

**NATIONAL JOHNE'S
EDUCATION INITIATIVE**

A cooperative effort of the National Institute for Animal Agriculture, USDA, APHIS, Veterinary Services, in association with the National Johne's Working Group & United States Animal Health Association

Johne's Disease – Beef

Johne's Disease Not Just for Dairy Cattle Anymore

The beef industry had better pay attention. That's the advice of Dr. Maryrose Beasley, DVM, Roundup, Mont.

"We need to break the cycle of Johne's disease," she says. "As a veterinarian, I've seen enough of Johne's to make me very concerned—and I suspect there's more of this disease out there than we're realizing today."

Beasley's first positive Johne's disease case was four years ago. It started when she received a call from a cow-calf rancher who raised some of the nicest feeder calves she'd ever written health certificates for.

"He asked me to come to the ranch to check out a sick, two-year-old heifer," Beasley recalls. "When I got there, the heifer was lying down and had just 'broken' that day with diarrhea." The heifer was also emaciated with a broken, rough, thin hair coat and her eyes were sunken.

"I considered several differentials including parasite, hardware, nutrition, fat necrosis, mineral deficiency and even chronic BVD," she says. But, the rancher had used a good pour-on insecticide twice a year, all other commingling cows were of good to excellent flesh, their diet was steady and balanced and no other cattle appeared to be affected. Plus, the rancher had been employing a regular and well-administered broad-spectrum modified live vaccine program.

"I took blood and fecal samples, and we euthanized the heifer because by the time I got there, she couldn't get up anymore," she notes. "Interestingly, the owner also wondered about Johne's. He'd been online looking for possible causes before I got there."

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"I think there are a lot of skinny old cows out there that we should be thinking might have Johne's disease," states Dr. Bruce Hoffman, DVM, Manhattan, Mont.



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Johne's Disease 101: *Helping You See What's Happening Inside & Out*

Johne's disease experts agree that the more you know about Johne's disease, the better you can prevent and/or control the disease. Thus, here's the start of "Johne's Disease 101" presented in a question-and-answer format.

Q: What is Johne's disease and what causes it?

A: Johne's (pronounced "Yoh-nees") disease is a contagious fatal gastrointestinal disease that was first clearly described in a dairy cow in 1895.

Another name for Johne's disease is paratuberculosis.

Johne's disease is caused by a *Mycobacterium avium* ss. *Paratuberculosis*, a bacterium that is frequently abbreviated to "MAP.")

Q: What are the clinical signs of Johne's disease in beef animals?

A: A beef animal will typically exhibit only two clinical signs of Johne's disease: rapid weight loss and diarrhea. That said, cows infected with *MAP* will often have lower milk production—resulting in calves not meeting a producer's expectations—and can be less fertile.

While almost all animals are infected when they are extremely young—in the first months of life, signs of disease usually do not appear until the animals are adults. Then, despite continuing to eat well, older infected animals showing clinical signs become emaciated and weak.

It is not understood what causes a clinically normal animal that has been infected by *MAP* for months or years to suddenly become sick from the infection.

Q: What is happening inside an animal infected with MAP?

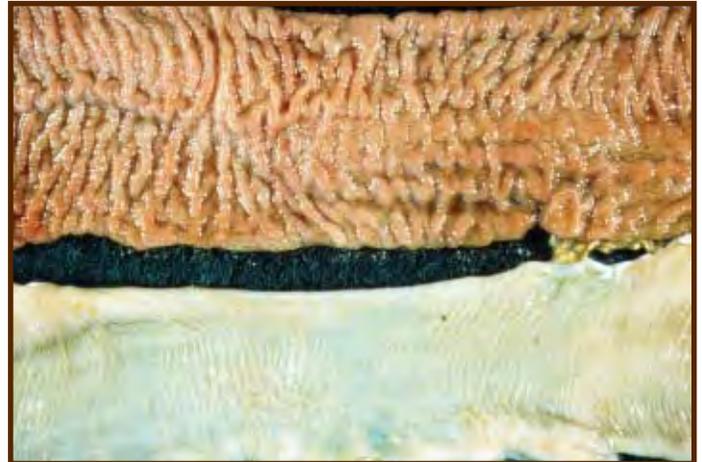
A: When an animal becomes infected with *MAP*, the bacteria grow slowly in the last part of the small intestine called the ileum.

