SLOW-RELEASE SELENIUM BOLUSES FOR GROWING CATTLE GRAZING TALLGRASS PRAIRIE

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Story in Brief

Thirty-seven fall-born calves, that had been weaned in late April, grazed rangeland from May to October. Half of the calves were administered a slow-release selenium bolus at the start of grazing season. Performance was similar to that noted in previous trials with cattle of this type. Cattle receiving the bolus had higher whole blood Se at midseason and at the end of the grazing season. According to guidelines from the laboratory conducting blood Se analyses, blood Se levels in the unbolused cattle were marginal while levels in the bolused cattle were adequate. Despite the elevated blood Se levels, weight gain was not improved by the Se bolus. Also, blood Se was not correlated with weight gain. These data suggest that, despite "marginal" blood levels, Se intake was adequate to maintain performance of growing calves of this type grazing rangeland in this region.

(Key Words: Range, Minerals, Selenium, Grazing, Cattle.)

Introduction

Selenium is an element required in trace amounts by livestock. Oklahoma is generally not considered a state with widespread Se deficiencies due to adequate levels in soils and vegetation. However, signs of Se deficiency or responses to Se supplementation are reported occasionally. The following trial was conducted to determine if supplemental Se in the form of a slow-release bolus would affect weight gains by steers grazing rangeland in central Oklahoma.

Materials and Methods

Thirty-seven beef steers were weaned in late April. The calves were progeny of Angus bulls and Angus X Hereford or Limousin X Angus X

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Hereford cows. All cattle grazed a common 160 acre pasture during the trial which extended from May 9 to October 4. Stocking rate for the grazing season was .72 AUM/acre. The predominant range sites on the area were Red Clay Prairie and Shallow Prairie. These sites are associated with a Masham silty clay loam, Grainola clay loam and Lucien fine sandy loam soils. The range sites were in high good to excellent range condition with little bluestem and tallgrasses accounting for the majority of forage production.

On May 9, the cattle were weighed, treated for internal parasites, and assigned randomly to either a control group (18 head) or to a group receiving a slow-release selenium (Se) bolus (19 head). Samples of whole blood were collected in heparinized vacuum tubes from 11 head in each group. The blood samples were mailed to the Schering-Plough Animal Health Laboratory, Elkhorn, Nebraska, for Se analysis. Weights and blood samples were obtained again on July 25 and October 4.

A mineral mix containing 50% salt and 50% dicalcium phosphate was available free-choice throughout the trial. In addition, protein supplement (38% CP) was fed to all cattle from July 25 until October 4. The supplement was offered three times weekly in prorated amounts to provide a total of 7 lb/head/week.

The data were analysed as a completely random design using least squares analysis. Steers were experimental units.

Results and Discussion

Blood Se was similar between the bolused and unbolused steers at the initiation of the grazing season (Table 1). However, in July the concentration of Se was 100% higher in the blood of steers that received the Se bolus. In October, blood Se remained 57% higher in the cattle that received the bolus. These results indicate that the bolus was successful in changing the Se status of the steers and the effect lasted through an extended grazing season.

According to the guidelines provided by the laboratory performing the blood analysis, blood Se concentrations of .06-.10 ppm are marginal while concentrations in excess of .10 ppm are considered adequate (Schering-Plough Animal Health, personal communication). Also, the guidelines state that concentrations "as high as .20 ppm may be desirable for maximum effect".

Steer performance is outlined in Table 2. Average daily gains were similar to gains noted in previous trials with cattle of this age and weight grazing tallgrass prairie (McCollum and Lusby, 1989; Lusby and McCollum, 1990). The Se bolus did not affect steer performance despite the significant increases in blood Se.

Table 1. Blood Se concentrations in steers.

Item	No Se	Se bolus	SE[a]	OSL[b]
	------lb/head--------			
Blood Se, ppm				
5/9	.14	.13	.013	.62
7/25	.08	.16	.013	<.01
10/4	.07	.11	.006	<.01

[a] Standard error, n=11.
[b] Observed significance level.

Table 2. Weights and performance of steers.

Item	No Se	Se bolus	SE[a]	OSL[b]
	------lb/head--------			
Initial wt.	440	423	--	--
Daily gain				
5/9 - 7/25	1.22	1.11	.07	.27
7/25 - 10/4	1.11	1.10	.05	.88
5/9 - 10/4	1.17	1.10	.04	.33

[a] Standard error, n=18.
[b] Observed significance level.

In Figure 1, the seasonal average daily gains of the cattle were regressed on blood Se in July. This demonstrates that weight gains by the cattle, the economic trait of interest in this study, were not dependent upon blood concentrations of Se and utilization of blood concentrations as an indicator of Se need would have been misleading.

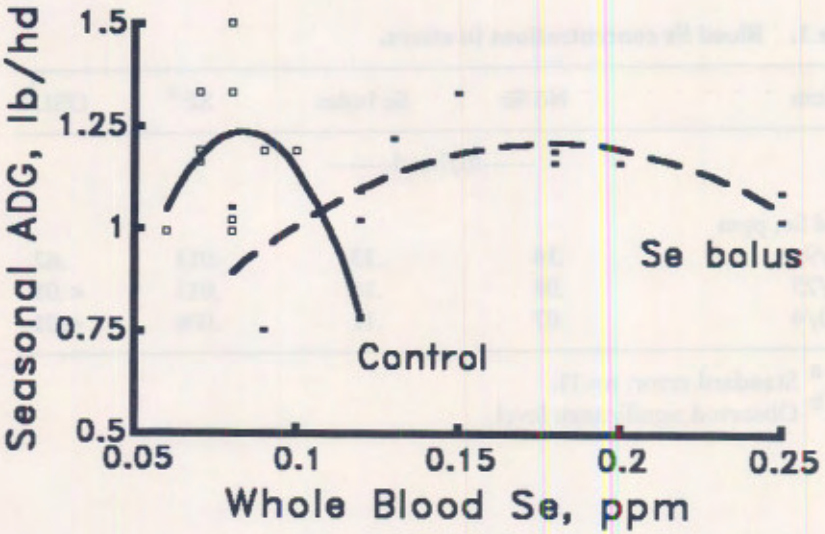

Fig. 1. Relationship between blood Se concentrations at midseason and average daily gain for the entire grazing season.

Literature Cited

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