

How Johne's hurts you in the pocketbook

Infected cows produce between 1,000 and 6,000 less pounds of milk during a given lactation and have significantly less lifetime production.

by Jason Lombard, D.V.M.

RESULTS from the National Animal Health Monitoring System's (NAHMS) Dairy 1996 study indicated that, in herds where more than 10 percent of cull cows showed clinical signs of *Mycobacterium avium* species *paratuberculosis* (MAP) infection and where at least two cows tested positive when 25 to 40 cows were randomly sampled, the cost of MAP infection was more than \$200 per cow for every cow in the herd. The majority of this lost income resulted from reduced milk production. The total cost to the dairy industry was estimated at \$200 to \$250 million annually.

So the question becomes how do we know that the disease causes this type of impact to production, and what can be done about it? Research can provide us with clues in answering these important questions.

The intestine of a cow with Johne's is not able to absorb nutrients effectively. This hurts milk production because nutrients that would have been absorbed and used for milk end up in manure. Numerous studies generating varying results have evaluated the effects of MAP on milk production. One major challenge to making production comparisons is the absence of a diagnostic test able to detect early stages of MAP infection.

Recently, several studies have evaluated milk production losses associated with animals' diagnostic test status. Although not yet peer-reviewed, the study with the largest number of animals relies on data collected from the National Johne's Disease Demonstration Herd Project. This project included 67 dairy herds from 18 states and over 40,000 head of cows. Cattle from this project testing strong-positive via serum ELISA had mature equivalent 305 (M.E. 305) milk production — for the current lactation — of about 1,000 pounds less (4 percent) than cows in other test categories, after accounting for lactation number and breed.

Cows that were fecal-culture positive also had significantly lower milk production, but the reduction was only in the 300- to 400-pound range. Fecal-culture positive samples are routinely categorized based on the number of organisms present. These categories usually are referred to as shedding levels. Cows shedding heavily in their manure are assumed to be at a later stage of disease and, therefore, present more risk of transmitting infection within the herd. Unfortunately, shedding levels for fecal results were not reported consistently in the demonstration herds.

Multiple methods were used for testing cattle for MAP infection, using both serum ELISA and fecal-culture procedures. Because of this, the results of the demonstration herd study

may be more representative of what you may see in your own herd.

A study conducted in Canada and recently reported in the *Journal of the American Veterinary Medical Association* evaluated 689 cows from nine herds. All cows were tested by serum ELISA, milk ELISA, and fecal culture.

What tests tell us . . .

There were significant differences in current-lactation milk among cows testing fecal-culture or milk-ELISA positive compared to those testing negative. Although an approximate 1,000-pound drop in milk production was observed in cows testing fecal-culture and milk-ELISA positive, there was no significant difference in cows

milk production of more than 5,700 pounds less than test-negative cattle.

Results of the milk-ELISA analysis were consistent with those obtained from serum ELISA. Cows testing positive have lower lactation and lifetime production. This suggests that both ELISA tests are identifying similar levels of antibody production and milk production. The milk-ELISA test is gaining popularity since milk samples routinely collected for Dairy Herd Improvement testing also can be used for MAP antibody testing, without the need for additional sample collection.

Analyzing records from almost 3,000 cattle tested by fecal culture from 23 of the original 38 operations revealed that heavy-shedding cows produced significantly less milk (5,660 pounds) than test-negative cattle. Total lifetime milk also was reduced significantly (28 percent) in "heavy shedders." Since heavy shedders typically show clinical signs — or soon will — it was not surprising to see such a significant hit in milk production. Although most of the difference in lifetime milk production was due to production in the current and usually last lactation, the data suggest that MAP infection does affect milk production in prior lactations. Interestingly, in both the Dairy 2002 and Dairy 2002 Follow-up studies, we found that cattle shedding low amounts of MAP actually had significantly higher milk production compared to those testing negative. To date, there is not a feasible explanation for this finding.

Based on all of our studies to date, it is clear that Johne's infection affects milk production, especially in cows producing

large amounts of antibody or shedding large numbers of bacteria. The amount of reduced milk production ranges from 1,000 to 6,000 pounds . . . just in the current lactation alone. There is not a definitive answer as to the extent Johne's impacts an infected herd, but we do know that milk production losses associated with MAP infection are the same as losses due to mastitis and other common dairy cattle diseases in that these losses cannot be regained. Plus, further losses can only be minimized by reducing the number of infected animals on the operation.

It is commonly recommended that cows testing strong positive or fecal-culture positive for MAP infection be culled. This recommendation is based on the potential risk these infectious cows pose to uninfected, susceptible animals . . . calves. But culling test-positive cows will not recoup the losses these cows have incurred by low productivity and will likely not bring a good price when sold. Therefore, culling decisions need to be considered as a balance of benefits accrued by reducing disease spread versus the loss of production. The best approach appears to be managing cows in a way that limits the spread of disease. 



ANY COW INFECTED with Johne's likely will produce at least 3 pounds of milk less per day, according to studies involving large cow numbers. For some heavily shedding cows, the loss of production is much greater.

testing serum-ELISA positive. However, when serum-ELISA results were categorized into strong positive, positive, weak positive and negative, significant differences were observed.

Cows testing strong positive on the serum-ELISA had a 2,000-pound decrease in milk production. There was a 1,000-pound drop in milk production among cows testing positive compared to cows testing negative.

Two additional studies were conducted as part of the NAHMS Dairy 2002 and Dairy 2002 Follow-up studies. For the Dairy 2002 study, we evaluated current lactation (305, M.E.) milk and lifetime milk production based on a serum ELISA, the milk ELISA, and fecal culture (multiple methods) results. For the Dairy 2002 Follow-up study, only serum ELISA and fecal culture were used.

Less lifetime milk . . .

In the Dairy 2002 study, more than 5,700 cows from 38 operations in 16 states were evaluated using serum ELISA. Cows that tested positive or strong positive had current lactation production of 880 pounds and 3,008 pounds less than test-negative cattle, respectively. Cows with strong-positive test results had lifetime

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