

Johne's Disease Status of the McNay Sheep Flock

Suelee Robbe-Austerman, lecturer
Department of Veterinary Diagnostics
and Production Animal Medicine
Dan Morrical, professor
Department of Animal Science

Introduction

Johne's disease caused by *Mycobacterium avium* subsp. *paratuberculosis* (MAP) results in chronic weight loss and eventual death in sheep as well as in other ruminants. The disease has spread throughout the U.S. sheep flock, and it is estimated that 10% or possibly more of the flocks in the U.S. are infected. Sheep can be infected and spread the organism for years before succumbing to the disease. Current diagnostic tests are unable to detect animals in the early stages of infection, and because there is a lack of "known negative" sheep in production settings, the development and subsequent validation of new diagnostic tests are hindered. The objective of this report is to describe the process the McNay flock went through to ensure researchers that this population was not infected with MAP.

Materials and Methods

In 1999, all sheep older than six months of age were bled and skin tested using a novel purified protein derivative (PPD) Johnin (Lot 1, 9801, NVSL, Ames, IA) as the antigen. For the skin testing, 0.1 ml was injected in the axillary region and palpated for induration or swelling 72 hours later. The sera were tested using agar gel immunodiffusion test (AGID) and also banked for future use. All animals testing positive were euthanized and carefully examined for any evidence of Johne's disease using histology.

This testing protocol was repeated in 2000, 2001, 2002, and 2003. Also in 2000, a new ELISA for Johne's disease (Parachek, CSL) that has been approved for use in sheep in Australia was also used according to manufacturer's directions that required a cut-point of 0.2+ and negative controls. At the same time, biosecurity protocols were put in place to reduce the risk of

introducing Johne's disease. Only rams from known flocks were introduced into the flock. The rams were skin tested and bled after arrival. Visitors were asked to wear clean clothing and put on plastic boots if they went into the sheep pens.

Results and Discussion

No ewes have exhibited clinical signs of Johne's disease throughout this period. In 1999, two sheep tested positive on the skin test but none tested positive on the AGID test. In 2000, one sheep tested positive on the skin test and none on the AGID test. Also in 2000, the new ELISA test was also used and two sheep tested positive. All five of these animals were negative upon necropsy indicating false-positive reactions.

In 2001, all animals tested negative for all three tests except for one ewe lamb that tested positive on the skin test. She was kept in the flock and subsequently tested negative in 2002 and 2003. Because we did not want to bias the flock by routinely removing sheep with false-positive test results, sheep were not euthanized after 2000 if they tested positive for only the skin test. We have never had a sheep test positive for both the skin test and the AGID or ELISA from this flock.

This flock has and can continue to be a resource to researchers looking for MAP-noninfected flocks, and for producers looking to purchase noninfected sheep. The flock helped validate the ELISA test for use with sheep in the U.S. This test is now used in many U.S. diagnostic laboratories. The flock also helped to evaluate several different PPDs produced by National Veterinary Services Laboratory. This flock has also been used to compare cell mediated immune (CMI) diagnostic tests such as the skin test and gamma interferon ELISA.

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