

Production Effects of *Mycobacterium avium* subspecies *paratuberculosis* Infection Based on Diagnostic Test Results

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Introduction

Several studies have evaluated the production effects of *Mycobacterium avium* subspecies *paratuberculosis* (MAP) infection with various outcomes. Some studies have reported up to an 18% reduction in milk production for fecal-culture-positive cows compared to fecal-culture-negative cows. A 4% reduction in milk production was observed in serum-ELISA-positive cows compared to test-negative cows in one study, while other studies have reported no differences between test-negative and test-positive cows. Most of these studies were restricted to a small region of the US and a relatively small number of operations.

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. A subset of operations allowed collection of biological samples for fecal culture and serum- and milk-ELISA testing for MAP infection, and access to Dairy Herd Improvement Association production records. Mature equivalent (ME) milk production in the lactation in which testing occurred was evaluated using Proc Mixed in SAS.

Results

There were 2,832 cows from 23 herds evaluated using fecal culture results, 7,614 cows from 38 herds

evaluated with serum-ELISA and 11,874 cows from 33 herds using milk-ELISA. Cows classified as heavy shedders produced significantly less ME milk in the current lactation compared to all other cows. Heavy MAP shedders produced almost 24% or 5,000 lb (2,273 kg) less ME milk compared to moderate shedders and 38% or 8,000-9,000 lb (3,636-4,091 kg) less than low, very low and culture negative cows. Cows that tested strong positive on serum-ELISA produced 10% (2,000 lb; 9,091 kg) less than test-positive cows, and more than 13% (2,500 lb; 1,136 kg) less than test-negative cows. For both ELISA testing methods, ME milk production was almost identical for each testing category. Cows that tested strong positive via serum-ELISA produced significantly less ME milk in the current lactation compared to cows that tested positive, inconclusive or negative. The same was true for cows tested via milk-ELISA. There were no significant differences in ME milk production between test-negative and test-positive cows for either ELISA.

Significance

Results of this study suggest that the decline in milk production for cows with MAP infection occurs in cattle that are shedding the largest number of bacteria or have developed the greatest immune response. These production losses to the producer cannot be regained, and subsequent losses can only be reduced by decreasing the prevalence or eradicating MAP from the herd.