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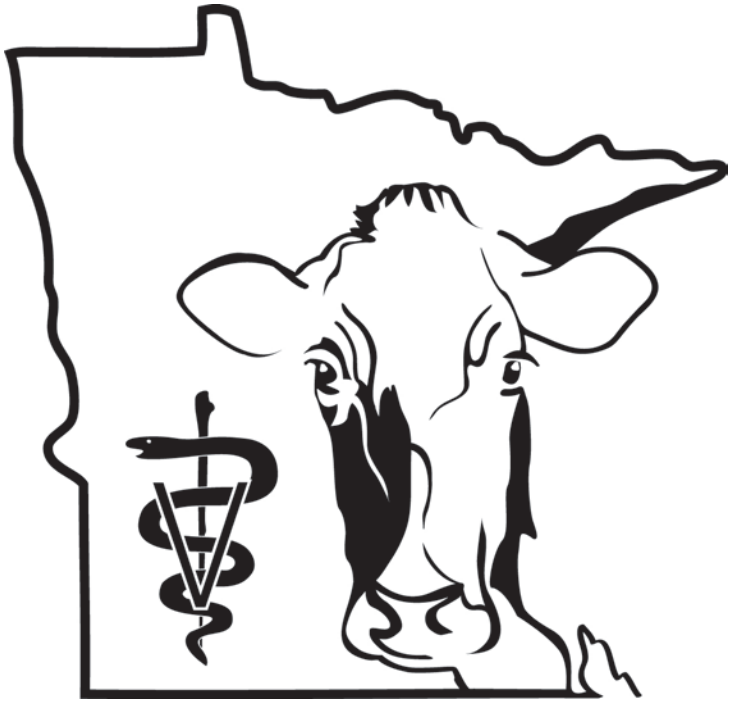

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Detection of Dairy Cattle Herds Infected with *Mycobacterium paratuberculosis*

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Control of Johne's disease is economically important to dairy farms, and many infected herds lose over $200 per cow in inventory per year (NAHMS, 1997). Transmission on infected farms occurs primarily through fecal-oral routes, and infected cows can transmit infection to other cattle before showing clinical signs of disease or testing positive. Effective Johne's disease control involves preventing replacement heifers from exposure to manure from adult cows (with focus on clean calving areas and segregated heifer rearing).

The first step in control of Johne's disease is valid identification of herd infection status. In the current Johne's disease program, blood samples are collected from a random sample of 30 cows in the herd to identify herd infection status. If at least one cow in the herd is test-positive using ELISA testing, fecal samples are collected from test-positive cows for confirmation of herd infection. If infected (in Minnesota), a State or Federal district veterinarian will visit the farm and perform a risk assessment to identify key risks for spreading infection on farm and assist the dairy producer and herd veterinarian with development of a herd control plan. If uninfected, the herd is eligible to participate in the Voluntary Johne's Disease Herd Status Program and gain the advantage of marketing low risk cattle replacements. A study evaluating the herd sensitivity of this test strategy for detecting *M. paratuberculosis* in dairy herds (Wells et al, 2002, JAVMA) showed that the probability of detecting infected herds varied by within-herd fecal culture prevalence. With 30 cows per herd sampled, only 33% of infected herds in which ≤ 5% of cows had positive bacterial culture results were detected, compared with detection of 84% of infected herds in which ≥ 10% of cows had positive bacterial culture results.

Another herd testing strategy involves testing of pooled fecal samples, through which a larger number of animals are represented within a tested population for a fixed laboratory cost. An experimental study (Wells et al, 2002, AJVR) found that bacterial culture of fecal pools was effective in detecting 94% of fecal pools with at least one cow shedding at moderate to high levels, indicating the potential of use of culture of fecal pools for characterizing herd Johne's disease infection status.

The objective of this study was to estimate the sensitivity of bacterial culture of pooled fecal samples for detection of *M. paratuberculosis*. Fecal samples, collected from dairy cows in 24 Minnesota dairy herds, were pooled in groups of 5 cows based on cow birth order and tested using bacterial culture for *M. paratuberculosis*, as a comparison to simultaneous bacterial culture of fecal samples from individual cows. Ninety-four percent of fecal pools containing at least one cow shedding *M. paratuberculosis* at high levels (a mean of at least 50 colonies per tube) were test-positive. Bacterial culture of fecal pools detected 94% of infected herds and within-herd pool culture prevalence was highly correlated with individual cow culture prevalence. Results from this study indicate that bacteriologic culture of pooled fecal samples provides a valid and cost-effective method of detecting for *M. paratuberculosis* infection in dairy cattle herds and estimating within-herd prevalence.