

Beef Day 2021

The presence of persistent bovine viral diarrhea virus infection and a novel bosavirus in a bison herd

Ben M. Hause¹, Julia F. Ridpath², Angela E. Pillatzki¹ Tom Bragg³, Christopher CL Chase¹

¹Department of Veterinary and Biomedical Science, South Dakota State University, Brookings SD; ²Ridpath Consulting, Gilbert IA; ³Turner Enterprises, Bozeman MT

Objective

Bovine viral diarrhea virus (BVDV) is a significant pathogen of cattle, leading to losses due to reproductive failure, respiratory disease and immune dysregulation. An investigation was conducted in an American bison (*Bison bison*) herd dealing with reproductive issues in 2018-2019 calving season to determine likely cause of the losses.

Study Description

Diagnostic tests including serology and virology (virus isolation and metagenomic sequencing) were conducted on samples collected from the breeding herd and from 4 American bison with failure to thrive and general unthriftiness in March 2020. Two of the these bison (one male and one female) and two “normal” bison (one male and one female) were submitted for pathological examination in September 2020. Serology indicated a high incidence of exposure as 26 of 26 animals had BVDV 1 titers between 512-8192. Type 2 titers were present in 26 of 26 and ranged from 64-8192. Metagenomic sequencing on pooled nasal swabs and serum from the four “unthrifty” bison identified a BVDV1a strain and bovine bosavirus (BBV). The BVDV genome was most similar to the BVDV type 1a vaccine strain Oregon C24V with 92.7% identity. Sequencing results were confirmed by PCR detection of BVDV and BBV in individual serum samples: BVDV was detected in two bison and BBV was detected in two bison with one bison co-infected with BVDV and BBV. Serum from these same animals collected two months later remained positive for BVDV and BBV, again with one animal co-infected with both BVDV and BBV. Pathological examination of the two BVDV PI bison revealed smaller spleens than the “normal bison”. On histopathology, the two BVDV positive animals had lymphoid depletion in the ileo-cecal valve lymphoid region. The female PI bison had decreased primordial/primary follicles in the ovary and there was decreased spermatogenesis in the testes of the PI male.

Take Home Points

These results suggest that both viruses can persistently infect bison. While the significance of BBV infection is unknown, the ability of BVDV to persistently infect bison has implications for BVDV control and eradication programs.

