DETECTION OF MYCOBACTERIUM AVIUM PARATUBERCULOSIS IN NATURALLY EXPOSED DAIRY CALVES

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Objective: A prospective, multi-cross sectional study was conducted over 28 months on heifers from eight Michigan, USA, dairy herds to determine if fecal shedding of Mycobacterium avium paratuberculosis (MAP), the causative agent of Johne's disease (JD), could be detected in naturally exposed dairy calves using a liquid culture system (ESP II).

Materials and methods: 10 heifers from each of 4 age groups: 0-3 months, 4-6 months, 7-14 months, and 15-24 months were selected every 3 months from each herd and their feces cultured for MAP using ESP II. Heifers from dams testing positive for JD by fecal culture (FC) or serum ELISA were preferentially sampled, with the remainder of each age cohort filled with randomly selected calves. Other data collected included the within herd JD prevalence and herd size at time of sample collection. To assess the effect of age, herd prevalence, and herd size on the FC status of the heifer, logistic regression was used, accounting for clustering of data within herds and repeated measures on individual calves using generalized estimating equations in a subject-specific model.

Results: A total of 1842 fecal samples were collected from 1203 heifers. 393 heifers were tested at least twice. 36 (2%) samples were culture positive for MAP, originating from 27 heifers. 7 heifers were FC positive on two different dates and 1 heifer was FC positive 3 times. The numbers of FC positive samples in each age group were as follows: 0-3 months, 4; 4-7 months, 2; 7-14 months, 18; 15-24 months, 12. All pair-wise comparisons between the four age groups revealed no statistically significant difference between age groups 0-3 months and 4-6 months or between age groups 7-14 months and 15-24 months. The final multivariable regression model assessing the factors associated with heifers being FC positive included: age >6 months (OR=6.0, 95% CI: 2.1-17.4), within herd JD prevalence >10% (OR=4.7, 95% CI: 2.0-11.1) and herd size ≥300 cows (OR=5.7, 95% CI: 2.4-13.4). The majority of positive FC's originated from heifers >6 months of age. Also associated with heifers culturing positive was within herd JD prevalence >10% and herd size ≥300 cows.

Conclusions: Based on this study, if a producer with a relatively high within herd JD prevalence desires to aggressively identify and remove MAP infected cattle by FC, targeted testing of heifers >6 months of age may be beneficial.

Keywords: Johne's disease, dairy, fecal shedding, replacements