

Johne's Disease – Beef

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

West Virginia Cowman— Johne's Disease Program Participation Leads to Peace of Mind, Value-Added Price

"It's better to know than to not know" is one reason why Bill Grantham of Meadow Green Farm, Kearneysville, W. Va., participates in his state Johne's disease program. Another reason is adding value to the animals that he markets.

"I don't want to knowingly or unknowingly pass along Johne's disease," he states. "As a cowman who sells animals to others, it is my responsibility to not introduce a disease to, or increase the incidence of, a disease on another farm."

Grantham, a commercial cow-calf producer who has 55 head of Angus and black baldie cows, typically sells a majority of his heifers each year to area cattlemen as replacements. He also markets 15 or so steers a year to his cousin who provides ground beef to three area school lunch programs.

"By participating in the state's Johne's disease program, I have a certificate that shows my herd is a test-negative herd. That, plus being a test-negative BVD herd, is good reason to ask for—and receive—the value-added price that I get for my animals," Grantham states.

Grantham began testing for Johne's disease five years ago after attending a program sponsored by area cooperative extension agents. Dr. Jewell Plumley, West Virginia's Designated Johne's Coordinator (DJC), was a speaker and talked about Johne's disease.

"Dr. Plumley made it very clear that Johne's disease was not just a dairy disease but a beef cattle disease as

well," Grantham states.

"After the meeting I started thinking about what she said regarding what it took to participate in the program and why a producer should participate, and followed up with a phone call."

That initial phone call resulted in Grantham setting up meeting at the farm on a day that was convenient for him and Dr. Plumley. The state DJC visited the farm and did a risk assessment. The risk assessment involved a question-and-answer session plus a walk around the farm.

During the discussion session, Grantham answered questions such as where cows are calves, where he buys bulls and replacement stock, etc. He also shared several years of records, showing that he has individual identification for all animals, birthdates, where sold and such.

The discussion session was followed both walking around the farm, with Dr. Plumley observing, asking more questions and taking notes.

"Dr. Plumley wanted to see where the cattle drank and location of the mineral feeders, calving areas and the like," Grantham tells. "She paid attention to everything and then offered suggestions that could reduce the risk of Johne's disease contamination.

"Dr. Plumley was very cognizant that this is a working farm and based her suggestions of this being a working farm. Her suggestions were commonsense things, easy to change and basically just good animal husbandry practices."

Suggested Management Changes

One suggestion offered by Dr. Plumley pertained to the commercial cowman's calving area. This area involved several small hutches that offered calves shelter during extremely bad weather. The size of the hutches allowed the calves to enter but not the cows. And Grantham liked the hutches and knew the value of the hutches.

"Dr. Plumley suggested that I create a 30-foot by 60-foot courtyard in front of the shed area where the cows wouldn't be able to stand and drop manure," Grantham explains. "This area, which has grass about 10 to 12 inches high, would be an area for calves only."

Grantham followed up on this suggestion. He says, in addition to the calves enjoying this area that is less muddy (Continued page 2)



Commercial cowman Bill Grantham of West Virginia says he is reaping the benefits of being a Johne's test negative herd.



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Virginia Cowman *(cont.)*

during wet times, the calves have a place to be that is not a cow-manured area. In the end, possible manure contamination from the cows has been significantly reduced.

A bonus from creating this area, Grantham states, is that his scour challenges have been significantly reduced.

Another suggestion made by Dr. Plumley was for Grantham to move his mineral feeder to the other side of the field, away from the water source. This, she said, would allow the area to not be so congested.

"Another easy fix," Grantham states.

Grantham simply put the mineral feeder on a tractor loader and moved it to the suggested spot. Thanks to this move, the cattle are kept on the move and no longer

congregate in just one area in the field. With the cows not congregating in one place, manure build up is not the problem it once was.

In addition to having a Johne's disease risk assessment, Grantham had his herd tested for Johne's disease.

The fall of that year, on his standard fall work day, a qualified person sent by Dr. Plumley was on hand and took blood samples as the cows went down the chute.

When blood tests showed that three cows were questionable, Grantham put the three cows down the chute a second time so fecal samples could be taken.

"Each of the three fecal samples came back negative, and we were very relieved," Grantham states.

Fecal samples were taken the following year, and all came back negative.

"We have a certificate that shows that we are a test-negative herd," Grantham states. "And, because I don't want to introduce Johne's disease to the herd, any bull brought onto this farm is from a test negative herd."

"I even had one bull source start testing for Johne's disease because of this practice. I think it's just good business for all bull and heifer suppliers to test for Johne's disease so buyers know if they are buying bulls and/or replacement heifers from a low-risk herd."

Grantham underscores the fact that participating in the education component and/or management component of a state Johne's disease prevention and control program is quite easy. And, he says, it doesn't take a lot of extra work to participate.

