NATIONAL JOHNE'S DISEASE EDUCATION INITIATIVE

Johne's Disease – Beef

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The Unknown can have Costly Consequences

The following story is true, but the names of owners and breeds have been changed to protect the innocent.

Willy Williams was an avid Angus breeder. His herd was closed, and he had been using artificial insemination to improve the genetics of his herd for many years.

One year Willy decided to buy two of the best cows he could find. The president of the regional Angus association, Amy Albert, was having a sale, and she had some of the best Angus genetics around.

Willy paid $6,000 each for five bred heifers: ear tags #21, 5, 18, 33 and 89. The newly purchased cattle were added to Willy's resident herd in December, and in the spring all had lovely healthy calves.

Three months after calving, Female #21 appeared thinner than the rest of the herd, and her manure was somewhat loose.

The herd was on a good parasite prevention program, but the herd veterinarian did a check for parasites on a fecal sample from Female #21 anyway. The parasite check was negative.

Considering other possible causes of weight loss and diarrhea in adult cattle, the veterinarian next drew a blood sample and submitted it for Johne's disease testing by ELISA. The result came back a week later: "Strong positive; S/P = 0.90".

Several pressing questions arose at this point:

- Is the diagnosis correct?
- Should the diagnosis be confirmed?
- How can the diagnosis be confirmed?
- What does Willy do with Female #21 and her calf while waiting for diagnosis confirmation if this is what he elects to do?

Four months later a laboratory report came back that *M. paratuberculosis* was isolated from a fecal sample taken from Female #21.

Now, more questions arise:

- Has the infection spread to other cattle or calves in the same pasture?
- How can the pasture be cleaned up?
- Are the other cattle purchased from Amy also likely to have Johne's disease?
- Can Willy safely sell cattle to others?
- Does Willy have to tell prospective buyers that Johne's disease has been diagnosed in his herd?
- Did Amy know Johne's disease was in her herd before selling these heifers?
- Did the bill of sale say anything about the health status of the cattle?
- Was Willy certain the infection was not in his herd before purchase of these heifers and does he have laboratory proof of this?
- Is Amy responsible for the value of #21 and her calf?
- Is Amy responsible for costs to control Johne's disease in Willy's herd?
- If Amy does not offer to compensate Willy, where does Willy go to find a lawyer who knows about Johne's disease?

This type of story happens all the time. Sometimes it can lead to litigation. More often it just causes either a headache, a heartache or both.

Editor's Note: Take precautions by following the "Lessons Learned." Because registered cattle breeders—as well as commercial cow-calf producers—have a lot at stake, it's wise to practice good biosecurity to protect your investment. Introduction of a chronic, infectious, untreatable disease like Johne's disease to your herd can have devastating consequences.

Borrowed from *www.johnes.org,* content by Dr. Michael Collins and Dr. Elizabeth Manning, University of Wisconsin.

Lessons Learned:

✓ Test your own herd annually to verify its Johne's disease status.

✓ BE A SMART BUYER. Always ask for Johne's disease test results on the herd from which you plan to purchase cattle.

✓ Quarantine purchased cattle until you can get one or more Johne's disease tests done. Ideally purchased animals should be tested by both ELISA and fecal culture.

USDA

This e-newsletter is brought to you by the National Johne's Disease Educational Initiative funded by USDA/APHIS/VS and managed by the National Institute for Animal Agriculture. Editor: Teres Lambert. To learn more about Johne's, visit ***www.johnesdisease.org***.

NATIONAL INSTITUTE FOR ANIMAL AGRICULTURE

Veterinarian-Beef Producer Handbooks Updated, Available Online

Beef producers and their veterinarians who want to help prevent or control Johne's disease in their herds often ask where they should start with the process. The answer: Begin by conducting an on-farm risk assessment, then develop and follow a management plan specific to a farm or ranch.

