

An epidemiological investigation into *Mycoplasma bovis* infection in U.S. bison (*Bison bison*): A case-control survey

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Introduction

Mycoplasma bovis (*M. bovis*) is an emerging pathogen in North American Bison (*Bison bison*) characterized by significant morbidity and mortality. Herds are reported to experience case fatality rates from 10 to 45%, with mature animals being primarily affected. To date, there are no published reports regarding the epidemiology of *M. bovis* within U.S. bison herds; this study serves as the first in-depth analysis of the prevalence, clinical signs and potential risk factors for *M. bovis*-associated disease in the United States.

Materials and methods

Our survey was based on a previously validated survey conducted on Canadian bison herds in 2014 and 2015. Our survey consisted of both multiple choice and open-ended questions and was administered, either by telephone or online, to 715 bison producers in both the U.S. and Canada. A total of 83 producers completed the survey (11.6% response rate), and 21 of those respondents reported having *M. bovis*-infected herds. Data was collected on herd demographics, size, biosecurity practices, health management strategies and exposure to potential risk factors (other livestock/wildlife species, shared equipment, climate, etc.). For herds reporting *M. bovis*-associated disease, data was collected on mortality rates, recurrent outbreaks, clinical signs and any events preceding the outbreak. Statistical analyses were performed using a Generalized Linear Mixed Model (GLMM) analysis in Program R, with significant risk factors identified through a stepwise additive approach.

Results

The prevalence of *M. bovis* infection among the surveyed herds was 25.9% (21/81). The prevalence of *M. bovis* infection among the surveyed herds was 25.9% (21/81). Definitive risk factors for *M. bovis* infection included herd size (> 500 animals; $P = 0.005$) and shared fence line with cattle ($P = 0.009$). For herds that were affected by *M. bovis*, the median duration of the outbreak was 5.5 months (IQR: 3.6-6). For herds that were affected by *M. bovis*, the median duration of the outbreak was 5.5 months (IQR: 3.6-6). Over half of affected herds had experienced prior outbreaks of *M. bovis*, and no management or treatment options were reported to have been effective.

Significance

Results of this study confirm that *M. bovis* infection is a significant pathogen of concern for U.S. bison production and conservation. Animal movements and fence-line contact with cattle may be facilitating the introduction and spread and highlight a need for effective management strategies to allow the safe movement of animals. Understanding the epidemiology of this disease in bison will help preserve this iconic species and provide assistance to ranchers.

