

Trichomoniasis (Trich)¹

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Bovine trichomoniasis is a venereal disease of cattle characterized by a period of pronounced infertility following natural breeding. The infertility is not due to problems in conception, but rather due to early embryonic death or abortion, which may lead to post-breeding pyometras and prolonged inter-estrus intervals. Because it causes virtually no systemic illness, it is often present in a herd for a considerable time, causing devastating losses due to poor calf crops and prolonged calving seasons before it is suspected and diagnosed. Identified risk factors for trichomoniasis include, age of bulls (older bulls are a higher risk of infection) herd size (herds with a larger number of cattle have a greater probability of infections) and shared grazing that results in increased exposure to potentially infected bulls. Trichomoniasis has been diagnosed in every state in the United States. The earliest problem herds were primarily dairy, but with the increased use of artificial insemination, the infection rates in dairy herds have been drastically reduced. Currently the disease seems to be maintained primarily in beef herds, especially those found in the western and southern U.S., where rangeland is open and natural breeding is common.

The disease trichomoniasis is caused by the flagellated protozoan parasite *Tritrichomonas foetus*, an obligate parasite of the bovine reproductive tract. The organism lives in the reproductive tract of the cow and in the crypts (wrinkles or folds) on the mucosal surface of the bull's penis and sheath.

Infection in the bull creates no identifiable clinical signs or lesions. The causative organism is an external parasite for a bull, living in the crypts of the penis and the sheath. Since these crypts develop with age, old bulls (4+ years) usually become permanently infected after exposure and carry the disease into the next breeding season. In young bulls (under 3-4 years of age), trichomoniasis tends to be a transient infection, with transmission by these young bulls apparently relying on sexual contact with a noninfected cow within a matter of minutes to days following the initial breeding of an infected cow. Bulls under four years of age that become infected will tend to "clean up" after the breeding season. Unfortunately, infected bulls will show no signs or symptoms of the disease. It should also be noted that the organism can survive the freezing process used to preserve semen, and every precaution should be taken to insure that bulls used for semen collection are free of the infection. Transmission of the disease in semen

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can be prevented if producers use semen from companies that follow the Certified Semen Services (CSS) protocol.

Infection in the cow occurs primarily through natural service with an infected bull, but contaminated semen or contaminated insemination equipment may also be sources of infection. Infected cows will develop a redness of the vagina, cervix and uterus. The organism may be found in the mucus secretions from any of these affected areas. Infections may result in small quantities of a mucopurulent vaginal discharge within a few weeks of breeding, but signs are rarely observed. The infected cow will conceive, but death of the fetus occurs within the first half of gestation, more commonly between 7 to 10 weeks of gestation. The infected cow will usually remain infertile for 2-6 months. Most infected cows will become free of the organism and develop resistance to the disease. This acquired immunity to reinfection will be variable, lasting from 6 months to a year. Latent infections of pregnant cows may rarely prevail through the entire gestation period. These carrier cows can serve as reservoirs of infection for the herd. Carrier cows are rare, however. In herds with longer breeding seasons, a cow could become infected, lose the embryo, be infertile for several months, become free of the organism, get rebred, conceive, and carry a calf to term.

Trich-infected herds experience decreases in calf crops and delayed calving. The cows conceive, but often the developing embryo dies. Some infected cows carry a fetus to term and deliver a normal calf; however, these cows are still infected and can serve as reservoirs of infection the following year. Trichomoniasis can be especially damaging because it does not cause any alarming clinical signs. It often goes undetected until a producer takes a critical look at the herd's reproductive efficiency. Beef producers that accept a 60% or 75% calf crop may never know when they have the disease and operators that calve year-round are not able to determine their actual reproduction efficiency. During an initial encounter with trichomoniasis, the herd can easily experience a loss of 50% in calf crop, especially in those herds where the breeding season is relatively short (45-60 days in length). In subsequent years, the calf crop in the infected herd may not be as drastically affected as

it was initially, but the herd can still experience a 10-20% reduction in the calf crop. The rebound effect occurs because the cows develop an immune response to the organism.

