Trace Minerals in the Dry Period associated to Postpartum Metabolic and Reproductive Disorders in Dairy Cattle.

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BACKGROUND & OBJECTIVE

• Providing the correct amounts of bioavailable trace minerals in the diet is necessary for healthy, productive dairy cows. Excess or inadequate trace minerals may impact animal health and reproductive performance.

The objective was to examine the relationship between plasma trace mineral concentrations during the dry period and the incidence of postpartum 1) metabolic disorders (MD) [i.e. milk fever (MF), ketosis, displaced abomasum (DA), fatty liver, and 2) reproductive disorders (RD) [i.e. retained fetal membranes (RFM), metritis, anestrus, ovarian cysts, and endometritis] in dairy cattle.

MATERIALS & METHODS

• Holstein cows (n=227) from 11 Alberta dairy herds were involved in the study.

• Blood was sampled once between 6 and 14 days before calving to determine the plasma concentrations of manganese (Mn), iron (Fe), cobalt (Co), copper (Cu), zinc (Zn), selenium (Se), molybdenum (Mo).

• Data from farm and veterinarian records, and metabolic profiles (blood sampled collected 2 to 14 days after calving) were analyzed to determine the incidence of MD and RD.

• Reproductive data were retrieved from Dairy Comp 305 .

RESULTS

• Plasma concentrations of Co, Cu, Se and Mo differed (P<0.01) among farms.

• Based on reference intervals, the percentage of cows with low Se ranged from 0 to 100% and the percentage of cows with high Cu ranged from 0 to 38% (Fig. 1).

• Cows (%) with low and high Mo are shown in Fig. 2.

• Cows with RFM had greater (P<0.05) plasma concentrations of Mo (19.8 vs. 15.9 ng/mL) and lower concentrations of Fe (2.1 vs. 2.5 ug/mL).

• Ketotic cows had lower (P<0.05) plasma concentrations of Mn (1.5 vs. 1.8 ng/mL), Cu (0.8 vs. 0.9 ug/mL) and Se (0.07 vs. 0.08 ug/mL).