The internal wall of the ileum contains Peyer's patches that are covered with a layer of M cells. As the M cells are exposed to the food and nutrients passing through the ileum, they ingest bacteria, including *MAP*. Once absorbed into the Peyer's patches, *MAP* finds an ideal place for growth.

At some point, the *MAP* that have been lying quiet within cells of the ileum start to replicate and take over more and more of the tissue. The animal's immune system responds to all these organisms with what is called granulomatous inflammation.

This inflammation thickens the intestinal wall, preventing it from functioning normally. As a result,

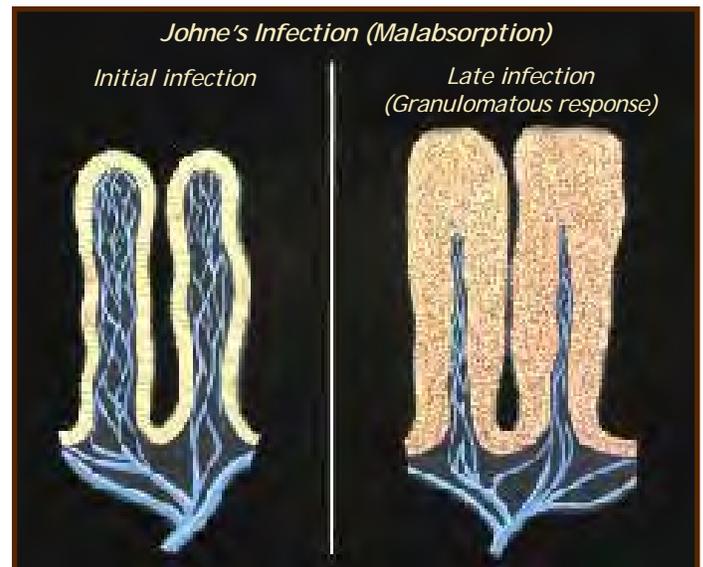
along with other factors, the infected animal cannot absorb the nutrition it needs and thus begins to lose body condition, milk production drops off and diarrhea may occur. In effect, an animal with Johne's disease is starving in spite of having a good appetite and eating well.



Top ileum: Inflammatory response to MAP.

Bottom: Thin, pliable, normal intestine.

Photo source: The late B.J. Jorgensen, Denmark.



Since the signs of Johne's disease are similar to those for several other diseases, laboratory tests are needed to confirm a diagnosis.

"If a case of Johne's disease occurs, it is very likely that other infected animals—those that may still appear healthy—are in the herd," states Dr. Elisabeth Patton,
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chairman of the U.S. Animal Health Association Johne's Disease Committee. "I would highly suggest that a Johne's disease testing program be implemented."

Q: How is Johne's disease transmitted?

A: Infected animals shed large numbers of bacteria in their feces, leading to contamination of feed and water sources.

Dr. Bob Whitlock, University of Pennsylvania and former co-chair of the National Johne's Working Group for 12 years, stresses that the single most significant hazard of maintenance and spread of infection are the subclinical animals—those that have the bacterium but have yet to exhibit clinical signs. As infected animals progress through the disease, shedding of the bacterium increases.

Researchers have found that only five percent of animals progress to the critical stages of the disease—waste away despite a normal appetite—where producers might just say "Hey, she must have Johne's disease." By then, numerous animals in the herd have been infected and may not be reaching their genetic potential, which have a negative influence on a producer's bottom line.

The most common method of infection is fecal-oral: animals, particularly calves under the age of three months ingest the bacteria via manure-contaminated udders, milk, water or feed. If there's fecal material around anywhere, the opportunity for the organism's presence is there—and it's a risk.

Researchers have found that it takes only a tiny bit of contaminated feces to infect herdmates and newborn and young calves. In fact, a calf can become infected from simply sucking on a contaminated teat.

Although *MAP* can replicate only when it is in animals, the bacterium can survive in contaminated soil or water for more than a year. *MAP* is an extremely hardy bacterium and is resistant to heat, cold and drying. One Agricultural Research Service/USDA study shows that *MAP* survives well in biofilms present on livestock watering trough materials.

Q: Can Johne's disease be cured with antibiotics?

A: No.

In the few studies that attempted to treat Johne's

disease with antibiotics, symptoms appeared to subside but animals relapsed after therapy was halted.

As with other mycobacterial infections—such as human tuberculosis, multiple antibiotics must be injected or given orally daily for months. For most animals, this is cost-prohibitive as well as infeasible. For more detailed information visit <http://www.johnes.org/antimicro/index.html>.

