

Case 3

First report of *Pseudocowpox virus* infection in an American bison (*Bison bison*)

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Signalment and History: A 7-year-old female bison was euthanized for declining condition and sores on vulva and udder.

Gross findings: There were multifocal raised, keratinized plaques (0.5–2cm) covering the skin of the ventral tail, perineum, caudoventral abdomen, udder, both inguinal recesses, and the medial aspects of both thighs. Distal to the thighs, the plaques became gradually fewer and smaller in size (0.2–0.5cm). Smaller papules (0.2–0.5cm) also covered both axillae and the hind limbs distal to the thigh. No gross lesions were present in remainder of the tissues examined.

Microscopic findings: Multiple sections of the keratinized skin plaques examined consistently showed moderate epidermal hyperplasia with elongated rete pegs and marked parakeratotic hyperkeratosis with crusts of degenerate neutrophils and cell debris. Multifocally, few epithelial cells within the stratum spinosum and stratum corneum have undergone ballooning degeneration and occasionally contain eosinophilic intracytoplasmic inclusion bodies (3–5µm Bollinger body).

Ancillary testing: Parapoxvirus was confirmed by qPCR (Ct 18.6) on skin, by negative stain Electron Microscopic examination of skin suspension, and by metagenomic analysis. Skin samples were negative for BVDV by real-time PCR and immunohistochemistry. Sequencing and phylogenetic analysis based on B2L envelope gene showed that the bison parapox shared 100% identity with bovine pseudocowpox virus.

Diagnosis: Dermatitis, proliferative and erosive, multifocally extensive, severe with ballooning degeneration and occasional intracytoplasmic eosinophilic inclusion bodies and crusting.

Comments: The gross and histologic lesions are characteristic of poxvirus infection². Further molecular analysis characterized the virus as pseudocowpox virus. The genus *Parapoxvirus* (family *Poxviridae*), characterized by ovoid virion structure is composed of *Pseudocowpox virus*, *Orf virus*, *Bovine papular stomatitis virus* and *Parapoxvirus of Red deer in New Zealand*. Pseudocowpox virus infection in bovine is generally a mild, self-limiting infection with papules and scabs on teats or udder¹. The occurrence of a severe pseudocowpox virus (in the absence of BVDV) that probably led to deterioration in the health of bison is of a concern. Parapoxviruses are zoonotic, causing cutaneous papules in humans. Identification of new susceptible hosts sheds light on the viral evolution and might have economic significance to bison industry.

References:

- 1 MacLachlan NJ: Chapter 7 - Poxviridae - MacLachlan, N. James. In: Dubovi EJ, ed. *Fenner's Veterinary Virology (Fifth Edition)*. Boston: Academic Press; 2017: 157-174.
- 2 Mauldin EA, Peters-Kennedy J: Chapter 6 - Integumentary System - Maxie, M. Grant *Jubb, Kennedy & Palmer's Pathology of Domestic Animals: Volume 1 (Sixth Edition)*: W.B. Saunders; 2016: 509-736.e501.