



A Pilot Program to Create a Source of Domestic Sheep Free of *M. ovipneumoniae* for Cooperating Private Owners

RICHARD B. HARRIS, Washington Department of Fish and Wildlife, Box 43141, Olympia, WA, USA 98504

THOMAS BESSER, Washington State University College of Veterinary Medicine, Pullman, WA, USA 99163

KELLI BUSH, Sustainability in Prisons Project, The Evergreen State College, 2700 Evergreen Parkway NW, Olympia, WA, USA 98505

GERALDINE GLENN, Busytails, 810 Ne C St, College Place, WA, USA 99324

JERRY KJACK, KJ Suffolks, 1420 Wallula Ave., Walla Walla, WA, USA 99362

JARED OYSTER, Washington Department of Fish and Wildlife, 2315 N. Discovery Place, Spokane Valley, WA, USA 99216

CARLA SCHETTLER, Washington State Penitentiary, Walla Walla, WA, USA 99362

EXPANDED ABSTRACT: Small ruminant owners indicate interest in lowering risk of pathogen transmission to bighorns while continuing to maintain their flocks. One promising approach is for owners to hold only animals free of *M. ovipneumoniae*, but managers lack sources for animals certified free of this pathogen to which they could refer partnering flock-owners. Because development of a *M. ovipneumoniae*-free flock was an experimental and untested process likely to entail up-front costs, the Washington Department of Fish and Wildlife (WDFW) decided to pave the way rather than expecting a private firm to shoulder these risks. We further reasoned that if we were successful, our experience would be useful to private breeders interested in expanding the program.

An avenue for cooperation had previously been established by Washington's Sustainability in Prisons Project, which has raised endangered turtles and butterflies in state correctional facilities, providing valuable life-lessons for participating inmates. In early 2016, WDFW collaborated with the Washington Department of Corrections (DOC) to begin raising and breeding for sale domestic sheep that could be certified free of *M. ovipneumoniae* at the Washington State Penitentiary in Walla Walla. WDFW contracted with 2 sheep experts to lead day-to-day operations, paid for testing and purchase of founder individuals, and, together with DOC, funded necessary infrastructure improvements. Fifteen Suffolk ewes, originating from 2 nearby herds, arrived onsite in late September 2017, and a (< 1 yr-old) ram was added in mid-October. In addition to testing PCR-negative (on nasal swabs) twice for *M. ovipneumoniae*, as well as once for ovine progressive pneumonia virus, paratuberculosis and Caseous lymphadenitis (CL), all founder individuals were genotyped either RR or QR (for scrapie), vaccinated against *Campylobacter* and CL, and inspected by a veterinarian.

Despite our precautions, the ram tested PCR-positive for *M. ovipneumoniae* in late November 2017, approximately 5 weeks after arrival, and a week later, a ewe was also positive. Rapid isolation of infected individuals, coupled with 5-day antibiotic treatment with via nasal wash and subcutaneous injection was evidently successful in both preventing further spread and clearing the infected animals of this particular infection. All 16 animals were PCR-negative



on 5 successive tests conducted over an abbreviated 2 week period. Lambing occurred from 13 March to 2 April 2018, a total of 30 lambs were produced, of which 28 (9 females, 19 males) survived.

However, follow-up swabbing and PCR testing for *M. ovipneumoniae* on April 30, 2018 unexpectedly revealed positive or indeterminate results for 7 ewes, only 2 of which were part of the previous infection. Strain-typing indicated that the 2 infections were separate, one originating from each of the 2 source herds. This suggested either that the bacteria had entered the flock a 2nd time (presumably through fomites, as the herd had been kept entirely closed), or that the founding individuals carried 2 strains, only one of which was detected in our initial (November 2017) outbreak. Correlations of strain types with source herds strongly supported the 2nd of these hypotheses. This, in turn, suggested that even our extensive testing had earlier yielded some false negatives. Further investigation identified the presence of strong PCR inhibitors in some sheep nasal mucus, and the PCR method was modified to reduce the effect of those inhibitors.

Additional testing in mid-July 2018 suggested that 5 of the newly infected animals may have cleared this 2nd strain (pending additional testing), 1 or 2 ewes seemed to be persistent carriers, but that the bacteria had spread to most of the lambs.

To attain our goal of *M. ovipneumoniae*-free status, we are currently planning a combination of separation, removal, and treatment. Although we have not yet met that goal, we have learned that more extensive testing than we'd anticipated – particularly prior to selecting animals to originate the herd — is needed to ensure that no undetected infections enter the herd. Once introduced, additional infections are likely. We remain optimistic that creating pathogen-free herds is possible and is a useful strategy for assisting cooperative owners, but caution that it will require substantial resources and patience.

Biennial Symposium of the Northern Wild Sheep and Goat Council 21:119-120; 2018

KEY WORDS Pneumonia; *Mycoplasma ovipneumoniae*; domestic sheep; *M. ovipneumoniae*-free flock; repeated testing; antibiotic treatment.