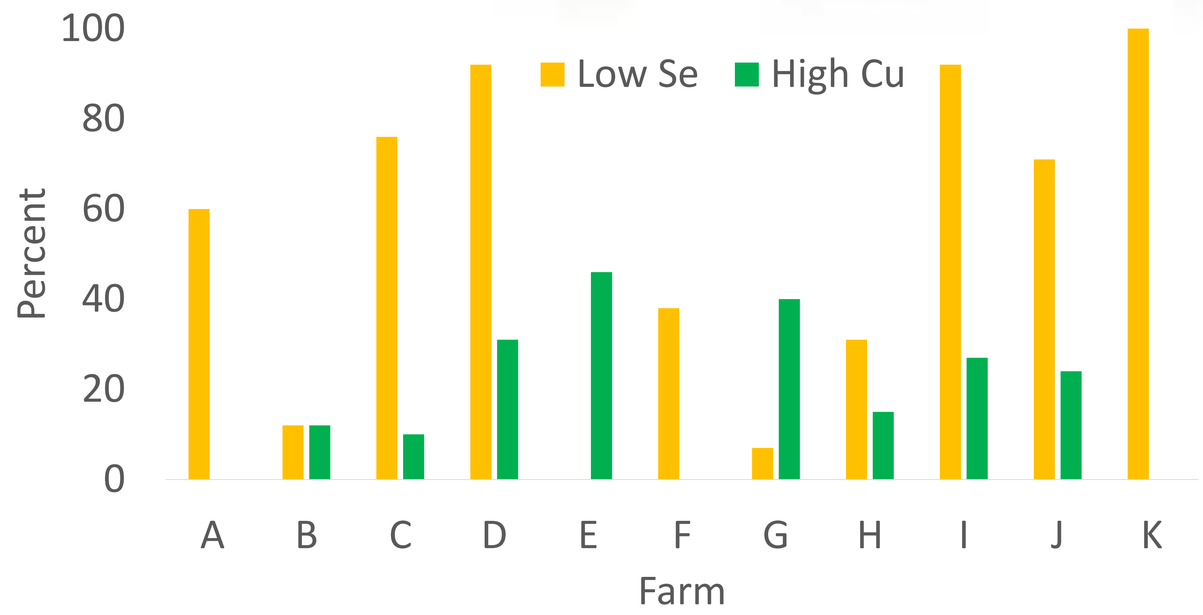

Fig 1. Percentage of dry cows (n=227) with low and high plasma concentrations of Se and Cu, respectively, from 11 dairy farms across Central and Northern Alberta.

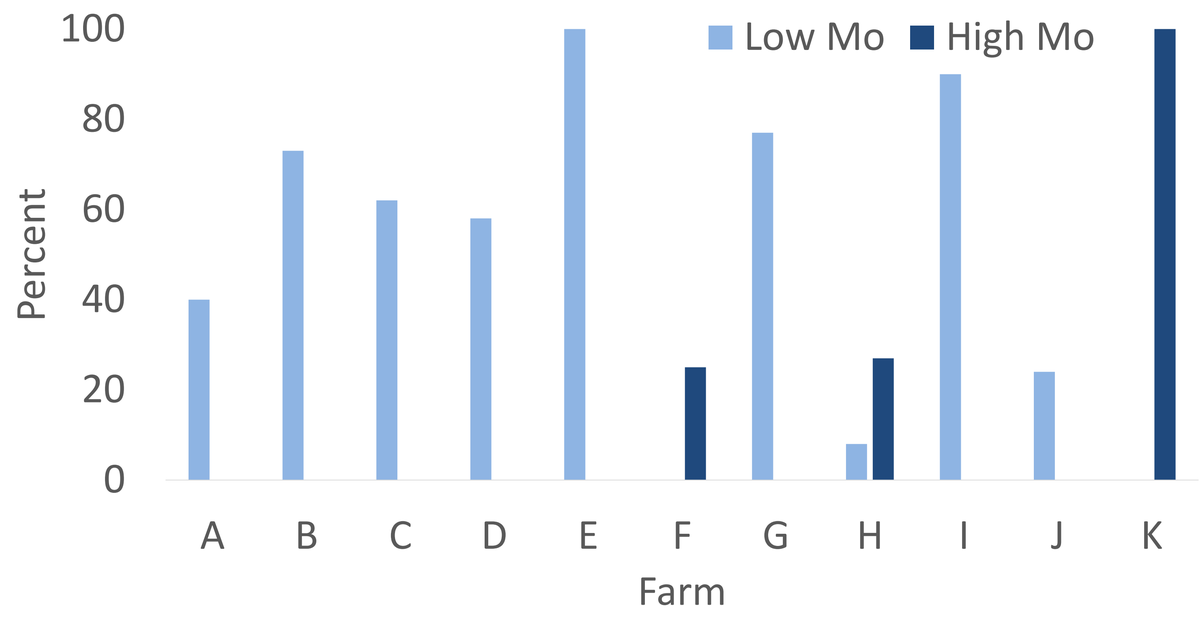

Fig 2. Percentage of dry cows (n=227) with low and high plasma concentrations of Mo from 11 dairy farms across Central and Northern Alberta.

• The incidence of MF was associated with reduced plasma concentrations of Se and increased concentrations of Mo.

• Cows diagnosed in anestrus (at approximately 5 weeks after calving) had lower (P<0.05) plasma concentrations of Mn (1.6 vs. 1.9 ng/mL) and Co (1.1 vs. 1.3 ug/mL).

TAKE HOME MESSAGE

• Plasma concentrations of trace minerals were highly variable among farms.

• Half of the cows were deficient in Se and the deficiency was associated with ketosis and milk fever.

• The excess of Cu needs consideration because of its liver toxicity.

• Most of the reproductive disorders, except anestrus, were not associated with concentrations of trace minerals.

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