"Everything centers around common sense questions and risk assessment," he states, "And the veterinarian testing our cows for Johne's disease came when it was convenient for us. Our chute work and day was not slowed down one iota."

In addition to knowing that he will not be one responsible for introducing Johne's disease to customers' herd, Grantham says he likes the value-added piece that comes from participating in his state's Johne's disease prevention and control program.

"Word has gotten around, and the replacement heifers that will be ready to sell next fall are already spoken for—and at a nice value-added price for me," Grantham summarizes. "The buyers really like the fact that the heifers are from a Johne's disease tested herd."

Food for Thought

"To reduce the chance of infection with Johne's disease, breeding should be by artificial insemination or with bulls which are confirmed negative for Johne's disease."

— *Doug Weaver, College of Veterinary Medicine, University of Missouri*

"The problem with controlling the spread of Johne's disease is that we can't efficiently identify the carrier animals before they show signs of weight loss or diarrhea. Therefore, you must avoid introducing animals into your herd from unknown sources, such as leasing bulls, purchasing dairy cattle (which have a higher incidence of Johne's disease than beef cattle) for nurse cows, fertilizing pastures with manure from other herds (particularly dairy herds) or other practices that would expose calves to manure from potential Johne's carrier cattle. Preventing Johne's disease introduction is particularly important because elimination of the disease from a herd can be very difficult."

— *John Maas, Extension Veterinarian, School of Veterinary Medicine, University of California-Davis*

"Purchasing properly processed embryos for embryo transfer into recipients in your Johne's negative herd is not considered to present a high risk for Johne's. However, be extremely cautious purchasing female recipients for use in an embryo transfer program. Often, these females come from multiple, unknown sources and may introduce Johne's disease into the herd or infect the fetus."

— *Bill Epperson, Extension Veterinarian, South Dakota State University, Veterinary Medicine Department and Animal Disease Research and Diagnostic Laboratory*

To learn more about Johne's disease prevention and control, please contact your state Designated Johne's Coordinator. A list of state DJCs is available online at www.johnesdisease.org.

Johne's Disease Research Underway

Scientists at the Agricultural Research Service's National Animal Disease Center (NADC) have a professional mission: To find a better way to detect Johne's disease-infected animals early on.

"MAP (*Mycobacterium avium* subspecies *paratuberculosis*) is like a stealth organism," states NADC microbiologist Judy Stabel. "It shelters in the host's white blood cells and stays at low levels until stress makes the disease apparent. And it's one of the hardest organisms to work with in the field."

Since the MAP genome—which contains all its genes—has been sequenced, researchers have information about the different proteins that comprise those genes.

From an array of 96 proteins, three proteins that consistently drew the strongest attacks from serum antibodies—a level of immune response that clearly linked the three proteins with the onset of Johne's disease—have been identified. NADC researchers continue to focus on these proteins, noting that the segment might provide crucial building blocks for development of a diagnostic tool for Johne's disease.

"This protein array is the only one like it in the world," states NADC researcher John Bannantine. "Because we've been so careful in selecting the MAP proteins for our array, we're confident that the antibodies are responding to MAP proteins—not similar proteins produced by another *Mycobacterium* species."

NADC studies have also cleared up another aspect of MAP infection.

"When an animal is first infected, there is a cell-mediated response to the bacterium," he explains. "We thought that another type of immune response—the one that produces antibodies—developed much later. But, in experimentally infected animals, we can use this array to detect exposure to MAP as early as 70 days after the animal is infected—much earlier than previously reported in field studies."

The next step in the research is to determine if these early-detected antigens are recognized by infected cattle in the real world.

"We also need to determine the extent of cross-reactivity these proteins have with other environmental mycobacteria, because one problem with some Johne's disease tests is the lack of specificity," Bannantine states.

Stabel has been studying more about the early stages of the cell-mediated response to MAP and finding ways to diagnose the disease in young animals.

"We've found a way to use information about the cell-mediated response to detect MAP in naturally infected calves that are only 6 months old," she says. "When animal this young are diagnosed, then the producer can decide how best to respond—either by

removing the animal from the herd or looking at other options."

Animal models for MAP research have been developed and are being evaluated, with a smaller ruminant model—for goats or sheep—showing promise.

"But then these animals are slightly quicker to reach a clinical disease state," she interjects.

Research Project: Genomic and Immunological Characteristics of Johne's Disease

Start Date: Nov. 07, 2006

End Date: Nov. 06, 2011

Objectives:

Objective 1: Systematically identify and characterize novel and specific antigens from the *M. paratuberculosis* genome sequence project.

Objective 2: Determine the genetic variability among *M. paratuberculosis* isolates and examine the transcriptional profile of the *M. paratuberculosis* genome.

Objective 3: Develop and evaluate methods to evaluate the host immune responses to *M. paratuberculosis* in early and late infection to distinguish elements of protective immunity.

