Ohio's Johne's Disease Demonstration Project: Environmental Sampling and Fecal Pooling

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Introduction

Ohio has participated in the National Johne's Disease Demonstration Project since the summer of 2004. Our overall goals included obtaining experience with and evaluation of the Trek ESP broth culture system, assessing the overall usefulness of culture of pooled fecal samples as compared to individual animal fecal cultures in identifying infected animals and infected herds, culturing samples taken from selected environmental sources to compare environmental "load" on the farm with apparent prevalence of infection in the animals and to determine if specific sites in the environment are more likely to present a hazard to young animals in that environment. In addition, we wanted to collect some of this data in beef herds to better characterize the disease in beef herds typical of our region.

Materials and Methods

One dairy herd and two beef cattle herds were identified for the project. Each herd has been sampled twice yearly with fecal and blood samples collected from each animal. The fecal samples were processed and cultured for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) using the Trek ESP para-JEM system, and the serum samples were tested using the BioCor ELISA. In addition, fecal samples were pooled in groups of five by convenience and cultured with the same procedure as the individual fecal samples. Environmental samples were collected in groups of five from free-stall alleyways, calving areas, dry cow areas, sick cow pens, and around round bale feeders and loafing areas, and cultured. In addition, samples were collected from teat and udder skin surfaces using a sterile gauze sponge soaked in water. These samples were processed and cultured as for fecal samples.

Results

Results from fecal sample pooling indicated that this technique can be useful to identify pools which contain cows that are heavy shedders. The number of days-to-positive (DTP) for the pool generally reflected the DTP for the animal with the shortest DTP in that pool. False negative pools generally contained cows with DTP >35. In addition, prevalence of positive pools tended to reflect herd prevalence with a relationship similar to that previously reported by other investigators. Proportion of positive environmental samples generally reflected the herd prevalence at that sampling date. Udder skin samples were frequently positive and were reflective of herd prevalence and environmental load. At one sampling date for one of the beef cattle herds, when most calves were less than three months old, more than one-third of the udder skin samples were culture positive. However, the apparent herd prevalence, determined by culture, was only 8% on that date. In some cases, these samples were positive in as few as 18 days.

Significance

The Trek ESP system, as used in our laboratory, worked well for both pooled fecal culture and environmental samples and was semi-quantitative. Fecal sample pooling allowed estimation of herd prevalence and has the potential of both reducing the cost for this estimation and the identification of cows shedding large numbers of MAP if individual cows from selected pools are re-cultured. We believe that environmental samples have the potential to provide useful information about high risk areas to the veterinarian and farm manager and may provide a tool for routine monitoring of management practices. The common finding of MAP, sometimes in large numbers, on the skin of the teat and udder of animals, many of which were not themselves fecal culture positive, serves to emphasize the importance of environmental contamination with MAP and the opportunity for transmission to nursing animals and contamination of product during harvest of milk.