What testing tells us

As part of the Johne's disease control program, testing proves invaluable for helping you make key management decisions

The stage of infection directly affects test results for individual cows.

Testing ranks high among the key components you need to implement an effective Johne's disease control program on your dairy operation. To use testing properly, however, you need to understand results and how to make management decisions based on them.

The Ontario Johne's control program uses testing to identify cows posing the biggest risk of spreading *Mycobacterium avium paratuberculosis* (MAP), the bacteria that cause Johne's. The program encourages you to consult with your veterinarian about using results appropriately.

Ontario's most commonly used Johne's test is the milk ELISA offered by CanWest DHI. It detects antibodies to MAP in a cow's test-day milk samples. The likelihood a cow is shedding MAP rises as the DHI milk test score increases.

The second most commonly used test is fecal culture. A laboratory cultures a manure sample to see if it can grow MAP bacteria. Infected cows may or may not be actively shedding MAP in their manure.

Most cows in the early stages of MAP infection will have negative results on either Johne's test. In the late stages, cows close to or already sick with Johne's, suffering from diarrhea and weight loss, will test positive on both. The most difficult results to understand come from animals between the early and late infection stages. They also make up the largest group of infected cows.

To show how the two tests can relate to each other and how the MAP infection stage can affect results, we tested four cows multiple times on both the milk ELISA and fecal culture tests. We picked four healthy-looking cows from a herd we knew had Johne's disease, based on the herd's test results.

We collected one milk sample and one manure sample from each cow every other day for 10 days. The daily manure sample was split and cultured three times for MAP at the Animal Health Laboratory in Guelph. The daily milk sample was tested once at CanWest DHI on the Johne's ELISA.

The table on page 37 shows all the test results. The shaded cells are positive test results, and all others are negative.

Although four cows make up a small sample size, our results clearly illustrate what can happen with Johne's testing. Cows 1 and 2 were negative on all the milk ELISA and fecal culture tests done over the 10 days. These results don't prove the cows are not infected with MAP, but they clearly were not producing much antibody and not shedding MAP during the 10-day testing period. While we don't know what

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Ruminations is prepared by Ontario Ministry of Agriculture, Food and Rural Affairs livestock technology specialists to provide information you can use on your farm.

will happen in the future, the fecal and milk tests agreed completely at the time of our testing.

Results for Cows 3 and 4 are less straightforward. When we assessed the multiple tests, we were convinced both cows had Johne's. Yet results for only a particular day would not have given us this result.

Cow 3 was a high-titre (HT) animal. She had results over 1.0 on all five days of milk ELISA testing and positive fecal cultures on four of the five days. Even though she was a HT, MAP-shedding cow, she still had one day when her fecal culture was negative. If this had been the only day she had been tested, her manure culture would not have agreed with her milk test done the same day. Nevertheless, results from the two tests agreed four out of five days, or about 80 per cent of the time.

Cow 4 had a very low antibody level on the milk ELISA one day, termed as suspect, but was negative the next four days. Fecal culture results were negative on all three cultures on two days, positive on all on another day and positive on only one of three cultures on the remaining two days.

This inconsistency occurred because she was shedding lower amounts of MAP bacteria in her manure. Sometimes, too few were present for the fecal culture test to detect them. Her antibody levels were also low. Only once were they high enough to cause a suspect result.

Overall this cow had one suspect milk test and was positive on one-third of all the manure tests. On two of the five test days this cow had results from the two tests that agreed. On the other three days, results conflicted.

This cow is likely typical of many in the intermediate stages of MAP infection. They may be shedding MAP intermittently and have fluctuating levels of antibody in their milk. Testing once does not provide the whole picture on cows like this.

Results on these four cows also show neither test proved better than the other. Fecal culture missed Cow 3 on one day compared with milk ELISA; milk ELISA missed Cow 4 on one day compared with fecal culture.

Nevertheless, testing successfully identified the high risk animal, Cow 3, every day she was checked. On the milk antibody test, Cow 3 was typical of animals with milk ELISA test results over 1.0—she was consistently shedding high numbers of MAP bacteria. Removing a cow like this is an essential step to protect your young calves from exposure to high MAP bacteria levels.

This small experiment reinforces our understanding of Johne's testing. As a MAP infection advances from early to late stages, test results become more consistent and confidence in what they reveal increases. However, you have to be careful not to over-interpret a negative result for a cow tested only once. You have to base decisions on your whole herd's test results and Johne's disease history.

Herds that rarely have positive test results and no suspicion of past Johne's cases are less likely to have infected cows. The few test-positive cows identified should be managed according to veterinary advice.

On the other hand, you need to make immediate changes in herds where HT cows are found, test-positive cows are more common or there have been cases of Johne's disease.

Whole herd Johne's tests give you an excellent basis for making decisions about how to manage your herd. More frequent herd testing would be worth considering in herds where Johne's is known to be present. However, the cost would be hard to justify for herds that have had all

Milk ELISA and fecal culture results on four cows tested on 5 days

Day	Test	Cow 1	Cow 2	Cow 3	Cow 4
Day 1	Milk ELISA	N	N	1.48 (P)	0.08 (Susp)
Day 2		N	N	1.37 (P)	N
Day 3		N	N	1.64 (P)	N
Day 4		N	N	1.46 (P)	N
Day 5		N	N	1.49 (P)	N
Day 1	A Fecal culture	N	N	P	P
	B	N	N	P	N
	C	N	N	P	N
Day 2	A	N	N	N	P
	B	N	N	N	P
	C	N	N	N	P
Day 3	A	N	N	P	P
	B	N	N	P	N
	C	N	N	P	N
Day 4	A	N	N	P	N
	B	N	N	P	N
	C	N	N	P	N
Day 5	A	N	N	P	N
	B	N	N	P	N
	C	N	N	P	N

negative results, have no history of Johne's and got good scores on the risk assessment and management plan (RAMP).

While testing provides highly valuable information, it's not the only program component you need to make good Johne's disease prevention decisions. You still need to do the RAMP with your herd vet to ensure all information relevant to your farm's Johne's risk is gathered at one time.

The RAMP helps you and your vet assess current management risks and identify gaps that could allow MAP to spread. Even if testing suggests you have a low rate of Johne's, you can make management decisions to prevent it from spreading.

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