Objective 4: Evaluate the sensitivity and specificity of cell-mediated diagnostic tests in sheep and cattle for early detection of *M. paratuberculosis* infection.

Approach:

Within Objective 1, unique antigens of *M. paratuberculosis* will be evaluated as immunogens with particular emphasis on their utility as diagnostic reagents or vaccine candidates.

Objective 2 will compare and contrast the genetic content of various strains of *M. paratuberculosis*, both within and between species of animals to provide information on the characteristics of infectivity and pathogenicity for different strains.

The host immune response to *M. paratuberculosis* infection will be evaluated in Objective 3 in both experimentally and naturally infected animals to gain an understanding of how the disease progresses from a subclinical to a more clinical state.

Objective 4 will examine the efficacy of skin testing and a blood assay for the early detection of disease in naturally infected and non-infected cattle and sheep.

New Johne's Disease Q&A Brochure FREE, Packed with Info

Beef producers who have culled one or more animals for unresponsive chronic diarrhea combined with reduced milk production and thin condition might want to learn more about Johne's disease—and find out if their herds are infected with Johne's disease. A good source of information about Johne's disease is a recently released 16-page brochure that is free to beef producers and veterinarians.

The new brochure describes how animals become infected with the organism that causes Johne's disease, details measures producers can take to help prevent and control Johne's disease and explains herd testing strategies. The brochure, which is underwritten by USDA-APHIS-VS and produced by the National Johne's Education Initiative overseen by the National Institute for Animal Agriculture, is science based and written in producer language.

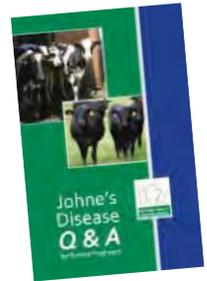
"Johne's disease is a slow and progressive bacterial disease of the intestinal tract that affects ruminants and is caused by the bacterium *Mycobacterium avium paratuberculosis*," states Dr. Michael Carter, National Johne's Disease Control Program Coordinator, National Center for Animal Health Programs, USDA-APHIS-VS. "It causes significant economic loss for producers whose animals have the disease, and the goal of every producer

should be to prevent getting it on their farm if they don't have it or control the disease to reduce the economic impact in herds with the disease."

Johne's disease is estimated to be present in eight out of 100 U.S. beef herds. Beef cows clinically infected with Johne's disease produce less milk resulting in lighter calves at weaning, and infected cows can be slower to breed back.

Johne's experts agree that the incidence of Johne's in beef herds can be reduced significantly when producers know about Johne's disease and implement measures—including testing—to control the disease-causing organism.

To learn more about Johne's disease or to obtain your free copy of the new 16-page Johne's disease question-and-answer brochure, go to www.johnesdisease.org or call the National Institute for Animal Agriculture at (719) 538-8843.



Check out this brochure online at www.animalagriculture.org. Just click on the "Johne's Initiative" tab at the top of the web page.

Free Online Course for Producers Takes Just 60 Minutes or Less

To help beef producers understand Johne's disease and become acquainted with preventive measures, an online course has been developed specifically for beef producers. Underwritten by a grant from USDA and developed by the University of Wisconsin-Madison School of Veterinary Medicine, the online course covers the causes of Johne's disease, how Johne's disease spreads, how to prevent Johne's disease from entering your herd, how to test for Johne's disease and management practices to use to control infections. The course also explains how the Voluntary Bovine Johne's Disease Control Program works and how producers can participate in the national program.

"Each course is free to producers," states Dr. Elisabeth Patton, Designated Johne's Coordinator for Wisconsin and co-chair of the Committee on Johne's Disease, U.S. Animal Health Association. "Plus, producers can complete their respective module in less than 60 minutes."

Taking the Johne's disease online course involves six simple steps. The first five steps take about five minutes to complete. The final step—going through the course—will involve about 30-45 minutes.

Step #1: Go to the University of Wisconsin School of Veterinary Medicine web site, www.vetmedce.org, where

you'll see the home page titled "Veterinary Continuing Education." Once at this page, click on "Courses" written in red at the lower left of the page.

Step #2: Once at the "Courses" web page, click on "Johne's Disease" located in the left-hand column.

Step #3: A new web page will appear. On this page, click on "Johne's Disease Courses for Producers."

Step #4: You're now at a new web page that lists the six Johne's disease courses, and you need to simply click on the "Beef Producer" course title.

Step #5: Once at your species page, a list of what you'll learn is listed along with other relevant information.

Step #6: Begin your species-specific course. Producers wanting a certificate of course completion are asked to register before taking the course, and will be required to take a quiz after they watch and listen to the presentation.

The beef producer online module is like sitting in a classroom, only you're sitting at your computer. Two speakers share information, and information is shown on slides.

"If you have a computer, then you can add to your knowledge base about Johne's disease," Dr. Patton states "What a great investment of a producer's time."