Q: How can you prevent your animals from getting Johne's disease?

A: Because Johne's disease usually enters a herd when healthy but infected animals are introduced to a herd, the most effective way to help prevent your animals from getting Johne's disease is to not introduce the bacteria to your herd. Thus, it is wise to purchase animals only from a source herd that has tested negative for Johne's disease.

Second best is to purchase animals only from producers who have tested for Johne's disease, know the level of Johne's disease in his or her herd—or are confident via testing that Johne's disease is not a problem—and follow good infection control practices. In this situation you would be wise to only purchase test-negative animals from test-negative dams.

If animals from test-negative herds are not available, herd additions should be tested before purchasing. Remember that Johne's disease is a herd problem, and that knowing the test-status of numerous adults in the source herd will give you a much better sense of the risk of purchasing an infected animal than the one test result you might get on the one animal you wish to buy.

Evaluating a source herd is not always easy but keeping the infection out of your herd is much less cost and trouble than controlling it once it gets in.

Q: Where can you go for additional information about Johne's disease?

A: Your veterinarian and state Designated Johne's Coordinator (DJC) are great sources of information. The contact information for the state DJC is available online at www.johnesdisease.org and/or is contained in this newsletter. Call today and start learning more about how to prevent and control Johne's disease.

He mentioned to Beasley that he had experienced one two-year-old heifer each year with the same signs—and he couldn't figure out why they were sick.

Beasley had never witnessed a Johne's disease case before.

She hit the books and researched the Internet to find the latest information.

"I learned, among other things, that the fecal culture test was the gold standard test. And that at the time false negative results happened with blood testing," she adds.

Beasley decided on the fecal culture. It came back positive for Johne's disease.

"I made dozens of phone calls, but it was an unheard-of disease in beef cattle," she explains. "We thought it was only a dairy cattle problem."

Breaking the Cycle

To break the cycle, the first thing Beasley had her client do was clean and disinfect his calving pens and corrals. He changed pastures for his yearling heifers and calves first-time heifers in a completely different barn from his older cows. He changed his cattle-buying habits and restocked bulls via private treaty.

"About six months later, I talked to my client and he said he sold all of this calves and replacement heifers and was starting completely over," Beasley says. "He sold everything to a feedlot and was assured they would not be put back in a breeding herd."

Fast forward to the fall of 2009. A new client of Beasley's bought 20 bred, registered and commercial heifers from a purebred breeder. One of the commercial heifers began to deteriorate shortly after the client brought them home.

"She began to 'waste' right in front of his eyes," Beasley says.

The heifer was also nervous and "honky"—the rancher wondered if she'd gotten into locoweed. By the time she calved a few months later, she was "a walking skeleton."

Then the heifer broke with diarrhea.

Beasley discussed the animal with the rancher, and he agreed to test her, but she was out in a pasture with the others at the time.

Of the 20 heifers, one was dry. The day came to take the dry heifer to town, and the rancher decided that rather than mess with the thin, emaciated heifer, he'd haul her to town too—along with her calf.

"The rancher confessed he really didn't want to know what was wrong with the heifer," Beasley says. "They didn't want to know." But he promised to watch and see if any other deteriorated.

Beasley highly suspects it was another case of Johne's disease—but she'll never know.

Tracking this disease is a big challenge—especially when ranchers don't want to deal with the problem.

"Confidentiality is huge with this disease," she says. "No rancher wants anyone to know they've got it."

Beasley adds that compounding the problem is that, by the time diseased cattle are found, the disease had already been passed to others.

Diseased animals are often sold or harvested before clinical signs are apparent, thus keeping the disease at an insidious level in the herd, enabling it to hide even better.

Beasley, who's also a rancher herself, says ranchers continue to look for bargains, buying from sale yards and from people not willing to test their cattle for Johne's disease.

Dr. Bruce Hoffman, DVM, also sees Johne's disease as a growing problem in the beef industry. Hoffman, who lives in Manhattan, Mont., is president of Portland, Oregon-based Animal Profiling International, a USDA-approved Johne's disease (serology) testing laboratory.

"I think there a lot of skinny old cows out there that we should be thinking might have Johne's disease," Hoffman says. "We need to start seriously considering Johne's disease as an element within the beef side of the U.S. cattle industry."

(Reprinted with permission from the American Simmental Association, SimTalk, January 2011)

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