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Comparison of Feeding Wet Distillers Grains in a Bunk or on the Ground to Cattle Grazing Native Sandhills Winter Range

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COMPARISON OF FEEDING WET DISTILLERS GRAINS IN A BUNK OR ON THE GROUND TO CATTLE GRAZING NATIVE SANDHILLS WINTER RANGE

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ABSTRACT: Two-experiments determined the effects of feeding wet distillers grains with solubles (WDGS) either on the ground or in a bunk to cattle grazing native Sandhills winter range. In Experiment 1 (Exp. 1), 120 multiparous March-calving cows (536 ± 53.5 kg BW) were stratified by age and assigned to one of four treatments: WDGS fed on the ground, either three or six d/wk; or WDGS fed in a bunk either three or six d/wk. In Experiment 2 (Exp. 2), 63 March-born steer calves (201.2 ± 27.5 kg BW) were stratified by weight and assigned to one of two feeding treatments: WDGS fed in a bunk or on the ground. Both experiments were conducted at the University of Nebraska Gudmundsen Sandhills Laboratory. Exp. 1 was conducted for 90 d from Dec 1, 2007 to Mar 1, 2008, while Exp. 2 ran for 60 d from mid-Oct to mid-Dec 2008. Cows in Exp. 1 were supplemented with the daily equivalent of 0.45 kg/cow (DMB) and supplement was delivered three or six d/wk. Steers in Exp. 2 were supplemented with the daily equivalent of 1.02 kg/steer (DMB) and supplement was delivered 5 d/wk. In Exp. 1, frequency had no effect on cow BW (P = 0.55) or BCS (P = 0.27). Body condition score of cows fed in a bunk increased, while that of cows fed on the ground did not change (0.4 vs. 0.0; P = 0.01). Cows fed in a bunk lost less BW than cows fed on the ground (9.1 vs. 29.0 kg; P = 0.07). In Exp. 2, steers fed in a bunk had higher ADG than steers fed on the ground (0.29 vs. 0.20; P = 0.04). A retrospective analysis using the NRC (1996) showed a 0.14 kg/d reduction in WDGS intake would have resulted in the 0.09 kg reduction in ADG. This is the equivalent of 13% waste. Calf sale value would have to be less than \$0.81/0.45 kg to justify not feeding in a bunk based on cost of feeding in a bunk being about \$0.16/d. Frequency of delivery of WDGS did not affect animal performance. An advantage in animal performance to feeding WDGS in a bunk versus on the ground was seen in the current studies.

KEY WORDS: Wet Distillers Grains with Solubles, feeding frequency, bunk, WDGS

Introduction

The growth of the ethanol industry in Nebraska and surrounding states has increased the availability of distillers co-products for livestock feed. Distillers grains plus solubles is high in protein, energy and phosphorous, making it an excellent supplement in many grazing situations (Gustad, 2006). In a summary of 14 grazing trials, Griffin et al. (2009) reported supplementation of dried distillers grains with solubles (DDGS) increased final BW and ADG quadratically. In addition, DDGS supplementation decreased forage intake quadratically, however total intake for supplemented cattle increased quadratically with increased DDGS levels (Griffin et al., 2009).

Wet distillers grains with solubles (WDGS) have not been widely used in grazing applications. This is due, in part, to potential inefficiencies in delivery of WDGS to grazing cattle. Feeding WDGS on the ground may result in higher waste levels when compared to feeding it in a bunk, but may increase its use in practical grazing situations and increase profitability compared to bunk feeding. Therefore, the objective of this study was to compare feeding WDGS in a bunk or on the ground to grazing cattle.

Materials and Methods

Both experiments were conducted at the University of Nebraska Gudmundsen Sandhills Laboratory (GSL) near Whitman, NE according to protocol approved by the University of Nebraska-Lincoln Institutional Animal Care and Use Committee. Cattle grazed native upland Sandhills winter range dominated by little bluestem [*Schizachyrium scoparium* (Michx.)], prairie sandreed [*Calamovilfa longifolia* (Hook.) Scribn.], sand bluestem (*Andropogon gerardii* var. *paucipilu* Hack.), switchgrass (*Panicum virgatum* L.), sand lovegrass [*Eragrostis trichodes* (Nutt.) Wood], indiangrass [*Sorghastrum nutrans* (L.) Nash] and blue grama [*Bouteloua gracilis* (H.B.K.) Lag. Ex Griffiths] (Lardy et al., 1999).

For both experiments, wet distillers grains were obtained from an ethanol production facility (Standard Ethanol, LLC; Madrid, NE) and transported about 179 km to GSL. The distillers grains was purchased in September each year and stored in a bunker fashioned from large round bales of meadow hay arranged in a "U" shape and covered with plastic until initiation of the experiment, according to methods outlined by Erickson et al. (2008).

In Exp. 1, 120 multiparous March-calving cows (536±53.5 kg BW) were stratified by age and assigned randomly to one of eight pastures. Pastures were then assigned randomly to treatment. Treatments were arranged as a 2 X 2 factorial in a completely randomized design as follows: WDGS fed on the ground, either three or six d/wk; or WDGS fed in a bunk either three or six d/wk. The experiment was

conducted for 90 d from Dec 1, 2007 to Mar 1, 2008, Cows were supplemented with the daily equivalent of 0.45 kg/cow (DMB) WDGS, delivered on Monday, Wednesday and Friday to cattle in the three d/wk treatment and Monday through Saturday to cattle in the six d/wk treatment. Cattle continuously grazed the same pasture throughout the experiment. Cow BW and BCS were measured upon initiation and completion of the 60-d feeding period. Weights were taken on a single day and cows were not limited fed prior to weighing.

