BEEF CATTLE RESEARCH UPDATE

Britt Hicks, Ph.D., PAS
Area Extension Livestock Specialist
Oklahoma Panhandle Research & Extension Center

December 2010

Effect of Mineral Supplementation on Performance of Cattle Grazing Winter Wheat Pasture

In general, wheat pasture contains marginal to sufficient phosphorus and magnesium, excess potassium, and inadequate amounts of calcium to meet mineral needs of growing cattle. Therefore, calcium is the most limiting mineral in most wheat pasture grazing situations.

Recent Oklahoma research evaluated the efficacy of mineral supplementation of stocker cattle grazing winter wheat pasture.[1] In this study, two experiments were conducted on wheat pasture located on the Southern Plains Experimental Range of the USDA, Agricultural Research Service near Ft. Supply, OK. In both experiments, stocker calves grazed wheat pasture for 84 days and were either fed no supplement of any kind or were offered a free-choice mineral mixture containing 16% calcium, 4% phosphorus, 5.5% magnesium, and 20% salt.

The results of these experiments are shown in Table 1. In Experiment 1, calves offered mineral gained 43% faster than calves not offered mineral (1.65 vs. 1.15 lb/day) and thus were 6.6% heavier (42 lb) at the conclusion of the grazing period. Similarly in Experiment 2, calves fed mineral gained 30% faster than control calves (2.47 vs. 1.90 lb/day) resulting in 6.5% greater final weights (46 lb). Mineral intake in Experiments 1 and 2, respectively averaged 2.6 and 5.9 oz/day compared to the manufacturers' suggested intake range of 2 to 4 oz/day. The cost of mineral per lb of added weight gain was $0.12 and $0.29 in Experiments 1 and 2, respectively (assuming a mineral cost of $0.40/lb).

These researchers concluded that supplementing a free-choice mineral that is high in calcium and low in phosphorus to cattle grazing wheat pasture in Northwest Oklahoma will increase daily gains in a cost effective manner.

Table 1. Performance of stocker cattle grazing wheat pasture.

	Experiment 1			Experiment 2		
Item	No Mineral	Mineral	P-value	No Mineral	Mineral	P-value
Initial weight, lb	505	501	0.97	547	547	>0.99
Day 84 weight, lb	637	679	<0.01	706	752	0.03
ADG, lb	1.15	1.65	<0.01	1.90	2.47	0.03
Mineral intake, oz	---	2.6	---	---	5.9	---
Mineral cost/lb added gain, $	---	0.12	---	---		0.29

Adapted from Gunter and Combs, 2010.

Effect of Preconditioning Average Daily Gain on Feedlot Performance and Carcass Characteristics

Recent University of Florida research evaluated the effect of preconditioning average daily gain (ADG) on feedlot performance and subsequent carcass characteristics of beef cattle.[2] In this study, 1,100 steer calves and 421 heifer calves from a single ranch were shipped 230 miles to be preconditioned in North Central Florida. The calves were preconditioned on bermudagrass pasture and acclimated to a high energy starter ration with a target dry matter intake of 3% of bodyweight. The calves were preconditioned for 43 days and then shipped 1470 miles to a feedlot in Western Kansas. These researchers found that feedlot ADG was similar across varying levels of preconditioning ADG. However, feedlot feed efficiency improved and days on feed decreased as preconditioning ADG increased. As a result, cost of gain in the feedlot decreased as preconditioning ADG increased. As preconditioning ADG increased, hot carcass weight increased, ribeye area increased, and ribeye area per cwt decreased. Quality grade and yield grade were minimally affected by preconditioning ADG.

Influence of Hide Color and Sex on Carcass Grading Performance and Value

Recent West Texas A&M University research evaluated the influence of hide color and sex on carcass grading performance and value using 18,575 carcasses from cattle that were slaughtered at three beef slaughtering facilities in the Texas panhandle.[3] The cattle exhibited color frequencies of black (50.0%), black-white face (10.6%), red (10.6%), red-white face (5.8%), gray (4.9%), yellow (4.7%), white (3.5%), Holstein (2.7%), striped

(2.4%), yellow-white face (2.2%), gray-white face (1.4%), and spotted (1.3%. The observed sex frequencies were 83.5% steers and 16.5% heifers. These researchers reported that black cattle (black and black-white face) had greater backfat thickness, hot carcass weight, calculated yield grades, and marbling scores with less ribeye area than did nonblack cattle (Table 2). Steers had less backfat thickness, calculated yield grades and marbling scores with greater hot carcass weight, and ribeye area than did heifers (Table 2). It was also noted that black cattle had greater hot carcass weight discounts and yield grade discounts with less quality grade discounts than did nonblack cattle (Table 3). Steers had less hot carcass weight discounts and yield grade discounts with greater quality grade discounts than did heifers (Table 3). Theses researchers concluded that their results suggest that the incentives to pay premiums for feeder cattle based on hide color diminish once the finished animal is in the carcass form and that steer and heifer carcasses have differing carcass characteristics that could warrant independent value-based marketing methods.

Table 2. Least square means for carcass traits by phenotype color and sex.

	Calculated Yield Grade	Backfat thickness, in	Hot Carcass Weight, lb	Ribeye Area, in^2	KPH, %	Marbling Score
			Phenotype Color			
Black	3.30	0.57	799	12.93	2.38	Small^{29}
Nonblack	2.89	0.49	788	13.47	2.34	Small^{02}
P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sex						
Steer	2.83	0.46	821	13.86	2.22	Slight^{98}
Heifer	3.11	0.54	759	12.93	2.47	Small^{19}
P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Adapted from Brown and Lawrence, 2010.

Table 3. Least square means for carcass value by phenotype color and sex.

	Carcass Value Attribute[1]				
	Yield Grade Discount	Hot Carcass Weight Discount	Quality Grade Discount	Market Value[2]	Gross Carcass Value[3]
Phenotype Color					
Black	-$2.46	-$1.32	-$2.07	$122.93	$981.25
Nonblack	-$1.73	-$1.10	-$3.46	$122.40	$968.18
P-value	<0.0001	0.002	<0.0001	0.0006	<0.0001
Sex					
Steer	-$1.33	-$0.97	-$3.68	$122.67	$1,017.35
Heifer	-$2.30	-$1.43	-$2.56	$122.70	$922.97
P-value	<0.0001	0.02	<0.0001	0.93	<0.0001

[1]All discounts are reported on a $/cwt basis.
[2]Includes base price and all premiums and discounts.
[3]Market value X hot carcass weight.
Adapted from Brown and Lawrence, 2010.

[1] Gunter, S. A., and G. F. Combs, Jr. 2010. Effect of mineral supplementation on the performance of stocker cattle grazing winter-wheat pasture. Proc. West. Sec. Am. Soc. Anim. Soc. 61: 134-137.
[2] Savell, J. D., T. A. Thrift, and M. J. Hersom. 2010. Effect of preconditioning average daily gain on feedlot performance and carcass characteristics of beef cattle. J. Anim. Sci. 88 (E-Suppl. 2): 742 (Abstr.).
[3] Brown, T. R., and T. E. Lawrence. 2010. Influence of phenotypic hide color and sex condition on beef carcass grading performance and value. Prof. Anim. Sci. 26: 611-619.