

Bovine Trichomoniasis

a venereal disease of cattle

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Bovine Trichomoniasis

Trichomoniasis is a venereal disease of cattle that has caused significant economic losses in American cattle herds for many years. The causative organism is *Tritrichomonas foetus*.

North Dakota has not had a reported case of bovine trichomoniasis since at least 1991. However, in recent years, neighboring western states have reported an increased incidence of trichomoniasis.

Economic losses primarily are due to open cows, repeat breeding and subsequent longer calving intervals. Consequently, affected herds have smaller and less uniform calf crops, increased culling rates, increased demands for replacement females and increased veterinary expense.¹

Tritrichomonas foetus: The Organism

Tritrichomonas foetus is a single-celled protozoon. *T. foetus* is one of many different types of trichomonads (family of organisms). Trichomonads also include *Tritrichomonas vaginalis*, which causes venereal disease in humans, and several other nondisease-causing species found in the gastrointestinal tract of domestic animals.¹

T. foetus is found primarily in cattle, but also has been found in swine nasal and intestinal passages, and in the digestive system of cats. In swine and cats, the organism is considered either nonpathogenic or mildly pathogenic, such as in the cat, where it has been associated with chronic mild diarrhea.^{2,3}

T. foetus is extremely sensitive to drying and heat. Therefore, the organism must reside in the cow or bull to survive and is transmitted only by breeding.

Cases of transmission of *T. foetus* at artificial insemination (AI) bull studs have been reported, but this is presumed to have occurred through contact of the penis with the rump or escutcheon of the teaser animal that had been contaminated through similar contact with an infected bull.⁴

Some confusion exists between the diseases "trichomoniasis" and "trichinellosis." Trichinellosis is a zoonotic (passed between animals and people) disease found in swine and is caused by a nematode (worm), which is completely different than trichomoniasis, which is found in cattle and is not a zoonotic disease.

Trichomoniasis in the Bull

Bulls infected by *T. foetus* are asymptomatic (have no symptoms). Semen quality and sexual behavior are not affected. In bulls, the organism is found only on the penis and membranes inside the sheath. It localizes in the smegma, or secretions, of the penis, sheath and end of the urethra.⁴ *T. foetus* does not normally live and reproduce in semen, but semen can become contaminated with organisms from the epithelial lining of the penis, prepuce and distal urethra.

The penis and sheath have crypts, or microscopic folds within the epithelial lining of the penis and sheath, and provide sites for localization of the organism. Because these crypts become deeper as the bull ages, a definite association exists between age and infection; mature bulls are more apt to become infected and stay infected for life.

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Trichomoniasis in the Cow

The organism colonizes the vagina, uterus and oviduct of the cow, but does not prevent initial conception (pregnancy). Cows may not appear infected until 1.5 to two months postinfection. Pyometra (uterine discharge) and abortion are often the first signs noticed, but this may occur in only 5 percent or less of the animals infected.

Colonization and infection of the cow take place at breeding. After the protozoa attach to the lining cells of the vagina, they form colonies that spread to the uterus and oviducts. The uterus reacts to this colonization with an inflammatory response. The inflammation usually terminates the pregnancy.

In rapidly developing infections, death of the developing embryo may occur before day 18 after breeding, with the cow returning to heat on her next 21-day cycle. This is not common.

Usually, inflammation due to trichomoniasis usually lasts 50 to 60 days. The cow clears the infection at this time and will rebreed if the bull still is available for service.

In some cases, infection may take an extended period of time to overtake the fetus and abortion may not occur until seven to eight months of gestation. This also is not common.

Immunity is short-lived, however, and cows will be susceptible to infection in subsequent years. Rarely, an infected cow may carry a normal calf to term and not clear her infection, remaining infected, and be a carrier to the next breeding season

In summary, an infected female may lose her first pregnancy, clear the infection and return to estrus. If a bull is available for service,

a second full-term pregnancy will occur. This results in a long, drawn-out calving season. If a bull is not available for service, the cow will remain open until the next breeding season or will be identified as open upon pregnancy testing.

