Use of Intra-nasal Antibiotics as an Aid to Clearing *Mycoplasma ovipneumoniae* Carriage by Domestic Sheep

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ABSTRACT: *Mycoplasma ovipneumoniae* is the primary cause of epizootic pneumonia of bighorn sheep (*Ovis canadensis*). Contacts with reservoir hosts of *M. ovipneumoniae*, domestic sheep and goats, may result in transmission of this bacterium initiating outbreaks of this disease. Efforts to control the disease have emphasized physical separation of bighorn sheep from these reservoir hosts; however, separation is challenged by the natural movements of bighorn sheep, by straying reservoir hosts, and by the apparent mutual attraction of these sheep species. The effectiveness of separation would be complemented by elimination of *M. ovipneumoniae* from reservoir host operations near bighorn sheep ranges. Elimination of *M. ovipneumoniae* may be achieved by removal of adult chronic carriers and by segregated weaning of replacement stock, but these practices are limited by lack of facilities for effective on-farm segregation, by infection of replacements prior to weaning age, or by carrier prevalences exceeding the operator's tolerance for culling. Clearing *M. ovipneumoniae* with antimicrobial drug therapy would circumvent these limitations. Here we report that combined systemic and local therapy can eliminate this pathogen from domestic sheep.
Pilot studies of systemic (subcutaneous) treatment of chronic carrier ewes with enrofloxacin, gamithromycin, tildipirosin, and tulathromycin failed to eliminate *M. ovipneumoniae* nasal carriage. However, combined systemic and intranasal enrofloxacin treatment successfully cleared *M. ovipneumoniae* from two carrier domestic ewes for >3 months. Two subsequent enrofloxacin trials examined yearling lamb (n=28) and adult ewe (n=15) carriers randomly assigned to one of 4 treatment groups in 2x2 factorial designs. Factors were 1) systemic treatment (yes or no) and 2) intranasal wash dosage (low or high). In both trials, animals treated with systemic enrofloxacin combined with either high or low dose intranasal treatment became PCR negative for *M. ovipneumoniae*. Carrier animals that failed to clear *M. ovipneumoniae* following intranasal-only therapy did clear the infection when subsequently treated with combined therapy. These results indicate that combined antimicrobial therapy can eliminate M. ovipneumoniae carriage by domestic sheep. Further studies are needed to 1) document the durability of *M. ovipneumoniae* clearance, 2) determine the efficacy of combined therapy in domestic goats, and 3) optimize antimicrobial drug choices and dosing levels.

Biennial Symposium of the Northern Wild Sheep and Goat Council 21:118; 2018

KEY WORDS Pneumonia; *Mycoplasma ovipneumoniae*; domestic sheep; antibiotics; subcutaneous treatment; intra-nasal treatment; combined therapy.