WHEAT MIDDLINGS VERSUS SOYBEAN MEAL AND TWO WHEAT MIDDLINGS/SOYBEAN MEAL SUPPLEMENTS FOR WINTERING SPRING CALVING BEEF COWS

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Story in Brief

Eighty-eight spring calving Hereford and Hereford x Angus cows and heifers wintered on dormant native tallgrass range were fed supplements to provide equal daily amounts of crude protein. The supplements consisted of soybean meal (40% crude protein), soybean meal and wheat middlings (32% crude protein), wheat middlings and soybean meal (24% crude protein) and wheat middlings (16% crude protein). Each supplement was fed to provide .8 lb of protein per day from November 5 to December 9, 1987 and 1.2 lb of protein per day from December 9, 1987 to May 4, 1988. Cow weight changes from November 5 to calving were 50, 68, 89 and 125 lb for 40, 32, 24 and 16% protein supplements, respectively. Winter weight changes, including calving weight losses, were -110, -79, -84 and -62 lb for the same treatments. Cows on treatments with the greatest weight and body condition gains before calving tended to lose more weight from calving until spring. Weaning weights and cow rebreeding rates were not significantly affected by treatments. Linear increases in precalving cow weight changes with increased levels of wheat middlings indicate that protein from wheat middlings is efficiently utilized and that wheat middlings are a good source of supplemental energy for beef cows. However, weight responses to different supplements may be different for nonlactating vs lactating cows.

(Key Words: Beef Cows, Energy, Protein, Soybean Meal, Wheat Middlings, Winter.)

Introduction

Wheat middlings are the offal of the wheat kernel after the milling process for removal of flour and germ. Over 140,000 tons per year are

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available for use in livestock feeds in Oklahoma. Wheat middlings contain about 16% crude protein (CP), but are discounted for their relatively high (8%) crude fiber content. Fiber from bran-type feeds has been shown to be highly digestible and to be an excellent energy source for grazing cattle. Lusby and Wettemann (1988) found that spring calving cows performed similarly when fed supplements containing 16% protein from either wheat middlings or mixtures of corn and soybean meal. The objective of this study was to compare winter performance of spring calving beef cows and their calves when supplemented with soybean meal, wheat middlings or two mixtures of soybean meal and wheat middlings.

Materials and Methods

Eighty-eight two- to five-year old spring calving Hereford and Hereford x Angus cows wintered on dormant native tallgrass range were fed supplements to provide equal daily amounts of crude protein (CP). Supplements consisted of soybean meal (40% CP), soybean meal and wheat middlings (32% CP), wheat middlings and soybean meal (24% CP) and wheat middlings (16% CP). Each supplement was fed to provide .8 lb of protein per day from November 5 to December 9, 1987 and 1.2 lb of protein per day from December 9, 1987 to May 4, 1988. Supplements were formulated to provide equal daily amounts of calcium, phosphorus and potassium. Composition of supplements and daily amounts fed are summarized in Table 1.

Table 1. Composition of supplements and daily feeding rates.

	Treatments (% crude protein)			
	40% SBM[a]	32% SBM/MIDDS	24% MIDDS/SBM	16% MIDDS
Ingredients, %				
Soybean meal	94.45	63.4	31.05	
Wheat middlings		31.95	66.85	98.35
Dicalcium phosphate	5.0	3.0		
Limestone	.5	.5	2.1	1.6
Vit A (30)[b]	.05	.05	.03	.025
Crude protein, 90% DM basis, %	44.4	35.6	26.7	17.8
Feeding rates per day, lb[c]				
11/05/87 to 12/09/87	2.0	2.5	3.3	5.0
12/09/87 to 5/04/88	3.0	3.75	5.0	7.5

[a]SBM is soybean meal and MIDDS is wheat middlings.
[b]30,000 IU/lb.
[c]7-day basis.

All cows grazed a single pasture and were gathered six mornings each week for supplement feeding in individual covered stalls. Supplement amounts were prorated for 6-day per week feeding. Cows were weighed and body condition determined (1 = very thin, 5 = moderate, and 9 = very fat) at 28-day intervals until early February, after which time cows were weighed and scored at 14-day intervals. The last weight and condition score prior to calving was used to estimate final pregnant weight and condition score. All weights were taken after overnight withdrawal from feed and water. Hay was fed during periods of extreme cold, snow and ice, and in April when adequate forage was unavailable. Calves were weaned on September 13, about 30 days earlier than normal because of extreme drought conditions.

Cows were exposed to Hereford bulls for natural service from April 28 to June 29, 1988 (62 days). Cows were vaccinated on January 5 and January 28, 1988 with Calf Guard (Norden Laboratories) to prevent calf scours. All cows and calves were treated with Ivermectin on May 4. Pregnancy was determined by rectal palpation at weaning. Calf weaning weights were adjusted for sex, age of calf and age of dam. Birth weights were similarly adjusted for calf sex and age of dam.

