Mycoplasma ovipneumoniae is frequently present in domestic sheep operations and is associated with negative effects on productivity and profitability. Infection of a flock with this pathogen may increase frequency of pneumonia, reduce lambing rates, and impair feed efficiency, resulting in significant financial costs. In addition, presence of this pathogen is associated with increased risk for nearby wild bighorn sheep, which can trigger deadly pneumonia outbreaks. Research led by Professor Tom Besser at Washington State University aims to improve our understanding of the prevalence and severity of this infection. A known pathogen with the potential to damage health and productivity of sheep is Mycoplasma ovipneumoniae. This mycoplasma affects respiratory systems and is transmissible between flock members and between flocks, given animal contacts. Until recently, most studies were conducted in Europe, Asia, or New Zealand under management systems with limited relevance to United States operations. Further, most of the studies had been conducted using poorly sensitive culture methods, whereas more sensitive and reliable DNA based methods are now available.

The Sheep 2011 project team also explored biosecurity-related factors for possible association with presence of M. ovipneumoniae infection in the domestic sheep operations. These factors included: operation size; type of operation management; operation biosecurity (rated 1 to 10); overall disease burden (rated 0 to 11) and antibiotic use (rated 0 to 5).

Factors which may lead to a domestic sheep operation becoming infected with M. ovipneumoniae include flock size and biosecurity practices.
A FIRST FOR U.S. SHEEP PRODUCTION

The Sheep 2011 data provided the first comprehensive study of the extent of M. ovipneumoniae infection in the United States; this research has found that more than 85% of operations are infected. They have identified that this infection translates to welfare implications for domestic sheep and financial loss for operation owners. The highly sensitive DNA-based testing used in these studies documented a greater prevalence of infection than most previous studies conducted in other countries using conventional culture methods. It is important that future research using similar methodology seek to replicate these results under other management systems and environmental conditions.

In this first comprehensive study of the extent of M. ovipneumoniae infection in the United States this research has found that more than 85% of operations are infected.

M. ovipneumoniae was detected in all exposed lambs by 30 days after weaning and continuing until the end of the trial. Negative group lambs exhibited significantly lower signs of respiratory disease, and at harvest lungs of negative group lambs showed significantly less microscopic evidence of infection and inflammation. Negative group lambs gained weight significantly faster, with improved yield grade and quality compared to exposed group lambs. These findings indicate current infection prevalence within domestic sheep operations so that these could be applied more broadly to reduce diseases of animals. He has worked for Washington State University Department of Animal Science (Dept. of Animal Science) for the Agricultural Research Service, the Center for Epidemiology and Animal Health, and the Forest Service.

Research Objectives

The research of Professor Tom Besser centres on the epidemiology and management of respiratory disease in domestic and wild sheep.

Bio

Professor Tom Besser obtained his Veterinarian qualification from the University of Minnesota and his PhD from Washington State University. Tom has almost 40 years’ research experience into infectious diseases of animals. He has worked for Washington Animal Disease Diagnostic Laboratory since 1990.

Funding

• United States Department of Agriculture, including the Agricultural Research Service, the Center for Epidemiology and Animal Health, and the Forest Service
• The Idaho Department of Fish and Game
• The University of Idaho
• The Wild Sheep Foundation and its state chapters and affiliates

Collaborators

• Kusa Manlove (Utah State University)
• E. Frances Cassirer (Idaho Department of Fish and Game)
• Margaret Benson (Washington State University

References


Personal Response

Are there opportunities for studies into other domestic animal production operations to use the techniques developed through your research? What do you envisage the long-term impact of this methodology to be?

The data from these projects offer intriguing clues that M. ovipneumoniae may present domestic sheep with adverse productivity and health effects, even when significant respiratory disease is not observed. These findings merit follow up studies: How much do the adverse effects scale with prevalence of the pathogen? Are these effects general across genetic strains of the pathogen, or are some genotypes more virulent than others? What is the most efficient method to eliminate the pathogen from domestic sheep operations of different sizes and management systems? If the pathogen is eliminated, what level of biosecurity is required to keep it out?