

Johne's Disease Control

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Introduction

Johne's disease is caused by the bacteria *Mycobacterium avium paratuberculosis* (MAP). The disease infects ruminants worldwide and causes a chronic, thickening of the gut that leads to chronic diarrhea and weight loss. This occurs despite a good appetite and a high plane of nutrition. There is no known cure for the disease and it is eventually fatal. As the disease progresses in an infected animal, the organism can be found in the cow's colostrum and milk. Thus, preweaned calves nursing infected cows in advanced stages of the disease are at increased risk of infection. Despite this, the disease is usually transmitted to calves during the first few months of life through ingestion of the organism via manure-contaminated teats, feed, or water sources.

Once the calf becomes infected, there is a long incubation period before the animal shows any clinical signs of Johne's disease. Typically, infected cattle will be two to five years of age before showing any evidence of diarrhea or weight loss. Current diagnostic tests are not sensitive enough to detect infected cattle during the early stages of the disease. Herds generally become infected by adding purchased cattle that appear to be healthy but are infected with the disease. Once a herd becomes infected, control of the disease requires implementation of a farm specific herd plan that focuses on reducing the likelihood of transmission from infected adults to young stock.

Many studies have been done worldwide to estimate the prevalence of infection in ruminants. The prevalence appears to be on the rise. In an early study in the USA, 7,450 culled, clinically normal cattle in slaughterhouses in 37 states from 1983 to 1984 indicated an apparent prevalence of 2.9% in dairy cattle and 0.8% in beef cattle, with an overall

prevalence of 1.6%. In Florida, a 1986-1987 survey indicated a prevalence of 8.6% in beef cattle and 17.1% in dairy cattle. An examination of data from the Florida State Veterinary Diagnostic Laboratory and USDA-APHIS statewide submissions of specimens submitted for Johne's testing from 1999-2001 (32,011 cattle - 25,561 dairy, 6,450 beef cattle) showed a prevalence in Florida cattle of 6.5%. Of the 75 herds tested, 62 herds (82.7%) had at least one test positive animal in the herd. These results warrant our consideration of Johne's disease as an important disease in the state today.

Prevention and Control of Johne's Disease in Beef Cattle

Many animals in the early stages of Johne's disease may not be noticed. Therefore, this disease becomes a herd problem. Johne's disease can be prevented, controlled, and even eliminated from infected herds, based on a thorough understanding of the disease. Half-hearted attempts to prevent or control Johne's disease will generally fail. Once a herd becomes infected, control of Johne's disease takes time and requires development of a individual herd management plan. Herd management plans are developed based upon the results of a herd risk assessment, which specifically targets those high risk areas for Johne's disease transmission on that particular farm or ranch. Usually, the infection has been spreading through the herd for a number of years before clinical cases are noticed. Control of the disease may take five years or longer. Faster control programs are possible but are usually more expensive to implement. Prevention is cheaper than control.

Prevention

Prevention should be the goal of every ranch and

farm that is currently free of the disease. It is encouraging to note that Johne's disease management practices focus on manure management and protection of calves from exposure to manure from adult cattle. Those same management practices will also reduce the risk for other important cattle diseases as well. Several viral, bacterial, and parasitic intestinal diseases that affect beef cattle are also transmitted from infected animals shedding the pathogen in the manure. A list of these pathogens or diseases include the calf scour microbes like BVD, Corona, and Rota viruses, *E. coli*, and Salmonella bacteria, the intestinal parasites Coccidia and Cryptosporidia, and intestinal worms transmitted through manure.

The basics of prevention are straightforward. Maintain a closed herd if possible. Animal additions or replacements should come from Johne's-free or Johne's test-negative herds. In herds where infection is already present, additional steps are required for control. These include manure management, colostrum or milk management, identification of infected animals and their removal or separation from the herd, and culling offspring of known infected mothers. What specific prevention practices are suggested?

- Prevent infections by closing the herd or securing additions from Johne's-free or Johne's test-negative herds.
- Purchase replacements from a herd that has individual cow/calf records, good management practices, and is currently herd-test-negative.
- Purchase replacements from a herd that has had no evidence of Johne's disease for five years as a second choice.

What Specific Control Practices are Suggested?

Control of Johne's disease is a long-term process requiring commitment, education, and development of a sound Johne's Herd Management Plan with your veterinarian and state or federal animal health officials. Best Management Practices for Johne's disease control include:

1. Manure Management.

- Reduce infections by treating all manure as if it were infected with Johne's disease.

- Maintain high standards of cleanliness for animal handling during calving periods.
- Avoid build-up of manure and contaminated mud in pastures and corrals where animals are kept.
- Clean feeders and water troughs to keep them free of manure contamination.