Results and Discussion

Cow weight and condition changes are summarized in Table 2. Cows fed wheat middlings gained more weight ($P<.01$) from November to calving than cows fed soybean meal (125 vs 50 lb). Precalving responses to wheat middlings/soybean meal mixtures at 24 and 32% protein were similar and intermediate between soybean meal and wheat middlings (+68 and +89 lb). Precalving cow weight gains increased linearly with amount of wheat middlings in the diet ($P<.001$).

Feeding wheat middlings also reduced cow weight losses ($P<.01$) through the entire supplementation period compared to feeding soybean meal (-62 vs -110 lb). Weight changes for cows fed 24 and 32% protein supplements were intermediate between soybean meal and wheat middlings (-79 and -84 lb). Cow body condition changes reflected weight changes.

While feeding increased amounts of wheat middlings significantly increased cow weight before calving, weight changes from calving to the end of the supplementation period were similar for all treatments. There was, in fact, a trend for cows on treatments with the greatest body condition at calving to lose more weight after calving. In a companion study (Ovenell et al., 1989), weight changes of lactating, fall calving cows fed these same diets were not different during the winter. This suggests that weight change responses of cows to supplements may depend on stage of production.

Table 2. Weight and body condition changes and rebreeding rates of cows fed soybean meal (SBM) and wheat middlings (MIDDS) supplements (least squares means).

	Treatments (% crude protein)			
	40% SBM	32% SBM/MIDDS	24% MIDDS/SBM	16% MIDDS
No. of cows	22	22	22	22
Initial wt, Nov. 5, 1987	929	931	938	944
Initial cond. score[e]	5.6	5.7	5.5	5.5
Weight Changes, lb precalving				
Nov 5 to Dec 3	39[a]	50[ab]	56[b]	55[b]
Dec 3 to Jan 5	-2	2	-14	5
Jan 5 to Jan 28	0[a]	14[ac]	23[bc]	24[cd]
Jan 28 to Feb 12	23	24	28	31
Nov 5 to Precalving	50[a]	68[ab]	89[b]	125[c]
Postcalving[f]				
Precalving to Apr 5	-194	-178	-220	-274
Apr 5 to May 4	33	31	47	87
Precalving to May 4	-160	-147	-173	-187
Winter wt change				
Nov 5 to May 4	-110[a]	-79[b]	-84[b]	-62[b]
Body condition changes				
Nov 5 to Preg cond.	-.3[a]	-.7[b]	-.1[a]	0[a]
Preg cond. to May 4	-.8	-.3	-.6	-.5
Nov 5 to May 4	-1.0[a]	-1.0[ab]	-.8[abc]	-.4[c]
Rebreeding rate[f]	75	84	81	68

[a,b,c,d]Means on the same line with different superscripts differ (P<.05).
[e]Body condition scale: 1 = very thin, 5 = moderate, 9 = very fat.
[f]Includes data only from those cows weaning a calf.

Calf birth weights (Table 3) tended to be greater for calves of cows fed greater amounts of supplement. Calf weight gains from birth to May 4, 1988, which should indicate level of milk production, also tended to be greater for calves of cows fed higher levels of daily supplements. Similarly, weaning weights also tended to be greater for calves of cows that received greater amounts of wheat middlings during winter supplementation (450, 445, 473 and 469 lb for 40, 32, 24 and 16% protein supplements).

Table 3. Calf birth weights, weight gains and weaning weights (least squares means).

	Treatments (% crude protein)			
	40% SBM[a]	32% SBM/MIDDS	24% MIDDS/SBM	16% MIDDS
Avg calving date	3/02/88	3/04/88	2/27/88	3/06/88
Calf birth weights, lb	83	83	86	87
Calf gain, lb				
Birth to May 4	83	83	91	91
Weaning weight, lb	450	445	473	469

[a]SBM is soybean meal, MIDDS is wheat middlings.

Rebreeding rates were not significantly different among treatments (Table 2). Considering the good body condition of all cows at calving, fewer cows than expected became pregnant. Greater than expected weight and condition losses from calving through breeding occurred because of drought conditions which severely reduced spring forage growth. These weight and condition losses, coupled with a high percentage of first and second calf females and only a 62-day breeding season, probably are related to the poorer than expected rebreeding rates.

In conclusion, precalving cow weight gains increased linearly ($P<.001$) as supplements containing greater amounts of wheat middlings were fed. This suggests that the protein value of wheat middlings is similar to that of soybean meal and(or) energy deficiencies are met with the additional middlings. After calving, additional amounts of supplement did not increase cow weight, demonstrating that increases in cow weight and condition must be achieved before calving. Wheat middlings can be effectively used as a protein and(or) energy source for wintering beef cows in Oklahoma.

Literature Cited

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