

PREVENTATIVE PROGRAMS FOR TB
AND JOHNE'S DISEASES IN DAIRY HERDS

*by Dr. Bruce Abbitt
University of Florida
Gainesville, Florida*

Bovine Tuberculosis

Tuberculosis is an infectious disease of cattle caused by bacteria of the genus *Mycobacterium*, primarily *Mycobacterium bovis*. The infection is characterized by the formation of tubercles, encapsulated areas containing this bacteria and other debris. The lungs and abdominal organs are most often infected although the bacteria may be located in any portion of the cow's body. The bacteria shed in bodily secretions such as sputum, saliva or manure contaminate the environment. Herdmate contact with feed, air or water contaminated in this manner spread the disease within a herd. Close confinement and group feeding of dairy cattle provides an ideal setting for rapid spread of tuberculosis.

Cattle infected with tuberculosis often do not appear ill. Those with signs of illness generally lose weight and exhibit a variety of other signs which may be common of many diseases. For these reasons, a simple test (caudal fold tuberculin) is used to detect cattle with tuberculosis. Other tests such as the comparative cervical are also used under some circumstances. The presence or absence of tuberculosis is confirmed by postmortem examination. Despite the availability of diagnostic tests, the incidental finding of tubercles on routine postmortem examination is a common method of locating infected herds. Infected herds are quarantined and a test and slaughter program allows the possibility of subsequent outbreaks of the disease on the same farm. Thirty percent of the herds depopulated for tuberculosis in 1973 through 1975 contained one or more non-reacting cattle with lesions of tuberculosis on postmortem. Because of the difficulty in eliminating tuberculosis once it occurs, prevention is extremely important in eliminating economic losses.

The best method to prevent introduction of tuberculosis is to maintain a closed herd. However, this is not a practical solution for all dairymen. For those purchasing replacements, emphasis should be placed on knowledge of the source of the replacements and testing for tuberculosis.

Replacement animals that are grouped from several farms or have been through several sale barns, auction markets, dealers, etc. should generally be avoided. Each additional herd represented in the group and each additional sale barn or other concentration point contacted increases the chances that an infectious disease will be introduced. Therefore, if possible, buy from the original owner. He knows the history of the animals and usually feels responsible for their health and absence of infectious disease. Secondly, prior to purchase, insist that all animals be tested for tuberculosis. The testing veterinarian will first inject .01 ml of the test tuberculin into the tail fold of the cow. Seventy-two hours later, he will palpate the area of injection for any signs of swelling. Ideally, you should observe the testing procedure. If you cannot, request

the testing forms signed by the veterinarian. Carefully check the identification of each purchased animal against those listed on the official form for any mistakes. If replacements are delivered to your farm and there is any question as to whether or not a tuberculosis test was performed, either refuse delivery or isolate immediately. An immediate test may result in some confusion. If a test was not actually performed (no tuberculin injected) before purchase or delivery, an immediate test will be a legitimate screening test. If the test was performed before delivery (tuberculin injected) and a retest is conducted within 60 days of the original test, the results may be inaccurate as both false negative and false positive reactions may occur. Therefore, to assure an accurate test prior to introducing the replacements into your herd, maintain them in isolation for 60 days and then retest. These problems stress the importance of documented reliable evidence of an accurate test for tuberculosis prior to purchase.

Once accepted, all replacements should be isolated for at least 60 days and then retested before introduction into the main herd. This serves as a check on the first test or may identify animals that have developed detectable tuberculosis since the first test. Even if the replacements are introduced directly into the herd, they should be retested in 60 days to allow for discovery of the disease before it is widespread. However, if introduced into the herd before discovery is made, the entire herd will have been exposed and thus face quarantine. It may also be advisable to test heifers you raise prior to introducing them into the main herd. Close contact with fowl or allowing the replacements access to pasture fertilized with chicken litter may result in false positive reactions to the test. However, if necessary, regulatory veterinarians can determine the accuracy of the test by performing a comparative cervical test.

Another source of tuberculosis in cattle is transmission of the disease from humans. All persons seeking employment of the dairy should be tested for tuberculosis prior to beginning work and periodically thereafter. This service is provided at no charge or for a nominal fee through county health departments.

Even the best screening techniques to prevent the introduction of tuberculosis will occasionally fail. Therefore, a method of detection and controlling spread is essential. Probably, the most reliable procedure is a frequent (at least yearly) test of the entire herd (all animals over 24 months of age). Of equal importance is thorough postmortem examination of dead animals on the farm as well as those sent to slaughter. Your local veterinarian will in most instances supply postmortem services for cows dying on the farm. Cull cows should be sold to slaughtering establishments utilizing either state or federal meat inspection services. Other techniques to minimize spread of infection are routine cleaning of feed bunks and isolation of sick animals. The above suggestions should be followed even in closed herds.

