Effect of Inclusion of High Protein Feedstuffs in Supplements on Stocker Cattle Performance on Wheat Pasture

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Story in Brief

Wheat forage contains substantial amounts of nonprotein nitrogen (NPN), and the rate of ruminal degradation of wheat forage crude protein is rapid. Performance of rapidly growing cattle grazing wheat pasture may be limited by flow of inadequate amounts of protein and(or) amino acids to the small intestine. A grazing trial was conducted using 80 fall-weaned heifers (479 lb) to evaluate effects on weight gains of stocker cattle on wheat pasture of including meat meal or cottonseed meal in supplements. Weight gains of heifers fed the cottonseed meal- or meat meal-containing supplements were increased, respectively, by .23 and .14 lb/day as compared with a more traditional high-energy, corn-based supplement. While these results are preliminary in nature, they are consistent with the suggestion that it may be beneficial to incorporate certain high protein feedstuffs into supplements for rapidly growing cattle grazing wheat pasture.

(Key Words: Wheat Pasture, Protein Supplementation, Stocker Cattle.)

Introduction

Rate of weight gain of cattle is a key figure that effects the profitability of stocker cattle enterprises. Seemingly small increases in daily gain of stocker cattle (i.e., on the order of .25 lb/day) will frequently increase profits by $15 to 20 per head. The feed additives, monensin and lasalocid, which increase gains of stocker cattle on wheat pasture by about .2 lb/day (Horn et al., 1981; Wagner et al., 1984; Andersen and Horn, 1985), have greatly improved the economics of feeding small amounts of supplements to cattle on wheat pasture. In addition, limited data indicate that monensin may reduce the incidence of bloat of wheat pasture stocker cattle (Branine et al., 1985). Producers who do not feed any supplement to cattle on wheat pasture have little chance of getting bloat preventive compounds such as poloxalene into their cattle when needed because the cattle are not accustomed to eating a supplement. Lee (1984, 1985) reported that weight gains of stocker calves fed 1.5 lb/day of a meat and bonemeal containing supplement were increased .20 lb/day as compared with calves fed control, milo- or hominy feed-based supplements. This trial was conducted to evaluate effects on weight gains of stocker cattle on wheat pasture of including meat meal or cottonseed meal in supplements.

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Materials and Methods

The trial was conducted from December 8, 1985 to March 20, 1986 at Panhandle State University (Goodwell, Oklahoma). Eighty fall-weaned heifers were randomly allotted according to breed and initial weight to two replications of 4 treatments. The heifers were three breed (i.e., Limousin x Hereford/Angus) or four breed (Limousin x Hereford/Angus/-Brahman) crossbred calves containing 0, 1/8th or 1/4th Brahman breeding. Replications consisted of 2 wheat pastures. One was an 88 acre pasture of volunteer wheat, and was fertilized with 50 lb N/acre in late October, 1985. The second replication was a 78 acre irrigated wheat pasture, that was not planted until the week of October 7th, and was not ready for grazing at the start of the trial. All of the eighty heifers were placed according to treatment on the volunteer wheat pasture on December 8, 1985. Heifers of treatment 1 received no supplemental feed, whereas those of treatments 2, 3 and 4 received 2 lb (as-fed)/head/day of supplements as shown in Table 1. The control supplement was a high-energy, corn-based supplement that contained about 8% crude protein. The meat meal[5] and cottonseed meal[6] supplements contained, respectively, about 18 and 22% (dry basis) meat meal and cottonseed meal and were near isocaloric to the control supplements. Calculated and actual nutrient contents of supplements are shown in Table 2. All supplements supplied about 10, 8 and 3 grams, respectively, of calcium, phosphorus and magnesium per 2 lb (as-fed), and 66 mg monensin/lb (as-fed). Heifers of treatment 1 had free-choice access to a commercial mineral supplement[7] throughout the trial.

Table 1. Ingredient composition of supplements.