2. Calves should be born in a clean environment with minimal fecal contamination.

- Avoid crowded calving areas.
- Segregate cow/calf pairs from the remainder of the herd as quickly as possible. Place cow/calf pairs into clean uncrowded pastures.
- Isolate replacement heifers from adult cattle and runoff from adult cattle, weaning through first calving.
- Avoid manure contamination of feed by using feed bunks, hayracks, and not using the same equipment to handle feed and move manure.
- Avoid manure contamination of water sources where animals drink. Provide clean water sources not utilized by adult cattle for replacement animals.
- For maximum risk reduction, infected pastures could be tilled or grazed by non-replacement, feeder-cattle until environmental conditions destroy the microbe.

3. Reduce infections in calves by colostrum management.

- Clean dam's udder and teats following any assisted births.
- If newborn calves need colostrum supplement, use it from Johne's-negative dams.
- Thoroughly clean the udder and teats before collection of the colostrum to avoid manure contamination.

4. Reduce infection spread by testing and removing infected animals and their calves.

- Test according to your individual Johne's Herd Management Plan. Consult with your private veterinarian or state or federal district veterinarian for decisions on how best to use and interpret tests used for diagnosis of Johne's disease.
- Use a test-certified diagnostic laboratory for running your tests.
- Identify all females and their daughters remaining in the herd.

- Remove, or keep separate and manage, animals testing Positive or Strong Positive on the Johne's ELISA test.
- Strongly consider culling all cattle that test Strong Positive on the ELISA test or have positive fecal culture for Johne's disease.
- Prevent infection spread by culling, or separating, offspring of infected mothers.

Some Johne's Disease Prevention or Control Plan Options for Beef Herds

1. Make Management changes only

These management practices are essential for the success of other program options. This is why development of an Individual Johne's Herd Management Plan with your veterinarian is so critical. Reduce the risk to calves by separating new cow/calves pairs from the rest of the herd when possible after birth. Avoid the spread of disease through fecal contamination by using elevated feeding troughs, hay racks, and water troughs. Other management changes should include at least four steps:

- immediate isolation of any scouring or unthrifty animals;
- taking samples to diagnose the cause;
- culling of any animal with diarrhea that is unresponsive to treatment and of an unknown cause;
- culling offspring of infected cattle.

Further management recommendations are to restrict access of susceptible young stock to high-risk areas (including swamps and ponds) where infected animals are known or suspected to have been recently. To buy time to clear heavily contaminated pastures, graze non-breeding stock on these high-risk areas and sell these feeder cattle less than 12 months of age only through slaughter channels. Finally, keep a closed herd or purchase only from test-negative herds.

A management-only choice is generally more affordable than other plans using more aggressive testing strategies for Johne's disease control. Management changes alone should reduce the load of infection in the herd and the incidence of clinical cases over time. In herds with low risk and low prevalence, good management alone may totally eliminate Johne's

disease from the herd.

A disadvantage to the management-only option may be that costs will not always be evident. These methods are not likely to work in heavily infected herds. For best results, this management only option must become a permanent part the operation. One final note: if the prevalence of infection in the herd is not known, an initial screening test of 30 randomly selected cows three years of age and older is advised to establish a baseline disease prevalence in the herd.

2. Management Plus Testing

This option requires adoption of the improved management practices described above. Testing for Johne's disease is an added tool to help control the disease faster than would otherwise be possible using management alone. Testing should be conducted according to the specific goals and objectives which should be outlined in your Johne's Herd Management Plan. Several testing strategies can be used such as targeted testing of specific groups, high risk animals, or animals exhibiting clinical signs of Johne's disease. Annual whole herd blood testing can be useful for monitoring the test results of individual cattle in the herd over time. Confirmed culture positive cattle and their offspring should be immediately isolated and/or sold through feeder/slaughter channels. In herds with a low prevalence of infection, an ELISA-positive test result should be confirmed with a fecal culture test or with appropriate samples collected at slaughter. This approach permits assessment of the herd status, identification of high-risk groups, and monitoring of progress.

An advantage of this approach is the ability to have an objective assessment of herd status for the purpose of selling breeding stock. Managed well, there will likely be a quick reduction in infection and clinical disease, allowing rapid progress toward a test-negative status. A disadvantage may be the cost associated with testing and culling reactors. Further, since some infected cattle will not be detected by the diagnostic tests early in their disease course, this option requires a long term commitment.

Expected outcomes of management plus testing include more rapid reduction in the prevalence of the

disease and a decrease of environmental loads of Johne's microbes. This option will assist eliminating infection from most herds. The management plus test approach is an option for seed-stock herds and commercial beef herds selling breeding stock.

