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RESEARCH FACTS

RESEARCH & TECHNOLOGY DEVELOPMENT FOR THE CANADIAN BEEF INDUSTRY

Beef Science Cluster



Trace mineral supplementation strategies in beef cows

Project Title:

Investigating Reproductive Failure in Western Canadian Cow-Calf Herds

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Background:

Optimizing cow-calf productivity requires that their nutritional demands be met. Trace mineral deficiencies are common in many parts of western Canada. Copper deficiency is a concern when the soil, feed or water does not contain enough copper (or if the dietary copper is bound by high levels of sulfate or molybdenum). During the last trimester of pregnancy, pregnant cows that are not consuming enough copper will actually deplete their own body stores to ensure that the developing calf gets enough. This means that the cow will be in especially poor copper status at calving. Copper deficiency at pasture turnout has been related to poor conception rates in young cows during the breeding season. Mineral supplementation is recommended, but is it better to feed it pre- or post-calving? Many farmers provide loose minerals in tubs, but is there a better method of ensuring that cows consume enough?

Objectives:

To compare the trace mineral status of cattle that supplemented free-choice compared to cattle fed mineral through a totally mixed ration.

What They Did:

A total of 121 Hereford-cross cows and 48 heifers were enrolled into a feeding trial. Cows were randomly placed into one of four groups (32 cows and 15 heifers per group). All four groups were fed the same rations, including 5 lbs (as fed) of barley silage. The only difference was how the minerals were provided. Two groups were fed free-choice minerals (one tub per group). The other two groups were fed mineral mixed with the barley silage.

After calving, half of each treatment group were switched to the opposite form of supplementation to create four treatment groups:

1) free-choice:free-choice (FC-FC), 2) free-choice:mixed-ration (FC-MR), 3) mixed-ration:mixed-ration (MR-MR), and 4) mixed-ration:free-choice (MR-FC).

Blood samples were collected from all cows and bred replacement heifers approximately 75 days prior to calving when the mineral supplementation strategy began. A second blood sample was collected from all cows and newborn calves within one week of calving. A third blood sample was collected from all cows and calves at turnout to pasture. Blood samples were tested for the trace minerals (copper, molybdenum, manganese, zinc, iron, selenium) and vitamins A and E.

What They Learned:

The cattle were supplemented mineral for an average of 89 days prior to calving. Eighty-nine percent of the cattle were classified as deficient (<0.6 ppm) for serum copper at the beginning of the trial. Delivering copper in the mixed ration improved the situation somewhat, but the free choice mineral had little effect. By calving, 55% of the mixed-ration and 86% of the free-choice mineral fed cattle remained deficient for copper. Although not statistically different, cows fed the free-choice mineral had a greater percentage of still-born and aborted calves (7.4 in the free-choice group vs. 4.8% in the mixed-ration group), assisted births (7.6 vs. 4.9%), and health treatments for cows (7.3% vs. 5.9%) and calf treatments (7.7% vs. 6.2%) compared to those fed mineral in the mixed-ration. What is most notable is that cows fed the mixed-ration mineral during the pre-calving period came into heat 2.3 times faster and became pregnant 5 days earlier than cows fed free-choice mineral.

The method of feeding mineral post-calving had no significant difference on the proportion of copper deficient cows or on the mean serum copper concentrations at turn-out to pasture.

What it Means:

Mineral supplementation is best given continuously pre- and post-calving. However, given its cost, pre-calving supplementation appears to improve blood copper levels more than post-calving supplementation. Based on this project, we would advise producers to provide mineral along with silage, barley or pellet to maintain a more consistent intake as compared to feeding it free-choice.

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