Use of environmental testing to identify high risk areas for Johne's disease transmission on cow-calf operations

R.M. Breuer,[2] DVM; **C.M. Garoutte**,[1] DVM; **A.C. Krull**,[1] DVM, PhD; **A.J. Kreuder**,[1] DVM, PhD, DACVIM (LAIM)
[1] Veterinary Diagnostic and Production Animal Medicine, Iowa State University, Ames, IA 50011
[2] Veterinary Medical Center, Iowa State University, Ames, IA 50011

Introduction

The majority of research related to testing and control strategies for decreasing the incidence of Johne's disease has been focused on the dairy industry with little focus on the beef industry. Because of the very different management styles for calf rearing and housing between the 2 industries, there is an urgent need to assess the effectiveness of currently recommended prevention strategies on mitigating the risk of Johne's transmission in beef cow-calf operations. Shedding of *Mycobacterium avium* subsp *paratuberculosis* (MAP) by infected adult animals into cow-calf housing areas likely poses the highest risk for spread of Johne's disease within beef herds. Therefore, development of an effective environmental testing strategy specifically designed for cow-calf operations that could be used to identify contaminated areas on farm is warranted.

Materials and Methods

A sample collection device consisting of a PVC pipe, plastic sleeve, and absorbent material was designed and tested on farm to confirm the ability to identify contaminated areas that currently housed a known positive animal. A total of 16 beef cow-calf herds known or suspected to previously have had MAP positive animals were enrolled and sampled in spring 2017. A Johne's risk assessment was performed for each farm, and 5 areas deemed highest risk were sampled 50 times each using the collection device. The samples were then washed in PBS and immediately frozen in liquid nitrogen and stored at -80°C. All samples were submitted for PCR analysis for MAP DNA; a subset of samples were also submitted to for MAP culture to correlate PCR positivity with the presence of live organisms capable of causing infection.

Results

Eleven of the 16 farms were identified as having positive (Ct <35) or suspect (Ct 35-<40) results on PCR, indicating environmental contamination with MAP. Growth of MAP organism was detected in all samples submitted for culture with a Ct <33, while no live MAP could be detected when the Ct was >34.5.

Significance

Results indicate that environmental sampling followed by PCR testing could be a useful tool for identifying high-risk areas contaminated with live MAP organisms or for surveillance of herd infection in beef cow-calf operations.