

## Malabsorption of metals and intestinal parasite infections cause health problems and lower birth rates in the American Bison on the Fort Peck Indian Reservation

Ryon Sun Rhodes, Melinda Stewart, Christina L. Topliff, Clayton L. Kelling, Steven Coon,

First published: 01 April 2019

[https://doi.org/10.1096/fasebj.2019.33.1\\_supplement.871.9](https://doi.org/10.1096/fasebj.2019.33.1_supplement.871.9)

### Abstract

#### Background

Herds of American Bison have been raised on pastures of different Indian Reservations in Montana. It has been discovered that many of these Bison have serious health problems related to malnutrition causing lower birth rates. Plants on these reservations absorb unusually high levels of selenium and molybdenum which the animals feed on. Previous studies indicate metals such as copper are necessary for proper health and birthrates. Metals such as Copper, Zinc and Iron are necessary for normal conception rates and will cause retarded growth of the offspring. In addition, poor calving rates in apparently healthy bison with adequate protein and energy in diets might simply be from the different metal deficiencies. We have successively been able to isolate liver samples and fecal samples from Bison on the Fort Peck Indian Reservation to compare with other herds in Montana.

#### Hypothesis

Decreased absorption of copper, zinc and iron is due to increased absorption of selenium and molybdenum. These deficiencies along with parasitic infections are causing health problems in the bison herds on the Fort Peck Reservation.

#### Methods

When Two different herds on the Fort Peck Reservation were tested. One was a cultural herd that is 100% genes and the other is a business herd that contains beef genes. From both herds when the animals are euthanized liver samples and fecal samples are removed for analysis. Body scores were taken to assess the states of malnutrition and number of offspring were counted to assess birthrates.

#### Results

Liver tissue specimens collected from bison bulls harvested from the business herd were tested for essential trace mineral levels as well as for the presence of toxic elements. Trace mineral imbalances were detected. Elevated molybdenum (MO) was evident. Elevated Mo can deplete liver copper (Cu) and increase Cu-molybdenate complexes in plasma or serum. Deficient levels of Cu, manganese and zinc were evident. In addition We determined that bison in the cultural herd were either free of internal parasites or had low burdens of internal parasites. The testing of 22 bison fecal samples found 7 samples to have undetectable ova or parasites per gram of feces. The remaining 15 samples had low levels of Strongyle sp. type ova (0.4–7.78 ova/gram of feces). Three of the 15 samples in addition to Strongyle sp. type ova, had Trichuris sp. (0.4 ova/gram), Nematodirus sp. (0.2–0.67 ova/gram), and/or Coccidia (0.6 ova/gram). In contrast, moderate to heavy burdens of internal parasites were commonly present in bison in conventional herds that we have studied to date.

## Conclusions

Malabsorption of nutrients such as copper may be caused by increased absorption of selenium, molybdenum or zinc as well as infections from parasites in the Bison digestive tract. We believe these health problems contribute to decreased weights and birthrates of the Bison on the Fort Peck Indian Reservation.

## Support or Funding Information

This research is supported by a USDA grant.

This abstract is from the Experimental Biology 2019 Meeting. There is no full text article associated with this abstract published in *The FASEB Journal*.



© 2021 Federation of American Societies for Experimental Biology (FASEB)

About Wiley Online Library

[Privacy Policy](#)

[Terms of Use](#)

[Cookies](#)

[Accessibility](#)

[Publishing Policies](#)

Help & Support

**Contact Us**  
**Training and Support**  
**DMCA & Reporting Piracy**

Opportunities

**Subscription Agents**  
**Advertisers & Corporate Partners**

Connect with Wiley

**The Wiley Network**  
**Wiley Press Room**