



# Johne's Disease

## (An Emerging Disease of Oklahoma Cattle)

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Johne's Disease (pronounced yo-nee's) is a disease of the intestinal tract of cattle and other ruminants. It is caused by the bacteria *Mycobacterium paratuberculosis*, an acid fast bacteria very similar to the organism that causes tuberculosis in man and animals. The organism *M. paratuberculosis*, however, only causes intestinal disease in ruminants. The greatest economic impact occurs in cattle, even though sheep, goats, llamas, and possibly other ruminants may also become infected and exhibit symptoms.

The organism is passed through the feces of infected animals. It will remain infective in contaminated feed, water, pasture, and equipment for extended times, as it is resistant to many disinfectants and environmental factors. Occasionally, infection may occur in calves before birth or from the milk after birth.

Infection occurs by swallowing contaminated material, most commonly fecal material on the teats of the young animal's dam. Even with initial infection occurring at a very early age, the incubation period is very long and symptoms occur at about two years, with peak period of symptoms becoming obvious at three to six years of age or older. The organism grows within the cells of the lining of the intestine and will be shed in the feces of both animals showing symptoms and those not showing symptoms. Because of the long incubation period and slow development of the disease, thereby making it difficult to identify carrier animals, the economic impact of the disease is especially high to the cattle industry.

### Clinical Signs of the Disease

In cattle, the disease shows the clinical signs of a chronic diarrhea with weight loss that leads to severe emaciation. These signs usually develop at two to six years of age. Cows do not recover and will die from not being able to absorb nutrients and fluids from the intestinal tract. Appetite may remain good until the animal's death. Mortality rate (those infected that die)

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is 100%. Herd morbidity (those that become infected) will vary but is usually low with only one or two animals showing signs at any time. Small ruminants (sheep, goats, llamas, deer, etc.) rarely show diarrhea until near death. They will become very emaciated, however, and tend to continue eating until about the time diarrhea starts. Herd morbidity, mortality and number of clinically ill animals is similar to cattle. The lesion seen in the gut of the animal is a thickened and corrugated appearance in the lining of the small and large intestine.

### Diagnosis of Johne's Disease

Due to the long incubation and small number of animals usually infected, early diagnosis is very difficult. Most diagnoses are made after death at the postmortem exam. In the dead animal, diagnosis is made by staining a section of the large intestine and looking for the acid fast organisms under a microscope. In the sick animal, the diagnosis is made by use of blood tests. These tests use blood serum and consist primarily of two tests. The best for clinically ill cattle is the complement fixation test (CF test). A titer of 1:32 is considered positive, 1:16 as suspicious, and 1:8 as negative. This test is not very useful for determining cattle that may be shedding the organism and not yet showing symptoms of the disease.

The recently introduced enzyme-linked immunoassay (ELISA) test is best used as a herd screening test to determine those animals who have been exposed to *M. paratuberculosis* and are at risk of developing Johne's disease.

Culture of feces is the best test to diagnose shedding and clinically infected cattle. The main restriction of this test is that it requires seven to eight weeks for the organism to grow. Some strains even require up to fifteen weeks.

A recent development in testing for Johne's disease is the DNA probe. It works very well for both clinical and exposed animals, is rapid (three days), but is expensive to run and requires specialized equipment. The test is run on feces and is highly sensitive; therefore, pen collected manure is not a suitable sample.

Two tests that have been used to diagnose clinically affected cattle are the acid-fast stain of a smear of tissue from the large intestine and the intradermal or intravenous Johnin tests. These tests are unreliable and are not used much anymore.

Your practicing veterinarian can arrange for the Oklahoma Animal Diagnostic Laboratory to run blood samples for the diagnosis of this disease.

## Prevalence of Johne's Disease in Oklahoma

Johne's disease is present in cattle throughout Oklahoma, and the incidence appears to be increasing. Complement fixation tests run at the OADDL from adult cattle indicate a reactor rate incidence from 4.1% to 16.8% of all cattle tested. Including cattle with suspect titers (which are often infected), the rates increase to a high of 21.6% in 1995 and 27.1% in 1990. Although these rates are biased by the sample population, they do represent consistent test procedures and give some reflection of the prevalence of Johne's disease in the state. The rate of infection is undoubtedly lower than in the northern and eastern, more predominantly dairy states. Johne's disease is of definite economic significance to Oklahoma cattlemen. The slow, insidious nature of the disease makes the future for *M. paratuberculosis* appear to be even more relevant to veterinarians and cattle owners.

## Prevention or Control of Johne's Disease

Johne's disease is not a treatable disease, and all cows showing clinical signs will eventually die from the disease. There is no approved vaccine for use in cattle in Oklahoma.

A laboratory diagnosis of *M. paratuberculosis* at the OADDL is reported to the Oklahoma State Veterinarian, but no federal or state regulated program exists; therefore, the information is primarily analyzed for epidemiological purposes. Infected cattle cannot be moved in interstate commerce due to their ineligibility to be certified as healthy. Infected animals with clinical disease should be humanely euthanized and disposed of by incineration or burial. The carcasses of infected animals are condemned as unsuitable for human consumption.

High prevalence herds with expensive genetic stock may try to establish control by removing newborn calves immediately and feeding colostrum milk from test negative cows. The best measure of control would be serologic herd testing followed by removal of culture-positive or DNA probe-positive animals from the herd. If a herd is considered negative, new additions should only be added after testing negative for Johne's disease.

Year	Positive	Suspect	Negative	Total	% Positive
1995	36	19	200	255	14.1
1994	20	12	131	163	12.3
1993	14	18	155	187	7.5
1992	6	16	117	139	4.3
1991	7	16	147	170	4.1
1990	26	16	113	155	16.8
1989	13	5	131	149	8.7
1988	6	6	102	114	5.3
1987	11	4	193	208	5.3

**Complement fixation reactor rates of adult bovine sera submitted to the OADDL for *M. paratuberculosis* testing. Positive =  $\geq$  1:32, Suspect = 1:16, Negative =  $\leq$  1:8**

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