyzed for DM, ash, Kjeldahl N, NDF, ADF, and IVDMD.

Statistical Analysis. All data were analyzed using least squares analysis of SAS (1985) as a replicated split-plot with a 2 x 2 x 2 factorial arrangement of treatments. Type of forage and supplement were the main plots and implant treatment was the sub-plot. The error term used to test pasture and treatment effects was replicate (pasture x treatment). The residual error, implant x rep (pasture + treatment), was used to test implant effects. All two and three way interactions were analyzed. There were no interactions (P>.12) so main effects were analyzed and reported.

Results and Discussion

Diet quality of the native tallgrass prairie and the old world bluestem was similar (P>.05), so similar performance of steers grazing these two types of forage would be expected unless other factors limited forage intake. Final weights and average daily gains of steers (Table 3) did not differ (P>.10) between forage types.

Final weights and ADG of implanted steers were greater (P<.05; Table 4) than the non-implanted steers. Improved weight gain (.42 lb/day vs .31 lb/day) of .11 lb/day for implanted cattle would be an increase of approximately 11.6 lb of body weight compared with nonimplanted steers over the entire trial.

No differences (P>.10; Table 5) were detected in final weight or ADG between the CON or the UREA supplement. Thus, the UREA supplement did not have any negative effects on gain of the steers. Addition of urea to provide 26% of supplemental DIP in a 41% CP supplement did not appear to affect forage intake or digestibility of either dormant tallgrass prairie or OWB as measured by animal performance. Cost of UREA was $207.00 per ton while the CON supplement cost $231.00 per ton at the initiation of the trial. The cost savings for the urea-containing supplement was $24.00 per ton for a total savings of $567.00 ($2.83/steer) for the UREA as compared with the CON supplement over the duration of the trial.

Interpretation of these results is limited because there was no negative control used in this study due to the fact that there were not enough pastures to include an additional treatment. Cattle fed the urea-containing supplement may have performed similarly to the control supplement even if the urea had been removed from the urea-containing supplement. Further research is needed to determine the effect of including urea in supplements for cattle grazing forages low in crude protein.

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Acknowledgment

Appreciation is expressed to Hoechst-Roussel Agri-Vet company for their support of this study.

Table 1. Feedstuff and nutrient composition of urea-containing (UREA) supplement[a].

Ingredients	% of supplement
Cottonseed Meal (44.0% CP, 57.0% DIP)	65.6
Wheat Midds (18.4% CP, 77.2% DIP)	28.6
Urea[b] (288.0% CP, 100% DIP)	2.5
Limestone	3.3

[a]All values expressed on DM basis.

[b]Urea supplied 17.5% of total supplement CP and 26% of total supplement degradable intake protein.

Table 2. Chemical composition of masticate samples from native tallgrass prairie and old world bluestem[a].

Item	Native[b]	OWB[c]	SE[d]
DM, %	93.5	93.3	.23
	% of DM		
Ash	8.1	5.8	.59

CP	5.2	4.8	.26
NDF	68.0	72.6	1.73
ADF	43.8	44.6	.78
IVDMD	52.6	55.6	2.13

[a]n = 8

[b]Native: Native Tallgrass Prairie: 1/21/97.

[c]OWB: Old World Bluestem: 1/21/97.

[d]Standard error of the means.

Table 3. Effects of forage type on weight gain of steers.

	Native[a]	OWB[b]	SE[c]
Number of Pastures	4	4	-
Starting weight (lb), 12/16/96	476	475	1.6
Final weight (lb), 4/1/97	520	508	5.8
ADG (lb)	.42	.31	.054

[a]Native: Native Tallgrass Prairie.

[b]OWB: Old World Bluestem.

[c]Standard error of the means.

Table 4. Effects of a Revalor-G® implant on weight gain of steers[a].

	Non-Implanted	Revalor-G®	SE[b]
Starting weight (lb), 12/16/96	472	480	3.4
Final weight (lb), 4/1/97	504[c]	524[d]	3.59
ADG (lb)	.31[c]	.42[d]	.002

[a]n = 8 groups of 25 steers per treatment.

[b]Standard error of the means.

[c,d]Means within a row without common superscript differ (P<.05).

Table 5. Effects of type of supplement on weight gain of steers[a].

	Control[b]	UREA[c]	SE[d]
Starting weight (lb), 12/16/96	475	476	1.6
Final weight (lb), 4/1/97	515	513	5.8
ADG (lb)	.38	.35	.054

[a]n = 4 groups of 50 steers per treatment.

[b]Control = 41% CP cottonseed meal fed at 2.25 lb/day.

[c]Urea = Urea-containing supplement consisted of : 65.6% cottonseed meal, 28.6% wheat middlings, 2.5% urea, and 3.3% limestone.

[d]Standard error of the means.

1997 Research Report