

Disease Transmission between Sympatric Mountain Goats and Bighorn Sheep

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ABSTRACT In 2009-10, Rocky Mountain bighorn sheep (*Ovis c. canadensis*) herds in the adjacent East Humboldt Range (EHR) and Ruby Mountains (RM) in Elko County, NV suffered an all-age pneumonia die-off with an estimated loss of 90% in each herd. Sympatric mountain goats (*Oreamnos americanus*) also experienced pneumonia with an estimated 10-20% loss in both herds (see Wolff et al 2014, Anderson et al, 2017). *Mycoplasma ovipneumoniae* was confirmed as a contributing pathogen in both bighorn sheep and mountain goats, and the same strain was identified in both species and ranges. In 2013, after removing the remaining 15 bighorns from the EHR, 20 bighorn sheep from Alberta, Canada were translocated to this range to assess whether surviving mountain goats would pose a threat to naïve, sympatric bighorns. At the time of translocation ($n = 20$), and during subsequent sampling events in 2014 ($n = 7$) and 2015 ($n = 13$), all sheep sampled were negative for *M. ovipneumoniae* by both ELISA and reverse transcription polymerase chain reaction (RT-PCR) on nasal swabs. Concurrent sampling of the EHR mountain goats for *M. ovipneumoniae* by RT-PCR indicated a prevalence of 6% ($n = 15$) in 2013, 12% ($n = 16$) in 2014, and 18% ($n = 11$) in 2015. From 2010-15 winter aerial surveys, annual mountain goat kid ratios ranged from 0 to 17 per 100 adults ($\bar{x} = 7$), with an estimated λ of 0.60 for the herd over the same time period. From 2013-15, we conducted summer ground observations on both species. In 2014 and 2015, we observed association of mountain goats with bighorns (as close as 2 meters apart). Between September and December 2015, clinical signs of respiratory disease were noted in the bighorns, and multiple mortalities observed. *M. ovipneumoniae* was identified in pneumonic lungs of bighorns, and 16S RNA IGS sequencing confirmed a match to the strain isolated from the mountain goats. These findings suggest that potential disease transmission between mountain goats and bighorn sheep should be considered where range overlap occurs.

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KEYWORDS disease transmission, mountain goat, *Mycoplasma ovipneumoniae*, Nevada, *Oreamnos americanus*, *Ovis canadensis*

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