Evaluation of Environmental Sampling to Determine Distribution and Dairy Herd Infection Status for *Mycobacterium avium* subspecies *paratuberculosis*

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Introduction

An important component of the Voluntary Bovine Johne's Disease Control Program is to determine herd infection status for *Mycobacterium avium* subspecies *paratuberculosis* (MAP). To help prevent the transmission of MAP, dairy and beef herds providing replacement cattle should know their infection status. Herds acquiring cattle should be fairly confident that the source herd is at low risk for MAP infection. The current requirements for a herd to be considered Level 1 of the test-negative component requires ELISA testing 30 animals followed by fecal culture confirmation of ELISA-positive cattle. Since the ELISA is approximately 25-50% sensitive, many infected herds are classified as low risk and enter Level 1 based on this testing scheme.

Materials and Methods

The National Animal Health Monitoring System's Dairy 2002 surveyed dairy operations in 21 states, representing 82.8% of US dairy operations and 85.5% of US dairy cows. One component of the study involved collection and culture of environmental samples for MAP from areas on the farm where manure from a majority of cows accumulated. Operations were selected based on perceived risk factors for MAP infection identified in an earlier questionnaire. Four to five environmental samples and paired serum and fecal samples were collected from March to August 2002. Animals in lactation two and greater were selected for MAP testing. Environmental and fecal samples were cultured using three methods in parallel. Serum samples were tested using a commercially available MAP ELISA kit. Results of individual animal testing were compared to environmental sampling to determine herd infection status.

Results

A total of 483 environmental samples were collected and 216 (44.7%) were culture positive for MAP. The highest percentage of positive environmental samples were collected from parlor exits (52.3%), holding pen floors (49.1%), common alleyways (48.0%), lagoons (47.4%) and manure spreaders (42.3%). Of the 98 operations tested with environmental sample culture, 97 had individual serum ELISA results and 60 had individual fecal culture results. Of the 50 herds classified as infected by fecal culture, 38 (76.0%) were also identified by environmental culture. Two of the 10 operations classified as not infected based on individual animal fecal culture were environmental culture positive. Of the 80 operations classified as infected based on serum ELISA positive test results, 61 (76.3%) were identified as environmental positive.

Significance

MAP is commonly found in the environment of infected dairy operations. Environmental sample culturing takes less time and is more cost effective than individual animal sampling. More than 75% of infected operations, based on individual animal sampling, were identified using environmental sample culture. Environmental sampling and culture is an alternative method for determining herd infection status.