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Combating Johne's disease

A Silent Killer

BY ALAN ATCHISON

The impact of Johne's disease on the Pennsylvania dairy industry has the potential to produce catastrophic results. A growing threat, Johne's disease is an intestinal infection that affects ruminants such as cattle, sheep, goats, deer, antelope, llamas and bison. If biosecurity measures are not implemented at its root causes, Johne's disease can quickly become a very serious health hazard and result in major economic losses for a given flock or herd. According to Penn State's College of Agricultural Sciences, between 20 and 40 percent of the dairy herds in Pennsylvania may have cattle with Johne's disease. Although beef cattle also can be infected, it is much less common. If dairy producers do not act to prevent the spread of Johne's disease, the Commonwealth's dairy operation will eventually decline in production.

NBC vets and testing

Dr. Robert Whitlock, associate professor of medicine at New Bolton Center, has been working closely on testing methods of Johne's disease. He was recently contacted by Alaska state veterinarian **Dr. Robert Gerlach, V'82**, who is responsible for ensuring the movement of 100 bison into the state. Due to Dr. Whitlock's research with emphasis on alternative culture methods to grow the mycobacterial bug, Dr. Gerlach requested that the herd of bison be tested to ensure all are free from or have a low risk of Johne's disease. A small group of yaks, moose and wood bison are also being tested for Johne's disease as part of the collaborative effort.

Johne's disease (pronounced "yo-knees") is caused by *Mycobacterium paratuberculosis*, a close relative of the bacterium that causes tuberculosis and Crohn's disease in humans. The organism, which is shed in manure, is most commonly spread by placing an unknowingly infected animal within a healthy herd. Individual animals contract the illness by consuming manure-contaminated feed materials, most frequently during the peri-

natal time period. Many times, the transmission of Johne's disease occurs without the owner's awareness of any health problems due to its prolonged incubation period; it can be as long as 10 years before clinical signs develop. *M. paratuberculosis* is a very hardy organism that is resistant to hot and cold temperatures and dry conditions, and can survive in soil or water for more than a year. Newborn animals are the most susceptible to the disease, with many infections occurring either *in utero* or by drinking milk or colostrum infected with the bacterium following birth.

Symptoms slow to show

Animals infected with Johne's disease typically don't show any symptoms until at least two years after initial contact with the bacterium. Signs of the disease include rapid weight loss and chronic protracted intermittent diarrhea that is unresponsive to treatment. Occasionally, several weeks after the onset of diarrhea, animals may develop a soft swelling under the jaw, a symptom known as intermandibular edema or "bottle jaw." Bottle jaw results from a loss of protein from the bloodstream into the digestive tract. Animals exhibiting bottle jaw symptoms often are not expected to live longer than a few weeks.

Johne's disease is difficult to detect due to its slow and progressive nature. The bacterium causes a gradual thickening of the intestinal wall, which interferes with the absorption of nutrients in the consumed feed materials.

Over time, the animal may start to lose weight, despite a normal appetite, resulting in a wasting away of the body even as the animal continues to eat.

Biosecurity measures during the perinatal time period reduces the possibility of introducing Johne's disease into any given herd. Some general disease-prevention strategies include:

- Creating clean environments for ruminant births.
- Reducing newborns' exposure to manure of other animals.
- Avoiding manure contamination of food, water and other drink sources.
- Cleaning udders and teats before collection of milk and colostrum.
- Never feeding pooled milk or colostrum to young ruminants.

Because the symptoms of Johne's disease occur late in the infection cycle, all animals should be tested for *M. paratuberculosis* before brought into a herd. The three most common ways to test animals for the disease are through culture of fecal samples from animals in the herd of origin, DNA probes on fecal samples and blood tests for antibodies to *M. paratuberculosis*. Manure samples from animals in the herd of origin are more likely to detect infection than when only one animal being sold from a herd is tested.

The initial concern regarding the movement of the 100 bison arose from the detection of a new strain of *M. paratuberculosis*, one particularly prevalent in bison from the western United States. Since that time, Dr. Whitlock's laboratory has successfully developed the culture medium to grow the particular strain. Fecal cultures of yaks, moose and on-the-move bison were subsequently sent to Dr. Whitlock's lab, which then set into motion the methods to detect the so-called "bison strain" or other strains that may infect bison. Dr. Whitlock stated that the cultures of fecal samples from a representative number of these bison were set up at the end of December 2005 and, if present, take about four months to grow. "At that time," he said, "we will know if the bison looking to be moved into Alaska are infected."

Currently, there is no cure for Johne's disease, what is often, unfortunately, a silent killer. However, through the growth and study of *M. paratuberculosis*, the ability to properly diagnose infected animals will become easier, and the chances of developing an effective vaccine or treatment will increase dramatically. ▀



As much as 40% of Pennsylvania's dairy herds may have cattle with Johne's disease. If dairy producers do not act to prevent the spread of the disease, the Commonwealth's dairy operation will eventually decline in production.