

# A Novel Approach to Control Johne's Disease in a Western U. S. Range Flock.

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Johne's disease (paratuberculosis) in small ruminants, as with many ruminant species, is a chronic inflammatory bowel disease, caused by *Mycobacterium avium* subsp *paratuberculosis* (MAP), resulting in chronic wasting and eventually death. Infection commonly takes place at a very early age, less than 6 months, but clinical signs may not be evident until greater than four years of age. Fecal-oral transmission is thought to be the most common route but intrauterine and transmammary transmission have been reported and may be of high importance in small ruminants. The organism is variably shed in the feces depending on strain (cattle versus sheep), species infected, and stage of infection. The tendency is for cattle to shed higher numbers and for longer periods than in sheep which often do not develop diarrhea until the terminal stages of the disease. This variability in shedding and extended incubation period (especially with sheep) makes identification of subclinical carriers imperative for any control program. Diagnostic tests range from fecal culture (gold standard but very slow), sera and milk ELISA, gamma-interferon, and Johnin PPD skin test. Sensitivities and specificities of these tests also are highly variable confounding interpretation.

Diagnosis and control of Johne's disease in sheep has been especially frustrating due to many factors including: variable shedding of MAP, extended culture times often greater than 6 months, variable sensitivity/specificity of available ELISA tests, economical considerations of both testing and handling of sheep (especially in large range flocks) and time of year that ewes are available for testing. Based on our work previously reported (Mamer et al USAHA/AAVLD 2007 and Ayers et al WBC 2008) we have designed a "test and sort" program in an attempt to control Johne's disease in a cooperative infected flock.

The goal of the control program is to create a nucleus of Johne's negative ewes that are bred to provide replacement ewe-lambs. White-faced ewes that have a white-faced ewe-lamb have milk collected on day two post-partum by herders and refrigerated or frozen until testing. Milk samples are tested undiluted (unless very viscous, then a 1:2 dilution is used) using the IDEXX Herdchek™ ELISA system. At present we are using an S/P ratio of 0.300 to 0.499 as suspect and greater than 0.500 as positive. Ewes testing positive or suspect are identified with a unique colored tag and removed from the replacement flock. Their ewe-lambs are also identified and are typically sold as fat lambs. Only ewe-lambs from test negative ewes are identified and designated to the replacement band.

January 2008 was the first year of implementation of this "test and sort" program. Two hundred ninety nine ewes were sampled and 86 identified as suspect (43) or positive (43). These data suggest an incidence rate in the replacement flock of 28.7%. Plans are to locate as many ewes that had been identified as positive or suspect and perform follow up testing in the fall of 2008 and again at lambing in 2009. In this way we hope to be able to generate enough data points that we can refine the milk test S/P cutoff and make the results as predictable as possible. We will continue to test the replacement band and follow the incidence rate as a measure of progress.

A test and cull program is not a practical economic means to control or eliminate Johne's disease in flocks of this size. However, control with reduction of clinical cases is necessary and therefore current plans are to continue the "test and sort" program outlined here with adjustments as necessary to maintain the goal of economic convenient control of Johne's disease in this large western range flock.