

BLOOD AND PERFORMANCE RESPONSES TO SLOW-RELEASE SELENIUM BOLUSES FOR CATTLE GRAZING TALLGRASS PRAIRIE

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Story In Brief

One hundred twenty crossbred beef steers were grazed from April to July and then 60 were grazed from July to September at the Pawhuska research station (Pawhuska, Oklahoma). Half of the cattle were administered a slow release Selenium bolus at the beginning of the grazing season. In July blood levels were determined to be marginal for unbolused cattle while levels were adequate for cattle receiving a bolus. Although blood levels were different, performance was not affected in either an early or season long grazing program. These data suggest that, despite "marginal" blood levels, selenium intake was adequate to maintain performance of growing calves of this type grazing rangeland in this region.

(Key Words: Range, Selenium Bolus, Grazing, Beef Cattle.)

Introduction

Selenium (Se) is a trace element required by livestock. It, along with vitamin E, has been shown to prevent white muscle disease in young ruminants (Muth et al., 1958). Selenium is also a component of the enzyme glutathione peroxidase that has antioxidant properties and assists in preventing membrane damage (Rotruck, 1973). Although Oklahoma is not usually considered a state with Se deficiency, occasional occurrences are reported. The following trial was conducted to determine how gains of cattle grazing rangeland in Osage county would respond to Se supplementation in the form of a slow-release bolus.

Materials and Methods

One hundred crossbred beef steers were received April 1 at the Pawhuska research station in north central Oklahoma. The steers were weighed, tagged,

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routinely processed and allotted to pens for a three week receiving period. On April 17 the steers were weighed full, re-vaccinated and implanted with Synovex-S. Half of the cattle received a slow release Se bolus designed to deliver 3 mg per day for 4 months and half were designated as controls. All steers were randomly assigned to one of four pastures with 30 steers per pasture. At this time ten steers from each group were bled via venipuncture for determination of beginning serum Se levels.

The study site is a mosaic of fine and coarse textured soils producing tallgrass prairie and oak-hickory forest vegetation types typical of the Cross Timbers resource area. Soils consist of a Coweta-Bates, Sleadman-Coweta, Darnell-Stephenville, Niotaze-Darnell complex.

On July 25, after a 99-day early grazing period, all animals were brought off pasture weighed, bled and reimplanted. Thirty steers from each treatment were returned to pasture for continued grazing and the remainder were placed in a feedlot. On September 21, the remaining steers were gathered off pasture weighed and placed in a feedlot. All blood samples were analyzed for Se by Schering-Plough Animal Health laboratory Elkhorn, Nebraska.

A mineral mix containing 50% salt and 50% dicalcium phosphate was available free-choice throughout the trial. In addition, protein supplement (40% CP.) was fed to all cattle from July 25 until the end of the trial. The supplement was offered on Monday, Wednesday, and Friday at a rate of 2.3 lbs per head.

The data were analyzed as a completely randomized design using least squares analysis. Steers were experimental units.

Results and discussion

Blood Se levels were not different between bolused and unbolused steers at the beginning of the grazing season (Table 1). However, in July the concentration of Se was 27% higher in the blood of Se-bolused steers (.135 vs

Table 1. Blood Se concentrations in ppm.

Item	No Se	Se bolus	SE ^a	OSL ^b
Date				
4/17	.21	.23	.18	.18
7/25	.098	.135	.026	.06

^a Standard error of difference.

^b Observed significance level.

Table 2. Weights and performance of steers.

Item	No Se	Se bolus	SE ^a	OSL ^b
	-----lb/head-----			
Initial wt.	516	517	---	---
Daily gain				
4/17-7/25	1.64	1.70	.08	.22
7/25-9/21	1.00	.95	.14	.74
4/17-9/21	1.40	1.42	.08	.77

^a Standard error of difference.

^b Observed significance level.

.098 ppm). According to the guidelines provided by the laboratory performing 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).

Steer performance expressed as average daily gain (ADG) is summarized in Table 2. Although blood Se levels were significantly increased performance in any phase was not affected. Based on the results of this study it appears unlikely that supplemental Se would be a profitable management practice.

Literature Cited

- Muth, O.H., et al., 1958. Effects of selenium and vitamin E on white muscle disease. *Science* 128:1090.
- Rotruck, J.T., et al., 1973. Selenium: biochemical role as a component of glutathione peroxidase. *Science* 179:588.