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Dried Distillers Grains Supplementation of Calves Grazing Irrigated Corn Residue

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Summary

Steer calves grazing irrigated corn residue received supplementation of dried distillers grains plus solubles (DGS) at 0.3, 0.5, 0.7, 0.9, or 1.1% of body weight. Steers were individually supplemented daily through Calan gates. Daily gain improved linearly (0.77 lb/head/day to 2.21 lb/head/day) with increasing supplementation (1.5 lb/day to 7 lb/day). Supplementing DGS to calves grazing corn residue increased gain during the winter period.

Introduction

There is significant potential for grazing corn residues in Nebraska due to the acres of corn planted annually. Grazing residues increases the length of the grazing season, allowing producers to feed less harvested feeds, thereby reducing annual feed costs. However, residues are lower in CP and energy than what is required to meet the needs of growing calves gaining more than 1 lb per day. Providing protein supplementation in the form of rumen undegradable protein (RUP) allows producers to increase winter gain of growing calves on corn residue. A feed that acts as an excellent source of RUP and energy in forage-based diets is distillers grains plus solubles (DGS). A quadratic effect has previously been demonstrated for calves grazing irrigated corn residue and receiving dried DGS at increasing levels, with optimal supplementation being at 1.1% of body weight (*2014 Nebraska Beef Catle Report,* pp. 48-49).

The objective of this trial was to compare different levels of supplementation of dried DGS for calves grazing an irrigated corn residue field.

Procedure

Sixty crossbred steers (519 ± 11 lb) were backgrounded on corn residue from Nov. 6, 2013, to Jan. 31, 2014, at the University of Nebraska–Lincoln Agricultural Research and Development Center near Mead, Neb. Treatments were arranged in a completely randomized design. Steers were assigned randomly to treatment to evaluate the effects of gain for calves grazing corn residue and receiving dried DGS supplementation. Dried DGS was fed at an inclusion level of 0.3, 0.5, 0.7, 0.9, or 1.1% of BW (5, 8.5, 11.5, 16, or 20 lb). Steers were gathered at 1,600 and offered supplementation individually through Calan gates. Steers were turned out at 0700 to graze residue for the remainder of the day. All calves were implanted with Ralgro® on day one of the trial and received monensin at 200 mg/steer and limestone at 60 g/steer daily as part of supplementation.

Six ruminally canulated steers were utilized for diet sampling. Diet samples were collected three times throughout the trial by evacuating the rumen of solid and liquid particulate matter. Once steers had a chance to graze for thirty minutes they were brought back in and the grazed forage was collected from the rumen, sealed in a labeled bag, and stored on ice for later analysis of *in vitro* organic matter disappearance (IVOMD). The original rumen contents prior to diet sampling were replaced in the rumen of the respective steer prior to turning them out with the herd. Total grazed contents were frozen and subsequently freeze dried. Samples were ground through a 1 mm screen prior to analysis. Diet IVOMD was determined by incubating each sample for 48 hours in a solution of MacDougall's buffer and rumen fluid. Samples were then filtered, dried, and ashed to obtain DM and OM amounts for the IVOMD calculation.

For grazing cattle, stocking rates are traditionally based on available forage and not the quality of the forage. Stocking rate was calculated based on yield of the field at harvest and previous research quantifying the amount of residue consumed per acre. The yield (bu/ac), estimated forage availability (8 lb/bu), grazing efficiency factor (85% for irrigated), and number of acres were multiplied together to estimate the total available forage for each field. Total available forage was then divided by estimated DMI of all steers allotted to graze each respective field in order to get days of available grazing. Using this calculation, the 32 acre irrigated field would allow 66 steers to graze for 84 days based on a yield of 260 bu of grain/ac. Due to the limited number of Calan gates, only 60 steers could be supplemented in the barn. The six ruminally canulated steers utilized for diet sampling were able to graze irrigated corn residue and received daily supplementation of dried DGS at 0.7% BW in a feed bunk outside the barn.

Results

Average daily gain increased linearly ($P = 0.03$) with increasing level of dried DGS supplementation for calves grazing irrigated corn residue. Calves supplemented at 0.3, 0.5, 0.7, 0.9, and 1.1% of BW gained an average of 0.77, 1.44, 1.71, 1.95, and 2.21 lb/day ($P < 0.01$). No feed refusals were observed for steers supplemented

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at any level. The gain response to increasing levels of DGS supplementation is shown in Figure 1. The linear effect suggests that optimal gain per lb of supplementation may not have been reached. Previous research (*2006 Nebraska Beef Cattle Report*, pp. 36-37) evaluating supplementation level of DGS used higher supplementation amounts than 1.1% of BW and found a quadratic response with increasing supplementation level. The highest level for this trial was set at 1.1% BW based on the previous year's trial which showed 1.1% BW as the optimal level while minimizing feed refusals (*2014 Nebraska Beef Cattle Report,* pp. 48-49). The current study may not have observed a quadratic response due to the maximum level of supplementation set in order to achieve maximum gain per lb of supplement.