Experiment 1 data were analyzed using MIXED procedures (SAS Inst. Inc., Cary, NC) and the model included the effects of feeding method, frequency of WDGS delivery and their interaction. Pasture was used as the experimental unit. Differences were considered significant when *P*-values were < 0.10.

In Exp. 2, 63 March-born steer calves (201.2 ± 27.5 kg BW) were stratified by weight and assigned to one of two feeding treatments: WDGS fed in a bunk or on the ground. Steers in Exp. 2 were supplemented with the daily equivalent of 1.02 kg/steer (DMB) and supplement was delivered five d/wk. The experiment was conducted for 62 d from October 14, 2008 to December 15, 2008. A total of four experimental pastures were used resulting in two observations per treatment. Steers continuously grazed the same pasture throughout the experiment. Steer BW was recorded on two consecutive days at the initiation and completion of the feeding period. Calves were not limit fed prior to weighing.

Experiment 2 data were analyzed as an unstructured treatment arrangement in a completely randomized design using MIXED procedures (SAS Inst. Inc., Cary, NC). The model included the effect of feeding method. Pasture was used as the experimental unit. Differences were considered significant when *P*-values were < 0.10.

Results

In Exp. 1, there were no frequency by method interactions ($P > 0.10$). Frequency had no effect on cow BW ($P = 0.55$) or BCS ($P = 0.27$). Body condition score of cows fed in a bunk increased, while that of cows fed on the ground did not change (0.4 vs. 0.0; $P = 0.01$; Table 1). Cows fed in a bunk lost less BW than cows fed on the ground (9.1 vs. 29.0 kg; $P = 0.07$; Table 1). Previous research as GSL has demonstrated 0.14 kg/d of supplemental crude protein to be sufficient to maintain BCS of spring-calving cows during the winter (Hollingsworth-Jenkins et al., 1996). In this experiment feeding WDGS in a bunk at an equivalent crude protein level resulted in a slight increase in BCS. This may be a result of the energy content of WDGS. While better performance was achieved by feeding in a bunk, this experiment demonstrated WDGS is a viable supplement for cows grazing winter range.

In Exp. 2, steers fed in a bunk had higher ADG than steers fed on the ground (0.29 vs. 0.20; $P = 0.04$; Table 2). The NRC (1996) was used to retrospectively calculate the WDGS intake difference between treatments. For steers fed in a bunk, 0.14 kg/d reduction in WDGS intake would have resulted in a 0.09 kg reduction in ADG. It was therefore assumed 0.14 kg/d of the WDGS offered to steers fed on the ground was wasted. This is the equivalent of 13% waste. Because steers in this experiment were gaining BW at a relatively modest rate, even a slight reduction in WDGS intake resulted in a relatively large decrease in ADG. If the steers were being fed to achieve relatively rapid BW increases and waste of WDGS remained constant than the relative difference in ADG between cattle fed in a bunk versus on the ground would be expected to be less than what was observed in this study

An economic analysis was conducted on Exp. 2 (Table 3). This analysis was based on the value of the average difference in weight gained between steers fed WDGS in a bunk or on the ground. Calf sale value would have to be less than \$0.81/0.45 kg to justify not feeding in a bunk based on cost of feeding in a bunk being about \$0.16/d. The cost of \$0.16/d was derived from the purchase of a commercial (Werk Weld Inc., Armour, SD) feed bunk, assuming full capacity of 40 h. Bunk cost of \$973.65 included a onetime delivery charge with a three year pay back and 60 days of use per year at an interest rate of about 9.5%. Bunk cost for individual producers will vary as will calf value necessary to justify bunk feeding (Table 3).

In conclusion, frequency of delivery of WDGS did not affect animal performance. An advantage in animal performance to feeding WDGS in a bunk versus on the ground was seen in the current studies.

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Table 1. Change in body weight (BW) and body condition score (BCS) of cow fed WDGS on the ground or in a bunk (Exp. 1)

	Bunk	*Ground*	*SEM*	*P-value*
BCS Change	0.43	0	0.068	0.01
Weight Change	-9.1	-29.0	5.6	0.07

Table 2. Performance of steers fed WDGS on the ground or in a bunk (Exp. 2)

	Bunk	*Ground*	*SEM*	*P-value*
Initial BW	199.7	202.7	5.0	0.67
Final BW	218.0	215.4	5.0	0.71
ADG	0.29	0.20	0.03	0.04

Table 3. Value of the difference in ADG between steers fed WDGS in a bunk or on the ground (Exp.2).

Value of 0.45 k live weight	Value of 0.09 kg/d weight difference
$0.80	$0.159
$0.85	$0.169
$0.90	$0.179
$0.95	$0.189
$1.00	$0.198
$1.05	$0.208
$1.10	$0.218
$1.15	$0.228
$1.20	$0.238
$1.25	$0.248
$1.30	$0.258
$1.35	$0.268
$1.40	$0.278
$1.45	$0.288
$1.50	$0.298