DIFFERENT REPRODUCTIVE AND LACTATIONAL RESPONSES TO PROTEIN SUPPLEMENTS BY TWO-YEAR OLD RANGE COWS: 1996 - 1997 TRIAL

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Results from the previous trial demonstrated the ability to change young cow lactational performance by supplementing different combinations of protein and fat. However, the lack of overall differences in calving rates and dates implied that the nutrient threshold for high rebreeding performance had been met. To further investigate protein effects on post-calving cow responses, three treatments were used in Spring 1996: feeding high versus low versus no ruminally undegrable protein. Two year-old crossbred cows grazing winter range were blocked by calving date and randomly allotted to:

1. High protein cube (n = 19): .40 lbs (182 g)/d ruminally degradable protein + .56 lbs (256 g)/d ruminally undegradable protein
2. Low protein cube (n = 18): .40 lbs (182 g)/d ruminally degradable protein + .11 lbs (52 g)/d ruminally undegradable protein
3. No supplement (n = 15)

Supplemented cows were individually fed on 2 d/week from April 1 (16 ±10.7 d post-calving) to June 7 (25 d after breeding started) at a rate of 5.8 lbs/feeding. Note that the high bypass supplement in 1996 provided 30% less of the protein supplied daily as compared to high bypass/low fat-fed cows in 1995. Due to the drought conditions of 1996, all cows were supplemented from June 7 until July 22 (end of breeding) with 4.5 lbs of a 16% protein cube on 2 d/week. Calves were weaned on September 26.

Protein supplemented cows lost less ($P < .01$) weight than unsupplemented cows by the start of the breeding season. The differences in weights between supplemented and unsupplemented cows was maintained at weaning. Condition loss was similar across treatments at the time bulls were put in (average - .2), but cows fed high versus low protein cube tended to lose more condition during the first part of the breeding season until supplementation ended (- .6 versus - .4; $P = .07$). Differences between high and low protein-fed cows resulted from the high protein supplement promoting increased milk yields ($P = .07$). Weaning weights also tended to be heaviest from feeding high protein cube.

In evaluating cow status and lactational performance together, supplemental and body nutrients were used differently based on treatment. Feeding additional undegradable protein increased milk production and calf growth while minimizing cow weight loss when compared to unsupplemented cows. Providing ruminally degradable protein alone minimized cow weight loss similar to high protein-fed cows, but did not improve lactational performance. Unsupplemented cows produced the same quantity of milk as low protein-fed cows, but lost the most weight and condition post-calving. This resulted from unsupplemented cows using body reserves to support milk production and calf growth.

Reproductive results are limited at this time. Using weekly blood samples to determine return to estrus after calving (progesterone > 1 ng/ml and a subsequent cyclic pattern), more protein supplemented versus unsupplemented cows had cycled during the first 28 days of breeding. Conception dates were estimated using a combination of progesterone levels which remained elevated during the breeding season and palpation of the fetus at fall weaning. Preliminary results suggest feeding protein reduced the time to rebreeding ($P = .02$). No differences were found in pregnancy rates at fall weaning via palpation. The last effect suggests unsupplemented cows responded to having access to new pasture on June 7, pasture regrowth, cube supplementation, and the later stage of lactation. Although unsupplemented cows were able to rebreed within the 70-d breeding season under improving conditions, feeding high protein enabled cows to produce heavier calves without negatively affecting reproductive performance under drought conditions.

Overall conclusions made from the two studies suggest that feeding lower as opposed to higher amounts of protein can promote desirable calf growth and reproductive responses. Feeding fat may also improve milk production, but results suggest early rebreeding performance may be reduced. Due to similar performance responses between feeding cottonseed meal and feathermeal, we recommend that feeding decisions should be based on the cost of supplementation and returns on calf sales. Future research will emphasize the further reduction in the size and ingredient costs of supplementation to further evaluate the profitability and response changes when feeding protein byproducts.

Treatment	Cow Weight 4/1/96	Cow Weight 5/10/96	Cow Weight 9/26/96	Milk Yield (lbs/4 hours) 5/10/96	Calf Weaning Weight 9/26/96
High Protein	820	778	983	2.0	465
Low Protein	828	778	988	1.5	452
No Supplement	816	744	959	1.3	454

Supplement type	% cycling by the first 28 d of the breeding season	Days Open	Fall Pregnancy Rate (%)
High protein	37	94	100
Low protein	38	92	94
No supplement	13	108	100