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Abortion Caused by *Brucella abortus* Biovar 1 in a Free-ranging Bison (*Bison bison*) from Yellowstone National Park

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ABSTRACT: A near-term aborted bison (*Bison bison*) fetus was collected near Old Faithful geyser in Yellowstone National Park, Wyoming (USA). On necropsy, the fetus liver had a small capsular tear, and there was a small quantity of blood in the peritoneal cavity. Microscopic lesions included mild, purulent bronchopneumonia and mild, multifocal, interstitial pneumonia. *Brucella abortus* biovar 1 was isolated from fetal abomasal contents, lung, and heart blood.

Key words: Abortion, bison, *Brucella abortus*, brucellosis, Yellowstone National Park, *Bison bison*.

On 26 March 1992, a free-ranging adult, female bison with placental membranes protruding from the vulva was observed near Old Faithful geyser in Yellowstone National Park (YNP), Wyoming (USA) (44°3′N, 110°45′W). A recently aborted female bison fetus was found nearby. The fetus was collected by a National Park Service employee, frozen, and submitted to the Montana Veterinary Diagnostic Laboratory (MVDL) for examination. At necropsy, the fetus had erupted incisors and was considered near term. An 8-cm capsular tear was observed on the ventral aspect of the left hepatic lobe, and a small quantity of blood was present in the peritoneal cavity. Margins of the liver were moderately rounded. Body fat stores were considered adequate. Necropsy findings were otherwise unremarkable.

Specimens of lung, liver, kidney, spleen, trachea, thyroid, brain and heart were fixed in 10% neutral buffered formalin and embedded in paraffin; 5-μm paraffin sections were stained with hematoxylin and eosin. Microscopic changes included small accumulations of neutrophils, mononuclear cells, and degenerate leukocytes in some bronchioles and alveoli. Small quantities of meconium and moderate amounts of amniotic debris were scattered in airways. Interalveolar septae were mildly thickened focally and contained increased numbers of mononuclear cells and neutrophils. Pneumonic lesions were consistent with lesions described in brucella-infected bovine fetuses (Smith, 1925; López et al., 1984), goat fetuses (Meador et al., 1988), and bison fetuses (Davis et al., 1990). Meconium and amniotic debris in the lung were evidence of fetal stress. Sections of other tissues were unremarkable.

Abomasal content, lung, and clotted heart blood were inoculated onto bovine blood agar plates and tryptic soy semisolid medium and cultured for *Brucella* sp. using the methods of Alton et al. (1988). In addition, the abomasal content was examined by darkfield microscopy and inoculated onto modified Diamond's medium (Kimsey, 1986). Isolates from abomasal content, lung, and heart blood were identified as *Brucella* sp. using the API® 20-E® system (Analytab Products, Inc., Plainview, New York, USA), as well as CO_2 dependence, slide agglutination, motility, and H_2S, oxidase, catalase, and urease production (Alton et al., 1988). No other bacteria or protozoa were isolated. Isolates were sent to the National Veterinary Services Laboratories (NVSL) (Ames, Iowa, USA) for speciation and biotyping. The isolates were identified as *B. abortus* biovar 1 using the following tests: growth in the presence of basic fuchsin, thionin, and thionin blue; growth on medium containing penicillin or erythritol; lysis by Tbilisi

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phage; urease and catalase activity; H_2S production; CO_2 dependence; and microagglutination test using A- and M-monospecific antisera (Alton et al., 1988).

Isolation of *B. abortus* from an aborted fetus of a free-ranging, naturally infected bison has not been reported previously. However, this organism has been isolated from vaginal discharge, uterus, uterine contents, and supramammary lymph nodes of a naturally infected wild bison that had recently aborted (Williams et al., 1993). In addition, abortions or retained placentas have been observed in brucella-infected bison herds in Montana (Creech, 1930) and Alberta, Canada (Corner and Connell, 1958), and serum samples from two YNP bison cows that had recently aborted contained antibodies to *B. abortus* on agglutination test (Mohler, 1917). Experimental *B. abortus* infections in captive bison produced abortions and transmission to cattle under controlled conditions (Davis et al., 1990).

The frequency of abortions and retained placentas in YNP bison is not known. Tunnicliff and Marsh (1935) reported an estimated calf crop of 55% for 1931 and 69% for 1932 in the YNP bison herd. Based on their observations, they concluded that brucellosis infection had very little deleterious effect on reproductive organs of bison cows and that reproductive inefficiency was not entirely due to *Brucella* sp. infection.

Finding the recently aborted bison fetus reported on here was fortuitous because scavengers are abundant in YNP. Laboratory confirmation of *B. abortus* biovar 1 in this fetus substantiates abortifacient properties of brucellosis in at least one YNP bison. Brucellosis may cause only rare abortions in YNP bison. Alternatively, the epizootiology may resemble that of brucellosis in chronically infected domestic cattle herds before control measures were instituted: in those herds, heifers aborted more often than older cows, and only a small percentage of individuals aborted in any one calving season (Hadley and Lothe, 1916). More research is needed to understand the pathogenesis of brucellosis in YNP bison.

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