

Johne's: progress in small steps

■ Johne's disease continues to hamper dairy profitability, and testing and prevention remain the best weapons.

by JoDee Sattler

Like many diseases, it's much easier to prevent Johne's disease (paratuberculosis), because there is no cure or effective treatment. Losses come as reduced milk production, early culls and increased risk for other diseases, with some negatively impacting reproduction. In Wisconsin alone, some estimates put Johne's disease losses near \$100 million annually.

Johne's disease is challenging to control because it is difficult to detect in its early stages of infection. It's estimated that for every animal in a herd that shows symptoms, another 15-25 animals that appear to be in good health are in the early stages and may be contaminating your dairy's environment. This is important because these cattle may be spreading infection to calves. "Even on a farm without any previous Johne's disease clinical cases, one single 'si-

lently' infected heifer bought as a replacement can spread the infection throughout the herd," reported the Wisconsin Johne's Disease Control Program.

Prevalent, persistent 'bug'

Mycobacterium avium subspecies paratuberculosis (MAP), which causes Johne's disease, is persistent in the environment. It's highly resistant to heat, drying, freezing and thawing. MAP can remain in water for up to two years and is resistant to many disinfectants.

A Michigan Johne's disease demonstration project showed that 79% of the time when MAP was found on cattle housing flooring, there was 2% or more Johne's disease herd prevalence.

Kimberly Cook, a USDA research microbiologist, found high-traffic alleyways contained the



Antibody-based detections tests

ELISA

The Johne's disease ELISA test should be used as a screening tool for an entire herd or subsets of a herd. It measures the presence or amount of antibody produced, which can be detected in blood or milk samples.

Pros

Fast, with results in less than one week
Inexpensive, with most tests \$5-\$10
Widely available

Cons

Only 1 in 3 infected animals reliably detected
Can give false positives
Animals in early stages of infection don't produce antibodies

Organism detection-based tests

Culture

The fecal culture detects the organism that causes Johne's disease. It is a good individual test to detect or confirm infection.

Pros

Detects about 2 in 3 infected animals reliably
Definitively identifies live Johne's bacteria
Reliable with manure, tissue, biopsy and environmental samples
Samples can be pooled

Cons

Takes 3-16 weeks for results
Cost, with most tests \$16-\$30
Potential for false positives due to heavy shedders in a herd

PCR

The Polymerase Chain Reaction (PCR) test detects unique segments of DNA in bacteria that cause Johne's disease. A positive PCR proves the organism's presence in a sample.

Pros

Fast, with results in less than 2 weeks
Can be run on manure, tissue, biopsy and environmental samples
Definitively identifies Johne's organism
Samples can be pooled

Cons

Cost, with most samples \$15-\$35
Not widely available
Only 1 in 3 infected animals reliably detected
Potential for false positives due to heavy shedders in a herd

FYI

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■ Visit the National Johne's Working group at www.johnesdisease.org.

■ The University of Wisconsin School of Veterinary Medicine offers free Johne's disease information at www.johnes.org.

■ Find an up-to-date list of Johne's-certified laboratories at www.aphis.usda.gov/vs/nvsl.

highest concentrations of MAP – 10 times more than what was found in the manure storage pit.

Robert Whitlock, University of Pennsylvania professor of veterinary medicine, explained that some cows are “super shedders,” often shedding more MAP, individually, than all other cows in a herd combined. “Some shed billions of MAP per day,” he said. Identify those cows and remove them from your herd immediately – even if they’re producing a lot of milk. Preliminary observations suggest that most super-shedder cows do not exhibit clinical signs of Johne’s disease, although they shed as much, or significantly more, MAP into the environment than typical cows with clinical Johne’s.

Prevention

To prevent Johne’s disease, strive to protect young animals from adult manure and avoid buying animals harboring Johne’s disease. Young animals are the most susceptible to Johne’s disease infection. If you purchase replacements, know the source herd’s Johne’s status. To put a Johne’s disease control program in place, consult your veterinarian.

Assessing risk and developing a herd management plan provides a systematic approach to attacking Johne’s disease, said Andrea Foley, DVM, of the Wisconsin Department of Agriculture, Trade and Consumer Protection. Besides helping control Johne’s, this strategy will help prevent other fecal-oral transmitted diseases. Better yet, some states offer reimbursement funding to cover and/or offset costs related to prevention, control and testing.

Federally funded Johne’s control programs offer free or subsidized testing, risk assessment and management consultation. In certain instances, cost-sharing is available to enhance facilities to help prevent Johne’s disease.

Milk ELISA: often the best test

While Johne’s testing provides valuable information, know what you are trying to accomplish with a particular testing strategy to make the most of test results. Testing alone will not control Johne’s disease. Use test results wisely.

Purdue University researchers found that sample handling substantially affected Johne’s enzyme-linked immunosorbent assay (ELISA) test results. They found more variation among results when samples were stored for one week or frozen, compared to samples that were refrigerated and shipped overnight to a certified testing laboratory.

Nathan Dorshorst, DVM, University of Wisconsin School of Veterinary Medicine, developed a decision analysis model for paratuberculosis control in commercial dairy farms. He noted that, in general, the milk ELISA (AntelBio Systems) is the best test. When test accuracy and test costs for five commonly used paratuberculosis tests were used in the decision analysis model, milk ELISA was the test most often recommended as having the best cost-benefit. Dorshorst noted, however, that improved calf hygiene is critical for paratuberculosis control programs and often is more economical than Johne’s disease testing.

Adopt testing strategies

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sciences, University of Wisconsin School of Veterinary Medicine, explained that when within-herd infection rates are high, it is not economically feasible to cull all test-positive cows. Consequently, it is necessary to adopt testing strategies that provide both diagnostic and prognostic information. “The owner needs to know which cows are most infectious and are unlikely to survive another lactation; these cows need to be removed from the herd,” Collins stated.

AntelBio’s milk ELISA gives numerical data – not just a positive, negative or inconclusive rating. Results can be used quantitatively to rank cows for culling. “If used judiciously and interpreted quantitatively, milk ELISA is an accurate and cost-effective tool in support of paratuberculosis control programs in dairy herds,” Collins remarked.

Keep in mind that not all milk ELISA tests are created equal.

Collins recommended not testing cows at peak milk production, due to a dilution effect.

Vaccine

In Wisconsin, a vaccine is approved for limited use in controlling Johne’s disease in cattle. The vaccine is a useful tool, in certain circumstances, in controlling Johne’s disease. However, restrictions apply. To discover if vaccinating against Johne’s disease is approved in your state, see the Johne’s state contact list accompanying this story.

Besides the millions of dollars lost on dairies across the country, Johne’s disease is a threat to the dairy industry due to its potential link to Crohn’s disease in humans. Some in the medical community believe there is a link between Johne’s disease and Crohn’s disease, while very few gastroenterologists think there is a link, Collins said. ■