Bovine TB

Answering frequently asked questions.

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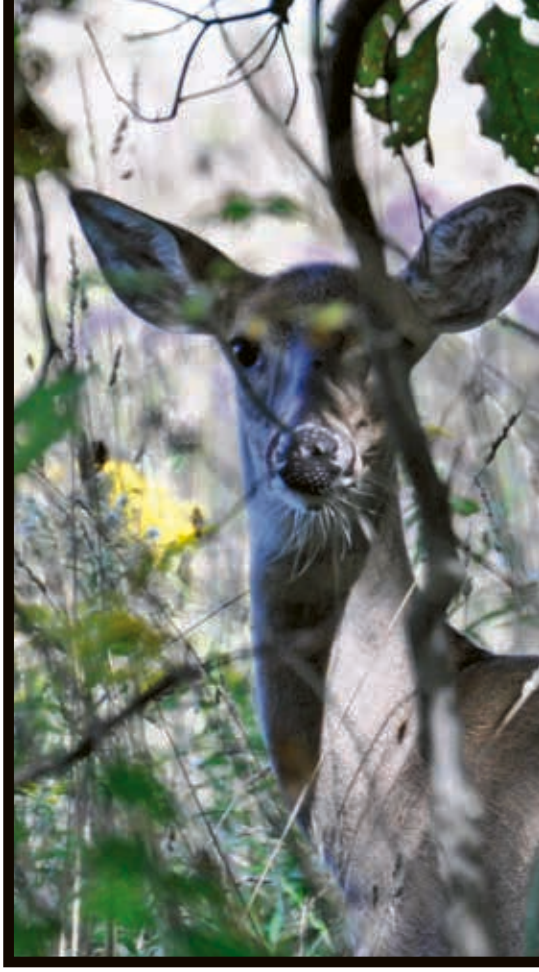

The diagnosis in Michigan of four herds infected with bovine tuberculosis (TB) in the first five months of 2013 and recent headlines in Europe concerning TB-infected cattle are reminders cattlemen should understand what they can do to reduce the risk of disease in their herd. The following answers to frequently asked questions are intended to bolster your understanding of the disease and its ramifications.

What causes bovine TB?

TB is caused by an infection with the bacteria called *Mycobacterium bovis* (*M. bovis*). Infected animals may not show any outward signs of disease until the most advanced stages.

Can *M. bovis* survive in the environment?

M. bovis is very resilient. Survival is affected greatly by temperature and moisture. When exposed to summer temperatures, sunlight and drying conditions, the bacteria dies, but away from sunlight and in moist conditions in soil and manure, *M. bovis* can survive for many months, especially in the cold.

How is the disease transmitted from wildlife?

In Michigan, as well as in areas of New Zealand, the U.K. and other locations, wild animals are believed to be a primary source of *M. bovis* transmission to cattle. A wildlife reservoir of the disease occurs because of three factors:

1. The disease has established itself in a wildlife population;
2. The live bacteria can be shed by the animal; and
3. There is opportunity for *M. bovis* to be transmitted to cattle through both direct and indirect pathways.

An example of direct transmission would be when aerosols or droplets containing the bacteria are exhaled or coughed by an infected animal and inhaled by a susceptible animal. This type of transmission would most likely occur in crowded conditions, high populations or in contained areas.

Indirect transmission could occur when bacteria from an infected animal are transmitted to a susceptible animal through some indirect means. Examples would be when an infected animal's respiratory secretion or saliva containing *M. bovis* is deposited on a feedstuff, which is subsequently ingested by a susceptible animal, or through ingesting milk that contains live *M. bovis.*

In Michigan, it is believed that indirect transmission of *M. bovis* is the most common cause of herd infections.

Can *M. bovis* be spread through small wild animals like opossums and raccoons?

While the disease has been identified in these animals, as well as in scavenging carnivores such as coyotes, bobcats, foxes and bears, it is not believed that these animals can pass it on to cattle or that it has become endemic in their populations. Producers are encouraged to control small animals on their farms to suppress possible transmission of various diseases.

How contagious is *M. bovis* within a cattle herd?

Diseases spread when conditions favor exposure and when animals are susceptible. In Michigan herds located in the geographic area known to have TB in wildlife, annual testing of cattle has found the infection often in early stages. In most of the infected herds, only one or two infected animals have been found. From that, it was believed that the disease was not very contagious. However, the experience with a few herds in which a high proportion of animals has been found infected causes us to question that conclusion. In fact, when conditions and management result in greater exposure, particularly of young animals, the disease can apparently be fairly contagious.

Can cattle get TB from feed?

Yes, cattle, deer and other animals that eat feed on which saliva from infected animals has been deposited and where the bacteria survives can become infected. That has been shown in research in which infected animals were allowed to eat a feed and then were removed. That feed was fed to uninfected animals, all of which became infected. That is the scientific basis for eliminating the feeding and baiting of wild deer that can spread the disease within their herds.

