Field Peas as a Binder for Dried Distillers Grains-Based Range Cubes

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Summary

A grazing study was conducted to determine if field peas are a good natural binder for dried distillers grains-based range cubes. Cattle supplemented dried distillers grains in the bunk or a 25% field pea/75% distillers grains cube fed on the ground gained similarly and outgained cattle supplemented dried distillers on the ground. A 25.6% loss of the distillers grains fed loose on the ground was estimated. The similar performance of cattle fed distillers grains in the bunk and those fed pea/distillers cube on the ground suggests field peas reduced distillers grains loss and therefore are an acceptable binder for distillers grains based range cubes.

Introduction

Farmers in the Nebraska Panhandle are becoming more interested in the value of raising field peas as an option to reduce fallow time in dryland wheat rotations. The availability of this commodity has sparked interest in its value as a feed for beef cattle. Research has indicated that field peas are palatable, result in no reduction in animal performance, and enhance carcass tenderness. Dried distiller's grains (DDGS) are a good protein supplement for grazing cattle but when fed loose can result in substantial waste. Field peas are a good binder when making range cubes and supply degradable intake protein (DIP) to complement the undegradable intake protein (UIP) supplied by the distiller's grains. Feeding supplement on the ground as opposed to using stationary bunks allows producers to encourage more uniform grazing by supplementing in different locations throughout the pasture. Therefore, the objective of this study was to determine if field peas would make a good natural binder for DDGS cubes to prevent waste.

Procedure

A grazing experiment was conducted over two years. In year 1, 108 crossbred yearling heifers (initial BW = 744 ± 31 lb) were utilized in a randomized complete block designed grazing trial at the High Plains Agricultural Lab (HPAL) near Sidney, Neb. Heifers were weighed two consecutive days with the average of the two weights used as initial BW. Heifers were blocked by weight and assigned randomly to one of nine 105-acre pastures (12 head/pasture). Heifers grazed from June 22-Oct. 5, 2010. In year 2, 90 crossbred steers (initial BW = 706 ± 22 lb) were utilized in a complete randomized design in the same pastures as year 1 (10 head/pasture). The average of two consecutive day weights was used for initial BW. At the termination of the grazing period the average of two consecutive day BW was used as the ending BW. Steers began grazing May 17, 2011, and the second day final weight was taken Sept. 7, 2011.

In both years three pastures were assigned to each treatment. Treatments were DDGS fed on the ground (GROUND), DDGS fed in a bunk (BUNK), or a 25% field pea, 75% DDGS cube fed on the ground (CUBE). The amount of supplement fed was designed to supply 0.6 lb of CP daily for each treatment (Table 1). The variation in the CP content of the field pea/DDGS cube between years is likely due to variation in the CP content of field pea varieties. The weekly amount of supplement was prorated and fed three times per week. Cattle were rotated through the nine pastures every two weeks to minimize pasture effect. Forage samples were randomly clipped (Aug. 17, 2010 and July 5, 2011) at ground level and IVDMD and CP concentration of the

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Table 1. Crude protein content and amount of supplement fed (DM basis) to cattle grazing crested wheatgrass pastures.

	DDGS[1]	CUBE[2]
% CP		
Year 1 (2010)	30.7	20.6
Year 2 (2011)	30.7	27.1
Amount Fed (lb/head/day)		
Year 1 (2010)	2.0	3.1
Year 2 (2011)	2.0	2.2

[1]DDGS fed loose in a bunk or on the ground.
[2]25% field pea, 75% DDGS cube fed on the ground.

forage samples was determined.

Data were analyzed using the MIXED procedure of SAS with pasture as the experimental unit. The model included the fixed effect of treatment, year, and the treatment by year interaction. Cattle were individually weighed and weights averaged for each pasture. Effects were considered significant at a *P*-value of ≤ 0.05, with tendencies declared at *P*-values between 0.05 and 0.10.

Results

The year x treatment interaction was not significant ($P > 0.13$) for initial BW, final BW, and ADG so the main effects of treatment are presented. By design, initial BW was not different ($P > 0.50$; Table 2). Conversely, final BW and ADG were less ($P < 0.01$) for steers supplemented GROUND compared with CUBE and BUNK which were not different. In this study the National Research Council Nutrient Requirements of Beef Cattle (NRC 1996) was used to estimate waste. Using BUNK ADG (1.54 lb/day), DDGS fed (2.0 lb/day), and the TDN of the forage and DDGS (58% and 110%, respectively), forage intake was predicted. Forage TDN was calculated from ADF by Servi-Tech Laboratories. The TDN of the DDGS was estimated from earlier reported research (*Journal of Animal Science,* 2008, 86:3504). Holding forage intake constant (16.7 lb/day) and using GROUND gain (1.34 lb/day), the amount of DDGS consumed to result in the decreased gain was predicted to be 1.47 lb/day. This suggests an estimated 25.6% loss in DDGS when fed loose on the ground. The similar performance of CUBE and BUNK suggests the field pea served as an acceptable binder for the DDGS. Feeding supplement in a bunk reduces supplement waste but typically will cause overgrazing near the feeders. However, costs associated with purchasing and moving bunks are incurred using this management method. As a result, many producers prefer to feed supplement on the ground, which encourages cattle to move throughout the pasture for more uniform grazing. Additionally, the degradable CP (% of CP) of several field pea varieties has been determined to be between 46-74% (*Journal of Animal Science,* 2012 , 90:585). Conversely, the undegradable intake protein fraction is 73% (% of CP) for DDGS. Therefore, the combination of field peas and DDGS in a range cube may supply a good balance of UIP and DIP on dormant native range.

Crude protein and IVDMD of the crested wheatgrass are shown in Table 3. The CP and IVDMD of the crested wheatgrass were higher in the second year due to an earlier collection date and a greater amount of precipitation. The results of this study suggest field peas are an acceptable binder for DDGS based range cubes. A 25% field peas, 75% DDGS range cube can be fed on the ground as a protein and energy supplement to grazing cattle with minimal wastage. This would potentially allow producers to use supplementation to improve grazing distribution without the labor and expense of using bunks.

Table 2. Performance of cattle grazing crested wheatgrass pastures supplemented with DDGS on the ground, in a bunk, or a 25% field pea, 75% DDGS cube on the ground.

	GROUND	BUNK	CUBE[1]	SE
Initial weight, lb	735	737	733	24
Final weight, lb	800[a]	902[b]	900[b]	24
Daily gain, lb/day	1.34[a]	1.54[b]	1.56[b]	0.15

[1]GROUND = DDGS fed loose on the ground, BUNK = DDGS fed in a bunk, CUBE= 25% field pea, 75% DDGS cube fed on the ground.
[a,b]Treatment values with differing superscripts differ $P < 0.01$.

Table 3. Crude protein and *in vitro* dry matter disappearance of clipped samples from crested wheatgrass pastures.

	CP, %DM	IVDMD, %DM
Aug. 17, 2010[a]	4.8	46.7
July 5, 2011	6.9	56.0

[a]Samples clipped at approximately the midpoint of the grazing season.

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