Trichomoniasis in the Herd

The overall herd effects of trichomoniasis are:

1. An extended calving season results, especially when bulls are left with the cows for an extended breeding season (> 90 days).
2. Poor pregnancy rates result when bulls are pulled from breeding pastures in a timely manner (\leq 90-day breeding season).
3. Although abortions are a routine outcome due to trichomoniasis, abortions typically are not observed because they occur at an earlier stage of pregnancy.
4. Ultrasound examination may reveal evidence of dead fetuses or pyometras if cows are examined during the proper time window.
5. Cows return to estrus in midbreeding season.

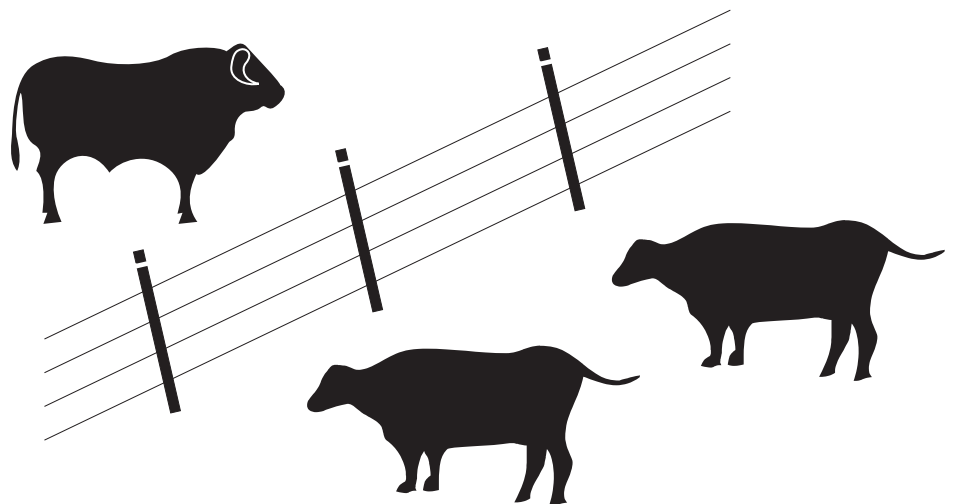
Transmission of Trichomoniasis

Natural breeding is where *T. foetus* is transferred between infected cattle. Thirty percent to 90 percent of cows bred by an infected bull will become infected. The infective dose of *T. foetus* is a relatively small number of organisms.³

Infection of a previously uninfected herd may occur with the addition of an infected female, but usually occurs when nonvirgin bulls are purchased, borrowed or rented; when animals are commingled on common grazing tracts; or when cattle mix with neighboring herds through downed fences.

Trichomoniasis Diagnosis

Herd diagnosis usually is made by testing the bulls. Definitive diagnosis is made by observation of *T. foetus* in smegma samples (scrapings or washings). Culture techniques that enhance growth of the organisms usually are necessary for enough organisms to be present for identification.



Because trichomoniasis is a regulatory issue in many states, you will need to involve your veterinarian.

Bulls should have at least two weeks of sexual rest before undergoing testing. Collection of the sample involves using a dry AI pipette attached to a syringe and vigorously scraping the interior of the bull's sheath to obtain a smegma sample. The sample then is placed into a culture tube or pouch for incubation.

Two types of culture systems commonly are used by veterinarians to collect the samples and ship them to a veterinary diagnostic laboratory for testing:

1. InPouch TF, which is a commercial pouch in which the sample can be placed, incubated and examined
2. Diamond's media, which is placed into tubes into which the sample also is placed.

After incubation, the culture fluid is checked under a microscope. *T. foetus* organisms, if present, are identified by their distinct features and a characteristic rolling, jerky motion exhibited by the protozoa.

The sensitivity of a single-sheath culture in an infected bull is estimated to be from 70 percent to 90 percent. Veterinarians recommend that bulls be serially sampled once a week for three weeks in a row. Serially testing bulls in this manner raises the sensitivity

of the procedure to 99.8 percent to 99.9 percent. The consequence of a false negative (actually positive) bull being allowed to breed cows and heifers justifies the three weekly tests.

Cows can be sampled for trichomoniasis. *T. foetus* organisms infecting cows can be found in mucus from the cow's vagina or cervix or from pyometra fluid. Samples are placed in culture fluid, incubated and examined in the same manner as samples from the bull. Since cows clear the organism after infection, the sensitivity of testing cows is much lower than that for bulls, averaging between 58 percent and 75 percent.¹

Polymerase chain reaction (PCR) testing recently has become available and can shorten the time needed to obtain test results. The PCR test will detect *T. foetus* down to the level of 6.5 organisms per milliliter of wash sample.

