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Johne's Disease (Paratuberculosis)

This NebGuide discusses paratuberculosis (a costly disease) of cattle, sheep and goats, its causes, clinical signs, transmission, diagnosis and control measures.

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Johne's Disease, or paratuberculosis, is a chronic wasting disease that causes considerable production losses in adult cattle, sheep and goats. The disease is caused by *Mycobacterium paratuberculosis*, a bacterium related to the tuberculosis bacterium *Mycobacterium bovis*.

This bacterium causes an enteritis (inflamed intestinal tract) that results in severe weight loss and diarrhea. Some animals may be so emaciated (thin, dehydrated) that they are condemned at slaughter; others may suffer from reduced productivity long before clinical (visible) signs are evident.

The prevalence of Johne's disease in the United States, as determined from cattle slaughter, ranges from 2 to 18 percent; it is considered a major problem.

Johne's disease has perhaps its greatest economic impact in dairy cattle, where estimated losses (in excess of \$1.5 billion annually) are due to decreased weight gain and milk production. Dairy herds presumably are at greatest risk because of intensive management practices that favor the transmission of the Johne's bacterium.

Initial infections generally occur when young calves ingest the organism by sucking milk from a contaminated udder, or are exposed to infected bedding. Research also suggests infection in calves before birth may contribute to transmission of Johne's disease in infected herds (Seitz, S; Heider, L; et al, JAVMA, 194:1423-1426).

Although transmission by artificial insemination or natural service has never been demonstrated, there is

evidence it is possible.

Signs of the Disease

Infection by *M. paratuberculosis* starts early in life. Clinical signs rarely appear until cattle are two to three years of age or older. Chronic diarrhea and/or weight loss is typical of the clinical disease.

Generally, only one or two animals in the herd have these signs. Infected cattle frequently eat well, and look bright; however, they appear to be unthrifty. Body temperature may or may not be elevated.

It is important to realize infected animals showing signs of disease *and* infected animals without clinical signs of disease shed *M. paratuberculosis* organisms. There also can be carrier animals that do *not* shed *M. paratuberculosis*, and there can be noninfected cattle in a typical infected herd.

Diagnosis

The standard diagnostic test has been to attempt to culture *M. paratuberculosis* from the feces of infected, shedding animals. Culture can take up to three months, as *M. paratuberculosis* grows very slowly.

An intradermal or intravenous injection of a special bacterial preparation (Johnin) has been used for many years. False positive and false negative results may occur. Accuracy of the intradermal test in general has been disappointing.

An intravenous test also has been utilized; it is quite reliable in highly infected cattle that are clinically ill.

Newer tests have been developed that may make it possible to identify most infected animals in the clinical stages of the disease. The enzyme linked immunosorbant assay test, ELISA, could aid in the control and/or eradication of paratuberculosis. It is based on detecting antibody to *M. paratuberculosis* in the animal's blood serum. False positives occasionally can occur.

A rapid test kit, the agar gel immuno-diffusion (AGID) test, can help differentiate between clinical Johne's disease and other similar diseases. This test requires the testing of the suspect animal's blood (serum).

The test is simple to perform, and results are complete in 24-48 hours. The test accurately detects animals with advanced disease, but it does not detect animals in the early stages of infection.

Treatment

There is no effective treatment for Johne's disease; attempts at treatment generally are not warranted.

Prevention and Eradication

Prevention is based on maintaining a closed herd. Do not buy or lease livestock unless they are known to be from clean herds.

A vaccine, administered only after permission by state regulatory veterinarians, can be used in known

Johne's disease-infected herds. The vaccine does not protect against severe infection and generally is not a substitute for eradication.

Management changes that prevent *M. paratuberculosis* transmission to noninfected cattle are necessary. Establish a good sanitation program in all areas of production. Specific actions include:

1. Identify and eliminate known *M. paratuberculosis*-infected animals.
2. Be aware that *M. paratuberculosis* may be transmitted from an infected pregnant cow to the calf (fetus) in utero.
3. Raise baby calves separately, using only colostrum and/or milk from noninfected cows.
4. Be aware of and maintain sanitation practices.
5. Do not graze young cattle on pasture used by adults.
6. Consider artificial insemination to minimize disease spread.
7. Supply water only from clean tanks, and fence off ponds.
8. Do not spread manure on pastures used for grazing.
9. Buy livestock only from herds known to be free of *M. paratuberculosis* and other diseases.
10. Remove calves from the herd when they are known to be from infected cows.
11. Call your veterinarian early if diarrhea is persistent. Rule out other diseases and discuss available diagnostic tests.
12. Evaluate other on-farm animal species; sheep and goats may be a source of *M. paratuberculosis* (but this has not been proven).

Conclusion

Eradication of Johne's disease is extremely difficult because of its insidious nature, long incubation period, difficulty in early detection, and major management changes necessary to prevent and eradicate it.

Consultation and action by a veterinarian experienced in the management of Johne's disease is necessary for the development of a herd-control and eradication program.

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