Diagnosis of trichomoniasis is on a herd basis. When one individual is infected then the herd is most likely also infected. When observing an infected herd, a rancher may notice the bulls going back to work at the end of a long breeding season, a lot of open cows at the end of a short breeding season, a 10% to 40% reduction in pregnant cows at pregnancy check time, a spread out calving season or a wide variation in weaning weights. When ranchers notice any of the herd signs described, they should call a veterinarian to obtain a confirmed laboratory diagnosis. Keep in mind that other diseases can cause similar signs; confirm diagnosis by finding the organism in the herd. Since most cows will eventually become free of the organism after infection, the cow is not the ideal candidate to start with when trying to diagnose trichomoniasis. Diagnosis in the bull involves collecting a sample from the prepuce, transporting and culturing the sample in special growth media, tentatively identifying the organism by microscopic examination, with confirmation using polymerase chain reaction (PCR) to identify the protozoan DNA as *trichomonas foetus*, rather than another protozoan organism. Samples should be transported at ambient temperature, kept out of sunlight, not refrigerated, and delivered promptly to the diagnostic laboratory. It is virtually impossible to get a confirmed diagnosis in every infected bull. The organism is extremely fragile and dies easily. One negative culture on a bull does not label him disease free. If a sensitivity of 90% is acceptable to consider a bull free of the organism, it is recommended that three successive cultures be taken at one- to two-week intervals. Finding the organism in just one bull indicates an infected herd. All bulls in a herd should be tested rather than just a sampling of bulls. Diagnosis in the female requires identifying or culturing the trichomonads from cervico-vaginal mucus, uterine exudates, placental fluids or fetal abomasal contents, with confirmation utilizing PCR.

Once trichomoniasis has been confirmed in a herd, a management scheme must be implemented to minimize and hopefully eliminate the disease. In the

United States there is currently no legal, efficacious treatment for trichomoniasis in either the bull or the cow. The disease challenge in an infected herd can be reduced by identifying and removing infected bulls, culling open cows, shortening a long breeding season, and purchasing only tested free bulls or virgin bulls. A trichomoniasis-free bull is one that has been sexually rested for two weeks before testing begins and has tested negative three consecutive times at weekly or bi-weekly intervals. A virgin bull is one that has never bred a cow and has never been pastured or housed with a bull that has bred a cow. Some of the older literature suggests that young bulls who frequently mount each other may leave an STD pathogen on the skin of the mounted bulls rump. Whether such hindquarter exposure occurs in natural mating is not known, but is unlikely. It is known that *tritrichomonas foetus* is susceptible to desiccation and to ultraviolet light, hence their survival time on the surface of the hair coat of a bull is probably very brief, and the opportunity for transmission between males is therefore very limited. A trichomoniasis management plan may also utilize vaccinating susceptible females within the herd against *tritrichomonas*. There is a commercially available killed whole cell *tritrichomonas foetus* vaccine (Trich Guard, Fort Dodge Animal Health, Overland park, Kansas). The vaccine is labeled for use in cows only. There is no label claim for efficacy in a bull. Use in bulls would be considered as extra label use. The initial vaccination regime for the cow herd requires two doses administered 2-4 weeks apart. The second injection and an annual booster should be given four weeks before breeding so that the cow has time to build resistance.

To prevent a herd from becoming infected with trichomoniasis foetus can be difficult due to management systems in the United States that allow the movement of cattle in and out of herds; however, a few simple management procedures (biosecurity protocols) can assist in reducing the possibility of a herd getting infected. Those procedures include:

1. Maintain a young bull battery.
2. Conduct a fertility exam and culture all bulls before the breeding season.

3. Purchase only virgin, yearling bulls.
4. Do not share or lease bulls.
5. Do not purchase older cows and add them to your herd.
6. Cull open cows.
7. Maintain a defined breeding season to identify reproductive problems.
8. Pregnancy test all cows and heifers 120 days after the breeding season and cull open females.
9. Keep fences in good repair to keep your neighbor's herd out.
10. You may elect to vaccinate, but vaccine alone will not prevent the disease from getting into the herd.

Trichomoniasis is an economically significant disease. Preventing the introduction of the disease into your herd can be difficult if biosecurity protocols are not implemented and maintained. Once this disease is introduced into a herd, eliminating it may require significant changes in herd management procedures.