

## Herd Stratification to Reduce the Spread of Johne's Disease

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### Introduction

Johne's disease (JD) is a chronic, progressive enteric disease of ruminants caused by infection with *Mycobacterium avium* subspecies *Paratuberculosis* (MAP). Johne's disease causes major economic losses to the cattle industry. There is an age susceptibility to JD with younger cattle being more susceptible. Calves are generally infected as neonates. After a prolonged incubation period of two to ten years, initial clinical signs may develop, including severe progressive diarrhea and gradual weight loss, despite the persistence of a normal appetite. Typically, the infection develops in the ileum and gradually spreads to regional lymph nodes and other viscera. Over time, cattle become lethargic, emaciated and, in the terminal stages of disease, exhibit cachexia and severe watery diarrhea. MAP survives in the soil and the cattle environment for extended periods of time. Environmental contamination contributes to the pathogen load and infection rate of neonatal calves. In an attempt to reduce the pathogen load that neonatal calves are exposed to, these two cow herds were stratified by age and stage of production.

### Materials and Methods

Cattle flow through the production units and drainage were analyzed. The calving area and calf flow was altered to reduce contamination of the calving area by MAP.

### Results

Culture results of the calving area and cow herd demonstrated reduced MAP contamination of the environment. It will be several years before a determination of any reduction in herd prevalence of MAP infection can be determined due to the extended incubation time of this disease.

### Significance

Management of cattle flow and calving areas offer tools to reduce the herd prevalence of MAP infection.

## Systematic Review of Johne's Disease Vaccination

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### Introduction

Johne's disease (JD) is a major health concern for the cattle and small ruminant industries world wide. Vaccination against JD has been in use since 1926, but has been controversial. Our objective was to conduct a systematic review of JD vaccination and do a meta-analysis of the data.

### Materials and Methods

Criteria for inclusion in the systematic review included: must be a randomized clinical trial, have a minimum of 10 animals, last for more than 30 days and had an outcome of at least one of the following: clinical disease, fecal shedding, or tissue culture or histology. Search methodology included using The History of Paratuber-

culosis, Medline, reference lists and hand searching proceedings. A total of 66 research trials were identified, and 20 met the criteria for inclusion in the systematic review.

### Results

The JD vaccine reduced the occurrence of clinical disease by 92% (95% CI 90-96%), with a heterogeneity chi square of  $p=.96$ . The vaccine reduced fecal shedding by 57% (95% CI 41-69%), there was heterogeneity ( $p$

value  $=.001$ ), but all trials were able to reduce fecal shedding. The JD vaccine reduced the numbers of animals with positive tissues by 56% (95% CI 49- 62%). Again, there was heterogeneity ( $p$  value  $=.000$ ), but all trials had a reduction in positive tissues.

### Significance

These data would suggest that the Johne's disease vaccine is effective at reducing clinical disease, fecal shedding and tissue infection.

## Effect of Sub-Clinical Manifestations of Bovine Paratuberculosis in Beef Cattle

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### Introduction

Bovine paratuberculosis (Johne's disease) is a chronic, debilitating disease of cattle. Although widely known in the dairy industry, the effect of the disease in extensive ranch operations is unknown. Currently, testing techniques for bovine paratuberculosis in beef cattle are few, costly and somewhat inaccurate. We conducted the study of a beef herd located in Texas with the objective of evaluating the effect of subclinical manifestations of bovine paratuberculosis in beef cattle.

### Materials and Methods

We conducted serial testing using ELISA for serum samples collected during three consecutive years (2003-2004-2005) of 695 *Bos taurus* x *Bos indicus* cows from a ranch known to have clinical cases of the disease with fecal culture positive samples. Animals were considered positive when an ELISA S/P value of 0.25 or more was detected in at least one of the tested years. Weaning weight and age of wean of the offspring (females, males and steers) of seropositive and seronegative dams were compared using One-Way ANOVA, all pairwise multiple comparison (Tukey test), Dunns'

method of multiple comparison and Kruskal-Wallis one-way analysis of variance in non-parametric comparisons.

### Results

The most important finding was that the weaning weights of female offspring of seropositive dams were significantly different than the weaning weights of female offspring of seronegative dams ( $P=0.035$ ). We also found statistically significant differences in weaning weights between females, males and steers in each seropositive and seronegative group (the male offspring of seronegative dam were considerably heavier). No statistically significant differences were found in age at weaning.

### Significance

Our results indicate that subclinical cases of bovine paratuberculosis can cause significant differences in herd performance (in our study, weaning weights) on beef herds. Due to the chronicity of the disease and limited performance of the currently available tests, serial testing is required to provide an estimate of disease prevalence.