



Johne's Disease on the Rise in Goats

Morgan Randall, Brenna Kunkel, Michael T. Collins
University of Wisconsin-School of Veterinary Medicine, Madison, WI

Introduction: The study objective was to report the rates of *Mycobacterium avium* ssp. *paratuberculosis* (MAP) infection in goats based on submissions to the Johne's Testing Center (JTC). MAP has historically been considered a disease of dairy cattle. In dairy cattle, it causes weight loss and a "hosepipe diarrhea", despite the animals maintaining a healthy appetite. In goats, the disease manifestations are more subtle, although it is caused by the same organism and transmitted in the same ways. Animals lose weight despite a healthy appetite, but usually maintain normal feces until the disease is in the very end stages and the animal is near death. This perpetuates the infection in herds as the infected animals are shedding MAP and infecting many other animals long before it is clinically apparent that they are MAP-infected. To better understand the magnitude of this infection in goats, an analysis was performed on all samples from goats received in 2017 by the JTC.



Materials and Methods: Clients submit samples in order to test clinical suspects exhibiting the signs mentioned above, perform surveillance on their herd, or perform pre-purchase examinations. Using the lab's internal accession program, a list of samples was generated from submissions received between January 1, 2017 and December 31, 2017. The list was then copied into Microsoft Excel, and the data was sorted first by state, then test type, and finally result. Using internal functions in Excel, the following parameters were determined: proportion of samples received per state, positive rate per state, number of ELISA tests per state, number of ELISA positives per state, PCR tests per state, PCR positives per state, number of PCR pools run per state and number of positive individuals found in pools after individual retest.

Results: Of the individual fecal samples submitted for PCR testing, 10.5% (75/709) were PCR-positive. Three hundred sixty-seven goats were submitted for PCR testing as 116 pools. Up to five animals may be grouped into pools for testing (in order for clients to reduce the cost of testing). Of the 116 pools comprising 367 animals, 7 (6%) were PCR-positive. Clients can choose to test animals individually after detection of a PCR-positive pool, and the individual fecal samples comprising 6 of these positive pools were tested. Seven PCR-positive animals

were identified in those 6 positive pools, giving the owner a definitive answer as to which animal was MAP-infected and which animals were probably not. The states with the most PCR-positive samples (both individual and pooled) were IL (20%; 16/82), WI (16%; 13/82), MI (15%; 12/82), OH (10%; 8/82), and CA (7%; 6/82). In addition to fecal testing, 1,303 blood samples were submitted to the JTC for testing by ELISA, and 64 (4.9%) of those were positive. The majority of positive ELISA results came from MO (23%; 17/73), CA (15%; 11/73), IN (12%; 9/73), MN (10%; 7/73), and OR (7%; 5/73).

Overall, the states responsible for submitting the most samples were MO (16%; 307/1931), OH (9%; 113/1931), IL (8%; 156/1931), and CA (8%; 148/1931). In total, samples from goats came to the JTC from 38 states in 2017. Although not intended to be a valid survey, JTC data indicate that MAP-infections are common among goat herds submitting samples to the JTC from the Midwest and California.

Conclusion/Significance: Johne's disease is a bigger problem in goats than many owners and veterinarians realize. Among all laboratory submissions to the JTC in 2017, 10.5% were PCR-positive and 4.9% were ELISA-positive giving a rough idea of the prevalence of MAP infections. The difference in positivity rates for PCR and ELISA reflect the roughly 3-fold higher diagnostic sensitivity of PCR. The fecal pooling strategy is a cost-effective, whole-herd testing strategy for herds with a low or zero MAP-infection prevalence.

It is critical that paratuberculosis in goats be recognized and effectively dealt with before it becomes endemic. In the early 20th century when Johne's disease was first reported in U.S. dairy cattle, producers were warned about this contagious, infectious disease, and most decided to ignore it rather than stomping it out before it became a bigger problem.

Today, MAP is a very difficult, although not impossible, infection to eradicate from herds. Through whole-herd testing, hygienic kidding practices, and pre-purchase testing, this chronic, contagious, untreatable infection can be halted in its tracks. Testing nannies before breeding identifies those that pose a risk of infecting their fetuses during gestation and other goat kids they come into contact with. Nannies should also be tested if they are going to be used as a source of colostrum or milk for feeding kids.