No differences in IVOMD were present for diet samples collected and analyzed by sampling period ($P = 0.52$). Figure 2 shows the changes in IVOMD over time. The IVOMD calculation shows the quality of the diet samples throughout the sampling period for the irrigated field to remain relatively constant. Grazing corn residue is unique in that all of the available forage is accessible to the animal on the first day of grazing. Animal selectivity occurs with the steer consuming the grain, husk, leaf, cob, and then stalk. Residue parts are selected for in order of highest to lowest nutrient quality, supporting the decline in IVOMD over the grazing period. The lack of decline in diet quality suggests we had an appropriate stocking rate to maintain forage quality throughout the grazing season.

This experiment suggests gain is greater for calves receiving a higher supplementation level as a percentage of BW. The optimal supplementation level does not appear to have been met and may be higher than 1.1% BW since steers were given sufficient time to consume supplement.

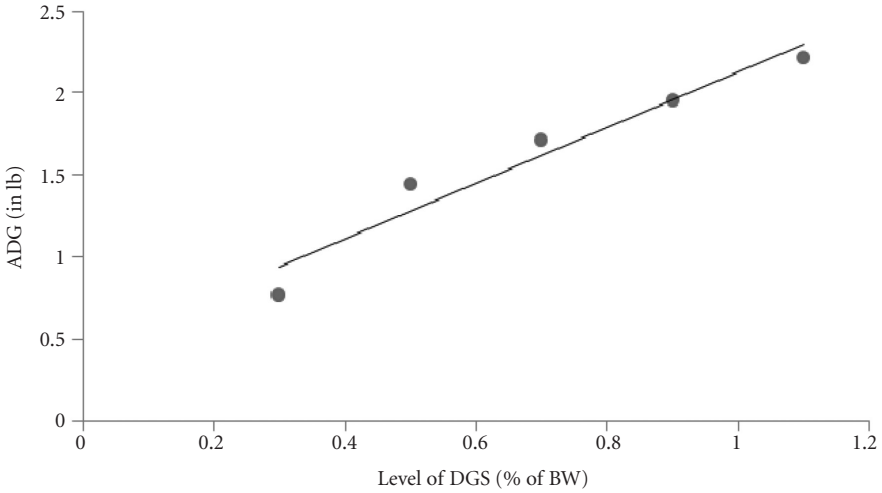

Figure 1. Effect of gain on level of dried distillers grains.

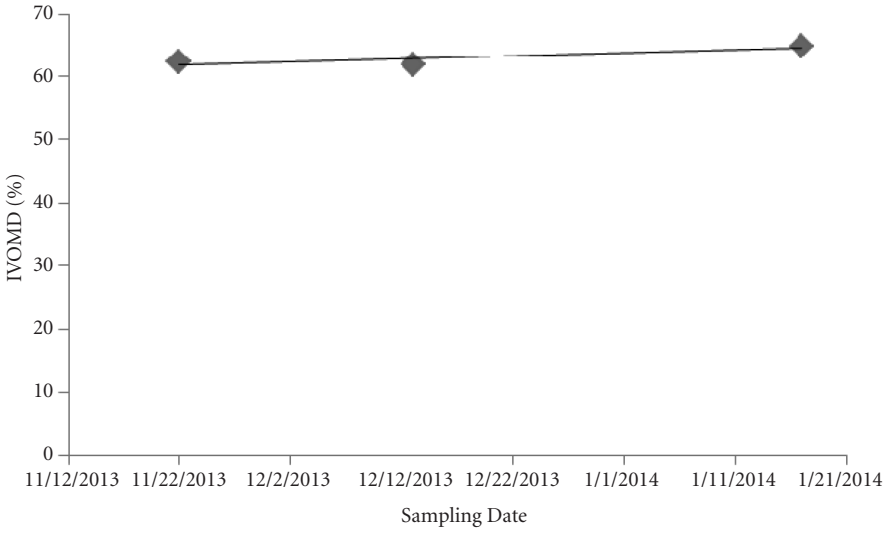

Figure 2. *In vitro* **organic matter disappearance of diet samples over time.**

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