The NDSU Veterinary Diagnostic Laboratory recommends that samples be submitted in the above-mentioned pouches. This will allow the organism, if present, to begin multiplication in the media while in transit to the laboratory.

For more information regarding testing for trichomoniasis, contact your local veterinarian or the NDSU Veterinary Diagnostic Laboratory at (701) 231-8307.

Trichomoniasis Prevention and Containment

Dealing with trichomoniasis can be considered in two ways:

1. Prevention – Keeping the disease out of your herd
2. Containment – Minimizing the impact of the disease on your herd

Prevention: Keeping Trichomoniasis Out of Your Herd

Keeping a herd free of trichomoniasis is dependent on managing potential sources of the disease:

1. Females. Female additions should be virgin heifers from a reputable source. Purchase of bred cows or heifers should be only from reputable sources, preferably from areas in which trichomoniasis has not been found.
2. Males. Purchase only virgin bulls or bulls that test negative for three weekly tests. North Dakota has specific rules for bulls coming from out of state. See North Dakota Board of Animal Health order 2007-03⁵.
3. Use AI and synchronization programs as much as possible to decrease the need for bulls.
4. Maintain good fences.
5. Avoid communal grazing situations if possible.

Trichomoniasis Treatment

No approved, effective treatment exists for trichomoniasis in cows or bulls.

Containment: Management of the Infected Herd

If a herd is infected with trichomoniasis, measures must be implemented that will reduce its impact next breeding season and protect others around you. These measures include:

1. Testing all herd bulls. Remove or sell all positive bulls (to slaughter) and replace with virgin bulls. Implementing AI or increasing the use of an AI program should be considered.
2. Culling all open and late-calving cows. These are the cows most likely to be carriers of *T. foetus*. Late-calving cows are more likely to be long-term carriers.
 - Pregnancy checking should be conducted in a timely manner to detect infected cows as soon as possible, and implementation of a short breeding season – 90 days or less – is important.
 - Segregating cows based on gestation length at the time of trichomoniasis diagnosis may be considered:
 - a. Cows pregnant five or more months have the lowest risk.
 - b. Cows pregnant less than five months should be pastured separately and observed closely. Cull any of these cows that abort.
 - c. Open cows with or without pyometras or other uterine abnormalities should be culled.
3. Maintaining biosecurity by preventing any reintroduction of disease.
 - Ensure replacement animals are virgins or tested clean.
 - Maintain good fences.
4. Dividing the herd into a “clean” herd and a “dirty” herd. This option is to be considered only when facilities and personnel resources are available. The “clean herd” would consist only of virgin heifers and cows not exposed to infected bulls. The “dirty” herd eventually would be culled (to slaughter) by attrition (culling through time)
5. Vaccination. A vaccine is available. Vaccination alone will not clear up a trichomoniasis infection. Vaccines, when used according to label directions, show effectiveness in the female, but not in the bull. Vaccination will not prevent transmission and infection by *T. foetus*. Vaccination will limit the duration of infection and result in more pregnancies being carried to term. Vaccination should be considered only when bulls cannot be tested or removed, when desirable management practices cannot be employed or in other high-risk situations.

References

1. Grahn, R.A.; BonDurant, R.H.; van Hoosear, K.A.; Walker, R.L.; Lyons, L.A. An improved molecular assay for *Trichomonas foetus*. *Vet Parasit* 2005; 127:39-47.
2. Anonymous. Trichomoniasis. In: *Merck Veterinary Manual*, 9th ed. Whitehouse Station, N.J., Merck and Co. 2005, pp. 1142-3.
3. Gookin, J.L.; Breitschwerdt, E.B.; Levy, M.G.; Gager, R.B.; Benrud, J.G. Diarrhea associated with trichomonosis in cats. *J Am Vet Med Assoc* 1999; 215:1450-4.
4. Kimsey, P.B. Bovine trichomoniasis. In: Morrow, D.A. (Ed.): *Current Therapy in Theriogenology*, 2nd ed. Philadelphia, W.B. Saunders 1986, pp. 275-9.
5. North Dakota Board of Animal Health Order. Accessed at www.agdepartment.com/Programs/Livestock/BOAH/BoardOrder2007-03TrichomonasTesting.pdf. Accessed on Aug. 10, 2007.

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