Effects of Altering Supplementation Frequency During the Pre-Partum Period of Beef Cows Grazing Dormant Native Range

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Abstract
Spring-calving beef cattle that are grazing low-quality (< 7% crude protein) dormant forage typically are unable to meet their maintenance requirements for protein. Providing a protein supplement (> 30% crude protein) is recommended to decrease losses of body weight and body condition. Nutrient supplementation when forage quality is poor or limited is one of the largest expenditures for forage-based beef cattle operations. The expansion of the ethanol industry has afforded many producers in corn and sorghum-producing regions an alternative to traditional oilseed-based protein supplements. The availability and nutrient profile of distiller's grains with solubles (DDG) has made it popular as a supplement for cows that are grazing dormant low-quality forages.

Decreasing supplementation frequency reduces costs for labor and fuel. Previous research has shown no difference in body weights or body condition scores of cows supplemented with distiller's grains daily, once every three days, or once every six days; however, the proportion of cows that ate hay during the 60 minutes immediately after supplementation was less on the day of supplementation for cows supplemented once every six days compared to cows supplemented daily. The observed decrease in hay consumption following supplementation could potentially decrease total organic matter intake during late gestation. More frequent supplementation may increase organic matter intake and improve performance during the month before parturition.

Therefore, the objective of this study was to evaluate effects of altering frequency of supplementing distiller's grains during the last 28 days of gestation with respect to performance of spring-calving beef cows consuming low-quality dormant native range.

Keywords
Beef Cattle Research

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supplementation, gestation, distiller’s grains

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C.J. McMullen, J.R. Jaeger, J.W. Waggoner, K.R. Harmoney, and K.C. Olson

Introduction

Spring-calving beef cattle that are grazing low-quality (< 7% crude protein) dormant forage typically are unable to meet their maintenance requirements for protein. Providing a protein supplement (> 30% crude protein) is recommended to decrease losses of body weight and body condition. Nutrient supplementation when forage quality is poor or limited is one of the largest expenditures for forage-based beef cattle operations. The expansion of the ethanol industry has afforded many producers in corn and sorghum-producing regions an alternative to traditional oilseed-based protein supplements. The availability and nutrient profile of distiller’s grains with solubles (DDG) has made it popular as a supplement for cows that are grazing dormant low-quality forages.

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Key words: supplementation, gestation, distiller’s grains

Experimental Procedures

Pregnant Angus crossbred cows (n = 238; age = 6 ± 2.5 years; initial body weight = 1362 ± 123.9 lb; initial body condition score = 5.7 ± 0.03) were maintained on dormant native range for 88 days until the onset of calving. Pasture botanical composit...
Cattlemen’s Day 2016

Cattle consuming low-quality dormant native range generally do not consume sufficient nitrogen to optimize ruminal fermentation, which hinders nutrient digestion absorption. Previous research reported that supplementation frequency had no effect on cow performance when cattle were supplemented protein as infrequently as once per...
we found no differences between groups of cows supplemented daily or at 6-day intervals (Table 2).

We hypothesized that increasing supplementation frequency for the 28 days prior to onset of calving from once every 6 days to daily would increase dry matter intake, thus resulting in greater nutrient intake and more favorable performance. In contrast, increasing supplementation frequency had the opposite of its intended effect (Table 2). Cows in the D6-D1 group had lighter body weights ($P=0.04$) and less body weight gain at the end of the 88-day supplementation period compared to cows in the D1, D6 and D1-D6 groups. Likewise, body condition scores of D6-D1 cows tended ($P=0.09$) to be lower than those of cows in the D1, D6 or D1-D6 supplementation groups.

**Implications**

Under the conditions of our study, increasing supplementation frequency from once every 6 days to daily during the final 28 days prior to calving resulted in less body weight gain and poorer body condition scores for pregnant beef cows supplemented with dried distiller’s grains. No adverse effects of reducing supplementation frequency to once every 6 days were observed in pregnant beef cows fed dried distiller’s grains. Reducing supplementation frequency may be a viable means of reducing supplementation costs when dried distiller’s grains are used as supplement.
### Table 1. Nutrient composition (dry matter basis) of native range and dried distiller’s grain with solubles

