

# COTTONSEED MEAL, CORN/UREA AND CORN/UREA WITH SARSAPOGENINS FOR STEERS GRAZING TALLGRASS RANGE IN LATE SUMMER

F.T. McCollum<sup>1</sup> and G.W. Horn<sup>2</sup>

## Story in Brief

Sixty steers of mixed breeding (avg. wt. 671 lb) were fed one of three supplements from July 31 to September 27, 1985. Treatments were a) 6.75 lb/hd/wk of a 36% natural protein supplement, b) 9.4 lb/hd/wk of a 29% crude protein corn-urea supplement, c) 9.4 lb/hd/wk of a 28.3% protein corn-urea-sarsapogenin supplement. During the 59 day trial, the steers fed the natural protein supplement gained 62.7 lb/hd, whereas those fed the corn-urea and the corn-urea-sarsapogenin supplements gained 59.3 and 45.9 lb/hd, respectively. Since there was no gain response to the supplemental energy provided, it is likely that forage digestion was reduced by the corn-urea supplements. In addition, sarsapogenins depressed gains suggesting that the additive further reduced forage digestion and intake.

(Key Words: Steers, Summer Grazing, Range, Supplements, Sarsapogenins, Urea)

## Introduction

Over the years, numerous studies have documented the benefits of feeding small amounts of high-protein supplements to cattle grazing range during the late summer. Daily gains are usually increased .2 to .4 lb/hd over unsupplemented cattle. In addition, numerous studies have evaluated the use of nonprotein nitrogen (NPN) compounds in range supplements. In most cases, NPN supplements are inferior to natural protein supplements.

Rapid hydrolysis of urea to ammonia in the rumen may result in inefficient conversion of NPN to microbial protein if sufficient energy is not available. Some researchers have suggested that slower release of ammonia-N from NPN would improve the value of NPN for range cattle. Scientists have recently determined that sarsapogenins, naturally occurring saponins in the yucca plant, contain urease enzyme inhibitors. Depressing ruminal urease activity might enhance the efficiency of utilization of NPN in range supplements (R. Goodall, personal communication). This trial was conducted to compare the weight gain response of steers grazing native range in late summer and fed a high protein supplement, or a medium protein corn/urea supplement with or without sarsapogenins.

## Materials and Methods

On July 31, 1985, 60 crossbred steers were weighed (init. wt. 671 lb), randomly sorted into three groups, and placed on one of three native pastures at the Pawhuska Research Station. Predominate forage

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<sup>1</sup>Assistant Professor    <sup>2</sup>Professor

Table 1. Composition of supplements.

Item	Natural Protein	Corn/Urea	Corn/Urea/Sarsapogenin
	----- % As-Fed -----		
Cottonseed meal	92.6	21.5	21.5
Corn	---	61.7	61.7
Molasses	---	4.0	3.9
Urea <sup>a</sup>	---	4.5	4.5
Dicalcium phosphate	4.5	4.6	4.6
Limestone	1.9	.6	.6
Potassium chloride	1.0	2.5	2.5
Sodium sulfate	---	.6	.6
Sarsaponin <sup>b</sup>	---	---	.1
Dry matter, %	90.5	89.3	88.9
	----- % of DM -----		
Crude protein	36.3	29.1	28.3
TDN, estimated	71.0	74.0	74.0

<sup>a</sup>Provided 46% of supplement crude protein equivalent.

<sup>b</sup>Carrier for sarsapogenin, Trademark of Distributor's Proc., Inc., Porterville, CA.

species were big and little bluestem (*Andropogon gerardii* and *Schizachyrium scoparius*). All steers had been on another common grazing study from late April until mid-July. The supplement treatments were 1) 6.75 lb/hd/wk of a 36% crude protein (CP) natural protein (NP) supplement, 2) 9.4 lb/hd/wk of a 29% CP corn/urea (CU) supplement, and 3) 9.4 lb/hd/wk of the corn/urea supplement containing .1% Sarsaponin<sup>1</sup> (CUS; Table 1). Prorated amounts of the supplements were group-fed in troughs three times weekly. Cattle were rotated among the pastures every ten days to help remove any pasture effects. The cattle were weighed off trial on September 27, 1985. Both initial and final weights were determined after an overnight shrink.

### Results and Discussion

During the 59-day trial, steers consuming NP and CU supplements gained similar ( $P > .05$ ) amounts of weight (Table 3). One would normally expect gains of steers supplemented with a small amount of an "all-natural" high-protein supplement to be greater than steers supplemented with an equivalent amount of crude protein from a urea-containing supplement. Average daily gains were at the lower end of the range normally observed for supplemented cattle during this time of year. As noted in Table 2, CU steers consumed .99 lb of supplemental TDN compared to .68 lb supplemental TDN for the NP steers. The similarity in performance, despite the supplemental energy, suggests the CU supplement possibly reduced forage digestion and intake. Perhaps daily feeding of

<sup>1</sup>Carrier for sarsapogenin. Trademark of Distributor's Processing Inc.

Table 2. Supplement intake.

Item	Natural Protein	Corn/Urea	Corn/Urea/Sarsapogenin
-----lb/head (DM basis)-----			
Supplement			
per feeding	2.25	3.13	3.13
per day	.97	1.34	1.34
Supplemental protein			
per day	.35	.39	.38
Supplemental TDN			
per day	.68	.99	.99
Sarsaponin <sup>1</sup>			
mg/day	---	---	681

<sup>1</sup>Trademark of Distributor's Processing, Inc.

Table 3. Steer weights and performance.

Item	Natural Protein	Corn/Urea	Corn/Urea/Sarsapogenin	SEM <sup>a</sup>
Initial wt., lb	665	665	683	
Final wt., lb	728	725	729	
59-day gain, lb	62.7 <sup>b</sup>	59.3 <sup>b</sup>	45.9 <sup>c</sup>	3.9
Average daily gain, lb	1.06 <sup>b</sup>	1.00 <sup>b</sup>	.78 <sup>c</sup>	.07

<sup>a</sup> Standard error of the mean; n=20.

<sup>b,c</sup> Means with different superscripts are different, P<.05.

CU or CUS would have improved performance. Previous work by Chase and Hibberd (1985) indicated that daily feeding of corn-based supplements to cows consuming prairie hay was preferred to alternate day feeding.

When sarsapogenins were added to the CU supplement, steer daily gain declined (P<.05) .2 to .3 lbs/day (Table 3), reducing total 59-day gain by 27% and 22.5% compared to NP and CU, respectively. The reasons for this decline are not known. A similar response was observed in a previous winter supplementation trial with sarsapogenin (McCollum et al., 1985). The additive may have altered ruminal function. In situ ruminal disappearance of bermudagrass hay in mature Hereford cows fed the same hay declined linearly as the dietary level of Sarsapogenin increased (0, 500, 700 and 900 mg Sarsapogenin daily) (A. L. Goetsch, personal communication). An effect similar to this in the present trial may have reduced forage intake by the CUS cattle.

## Literature Cited

- McCollum, F.T. et al. 1985. Winter protein supplements for stockers on native range. OAES MP-114, pp.218-221.
- Chase, C.C., Jr. and C.H. Hibberd 1985. Feeding frequency of high grain supplements with low quality native grass hay. OAES MP-114, pp. 211-214.