

Efficacy of Drought Stressed Soybean Supplementation for Fall Calving Beef Cows

J.D. Steele, D.L. Lalman, R.P. Wettemann, and C.R. Krehbiel

Story in Brief

Fifty-eight fall calving cows and heifers were used to determine the effects of feeding whole or rolled drought stressed soybeans as a winter supplement to bermuda grass hay during lactation. Cows and heifers were blocked by weight, age, and calving date, and then allotted to one of three supplement treatments. Treatments were whole soybeans (WSB), rolled soybeans (RSB), or no supplement (CON). The supplementation period (100 d) was December 18 through March 28. Supplemented cows were individually fed in portable feed wagons three days per week. There were no significant differences in cow weight or condition score changes between the three treatments. Calves nursing cows receiving supplement gained more weight during the supplementation period, although weaning weight was not different. Rebreeding rates were greater than 85 %, and were not affected by the treatments. We conclude that drought stressed soybeans are a viable and economical supplementation source for lactating beef cows. Due to a relatively mild winter and adequate nutrients in the forage source, supplementation in this situation was beneficial only to the calves.

Key Words: Soybeans, Beef Cows, Winter Supplementation, Fall Calving

Introduction

A frequent problem associated with soybean production in Oklahoma is drought conditions during the late summer months when the plant is filling the seed head. These conditions cause damage to the grain being produced and a new problem arises in marketing this damaged grain. High quality soybeans have proven to be a good source of energy and protein in beef cattle rations and supplements (Albro et al., 1993). Some research conducted in South Dakota has shown that frost damaged immature soybeans are a viable feedstuff for ruminants (Loeshe et al., 1988). High oil content and the presence of trypsin inhibitor have caused skepticism about the use of soybeans for livestock feed. A separate OSU study indicated that damaged soybeans can be an effective protein source for gestating beef cows (Steele et al., 2002). This experiment was designed to evaluate the use of drought stressed soybeans, fed whole or rolled, as a winter protein source for lactating beef cows.

Materials and Methods

This trial was conducted at the Eastern Oklahoma Research Station, located near Haskell, Oklahoma. Fifty-eight fall calving cows and heifers were allotted by age, weight, body condition score (BCS), and calving date to one of three treatments. The three treatments were: 2 lb/d of whole soybeans (WSB), 2 lb per d of rolled soybeans (RSB), and no supplement (CON). Soybeans were fed at this rate to deliver .77 and 1.95 lbs per d of crude protein and total digestible nutrients, respectively. Cows had ad libitum access to bermudagrass hay (crude protein = 8.7%, neutral detergent fiber = 79%) that was harvested at the same location. Cow

weights and body condition scores (1-9 scale), along with calf weights were taken after overnight withdrawal from feed and water on days 0, 37, and 100 of the supplementation period and at weaning. Initial cow weight and body condition score was 1084 ± 33 lbs. and $4.75 \pm .11$, respectively.

The supplementation period began on December 18, 2000 and continued through March 28, 2001 for a total of 100 d. The WSB and RSB cows were fed 4.67 lb of beans on Monday, Wednesday and Friday each week (equivalent to 2 lb/hd/d). Portable feed wagons equipped with individual cow stanchions were used to deliver the supplements on an individual basis. The drought stressed soybeans used for this study were purchased from a producer west of Stillwater, Oklahoma and were harvested in October, just prior to the initiation of trial. The soybeans were 3502 ASGRO variety, weighed 56 lb/bu. and contained 93% DM, 38% CP, and 16% fat. The soybeans graded US #4, and the overall appearance was small, with a percentage of the beans being green and/or shriveled. One-half of the soybeans were processed through an eighteen inch corrugated roller at the OSU feed mill. The roller was adjusted to a width capable of splitting the soybeans. All cows were managed as a contemporary group during and after the supplementation period. No supplement was provided after March 28, as pastures were adequate at this time. Calves were weaned on June 28, 2001, and pregnancy was determined by rectal palpation.

Data were analyzed using proc GLM of SAS (1985) and the least squares analysis of variance were calculated. Cow served as the experimental unit, and the model included treatment and cow age.

Results and Discussion

Cow and calf performance are summarized in Table 2. Cow weight and body condition score changes were not different between treatments during or after the supplementation period. Calves nursing supplemented cows gained at a faster rate during the supplementation period compared to CON calves. Improved calf performance during the supplementation period is indicative of increased milk production or increased milk nutrient concentration in supplemented cows. However, overall calf weight change was not significantly influenced by the winter supplement treatment. Pregnancy rate was not affected by treatment, ranging between 85 and 90%.

Table 2. Weight and BCS changes, calf weights changes, and pregnancy rates

	Treatment ^a				
	WSB	RSB	CON	SE	P-Value
Pairs per treatment	19	20	19		
Cow wt chg, supp. Period	-64	-66	-70	7.4	.51
Cow BCS chg, supp. Pd	-.14	-.19	-.44	.11	.14
Cow wt. change, Mar. 28 thru June 28	-7	19	19	13.4	.18
Cow BCS change, Mar. 28 thru June 28	.05	.44	.43	.16	.15
Total cow weight change, Dec. thru June	-71	-47	-51	13.4	.18

Total cow BCS change, Dec. thru June	-.09	.24	-.01	.15	.15
Initial calf weight, Dec. 18	191	191	208	16	.35
Calf weight gain, 100 d	139 ^a	140 ^a	121 ^b	6.7	.05
Calf weight gain, 192 d	318	303	298	11.9	.50
Pregnancy rate, %	90	85	90		

^a WSB = whole soybeans, RSB = rolled soybeans, CON = no supplement

Implications

In this fall calving system, supplementation did not improve cow or calf performance at the time of weaning. This is probably due to mild weather conditions and adequate nutrient concentration in the bermudagrass hay. Supplementation increased calf weight gain only during the supplementation period. These results do not indicate a significant advantage to processing the soybeans.

Literature Cited

Albro, J.D. et al. 1993. J. Anim. Sci. 31:26-32

Loesche, J.A. et al. 1988. South Dakota State University Beef Research Report, 20-24.

SAS. 1985. SAS Inst. Inc., Cary, NC.

[Steele, J.D. et al. 2002. Oklahoma Agric. Exp. Sta. Misc. Publ.](#)

Acknowledgments

Appreciation is extended to Tom Pickard, Duane Miller, Ted Newell, and Kent Barnes for their assistance throughout this study.

Copyright 2001 Oklahoma Agricultural Experiment Station