Isolation of Mycobacterium avium subsp. paratuberculosis From Recycled Sand

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Introduction

Johne's disease (JD), caused by the bacterium Mycobacterium avium subsp. paratuberculosis (MAP), is a chronic untreatable disease of ruminants. It primarily affects the intestinal tract resulting in chronic diarrhea and weight loss. JD is transmitted to young stock through the ingestion of colostrum, milk or feedstuffs contaminated with MAP or through exposure to MAP contaminated environments. Many dairy farms use sand as a bedding material and new technology has been developed to recycle sand and reuse it. In some instances, recycled sand may be used for bedding of replacement heifers that are most susceptible to infection with MAP. This study was conducted to determine if MAP could be found in recycled sand, thus serving as a source of environmental exposure to susceptible animals.'

Materials and Methods

Two dairy farms known to be infected with MAP were used in this study. One farm was visited weekly for 4 weeks during the summer and for 3 weeks during the winter of 2006/2007 (n=7 visits). The other farm was visited once every 6 months from 2004-2006 (n=6 visits). On each farm, a 4 oz sample was collected from the pre sand separation holding area, the post separation recycled sand pile and the post separation organic material holding area (lagoon). Samples were submitted to the Michigan State University Diagnostic Center for Population and Animal Health where they were cultured for MAP using a liquid culture system (TREK ESP II, TREK Diagnostic Systems, Cleveland OH). Positive samples, as determined by the TREK liquid culture system were confirmed by both acid-fast staining and IS900 PCR.

Results

MAP was cultured from 12/13 samples collected from the pre separation holding tanks. Post separation, MAP was cultured from 11/13 and 13/13 of the post separation sand pile and post separation organic material respectively. There was no difference in the frequency of MAP recovery based on farm or season of the year.

Significance

This study demonstrates that on infected dairy farms, MAP can be found in recycled sand and can potentially serve as a source of disease exposure if used as bedding for susceptible animals. Veterinarians should recognize this risk when conducting Johne's disease risk assessments and advise their clients on how best to manage recycled sand to reduce risk of MAP transmission. Future studies will attempt to determine how long MAP may remain viable in recycled sand and to identify management strategies to reduce survivability.