The recently updated handbooks—"Handbook for Veterinarians and Beef Producers—A guide to Johne's disease risk assessments and management plans for beef herds, 2011 edition" and "How to do Risk Assessments and Develop Management Plans for Johne's Disease"—are available for beef producers and their veterinarians who are serious about addressing Johne's disease and stopping the financial drain of this devastating disease. This fourth edition of the handbooks reflect the USDA's updated Program Standards for the Voluntary Bovine Johne's Disease Control Program and are significantly more user friendly.

"The team in charge of developing the 2011 edition of the handbooks brainstormed long and hard to develop easy-to-comprehend and easy-to-complete information and forms, and I think all three handbooks are home runs," states Dr. Elisabeth Patton, chairman of U.S. Animal Health Association's Johne's Disease Committee.

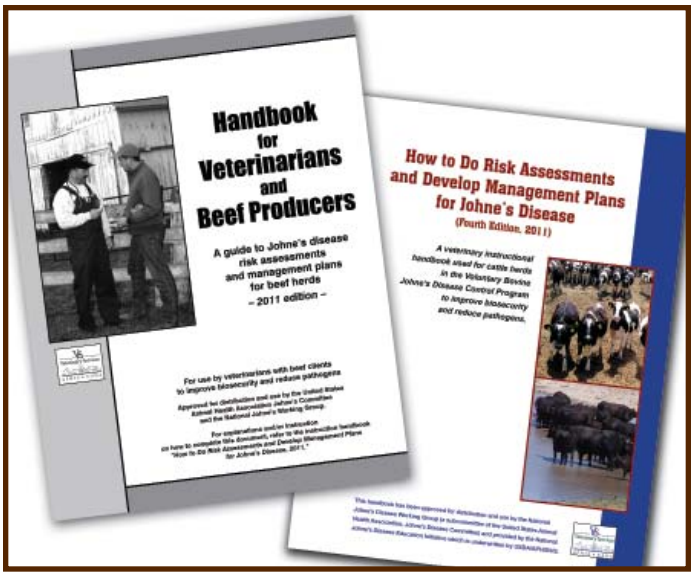
Patton explains that the handbooks are for use by veterinarians with beef clients to improve biosecurity and reduce pathogens, particularly *Mycobacterium avium* subspecies *paratuberculosis* or *MAP,* the bacteria known to cause Johne's disease. The 'how to do risk assessments and develop management plans' handbook is a companion piece to the other two.

"Together the handbooks are a veterinarian's manual to help beef producers reduce or prevent Johne's disease in their herds," Patton adds. "That said, many of the management practices developed to address Johne's disease should help reduce the presence of other pathogens as well."

The "Handbook for Veterinarians and Beef Producers" has just eight pages: one page for recording "current herd health status and concerns" and six pages dedicated to risk assessment and management recommendations related to calving area, nursing calves, weaned heifers and bulls, bred heifers and yearling bulls, cows and bulls, and replacements and additions.

The 23-page "How to do Risk Assessments and Develop Management Plans for Johne's Disease" goes more in depth and covers seven key steps to helps reduce or prevent Johne's disease.

Step 1— collect information on current herd health status and production



When a beef producer teams with a veterinarian to complete these two handbooks, significant progress can be achieved toward the prevention and control of Johne's disease. Yes, an investment of one day can reap big rewards!

Step 2— Collect history, owner goals and biosecurity data and estimate Johne's disease prevalence

Step 3— Assess risks for transmitting Johne's disease among specific animal groups, with descriptive guidelines for scoring risk factors for dairy herds or beef herds

Step 4— Consider how Johne's disease management efforts will benefit and integrate with other health and performance issues

Step 5— Select critical management practices to include in the management plan

Step 6— Build the elements of a testing strategy

Step 7— Do a reality check. Will the plan work? Plan to monitor it.

The Fourth Edition, 2011, of the handbooks are a collaborative effort of the National Johne's Disease Education Initiative, the Johne's Disease Committee of the United States Animal Health Association (USAHA), the National Johne's Working Group and the USDA's Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS).

PDFs of the beef veterinarian handbook and the "How to do Risk Assessments and Develop Management Plans for Johne's Disease" are online at *www.johnes.org,* along with the Veterinarian and Dairy Producer handbook. Please contact your State Designated Johne's Disease Coordinator for specific information related to your state.

