Mycoplasma ovipneumoniae as a Primary Agent of Epidemic Respiratory Disease in Bighorn Sheep (Ovis canadensis) Commingled with Domestic Sheep (Ovis aries)

THOMAS BESSER, Department of Veterinary Microbiology and Pathology, Washington State University College of Veterinary Medicine, Pullman, WA 99164, USA
CATHERINE YAMADA, Department of Veterinary Microbiology and Pathology, Washington State University College of Veterinary Medicine, Pullman, WA 99164, USA
E. FRANCES CASSIRER, Idaho Department of Fish and Game, 3316 16th St., Lewiston ID 83501, USA
DONALD KNOWLES, Agricultural Research Service, U.S. Department of Agriculture, Pullman WA 99164, USA.
J. LINDSAY OAKS, Department of Veterinary Microbiology and Pathology, Washington State University College of Veterinary Medicine, Pullman, WA 99164, USA
SHANNON SWIST, Department of Veterinary Science, Wyoming State Veterinary Laboratory, University of Wyoming, Laramie, WY 82070, USA
CAROLINE HERNDON, Department of Veterinary Microbiology and Pathology, Washington State University College of Veterinary Medicine, Pullman, WA 99164, USA
SRIKUMARAN SUBRAMANIAM, Department of Veterinary Microbiology and Pathology, Washington State University College of Veterinary Medicine, Pullman, WA 99164, USA

Abstract: Bighorn sheep are threatened by outbreaks of severe respiratory disease, some of which is associated with domestic sheep contact in the wild. This has been reproduced in captivity: cumulatively, 98% of 90 bighorn sheep experimentally commingled with domestic sheep died within 100 days, whereas 91% of 43 bighorn sheep commingled with other domestic animals survived. Our hypothesis is that M. ovipneumoniae is a primary initiating pathogen of epidemic respiratory disease in bighorn sheep. We commingled 4 bighorn with 4 domestic sheep that all tested negative for M. ovipneumoniae. One bighorn sheep died of acute pneumonia 90 days later but the other 3 remained healthy for >100 days (P <0.005 vs previous commingling experiments). All domestic sheep remained healthy. Mannheimia haemolytica was isolated from the lungs of the dead bighorn sheep. We infected one of the domestic sheep with M. ovipneumoniae and penned it with one surviving bighorn sheep. The bighorn sheep subsequently began shedding M. ovipneumoniae and developed respiratory disease, while the domestic sheep remained healthy. Shortly after the onset of coughing in the first bighorn sheep, M. ovipneumoniae was naturally transmitted to the other 2 bighorn sheep located in pens 7 and 12 m distant. These animals developed respiratory disease, while their domestic sheep pen-mates, which also acquired M. ovipneumoniae infections, remained asymptomatic. The bighorn sheep were euthanized and necropsies revealed moderate to severe pneumonia, purulent otitis, and sinusitis. Bacterial lung cultures yielded Bibersteinia (Pasteurella) trehalosi and positive PCR tests for M. ovipneumoniae were obtained from lungs, sinuses, and middle ears. Histologically, the lung lesions were typical of those reported for mycoplasmal pneumonia in other host species. These results support the hypothesized role of M. ovipneumoniae in bighorn sheep respiratory disease outbreaks.

Email: frances.cassirer@idfg.idaho.gov