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EVALUATION OF WHEAT MIDDLINGS AS A SUPPLEMENT FOR CATTLE CONSUMING WINTER RANGE FORAGE[1]

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Summary

Intake of dormant, bluestem-range forage was increased by feeding steers supplements based on wheat middlings or soybean meal + sorghum grain, although the degree of influence on forage intake depended on type and level of supplementation. All supplements increased ($P<.10$) total diet digestibility. However, fiber digestibility tended to be slightly lower for steers receiving the high level of wheat middlings and the soybean meal + sorghum grain supplement.

Introduction

Kansas leads the nation in quantity of wheat production (17.4% of U.S. total in 1987) and wheat flour milling (14.2% of U.S. total in 1987). Approximately 25% of the total wheat milled is left as a byproduct, frequently referred to as wheat middlings or mill feed. In 1987, 793,160 tons of wheat middlings were produced in Kansas. Wheat middlings are frequently available at very reasonable prices and are often included in range cattle supplements. However, little research has specifically documented the utility of this feedstuff as a supplement for cattle on dormant winter range. Therefore, a trial was initiated to measure forage intake and digestibility responses when cattle consuming dormant, bluestem-range forage were supplemented with either wheat middlings or soybean meal (SBM) + sorghum grain supplements.

Experimental Procedures

Sixteen ruminally cannulated, Hereford x Angus steers averaging 830 lbs were randomly assigned within weight groups to one of four treatments: 1) control (no supplement); 2) SBM + sorghum grain - 2.9 lb/head/day; 3) low level wheat middlings - 3.5 lb/head/day; 4) high level wheat middlings - 7 lb/head/day, all expressed on an as-fed basis. Preliminary analysis of crude protein concentrations in feedstuffs yielded the following: wheat middlings - 18.4%; soybean meal + sorghum grain - 18.7%; and dormant, winter-harvested, bluestem-range forage - 2.5%. The SBM + sorghum grain and the low level wheat middlings supplement were fed at equal supplemented metabolizable energy levels (3.5 Mcal/head/day). Steers were housed in individual drylot pens. Dormant bluestem was fed at 130% of each animal's previous 5 day intake. The

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trial consisted of a 14-day adaptation period, a 7-day intake measurement period, and a 7-day total fecal collection period. Forage and grain offered, forage refusals, and fecal output were weighed and sampled daily, analyzed for dry matter, and stored for future analyses.

Results and Discussion

Intake of dormant, bluestem-range forage was increased (P<.10) 23% by the SBM + sorghum grain supplement and 32% by the high-level wheat middlings supplement compared with unsupplemented controls (Table 15.1). The low level of wheat middlings also tended (P=.16) to increase forage intake (14% increase). Because of additional supplement fed, all supplemented groups had greater (P<.10) total intakes than unsupplemented steers. In addition, total intake was greater (P<.10) for the high wheat middlings treatment than the other supplemented groups. All supplements enhanced (P<.10) total diet digestibility by approximately 14%. In contrast, fiber (neutral detergent fiber) digestibility, compared with that of unsupplemented steers, was slightly depressed (P<.05) when wheat middlings were fed at the high level. Similarly, fiber digestibility tended (P=.14) to be depressed in those steers supplemented with the SBM + sorghum grain supplement. The trend toward depressed fiber digestibility in the high wheat middlings group may be a result of the large increase in total intake, which would tend to reduce the length of time the digesta remained in the rumen. The improvement in forage utilization with protein supplementation in this study is consistent with previous research conducted at Kansas State. However, the degree of response was slightly less than that observed with supplements containing 25% protein or more. Additional research quantifying the optimal level for using wheat middlings in winter supplements would be useful.

Table 15.1. Influence of Supplemental Protein Sources on Intake, Diet Digestibility, and Fiber Digestibility of Dormant, Bluestem-Range Forage

	Supplement				
Item	None	SBM + Sorghum Grain	Low Wheat Middlings	High Wheat Middlings	SE[1]
Forage DM intake, lb/d	0.87[a]	1.07[bc]	0.99[ac]	1.15[b]	.10
Supplement DM intake, % BW[2]	---	0.31	0.39	0.77	
Total DM intake, % BW[2]	0.86[a]	1.38[c]	1.39[c]	1.92[b]	.06
Total DM digestibility, %	43.93[a]	49.43[b]	50.55[b]	50.44[b]	1.5
Neutral Detergent Fiber Digestibility, %	56.9[a]	53.8[ab]	56.1[ab]	51.7[b]	1.8

[1]SE = standard error (n=4).
[2]BW = body weight.
[abc]Row means without a common superscript differ (P<.10).