



Bovine Tuberculosis

Guide B-219

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Bovine Tuberculosis (TB) is caused by *Mycobacterium bovis*, an organism closely related to the organism that causes avian TB (*Mycobacterium avian*), human TB (*Mycobacterium tuberculosis*), and Johne's disease (*Mycobacterium avian* subspecies *paratuberculosis*). While bovine TB can affect any warm-blooded mammal, infection of nonruminants is comparatively rare.

Transmission of TB usually involves inhalation of bacteria as aerosols exhaled by infected animals, so close contact is required. However, contaminated feed, milk, pastures and water are other routes of transmission.

Both beef and dairy cattle are susceptible to bovine TB. However, confinement dairies and feedlots are the primary areas of concern. Frequent herd additions increase the opportunity for introduction of the disease, and high animal densities increase the likelihood of the disease spreading among herdmates. Like most mycobacterium, *M. bovis* multiplies slowly, so animals exposed in a terminal feedlot are usually sent to slaughter during the early stages of the disease. However, because dairy cattle remain in the herd longer and are maintained in relatively dense populations, dairies are at higher risk for heavy herd infection rates.

An eradication program for bovine TB has been under way for the last 86 years in the United States. However, TB has proven to be a hard disease to eliminate from our herds. Michigan has had frequent TB outbreaks in beef and dairy herds since 1998, and in recent years Texas, California and New Mexico have had their TB status downgraded.

WHY IS THIS DISEASE A THREAT TO U.S. CATTLE?

In 1917, when the eradication program began, the prevalence rate of immunoreactors was 5 percent. The current U.S. prevalence rate is 0.02 percent, so inroads have been made into eradication (APHIS, 2002). Unfortunately TB is a silent disease that often shows no outward clinical signs. It has a wide range of hosts al-

lowing for many different introduction vectors. In Michigan, which had its TB-free status downgraded in 1998, feral deer populations have been suspected in the reintroduction of the disease. In the El Paso, Texas, milkshed, birds are the suspected agent. In California, unofficial reports indicate that commingling with Mexican-origin cattle may have infected at least one of the herds.

One difficulty in eradicating TB is its illusive nature within a herd. Cattle can be asymptomatic for many years. Symptoms of the disease include slight fever, swollen lymph nodes, loss of body condition, respiratory difficulties and hacking cough. Most cases are detected at slaughter, where lung lesions are found upon inspection.

PUBLIC SAFETY

Even during a TB outbreak, consumers are protected. The Pasteurized Milk Ordinance regulations for pasteurization temperature are designed specifically to protect consumers from contracting bovine TB. Only people (or animals) who drink unpasteurized (or improperly pasteurized) milk from infected cows could be at risk for contracting the disease. Animals that present TB lesions at slaughter are condemned, and do not enter the food chain. In addition, the TB bacterium is rarely found in muscle tissue. Only farm employees are at risk since exposure to the infectious agent can occur when workers come in close contact with TB-infected animals or take unpasteurized milk home from the bulk tank.

KEEP TB OUT OF YOUR HERD

Protecting your herd from bovine TB requires many of the same biosecurity precautions necessary to protect from other infectious agents.

1. **Keep a closed herd.** *This is the most effective method to prevent the introduction of the disease into your herd.* Because this is not practical under the management style of most Southwestern dairies,

you should limit the number of sources from which you receive animals if at all possible.

2. **Only purchase animals with a negative tuberculin test.** The state of New Mexico requires all incoming dairy animals to have a negative test; however, that test is only of value if properly administered and read. In the case of an infected California herd, several of the cattle with extensive TB lesions originated in TB “free” states (Meyer, 2003).
3. **If possible, isolate incoming animals from the rest of the herd, and retest them for TB after 60 days.** Animals with bovine TB may appear perfectly healthy, so simple isolation and observation is not an effective method of prevention.
4. **Require your workers to have a negative tuberculin test.** This test is available free at the local office of the state health department. Humans can contract bovine TB from cattle, and cattle can contract human TB. These types of transmissions may be rare; however, they are possible.
5. **Do not commingle your cattle with those from other farms.** Producers should avoid this practice as a standard biosecurity issue, not just as protection from TB. There is no point wasting your efforts to keep your herd disease-free if your cattle can rub noses with the cattle of your careless neighbor.
6. **Do not commingle your heifers with beef animals (unless they are of known origin), and don’t buy heifers or contract with growers who do.** The number of beef animals imported from Mexico continues to increase and, while all imported cattle are tested for TB, the infection rate of herds in Mexico is quite high compared to the United States. It is simply not worth the risk to your dairy.
7. **Control vectors on your property.** Native wildlife vectors have been implicated in TB outbreaks in Michigan and Texas. In the Southwest, native deer and elk populations are not known to carry TB. However, in El Paso County, Texas, pigeons are suspected of bringing TB into the area from dairies in Ciudad Juarez, Mexico (although there is no definitive evidence supporting that theory). If you live in an area that is having a TB outbreak, or you live in an area where a large number of Mexican cattle are on pasture or feedlot, controlling rodents and nuisance birds is advised.

TB TESTING

All intact cattle greater than six months of age leaving a “modified accredited advanced” state, which are not bound for terminal feed yards must be tested for TB within 60 days prior to shipment. Testing for TB involves injecting tuberculin subcutaneously near the vulva, neck, or most commonly the caudal fold. Tuberculin is a protein secreted by *M. bovis* that elicits a hypersensitivity reaction in animals that have been previously exposed. However, animals that have been exposed to another species of mycobacteria will react to the tuberculin injection as well. Cattle are examined 72 hours after the tuberculin injection to determine if they are reactive. Positive cattle will be subject to a second test to rule out exposure to another species of mycobacterium. This test is the comparative cervical test, in which separate injections of tuberculin from *M. bovis* and *M. avian* are given in the neck. After 72 hours, the injection sites are compared. Cattle previously exposed to *M. bovis* will be more reactive at the *M. bovis* site. Skin tests are only able to detect 80 percent of infected animals; animals that are immunosuppressed from old age, calving, stress or advanced tuberculosis may not react. Animals that have recently been infected can also produce a false negative. Other tests are available for the confirmation of *M. bovis* infection, including the g-interferon and the ELISA tests. The ELISA test detects antibodies to *M. bovis* in the blood. The y-interferon test detects the immune response of exposed cattle in blood serum. This test has recently been approved as a follow-up to the tuberculin test, in lieu of the caudal fold skin test. It is more sensitive than skin tests but is also more costly. If *M. bovis* reactors are found within a herd, those animals are sent to slaughter, where tissues are cultured for *M. bovis*. Only upon confirmation by culture is the animal considered TB positive.

LITERATURE CITED

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