	Supplement ID		
	Corn	Meat meal	Cottonseed meal
	---------- % of DM ----------		
Corn	79	67.05	62.8
Cottonseed hulls	9	9.05	4.0
Cottonseed meal			21.85
Meat meal		17.7	
Molasses	4.4	4.4	4.4
Limestone	2		2.1
Dicalcium phosphate	3.5		2.9
Magnesium oxide	.6	.3	.45
Plain salt	1.2	1.2	1.2
TM salt	.3	.3	.3
Rumensin 60 Premix[a]	+	+	+

[a]To supply 66 mg monensin/lb (as-fed) of supplement.

[5]Courtesy of IBP, Inc. West Point, Nebraska Slaughter Plant.
[6]Method of Processing (i.e., direct solvent vs prepress solent vs [7]mechanical) unknown.
[7]Wheat Gainer Mineral No. 2. Farmland Industries. Guaranteed analysis:Ca 15-17%, P 4.0%, Mg 10.0% and salt 19-21%.

Table 2. Calculated and actual nutrient contents of supplements.

	Supplement ID		
	Corn	Meat meal	Cottonseed meal
	DM Basis		
NE_M, Mcal/lb	.87	.88	.87
NE_G, Mcal/lb	.56	.56	.56
Crude Protein, %			
Calculated	8.13	16.31	16.33
Actual	8.32	15.90	15.44
Calcium, %			
Calculated	1.57	1.56	1.51
Actual	1.14	1.15	1.32
Phosphorus, %			
Calculated	0.94	0.96	1.03
Actual	0.98	0.97	1.01
Magnesium, %			
Calculated	0.48	0.49	0.50
Actual	0.35	0.34	0.39
	As-fed		
Monensin, mg/lb			
Calculated	66	66	66
Actual	68	66	71

In general the winter of 1985-86 was extremely mild. However, the heifers were moved off wheat pasture and into drylot on February 6, 1986 because of snow cover of pasture. Heifers of replication 1 were moved back to wheat pasture on February 14, whereas those of replication 2 were moved to the irrigated wheat pasture on February 24. Therefore, heifers of replications 1 and 2 were in drylot for 8 and 18 days, respectively, of the 103-day wheat pasture grazing trial. While in drylot the heifers were fed limited amounts of corn silage, a very high quality haygrazer hay and their respective supplements.

Even though growth of the irrigated wheat pasture did not permit treatments to be replicated by pastures, the data was analyzed by analysis of variance and differences among treatment means were tested for significance by Duncan's Multiple Range Test using the treatment by replication error mean square.

Results and Discussion

Consumption of supplements on wheat pasture was generally good up until March 4 at which time the heifers started "backing-off" the supplements because the pastures contained large amounts of lush, rapidly-growing wheat forage. In order to get the heifers to clean-up the supplements, supplements were not fed on 4 to 6 days (depending on treatment) of the last 16 days of the trial.

Mean initial and final weights and calculated daily gains of the heifers are shown in Table 3. While none of the differences among treatment were significant ($P>.05$), the high-energy, corn-based supplement increased weight gains of heifers by .14 lb/day, which is very

Table 3. Mean initial and final weights and daily gains of heifers.

	No Supplement	Corn	Meat Meal	Cottonseed Meal
Number of heifers	20	20	20	20
Initial wt., lb	475	477	480	485
Final wt., lb	660	677	694	709
Daily gain[a], lb	1.78	1.92	2.06	2.15

[a]December 8, 1985 to 3/20/86, 103 days. Differences among means are nonsignificant (P>.05).

similar to the .15 to .20 lb/day improvement that is generally expected from feeding 2 lb of a grain-based supplement to stocker cattle on wheat pasture. The supplements containing meat meal and cottonseed meal increased daily gains an additional .14 and .23 lb, respectively, above gains of heifers fed the corn-based supplements.

These results, while very preliminary in nature, suggest that weight gains of rapidly growing stocker cattle on wheat pasture may be limited by flow of inadequate amounts of non-ammonia nitrogen and(or) an imbalance of amino acids to the small intestine.

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