

Replacing Hay with a Blended Field Pea/Co-product Supplement Fed to Cows Daily or on Alternate Days

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Introduction:

Drought in the Northern Great Plains is common and limits hay production. Manske et al. (2010) summarized precipitation shortage in western North Dakota during the grazing season from mid-April to mid-October for the 118-yr period between 1892 and 2009. Thirty-nine years were identified as being mild to severe drought.

Nutrient-dense co-products can replace a large amount of forage, but when used in alternate day feeding systems, the supplement must not induce a rapid decline in rumen pH creating acidosis or bloat. Field pea starch fermentation rate in the rumen is similar to corn and rumen protein degradation (RDP) is estimated to range from 78 to 94%.

Distiller's dried grains with solubles are a source of rumen undegradable protein (RUP), energy, and minerals. As a percent of CP, DDGS contain approximately 65% RUP, which can be beneficial when balancing cattle diets for metabolizable protein. Barley malting co-products consist primarily of dried malt sprouts and some thin light test weight barley. Barley malt sprouts (BMS) possess medium CP (16%), moderate energy (TDN 74%), and a NEg of 1.15 Mcal/kg indicating that the fiber component is of moderate to high digestibility.

It has been proven that cattle can be fed supplements high in rumen undegradable protein as infrequently as 6-10 days, when being fed low quality forage, without adversely affecting dry matter intake, nitrogen efficiency, bacterial crude protein synthesis, or animal performance.

It has also been shown that supplements formulated to contain a balance of rumen degradable and undegradable protein could be fed daily or on alternate days.

Objective:

The objective of this project was to evaluate a drought strategy in which a significant amount of daily forage is replaced with a blended RDP/RUP supplement fed either *daily* or on *alternate days* to determine the effect on ending cow body weight, ending BCS, ending fat depth, estrous activity at the start of the breeding season, and the subsequent effect on calf gain and weaning weight.

Procedure:

- 107 3-10 year old beef cows were used in a 113 day late gestation-early lactation in which a significant portion of the daily feed was replaced with wheat straw and a balanced RDP/RUP supplement formulated with field peas, DDGS, and barley malt sprouts (BMS).
- Treatments: 1) All hay control diet, 2) 25% of forage DM replaced with a blended RDP/RUP co-product supplement fed at the rate of 0.25% of body weight daily (**D**), 3) 25% of forage DM replaced with a blended RDP/RUP co-product supplement fed at the rate of 0.50% of body weight on alternate days (**ALT-D**).

- Each treatment had 4 pen weight blocks: light, medium, medium-heavy, and heavy.
- Diets were formulated to contain balanced energy across treatment weight blocks using alfalfa-bromegrass hay (10.2% CP), wheat straw (4.7% CP), and the experimental pea-DDGS-BMS supplement (22.8% CP).
- Gestation NEm/cow was light -10.1, medium-10.8, medium-heavy-11.67, and heavy-12.52 Mcal/cow/day.
- Lactation NEm/cow was light -15.8, medium-18.2, medium-heavy-19.1, and heavy-20.0 Mcal/cow/day.
- The amount of hay to be fed each day was adjusted at the beginning of the week based on the upcoming weeks forecast.
- Measurements: changes in cow BW, BCS, 12th rib fat depth, number of cows cycling at the start of the breeding season (progesterone assay: 2 blood draws separated by 10 days).
- Data analyzed using the MIXED procedure of SAS. Pre-trial gestation interval was used as a covariate.

Summary:

- Replacing forage with a field pea-DDGS-BMS supplement fed either daily or on alternate days was as effective as feeding only alfalfa-bromegrass hay.
- The amount of forage fed was reduced 44.5% by feeding the field pea-DDGS-BMS supplement. Supplement : hay ratio = 1.0 lb Suppl. replaced 3.23lbs. of forage (Fig. 1).
- At the end of the 113 day late gestation-early lactation study, there was no difference in cow performance (gain, BCS, 12th rib fat depth) due to supplementation or supplementation feeding frequency (Fig. 2-4).
- Reproductively, there was no difference in the number of cows that had resumed estrus activity by the start of the breeding season (Fig. 5).
- Feeding supplement on alternate days increased calf birth weight (P = 0.014), but not calving difficulty. There was no treatment difference for calf weaning wt. or ADG.
- Feed cost was \$1.13, \$1.19, and \$1.19/cow/day for the Control, Daily, and Alternate Day treatments, respectively (Fig. 6).