

***Mycoplasma ovipneumoniae* originating from Domestic Goats Triggers Mild Bronchopneumonia in Experimentally Exposed Naïve Bighorn Sheep (and Domestic Goats)**

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ABSTRACT We conducted a series of experimental exposure studies to investigate the virulence of *Mycoplasma ovipneumoniae* carried by domestic goats (*Capra aegagrus hircus*) for naïve bighorn sheep (*Ovis canadensis*). Bighorn sheep ($n = 6$) from an *M. ovipneumoniae*-free population were transported to Washington State University and divided into two groups of 3 animals held in pens >1 km apart. Domestic goats were purchased from local private operations. Experiment 1: Following the addition of 3 naturally *M. ovipneumoniae*-colonized domestic goats to one of the pens, the 3 comingled bighorn sheep developed symptoms of chronic respiratory disease and, at necropsy 100 days later, all exhibited focal bronchopneumonia. During this period, the isolated, non-comingled (control) bighorn sheep in the second pen remained healthy. Experiment 2: Three *M. ovipneumoniae*-free domestic goats were comingled with the 3 remaining bighorn sheep and observed for a 100-day period. There was no evidence of respiratory disease in either bighorn sheep or goats during Experiment 2. Experiment 3: Goat-origin *M. ovipneumoniae* was introduced into the same comingled domestic goats and bighorn sheep that had been used for Experiment 2. During the following 100 days, all 3 domestic goats and all 3 bighorn sheep in Experiment 3 developed signs of chronic respiratory disease, and at necropsy all of the animals exhibited focal bronchopneumonia. See Figure 1 for a schematic summary of these three experiments. The results indicate that the goat-origin *M. ovipneumoniae* strains used in these experiments were capable of causing respiratory disease symptoms and pneumonia lesions in susceptible bighorn sheep and domestic goats. *Pasteurellaceae* bacteria encoding *lktA*, the gene encoding the leukotoxin virulence factor, were detected in all animal groups both prior to and after each experiment, and so were not clearly involved with the observed respiratory disease. The disease observed in Experiments 1 and 3 was notably milder than that reported in previous experiments conducted with domestic sheep-origin strains of *M. ovipneumoniae*. Nasal discharge from infected bighorn sheep, although consistently observed, was relatively scant and non-purulent compared to previous experimental infections of bighorn sheep with domestic sheep strains of *M. ovipneumoniae*. Coughing was also consistently observed among bighorn sheep in Experiment 1 and among both bighorn sheep and domestic goats in Experiment 3, but the frequency, severity, and duration of coughing episodes was markedly reduced compared to previous experiments with sheep strains. Finally, no respiratory disease deaths occurred during these studies, whereas previous comingling studies of bighorn sheep with domestic sheep have been associated with nearly 100% bighorn sheep mortality.

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KEYWORDS bighorn sheep, comingling experiments, domestic goats, enzootic pneumonia, *Mycoplasma ovipneumoniae*

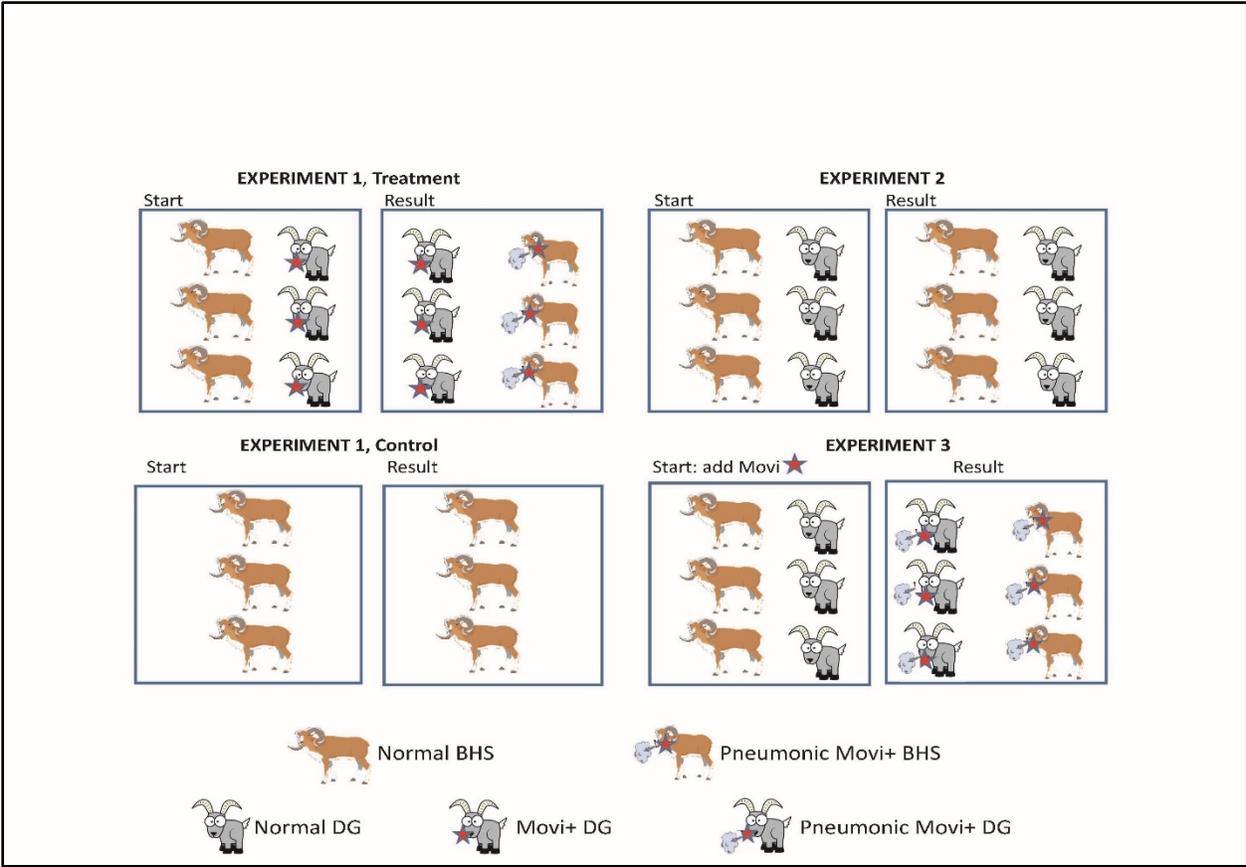


Figure 1. Schematic diagram of experiments described herein.