Dr. Colin Palmer

Biography:
Dr. Colin Palmer is an Associate Professor of Theriogenology (Animal Reproduction) at the Western College of Veterinary Medicine. Originally from Nova Scotia, Dr. Palmer worked in mixed practices in Ontario and British Columbia and has owned/operated a practice in Saskatchewan. Dr. Palmer along with his wife Kim and children Lauren, Emily and Carter run a herd of purebred Red Angus cattle under the KC Cattle Co. name.

A Breeder's... Veterinary Perspective

Johne's Disease and the Seedstock Industry

Johne's disease (pronounced as "yo-knees") caused by the bacteria Mycobacterium avium subspecies paratuberculosis, often abbreviated as MAP, has been getting more attention in the agricultural press lately. Named for Dr. Heinrich Johne, a German veterinarian who first identified it in 1895, it was found worldwide and results in substantial losses to the cattle, sheep and goat industries. Clinically affected cattle are usually older, between 2 and 6 years of age, but this only represents the final stages of the disease. Most infections become established in young calves that are exposed to contaminated milk or manure; however, because the bacteria is relatively slow growing it usually takes years before actual clinical disease is seen. Dirty udders caked with manure have been identified as a potential source of infection for calves. Bacteria also can become established in the udder and are capable of surviving the pasteurization process. Calves born to infected cows have been reported to be considerably more prone to develop the disease, and at an earlier age, which has led some to believe that these calves may have become infected in the uterus. Older cattle are less likely to establish new infections because of having a better immune system.

The classic Johne's disease case description is that of an older, severely emaciated cow, with persistent, watery, "pipe-stream" diarrhea. These animals usually do not have a fever, but are very weak and lethargic. Some may appear to have swelling between the lower jaws known as bottle jaw, due to severe protein loss associated with the diarrhea. The MAP bacteria have a liking for the bowel lining essentially causing severe inflammatory bowel disease. There is no effective treatment; therefore, affected cattle die or are destroyed.

Although MAP has not been proven to be the cause of Chrohn's disease, an inflammatory bowel disease affecting humans, most researchers agree that there is a link between the animal and human diseases. Production losses to the livestock sector and the possibility that the same bacteria responsible for Johne's disease may be associated with human illness, has prompted governments in several countries including the United States, Australia and the Netherlands to step up their control programs. A number of cattle industry groups in Canada are also making efforts to encourage control measures amongst their producers in an effort to decrease the prevalence of the disease.

Dairy cattle around the world have a higher prevalence of MAP bacteria. Herd prevalence amongst North American dairy herds has been reported to range between 8% and 33%. A 2001 USDA study estimated that nearly 8% of US beef herds had at least one test-positive animal. Higher herd prevalences were reported in the Southern US with an estimated 50% of Alabama herds being affected. The higher prevalences in the South might be due in part to an increased susceptibility to infection in Brahma-type cattle. Studies in Saskatchewan and Alberta estimated the prevalence of beef herds having at least one animal test positive at 15.2% and 28.5%, respectively; however, substantially fewer herds had two or more test-positive animals.

Production losses associated with Johne's disease are attributed to decreased milk production, poor carcass quality and early culling. Infected, but not yet clinically affected cattle, will without a doubt perform at a substandard level, but so far the total costs to the beef industry have not yet been

calculated. Any direct losses to the producer should be considered to be minimal compared to the cost of closed markets as our trading partners intensify their control measures. Most control programs are focused on dairy cattle because of a higher prevalence of disease in the dairy population and because the MAP bacteria may be contaminating the milk supply. Nevertheless, beef producers should get involved, before trade in live cattle is limited because of a lack of control programs in your herd, region or country of origin.

One of the most important facts to be realized with Johne's disease is that clinically affected cattle only represent the tip of the iceberg. If a herd has one clinically affected animal, there are probably at least another 15 infected animals in the herd and all could be shedding the MAP bacteria in their manure. The MAP bacteria are capable of surviving in the environment, including chlorinated water, for long periods of time. Soils high in organic matter and low in pH, as well as all types of manure are favoured by MAP bacteria. Even composting seems to do little to thwart its survival. There is no treatment and to date no effective vaccine. Suppression of the immune system can occur around the time of calving may lead to increased shedding of MAP bacteria in carrier animals, ensuring the spread of the disease to the uninfected population.

Testing for MAP is a complicated process. Most commercial labs utilize bacterial isolation or identification of MAP DNA from manure samples. Culturing and identifying the bacteria has traditionally taken several weeks, whereas DNA testing may be completed in as few as 3 days, but may be limited by the amount of DNA in the sample. An effective method for beef producers to test their herds is to submit pooled stool samples collected from groups of 5 similarly aged cows. This increases the odds of detecting the disease by ensuring that enough bacteria will be present from only a single carrier if she exists, while at the same time eliminating the extra expense of testing each individual cow. Individual animals can be identified later if need be.

Control of the spread of MAP bacteria in dairy herds is largely based on decreasing the exposure of young cattle to infected manure, colostrum or milk. Many of these principles apply to beef cow-calf operations. Keep calving pens clean and avoid overcrowding. Identify and cull carrier animals and be conscientious regarding new purchases. Specific management practices that have been shown to result in MAP infections in beef herds include; keeping dairy cows as nurse cows, calving during the spring when it is wet, and the use of open streams as water sources. The use of monensin in the feed has been shown to reduce shedding of MAP in the manure of carrier animals, and decreased the infection rate when fed to calves. Fortunately, the extensive nature of most beef operations will reduce the risk of contact between young cattle and contaminated manure. However, seed stock operations that tend to purchase animals from a variety of sources, calve in paddocks, and maintain young cattle in pens in close proximity with older cattle are more likely to have MAP carriers; especially if the facilities are wet and dirty.

Johne's disease research has intensified in Canada and around the world in recent years and greatly improved our level of understanding. We as seedstock producers need to do our part to help limit the spread of the MAP bacteria before it is mandated by those we do business with.

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