

Seroprevalence of caseous lymphadenitis, *Mycobacterium avium* subsp. paratuberculosis and small ruminant lentiviruses in U.S. domestic sheep and goat herds

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Introduction

Historically, caseous lymphadenitis (CL), *Mycobacterium avium* subsp. paratuberculosis (MAP) and small ruminant lentiviruses (SRLV) have been the most common diseases tested for in sheep and goats. The most common reasons for disease surveillance include herd health monitoring, maintaining biosecurity on the farm, diagnosing sick animals and as required for state exhibition/transportation. The objective of this study was to evaluate the seroprevalence for these three diseases through passive surveillance of U.S. domestic sheep and goat serum samples submitted to the Washington Animal Disease Diagnostic Laboratory.

Materials and Methods

Serum samples (n = 19,525; CL – 6,377, MAP – 6,185 & SRLV – 6,963) representing 28 states were submitted for serologic screening over a 14-month period from August 2022 through October 2023. Thirteen percent were from domestic sheep (2538/19,525) and 87% from domestic goats (16,987/19,525). Samples were analyzed using the Synergistic Hemolysin Inhibition (SHI) test for CL, competitive enzyme-linked immunosorbent assay (cELISA) for SRLV and the IDEXX MAP ELISA Test Kit for MAP. The MAP and SRLV positive cutoffs used were in accordance to the manufacturer guidelines. The SHI test for CL is an in-house test and therefore the cut-off was based on a validated in-house test procedure.

Results

Results for CL were as follows: 6,377 total submissions with an overall seropositive prevalence of 2.7% (172/6,377). Single test positivity (5.5%; 38/690) was greater than biosecurity panel testing (2.4% 134/5,687). Of the positive submissions, 18.6% were ovine 32/172, and 81.4% were caprine (140/172). Results for MAP were as follows: 6,185 total submissions with an overall seropositive prevalence of 1% (59/6,185). Single test positivity (5.1%; 26/506) was greater than biosecurity panel testing (0.6% 33/5,679). Of the positive submissions, 17.0% were ovine (10/59), and 83.1% were caprine (49/59). Results for SRLV were as follows: 6,963 total submissions with an overall positive seroprevalence of 4.8% (332/6,963). Single test positivity (12.8%; 164/1,283) also was greater than biosecurity panel testing (3% 168/5,680). Of the positive submissions, 16.6% were ovine (55/332), and 83.4% were caprine (277/332).

Significance

To our knowledge, this is the first U.S. wide study of seroprevalence of CL, SRLV and MAP in small ruminants. Although these results represent passive surveillance, when tests were evaluated on individual submissions (rather than as part of a small ruminant biosecurity panel inclusive of all 3 diseases) seroprevalence was significantly higher across each test, suggesting samples were submitted due to a high index of suspicion for disease. This provides insight that might prove useful for coding submissions in the future. Overall, this study provides baseline information for future epidemiological, herd management and public health investigations of CL, SRLV and MAP in U.S. sheep and goats.

