

Bovine Paratuberculosis of Dairy Cattle

A wasting condition, commonly called Johne's disease



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Paratuberculosis or Johne's (pronounced "Yo-nees") disease is a chronic intestinal infection of cattle. The disease, infectious in both domestic and exotic ruminants, is caused by the bacterium *Mycobacterium paratuberculosis*. The disease is named after Dr. Heinrich A. Johne, a German veterinarian who first described the disease in a dairy cow in 1895.

Johne's disease is increasingly recognized clinically in beef and dairy herds in the United States. Each year in the U.S., economic losses to the livestock industry exceed \$1.5 billion. A 1996 national survey of 31,745 dairy cows from 967 herds showed 2.6 percent of the cows and 21.6 percent of the herds tested positive to blood tests for paratuberculosis infection. Positive herds with more than 10 percent of cull cows showing clinical signs of Johne's disease suffered economic losses of \$227 per cow annually.

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Transmission of bacteria

Bacteria can be passed to a cow's unborn fetus and excreted in the feces and milk of infected adult cattle. Transmission to calves can occur before birth, or as a result of nursing infected dams, or from ingesting contaminated fecal material on teats and hair, in feed and water. Newborn calves less than 30 days of age are the most susceptible to bacterial infection. As calves increase in age, they become less susceptible, or more resistant, to infection.

In an infected calf, bacteria invade the lining of the intestine where they multiply slowly for 2 or more years as a subclinical disease. Bacteria can be shed in feces and milk of infected cattle before they develop clinical signs, which makes subclinical cattle an important source of infection. Clinical signs of disease occur only in adult cattle and are often associated with some form of stress, such as calving or crowding. Clinical cattle spread the disease through feces, which is most dangerous to the herd. Cattle can shed bacterial organisms as long as 18 months after developing clinical signs. The bacteria do not multiply

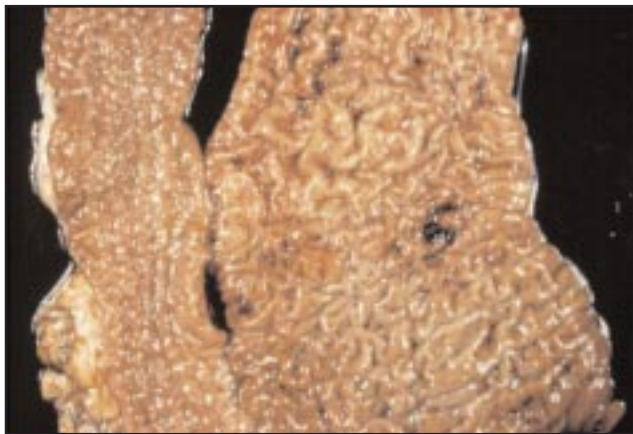
in the environment, but can survive in the soil and water for more than a year because of resistance to heat, cold and drying.



Newborn calves are exposed to contaminated milk and feces.

Effects of the disease

Bovine paratuberculosis is a wasting disease. In adult cattle, the bacteria cause enteritis, an inflammation of the small intestine that becomes thickened and corrugated. Poor absorption of nutrients occurs and watery diarrhea develops. Even though the animal has a good appetite, the animal rapidly loses weight, becomes weak and emaciated with a bottle jaw, and either dies or is culled. Cattle rapidly become emaciated, but often the wasting progresses over a few months.



Paratuberculosis causes enteritis.

Clinical signs in an infected cow commonly appear within a few weeks after calving. Diseased cattle continue to eat, but have constant or recurring bouts of diarrhea. Some cattle may appear to recover temporarily, but will relapse.

Typically, less than 1 percent of an infected herd may show clinical signs of the disease in a given year. The common history in an infected dairy herd is a 5 to 20 percent reduction in milk production and an occasional cow with diarrhea and weight loss. For every clinical animal, there are likely to be 15 to 25 subclinical animals in the herd.

Production losses in affected herds result from premature culling and reduced milk production. Additionally, the poor body condition in culled open cows further widens the economic spread between cull cow prices and heifer replacement costs.