Research Update

New Antibody Specific for MAP Developed

When trying to identify a specific bacterium as the cause for disease symptoms, researchers have been known to get false positive results from cross-reactivity. Such has been the case of any antibody used to detect *Mycobacterium avium* subsp. *paratuberculosis (MAP)* that was known to react with its close relatives the *M. avium* subspecies member including *silvaticum, hominissuis* and *avium.*

But this situation is about to change.

After years of work, researchers at the USDA's National Animal Disease Center have produced a monoclonal antibody that specifically binds to only MAP strains.

"When the antibody was checked for specificity, the results were astounding," states John Bannantine, a research microbiologist at NADC.

The resulting data was so impressive that USDA was recently awarded a U.S. patent for this antibody.

Bannantine adds, however, that trying to find the protein that the antibody binds to led him "on a wild goose chase." He said he initially thought that the antibody reacted with a protein encoded by a gene that was not originally identified in the *MAP* K-10 genome, a genome sequenced by Bannantine and Vivek Kapur at Penn State University back in the early 2000s.

"I was surprised at finding this new putative gene because I thought we were pretty thorough when K-10 was annotated," Bannantine states.

When pieces of data didn't add up, Bannantine kept digging and turned to Srinand Sreevatsan, University of Minnesota. Bannantine was confident that Sreevatsan would help out as both are members of the Johne's Disease Integrated Program, (JDIP) a comprehensive consortium of scientists whose mission is to promote animal biosecurity through the development and support of projects that are designed specifically to enhance knowledge, promote education, develop real-world solutions and mitigate losses associated with Johne's disease.

"He's been great to work with," Bannantine states. "This has been a real strength of the whole JDIP program. . .being able to call on other researchers within the program for help."

It turns out the gene "missed" by annotation in the K-10 genome was not a real gene after all but an epitope that mimicked a similar epitope in a real gene that is annotated in K-10. With this discovery, all pieces of data now fit like a glove. The only remaining question: Why is the antibody so exquisitely specific?

Editor's Note: Funding for JDIP is provided by USDA through competitive award number 2008-55620-18710 from the Animal Biosecurity program of USDA-CSREES National Research Initiative.

APHIS-JDIP Vaccine Project

Developing a more effective vaccine to help prevent Johne's disease is another project undertaken by the Johne's Disease Integrated Program (JDIP). Sponsored in part by USDA/APHIS/VS, the JDIP Vaccine Project has completed the first two phases of the project. The five mutants showing the best protection from challenge have now moved forward into the final phase of the vaccine project.

Phase III is the goat model being conducted in the lab of Dr. Murray Hines II at the University of Georgia. A total of 80 goat kids are being used in five test and three control groups. Results of this work will be available next fall.

Seven Research, Education, Extension Projects Funded

The Johne's Disease Integrated Program annually provides competitive awards for meritorious research, education and extension projects addressing Johne's disease. This year 15 proposals with requested funding of $1.23 million were received.

After rigorous peer review, seven proposals were approved for funding:

- *MAP* interaction with intestinal mucosa—Luiz Bermudez, Oregon State University
- *MAP* inhibition of macrophage apoptosis: A key immune evasion tactic—Paul Coussens, Michigan State University
- Clinical trials in Johne's disease control: Heat treatment of colostrum and maternity pen management—Sandra Godden, University of Minnesota
- Epidemiology and biostatistics core—Yrjo Grohn, Cornell University
- Education and outreach—Jeannette McDonald, University of Wisconsin
- Defining the characteristics of sporulation in *MAP*—Srinand Sreevatsan, University of Minnesota

Editor's Note: These projects are funded in full or in part by USDA.

For information about Johne's disease, contact your Designated Johne's Coordinator Donald Evans, *Donald.E.Evans@aphis.usda.gov*, **Ph (785) 270-1305 or your Beef Quality Assurance Coordinator Clayton Huseman,** *clayton@kla.org*, **Ph (785) 273-5115.**