

Northeastern Montana range pastures maintaining distinct American bison herds yield different trace metal availability and intestinal parasite infections in the American Bison on the Fort Peck Indian Reservation

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Abstract

Background

The Fort Peck Reservation tribes maintain two distinct bison herds on different pastures in Montana which includes a cultural herd (purebred) and a business herd (contains beef genes). The different pastures housing the herds have different Animal Unit Months (AMU) ratings (a measurement of forage/acre per adult animal) with the cultural herd pasture having a higher rating. With the limited grazing opportunities, it has been discovered that many of these bison have serious health problems related to malnutrition which can cause lower birth rates. Previous studies indicate metals such as copper (Cu) and zinc (Zn) are necessary for proper health and birth rates. In addition, poor calving rates in apparently healthy bison with adequate protein in diet might simply be from the different metal deficiencies.

Hypothesis

Decreased absorption of Cu and Zn are due to increased absorption of selenium and molybdenum. These deficiencies along with parasitic infections are causing health problems both bison herds on the Fort Peck Reservation.

Methods

We successively isolated liver and fecal samples from euthanized bison to test for toxic and essential trace minerals, and to probe for present parasites in the gastrointestinal tracts. Ova were counted using light microscopes from intestinal fecal matter obtained from the bison.

Results

Mineral imbalances were detected as elevated molybdenum (Mo) in both herds. Elevated Mo can

deplete liver copper (Cu). Deficient levels of Cu, manganese (Mn) and Zn were evident in both herds. On average cultural animals had Cu levels on of 7.75 ppm, well below the suggested range of 75 ppm while the business herd liver Cu content was averaged to be even lower at 4.33 ppm. Additionally, Mn was found to be deficient in the cultural herd (2.1 ppm where 3.0 ppm is normal) but not in the business herd. Zn was deficient in both herds at 28 ppm where 100 ppm is normal. Also, we determined that bison in both herds were either free of internal parasites or had low burdens of infestation. Seven business herd and 15 cultural herd fecal present in the cultural herd, none in the business herd. We believe health problems from malnutrition contribute to decreased weights and birthrates of the bison on the Fort Peck Indian Reservation samples were analyzed. The business herd had samples that exhibited undetectable ova or parasites per gram of feces while the cultural herd samples had low levels of Strongyle type ova (0.4–7.78 ova/gram of feces). Three of the cultural herd samples in additionally had Trichuris sp. (0.4 ova/gram), Nematodirus (0.2–0.67 ova/gram), and/or Coccidia (0.6 ova/gram).

Conclusions

Malabsorption of nutrients is caused by increased absorption of selenium and molybdenum but not infections from parasites in the Bison digestive tract.

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