| Item                        | Year 1 | Year 2 | Year 1 | Year 2 |
|-----------------------------|--------|--------|--------|--------|
| Dry matter, %               | 85.5   | 87.4   | 88.4   | 88.2   |
| Crude protein, %            | 5.5    | 4.6    | 32.7   | 31.2   |
| Neutral detergent fiber, %  | 69.1   | 73.4   | 29.7   | 37.0   |
| Acid detergent fiber, %     | 47.3   | 47.1   | 18.7   | 17.7   |
| Calcium, %                  | 0.36   | 0.28   | 0.09   | 0.07   |
| Phosphorus, %               | 0.13   | 0.10   | 0.82   | 0.85   |
| Sulfur, %                   | 0.10   | 0.06   | 0.80   | 0.60   |
| Net energy for maintenance, Mcal/kg | 0.95 | 0.56 | 1.98 | 1.93 |

1Analysis conducted by SDK Laboratories, Hutchison, KS.

### Table 2. Performance of spring-calving cows supplemented with dried distiller’s grains during the last trimester of gestation

| Supplement treatments | D1 | D6 | D1-D6 | D6-D1 | SEM | Treatment  | Year  | Treatment × Year |
|-----------------------|----|----|-------|-------|-----|------------|-------|-----------------|
| Number of cows        | 57 | 65 | 57    | 59    |     | 0.37       | 0.39  | 0.77            |
| Body weight, lb       |    |    |       |       |     | 0.13       | 0.24  | 0.74            |
| day 1                 | 1430.7 | 1432.9 | 1438.4 | 1401.2 | 7.99 |            |       |                 |
| day 60                | 1512.9 | 1468.1 | 1519.1 | 1503.3 | 7.99 | 0.04       | 0.14  | 0.96            |
| day 88                | 1540.4<sup>a</sup> | 1532.1<sup>c</sup> | 1540.7<sup>c</sup> | 1479.9<sup>b</sup> | 8.23 | <sup><i>P</i></sup> < 0.01 | <sup><i>P</i></sup> < 0.01 | 0.39 |
| Body weight change, lb |    |    |       |       |     | 0.08       | <sup><i>P</i></sup> < 0.01 | 0.65 |
| day 1-60              | 84.9<sup>c</sup> | 73.3<sup>c,d</sup> | 84.5<sup>c</sup> | 70.0<sup>de</sup> | 2.82 | <sup><i>P</i></sup> < 0.01 | <sup><i>P</i></sup> < 0.01 | 0.39 |
| day 60-88             | 26.2<sup>a</sup> | 27.3<sup>c</sup> | 19.4<sup>ab</sup> | 10.3<sup>b</sup> | 2.07 | <sup><i>P</i></sup> < 0.01 | <sup><i>P</i></sup> < 0.01 | 0.07 |
| day 1-88              | 111.8<sup>a</sup> | 101.2<sup>c</sup> | 105.0<sup>c</sup> | 81.2<sup>b</sup> | 3.23 | <sup><i>P</i></sup> < 0.01 | <sup><i>P</i></sup> < 0.01 | 0.39 |
| Body condition score   |    |    |       |       |     | 0.45       | 0.53  | 0.59            |
| day 1                 | 5.9 | 5.8 | 6.0   | 5.9   | 0.03 |            |       |                 |
| day 60                | 5.6 | 5.5 | 5.6   | 5.5   | 0.03 | <sup><i>P</i></sup> < 0.01 | <sup><i>P</i></sup> < 0.01 | 0.89 |
| day 88                | 5.8<sup>c</sup> | 5.8<sup>c</sup> | 5.8<sup>c</sup> | 5.6<sup>d</sup> | 0.03 | <sup><i>P</i></sup> < 0.01 | <sup><i>P</i></sup> < 0.01 | 0.75 |

1Supplements provided during the last trimester of gestation. Treatments: D1 = dried distiller’s grains fed daily from day 1 to day 88; D6 = dried distiller’s grains fed every 6 days from day 1 to day 88; D1-D6 = dried distiller’s grains fed daily from day 1 to day 60 and every 6 days from day 61 to day 88; and D6-D1 = dried distiller’s grains fed every 6 days from day 1 to day 60 and daily from day 61 to day 88.

2Scale of 1 to 9; 1 = extremely emaciated, 9 = extremely obese (Wagner et al., 1988).

<sup>a,b</sup>Means with different superscripts denote difference between treatments (<sup><i>P</i></sup> < 0.05).

<sup>c,d</sup>Means with different superscripts denote a tendency for difference between treatments (0.05 < <sup><i>P</i></sup> ≤ 0.10).