In summary, bovine tuberculosis control should be approached with strong emphasis on preventing introduction into your herd. Once introduced, economic losses will usually be severe. Preventive and surveillance practices should include the following.

1. Buy animals from a known source.
2. Insist on tuberculosis testing prior to purchase. If on arrival there is any question as to the performance of the original test,

- do not accept these animals or isolate and perform another test.
3. Keep new animals isolated from the rest of the herd for 60 days and then retest.
4. Have all employees tested for tuberculosis before they begin working.
5. Have postmortem examinations performed on cows dying on the farm. Send cull cows to slaughtering plants utilizing state or federal meat inspectors.
6. All cows over 24 months of age should be tested yearly for tuberculosis.

Paratuberculosis of Cattle

Paratuberculosis (Johne's disease) of cattle is prevalent in Florida. Constant to intermittent diarrhea with progressive weight loss is typical of clinical Johne's disease in adult cows. Clinical disease may result in culling 0 to 10% of adult cows each year in an infected herd. An increased incidence of mastitis and infertility may cause even greater economic loss in infected cows or herds.

Paratuberculosis is apparently more prevalent in areas with acidic soil, a possible explanation for the widespread incidence in Florida. The disease is caused by a bacterium (Mycobacterium paratuberculosis). Cattle primarily contract the disease by ingesting these bacteria. Calves are more susceptible than older cattle. Once ingested, the bacteria reproduce in the walls of the intestine and associated lymph nodes. The bacteria may remain in these areas for many years without causing clinical signs of weight loss and diarrhea. However, some cattle begin shedding large numbers of these bacteria in their feces for many months prior to onset of clinical illness. Manure from these cattle and those with diarrhea contaminate the environment and are a source of infection for other herd members, particularly calves.

Cows in an infected herd can be divided into four groups:

1. Clinically ill cows shedding bacteria in their manure.
2. Inapparently infected cows shedding bacteria in large numbers in their manure.
3. Inapparently infected cows shedding bacteria in small numbers in their manure.
4. Non-infected cows.

A variable percentage of adult cows in an infected herd will be in each group. Inadequate nutrition and/or poor sanitation seems to increase the percent of the herd in infected groups, especially group one. Factors responsible for the change from an inapparent carrier to a cow with clinical signs is largely unknown. Regardless, improvements in herd sanitary practices and nutrition may lower clinical losses.

A controlled study of one infected herd strongly indicated that inapparently infected cows (groups two and three) had more mastitis and infertility than cows in group four in the same herd. In this study, mastitis was given by the herdsman as the reason for culling 22.6% of inapparently infected cattle and 3.6% of their non-infected herdmates ($P < 0.01$).

Because of these possible affects, the economic significance of herd infections with Johne's disease is difficult to assess.

Many procedures are available to make a presumptive individual or herd diagnosis of Johne's disease. A definitive diagnosis is usually based on demonstration of the causative bacteria in the feces, or in a section of the cow's intestine removed after death. The bacteria can be demonstrated by culture of feces if the cow is passing approximately 100 or more bacteria per gram of fecal material. Culturing requires 60-90 days as this bacteria grows slowly under laboratory conditions. The bacteria can also be seen using microscopy on specially prepared scrapings from the lining of the rectum or sections of the intestine.

Prevention depends on either maintaining a closed herd or purchasing replacements from herds with no history of Johne's disease and/or a complete negative herd test for Johne's disease.

Control in infected herds depend on preventing exposure of susceptible animals (especially calves) to the bacteria and decreasing the amount of bacteria present by identifying and culling cattle shedding the organism in their feces. Calves in infected herds should be removed from their dams as soon after birth as possible and reared in separate facilities. The possibility of transfer of manure from the adult herd to the calf rearing facilities should be minimized. Procedures such as routine cleaning of boots, tractor tires, etc. between facilities may be helpful. Fecal samples should be collected periodically from each adult cows and cultured for the causative bacteria. Cows positive on culture (groups one and two) shed millions of the bacteria per day in their feces and should be culled. Cattle not shedding large number of Mycobacterium paratuberculosis organisms in their feces (group three) may not be detected by culturing. These cattle may begin shedding large numbers of the bacteria in the long interim between taking a sample and obtaining the laboratory results. This long period is due to the 60-90 day period required for growth of the bacteria on culture media. Therefore, a program of culling based on routine culturing approximately every six months may be required for several years to control the disease in a large herd. Elimination of the disease may be impractical especially in large herds.

Selected References:

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