In one study, *M. bovis* survived at least seven days on common deer bait feeds such as apples, carrots, corn, sugar beets and potatoes. The bacteria could still be isolated from apples, corn and beets at 112 days. It is believed that cattle grazing on pasture and eating apples from trees in pastures where deer have had access can be a means of transmission.

However, the question of whether harvested feed, such as hay, is a source of transmission has greater uncertainty. Experimentally, when dry hay was inoculated with *M. bovis,* survival in fall and winter was weeks or even months; however, survival in summer was less than three days. If saliva with bacteria is deposited on forage that is cut for hay or haylage, and cured in the sun for hours or days, there is lower likelihood of its survival.

With haylage, the process of ensiling results in the production of acids that preserve the feed. The impact of the ensiling process on the survival of *M. bovis* is under investigation in a 2013 study at Michigan State University. The hypothesis is that the bacteria cannot survive long and the intent is to characterize the death curve of the bacteria over time.

What other animals on my farm could get bovine TB?

Horses and sheep are apparently resistant to bovine TB and are not a concern. Goats and pigs can become infected. In addition, dogs and cats that drink milk from infected cows or eat tissues from infected cattle may also become infected.

►**Above:** Cattle, deer and other animals that eat feed on which saliva from infected animals has been deposited and where the *M. bovis* bacteria survives can become infected.

Can people get bovine TB?

Though the disease is called bovine tuberculosis, people indeed may become infected with it; however, it is not a very high risk. Simply being around infected cattle and working with infected cattle has not resulted in human infections. The most likely way that humans would become infected is by drinking unpasteurized milk from a herd with infected cows. It was that means of transmission that provided the impetus years ago for laws requiring the pasteurization of milk for sale.

Can't TB be treated?

Infected people can be treated for TB and in the vast majority of cases the treatment is successful. The course of treatment takes six to nine months and is, therefore, expensive. Treatment of infected cattle is not feasible.

How safe is our food?

Pasteurization kills disease pathogens meaning that pasteurized milk is completely safe for all consumers. The USDA meat inspection system examines carcasses and looks for any type of problem that would impact the health of consumers. When combined with proper handling and cooking, our meat supply is also safe.

How reliable is the TB test?

Tests are evaluated for their sensitivity (having a low rate of false-negative responses) and their specificity (having a low rate of false-positive responses). In diagnosing TB, no test is perfect. A test that has high sensitivity, like the caudal fold test (CFT), is used as a screening test, and is followed up with a test that has a higher specificity (gamma interferon or comparative cervical test, CCT). When an animal responds on both of these tests, it is sacrificed and the tissues and lymph nodes examined. Samples from these will be tested for genetic markers (PCR) of *M. bovis,* and cultures will be done to see if lab personnel can grow the bacteria from tissue samples. If either of these last two tests is positive, the animal is called infected, and therefore the herd is called infected.

CFT has been the standard screening test for many years. Its sensitivity is only around 80%, meaning that approximately 20% of infected animals will go undetected. The specificity of the CFT is about 95%, meaning that 2%-5% of the time it will yield a false-positive result. The desire and effort within the scientific community has been to have a screening test with a higher sensitivity and higher specificity. Research in developing other tests is ongoing.

If I'm a cattle producer, what should I do?

MSU Extension recommends taking the following measures to reduce the risk of transmission of TB to your herd:

►**Wildlife control.** Wildlife can be vectors of diseases, that is, they can carry diseases to cattle. This is the case for TB and other diseases, as well. Cattle producers, no matter where they are located, should develop measures to protect feed, water and housing areas from wildlife and should use all legal means to control the numbers of wild animals in the area of their farm. Talk with your Department of Natural Resources officer to learn more about the legal means available to you.

►**Herd health.** Cattle producers need to support the health of their herd through every means possible and lower the potential exposure to all disease pathogens, because one disease may impair immune response to another disease, making them more susceptible. This includes having a clean and dry environment for all cattle, particularly at calving, managing the stocking rate to keep aerosol and manure exposure lower, reducing the mixing of cattle of different ages and from different herds, and reducing the exposure of cattle to blood from other cattle. The latter may mean that you and your veterinarian commit to single use of examination sleeves and needles, and reduced use of bulls. In addition, cattle should be fed diets that meet their nutritional and immune system needs, including proper balancing for minerals and vitamins. Additionally, vaccination is an important tool to strengthen the immune response to certain viruses and bacteria. An animal whose health is compromised by one disease is more susceptible to other diseases.

►**Work with your veterinarian.** Managing cattle herd health should always be a partnership with your veterinarian in which together you evaluate the weaknesses and breakdowns in herd health and together plan ways to strengthen your herd health program.

►**Always properly identify animals.** Whenever an infected animal is found, the first question is what other animals have been exposed. Tracing the movements of an animal and being able to determine other exposed animals will help control contagious diseases faster with fewer animals needing to be killed. That requires that all animals that move be identified and that good records be kept of animals and where they went or where they came from. Therefore, it goes beyond simply complying with regulations to having records that can be provided if and when necessary.

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