

DISEASE ECOLOGY

Evaluation of Long-Term Patterns of *Mycoplasma Ovipneumoniae* Carriage in Bighorn Sheep and the Implications for Test and Remove Protocols

BRITTANY L. WAGLER, *University of Wyoming, Laramie, WY, 82071, USA*; bwagler@uwyo.edu

RACHEL A. SMILEY, *University of Wyoming, Laramie, WY, 82071, USA*

JACK N. GAVIN, *University of Wyoming, Laramie, WY, 82071, USA*

TONY W. MONG, *Wyoming Game and Fish Department, Cody, WY, 82001, USA*

COREY CLASS, *Wyoming Game and Fish Department, Cody, WY, 82001, USA*

ALYSON B. COURTEMANCH, *Wyoming Game and Fish Department, Jackson, WY, 82006, USA*

DOUG MCWHIRTER, *Wyoming Game and Fish Department, Jackson, WY, 82006, USA*

CHEYENNE STWEART, *Wyoming Game and Fish Department, Jackson, WY, 82006, USA*

DARYL LUTZ, *Wyoming Game and Fish Department, Lander, WY, 82520, USA*

ZACH GREGORY, *Wyoming Game and Fish Department, Lander, WY, 82520, USA*

PATRICK HNILICKA, *U.S. Fish and Wildlife Service, Lander, WY, 82520, USA*

ARTHUR LAWSON, *Shoshone and Arapahoe Fish and Game Department, Fort Washakie, WY, 82514, USA*

DEAN CLAUSE, *Wyoming Game and Fish Department, Pinedale, WY, 82941, USA*

BRANDON M. SCURLOCK, *Wyoming Game and Fish Department, Pinedale, WY, 82941, USA*

RUSTY C. KAISER, *U.S. Forest Service, Pinedale, WY, 82941, USA*

WILLIAM H. EDWARDS, *Wyoming Game and Fish Department, Laramie, WY, 82071, USA*

JESSICA E. JENNINGS-GAINES, *Wyoming Game and Fish Department, Laramie, WY, 82071, USA*

JENNIFER L. MALMBERG, *University of Wyoming, Laramie, WY, 82071, USA*

KEVIN L. MONTEITH, *University of Wyoming, Laramie, WY, 82071, USA*

ABSTRACT: New management strategies for bighorn sheep (*Ovis canadensis*) have eradicated or lowered the prevalence of *Mycoplasma ovipneumoniae* (Mo) in some populations suffering from pneumonia, which subsequently increased recruitment of young. Though test and removal may be a promising tool to mitigate disease, the long-term patterns of Mo carriage and what variables affect the ability to identify chronically infected individuals remain unknown. Further, the criteria for removal and seasonal timing of testing vary across agencies and populations, which could influence the success of test and removals. Using 4 populations of bighorn sheep in Northwest Wyoming, we evaluated long-term patterns of Mo carriage and how age and the season of testing influences the probability of testing positive for Mo, remaining positive, and detecting chronic carriers. The probability of testing positive for Mo was higher for both younger and older animals compared with mid-aged animals. Further, animals were more likely to test positive for Mo in March than in December. Given the higher probability of testing positive in March, animals were more likely to be identified as chronic carriers if testing only occurred in March. Using 1 positive test as removal criteria increased the percentage of animals removed and increased the percentage of removals that were not chronic carriers compared with criteria using 2 positive tests. Timing and repetition of testing affects the probability of identifying chronic carriers and thus, this work will assist in creating targeted test and remove protocols to match specific population needs and management objectives.

KEYWORDS: bighorn sheep (*Ovis canadensis*), chronic carriers, disease carriage, intermittent carrier, *Mycoplasma ovipneumoniae*, pneumonia, test and cull, Wyoming. pneumonia, respiratory disease, selective culling, wildlife disease.