Diagnosis of the disease

Blood tests for antibodies to the bacteria, bacterial culture of fecal samples, DNA probe on fecal samples, and tissue examinations on necropsy are ways to diagnose Johne's disease. The initial or early infection is not detectable by existing laboratory tests: Serum ELISA, Serum AGID, Serum CF, Blood Gamma Interferon, Fecal Culture, Fecal DNA, and Tissue Biopsy.

Blood tests and fecal cultures are used to screen the infection status of a herd and to diagnose the disease in an unhealthy, individual animal with clinical signs. Positive blood tests in clinically affected cattle are reliable, however, a negative test result is inconclusive. Because antibody production does not occur in the early stage of the disease, blood tests are not reliable for identifying infection in clinically normal individual cattle or groups of young cattle. Confirmation of infection in an individual adult animal without clinical signs is based on fecal cultures.

Control of the disease

To control the disease in an infected herd, early detection and removal of infected cattle and protection of newborn calves from contaminated feces and milk are vital. There are no drugs for treatment or vaccines for protection against Johne's disease.

Control Practices

- Fecal culture all mature cattle at 6-month intervals.
- Isolate and blood test diarrheic cattle.
- Isolate and blood test unthrifty cattle.
- Cull infected cows and bulls.
- Provide clean maternity areas.
- Remove calves to clean quarters immediately after birth.
- Do not permit nursing.
- Feed colostrum from negative, healthy cows.
- Use milk replacer or pasteurized milk after colostrum.
- Keep feeding utensils clean.
- Clean and disinfect footwear.
- Avoid manure contamination of feed and water.
- Do not use the same equipment to move manure and handle feed.
- Pasture calves separately from adults until at least 1 year of age.

Prevention of the disease

Use care when purchasing replacement cattle to prevent introduction of Johne's disease into a healthy, disease-free herd. Obtain mature cattle from Johne's test-negative herds or herds with no history of Johne's disease.

Isolate cattle purchased from non-tested herds until they are proven negative by fecal cultures. Negative blood tests on purchased animals are unreliable.



Paratuberculosis causes emaciation.

To control the spread of paratuberculosis in the cattle industry, a procedure to identify herds without infection is needed. Currently, no federal procedure exists and there is no indication that one will be developed. The U.S. Animal Health Association and the National Johne's Working Group have formulated a model Voluntary Johne's Disease "Status" Program. The model provides the minimum guidelines for states to follow in developing a state Johne's program. It requires a multi-year, multi-tiered series of testing and biosecurity procedures that will assure producers that their cattle are not infected.

The state cattle industry has requested the Texas Animal Health Commission to organize a Texas Johne's Advisory Committee. This committee is to be composed of producers and veterinarians who will oversee the program. This program is NOT an eradication program. Rather, the purpose of the program is to identify CLEAN herds and help producers keep them clean. It is anticipated that market demand for clean cattle will translate to premiums being paid for such cattle.

Public health significance

Because bacteria are shed by some asymptomatic cattle into their milk, the effectiveness of current pasteurization techniques for destruction of the bacteria in milk have been questioned. Fortunately, studies clearly demonstrate that current commercial pasteurization techniques (HTST — high temperature, short time) destroy this bacterium. The disease is not spread through consumption of pasteurized milk.

Crohn's disease in people is a chronic, inflammatory bowel disease with clinical and pathological similarities to Johne's disease. Although the cause of Crohn's disease is unknown, speculation has included infectious agents as one cause. The debate has included *M. paratuberculosis*, which has been isolated in 7.5 to 38 percent of Crohn's disease patients involved in a number of case studies. It has not been determined whether this bacterium causes Crohn's or is present as an opportunistic organism.



Pasteurized milk is safe.

Produced by AgriLife Communications and Marketing, The Texas A&M University System

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Issued in furtherance of Cooperative Extension Work in Agriculture and Home Economics, Acts of Congress of May 8, 1914, as amended, and June 30, 1914, in cooperation with the United States Department of Agriculture. Chester P. Fehlis, Deputy Director, Texas Agricultural Extension Service, The Texas A&M University System.