3. Partial depopulation

This option requires sending high-risk groups of livestock and any other cull cattle to slaughter only. Cull normally and sell all home-bred cattle through feeder or slaughter channels only. The operator must buy replacement cattle from test-negative herds. Another option is to obtain a written statement from both the herd owner and the veterinarian that, to the best of their knowledge, Johne's disease has not been in the herd for the past five years. Long-term considerations suggest that management should progressively create low-risk pastures, i.e., grazing high risk pastures with low-risk terminal stock. Manage the herd as described above, emphasizing: animal identification, record-keeping, whole-farm planning, and risk assessment of operation. This is best accomplished in cooperation with the herd veterinarian or state-federal district veterinarian.

This option generally incurs lower costs as compared with other options and, with good management skills and effective planning, will improve the prospects for overall success. One disadvantage is that low-risk replacement stock may not be identifiable or available for purchase until test negative herd status programs are more widely used. However, using this option to eliminate infection may still be possible in most herds. This may be an option for a beef herd where high-risk groups are well defined.

4. Two-herd program

This option requires producers establish distinct herds of cattle, rearing calves born to test negative cows in a herd separate from test positive or high-risk cattle. The test positive herd is gradually depopulated over time by selling all calves for feeder purposes only and all adult cattle for slaughter only. Restocking occurs after an appropriate time lapse. Maintaining biosecurity precautions between the two locations is essential.

This option may be used with other options as well. It may also provide an excellent means of saving

family lines of high genetic merit. As a caution, it should be noted that some infected cows will test negative and a small percent of calves from these cows may have become infected before birth. Therefore, annual testing of the negative herd is indicated to identify cattle that become positive on the test over time. Currently, there are no tests commercially available that detect light infection in animals less than a year old.

5. Embryo transfer

There is minimal risk of embryos being contaminated. As a precaution, it is recommended to use embryos from Johne's-negative dams; however, embryos from infected dams may also be harvested with limited risk. Regardless, all embryos must be implanted in uninfected recipients. This option provides a means of saving family lines of high genetic merit. Success will depend on risk and disease freedom of recipients.

Developing a Specific Plan for Prevention or Control of Johne's Disease in Cattle Herds

Herd owners and managers must have a long-term commitment to preventing or controlling Johne's disease in their herd. If they are to be successful, some thorough, well-designed plan needs to be fully integrated into management practices. In herds currently free of Johne's disease, the sooner a prevention plan is put to use, the better the chance is for maintaining a free status. For most low-risk, low-prevalence herds, the best time to start a control plan is now. The longer the delay the more difficult and expensive control becomes.

Development of Johne's Herd Management Plans should take into consideration the operations long-term goals and the desires and capabilities of herd owners, managers, and others working on the operation. Half-hearted herd plans will be prone to fail due to a noncompliance thus allowing continued disease transmission within the herd. Remember that preventing or controlling Johne's disease can enhance herd protection from other diseases. Management actions designed to prevent or control Johne's disease, are simply good management practices that will be

effective against other intestinal diseases as well.

Steps to Develop a Farm- or Ranch-Specific Program

Your herd veterinarian or State / Federal district veterinarian can help you develop a specific program tailored to your operation. The following steps provide a practical Johne's disease prevention or control plan:

1. Assess your current and long-term goals of the operation.
2. Know your herds' history for probable Johne's disease risk or prevalence.
3. Estimate the prevalence of Johne's disease in the herd.
4. Identify ranch-specific risks for spreading the disease.
5. Examine various options to manage these risks, including costs and benefits.
6. Consider diagnostic and herd testing strategies.
7. Define your objectives to control or eliminate the disease and time to accomplish.
8. Tailor the program around the long-term goals, management capabilities, and the commitment of your personnel to implement and carry out the Johne's Herd Management Plan.
9. Monitor progress and success of the plan by annual assessment and reevaluation of the plan.

What else can you do in developing a whole-ranch plan:

- Become familiar with current information about Johne's disease to thoroughly understand the disease and how it spreads.
- Be aware of the risks associated with different management practices.
- Learn about state law and requirements regarding Johne's disease.
- Have realistic goals and expectations. Different control options have different outcomes and the plan's success depends largely on the exactness with which control options are applied in the herd.
- Know that Johne's disease prevention, control, or elimination is a long-term commitment. The longer time the infection has been allowed to spread in the herd, the more difficult and time consuming it will be to control or eliminate the disease.
- Keep a written copy of the Johne's Herd Management Plan. Prevention, control, and elimination is a long-term commitment. applied in the herd. e positive on the test following and review it often to ensure you're on track with implementing the plan. Review and update the plan annually with your veterinarian.

The most appropriate strategy depends on the type of enterprise (commercial cow/calf, purebred, seed stock) herd objectives and the commitment of the herd owner. These factors determine the outcomes, chance of success, and cost-benefit of different control strategies.

For more information about Johne's disease, readers are referred to the following website from the United States Animal Health Association, National Johne's Working Group (NJWG), Subcommittee on Education: <http://www.usaha.org/njwg/jdbeefm.html>.

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