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## Performance of Beef Replacement Heifers Supplemented With Dried Distillers Grains With Solubles Versus a Mixture of Soybean Meal and Finely Ground Sorghum Grain

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# Performance of Beef Replacement Heifers Supplemented With Dried Distillers Grains With Solubles Versus a Mixture of Soybean Meal and Finely Ground Sorghum Grain

## Abstract

Costs of feed, labor, and equipment to develop heifers in a traditional confined feeding system are relatively high. Producers can greatly reduce input costs by developing heifers on dormant native range; however, heifers are unable to consume sufficient protein from the forage base. Suboptimal protein intake will reduce forage digestion and result in poor performance. Supplemental protein is required during these times to increase forage intake and digestion. The most efficient way of providing supplemental protein to heifers consuming low-quality (<7% crude protein) forage is by feeding high-protein supplements (>30% crude protein). Producers traditionally have used high-quality oilseed meals to supplement the necessary protein, but expansion of the ethanol industry has made dried distillers grains with solubles (DDGS) a potentially less expensive supplement option for producers in corn- and sorghum-producing areas. The objective of this study was to evaluate the effects of daily supplementation of DDGS vs. a mixture of soybean meal and finely ground sorghum grain on performance of replacement heifers grazing low-quality dormant native range.

## Keywords

dormant range, protein supplementation, distillers grains, heifer development

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### Introduction

Costs of feed, labor, and equipment to develop heifers in a traditional confined feeding system are relatively high. Producers can greatly reduce input costs by developing heifers on dormant native range; however, heifers are unable to consume sufficient protein from the forage base. Suboptimal protein intake will reduce forage digestion and result in poor performance. Supplemental protein is required during these times to increase forage intake and digestion.

The most efficient way of providing supplemental protein to heifers consuming low-quality (<7% crude protein) forage is by feeding high-protein supplements (>30% crude protein). Producers traditionally have used high-quality oilseed meals to supplement the necessary protein, but expansion of the ethanol industry has made dried distillers grains with solubles (DDGS) a potentially less expensive supplement option for producers in corn- and sorghum-producing areas.

The objective of this study was to evaluate the effects of daily supplementation of DDGS vs. a mixture of soybean meal and finely ground sorghum grain on performance of replacement heifers grazing low-quality dormant native range.

### Experimental Procedures

Angus-Hereford cross heifers (n = 88; initial body weight = 583 lb ± 62 lb; initial body condition score = 5.0 ± 0.3) were maintained on common native range pastures (4.4% crude protein; Table 1) for 84 days. The range site was mainly composed of the following species: sideoats grama (*Bouteloua curtipendula*), western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), Japanese brome (*Bromus japonicus*), and buffalo grass (*Bouteloua dactyloides*). Range samples were obtained prior to trial initiation for nutrient analysis. Free choice mineral (Suther's Prairie Cow 4P; Suther's Feeds, Frankfort, KS) and salt were available throughout the study. Dried distillers grains with solubles (32.7% crude protein; Table 1) originated from a single location and were stored in bulk for use throughout the treatment period. Soybean meal and finely

ground sorghum grain were mixed onsite and averaged 73.6% soybean meal and 26.4% sorghum grain (42.9% crude protein; Table 1).

Heifers were stratified by body condition score, birth date, and body weight and were then assigned randomly to one of four pastures per supplement treatment. Treatments consisted of daily supplementation of 3.64 lb of DDGS on a dry matter basis (to provide 1.25 lb crude protein) or 3.03 lb (dry matter basis) of a soybean meal and sorghum grain mixture (SBM-M; to provide 1.24 lb CP) supplemented every day. The SBM mixture was formulated to be approximately isonitrogenous and isocaloric to the DDGS.

Treatments were administered from January 15, 2014, until April 8, 2014, for 84 days. Body weights and body condition scores were recorded every 28 days for the duration of the study. Body condition scores were assigned by two independent, qualified observers (scale of 1 to 9; 1 = extremely emaciated, 9 = extremely obese).

Performance data were analyzed using the MIXED procedure of SAS (SAS Institute, Cary, NC). Initial and final body weight, body weight change, initial and final body condition score, and body condition score change were used as the dependent variables. Values were determined to be different when  $P \leq 0.05$ .

## Results and Discussion

Initial body weight and body condition score did not differ between treatments ( $P \geq 0.29$ ; Table 2). Final body weight and body condition score also did not differ ( $P \geq 0.55$ ) between treatments, nor did changes in body weight or body condition score ( $P > 0.30$ ).

## Implications

Dried distillers grains with solubles can replace soybean meal and finely ground sorghum grain when supplemented daily without adversely affecting performance of replacement heifers grazing low-quality dormant native range.

**Table 1. Nutrient composition (dry matter basis) of native range, dried distillers grains with solubles (DDGS), and a mixture of soybean meal and finely ground sorghum grain (SBM-M)**

Item	Native range	DDGS	SBM-M <sup>1</sup>
Dry matter, %	96.5	88.42	87.71
Crude protein, %	4.38	32.66	42.09
Net energy gain, Mcal/lb	0.16	0.57	0.57
Net energy maintenance, Mcal/lb	0.45	0.90	0.90
Neutral detergent fiber, %	71.25	29.72	8.62
Acid detergent fiber, %	46.80	18.71	7.04
Calcium, %	0.33	0.085	0.33
Phosphorus, %	0.09	0.82	0.59
Sulfur, %	0.08	0.80	0.35

<sup>1</sup>SBM-M: 73.6 % soybean meal and 26.4% milo, dry matter basis.

**Table 2. Performance of beef replacement heifers supplemented daily with dried distillers grains with solubles (DDGS) vs. a mixture of soybean meal and finely ground sorghum grain (SBM-M)<sup>1</sup>**

Item	Supplement		SEM	P-value
	DDGS	SBM-M		
Number of heifers	44	44		
Initial body weight, lb	589	575	8.6	0.29
Final body weight, lb	690	685	10.12	0.68
Body weight change, lb	101.5	109.4	3.58	0.17
Average daily gain, lb	1.21	1.30	0.04	0.17
Initial body condition score <sup>2</sup>	5.0	5.0	0.03	0.92
Final body condition score	5.8	5.8	0.06	0.55
Body condition score change	0.78	0.84	0.06	0.53

<sup>1</sup>SBM-M: 73.6 % soybean meal and 26.4% milo, dry matter basis.

<sup>2</sup>Scale of 1 to 9; 1 = extremely emaciated, 9 = extremely obese.