



# Indian Veterinary Magazine

## a monthly Magazine

of the people, by the people, for the people



Vol 2 Issue 5 May 2026, 723-727

ISSN:3108-1398

## Bovine Trichomoniasis: A covert danger to the effectiveness of reproduction

Sourav Maparu<sup>1\*</sup>, Jaita Biswas<sup>2</sup>

<sup>1,2</sup> Veterinary Officer, Animal Resource Development Department, Govt. of West Bengal, India

\*Corresponding Author: Sourav Maparu (e-mail: [souravmaparu123@gmail.com](mailto:souravmaparu123@gmail.com))

[doi.org/10.5281/IndianVetMag.20716755](https://doi.org/10.5281/IndianVetMag.20716755)

### ★ Key message

- Bovine trichomoniasis is a sexually transmitted disease caused by *Tritrichomonas foetus* that leads to infertility, early embryonic death, abortion, repeat breeding, and significant economic losses in cattle herds, with infected bulls serving as lifelong asymptomatic carriers.
- Since no fully effective treatment exists, control of trichomoniasis relies primarily on prevention through testing and culling infected bulls, vaccination of breeding females, use of artificial insemination, and strict herd biosecurity and breeding management practices.

### Abstract

Trichomoniasis is a sexually transmitted illness that affects cattle. Trichomoniasis is caused by the flagellated trichomonad protozoan *Tritrichomonas foetus*. Cattle can contract *Tritrichomonas foetus* through cow-to-bull or bull-to-cow routes. When *Tritrichomonas foetus* interacts with host epithelial cells, a number of proteases are activated, which causes the epithelial cells to die. After three to twenty-two months of incubation, heifers exhibit clinical signs such as vaginitis, endometritis, and edema of the vulva, perivaginal tissue, and uterine wall. Convalescent and acquired immune responses to *Tritrichomonas foetus* infection show the host's ability to mount innate responses both locally and systemically. Reducing the herd's exposure to other cattle and keeping open cows out of the herd are good prophylactic methods.

### Introduction:

In cattle, trichomoniasis, often known as Trich, is a sexually transmitted disease. Reduced calf yields from infected cows and smaller weaning weights from a prolonged or delayed calving season are characteristics of the disease. In 1932, dairy cattle from Pennsylvania were found to have the disease, and in 1958, it was discovered in beef cattle from the western United States (Yao, 2021). In certain regions, the disease continues to result in substantial financial losses due to infertility, abortion and the removal of carrier bulls (Rodning

*et al.*, 2008). Due to the use of hygienic artificial insemination, the disease has been shown to be less common in intensively farmed dairy and beef cattle (Mendoza-Ibarra *et al.*, 2012).

#### **Etiology:**

*Tritrichomonas foetus*, a fastidious flagellated trichomonad protozoan belonging to the phylum Parabasalia, order Trichomonadida, and family Trichomonadidae, is the cause of trichomoniasis, a significant STI (Dabrowska *et al.*, 2019). *Tritrichomonas foetus* infections in cattle can result in vaginitis, cervicitis, endometritis, infertility, abortion, and occasionally pyometra.

#### **Morphology:**

Binary fission is the method of multiplication used by trichomonads, which are intricate single-celled creatures. The parasite measures 5 to 25 µm. These highly motile protozoa are about twice the size of white blood cells. *Tritrichomonas foetus* contains three anterior flagella and a recurrent flagellum that proceeds toward the posterior part of the cell, clinging to the cell body to produce an undulating membrane. They do "barrel rolls" and move in a forward, jerky manner. Under a microscope, the organisms resemble tiny tadpoles with little tails. By attaching to the host's intestinal epithelium, the parasite interacts with bacteria that typically live in the digestive tract (Singh B.N. *et al.*, 2001).

#### **Transmission:**

*Tritrichomonas foetus* can spread between cattle by either cow-to-bull or bull-to-cow pathways. The organism may spread from the bull's prepuce, where the parasite prefers to live, if a bull naturally mates with an infected cow. Bull-to-cow transmission is the most frequent method. The cow may contract the infection by natural breeding with an infected bull or through artificial insemination with an infected bull's semen. However, in artificial insemination, *T. foetus* is typically destroyed by drying or high temperatures, even though it can survive the technique used to freeze semen after collection. *Tritrichomonas foetus* in cattle can only effectively spread from one host to another since it is unlikely to survive outside of the animal (Dabrowska *et al.*, 2019).

#### **Pathogenesis:**

There is little knowledge about the pathophysiology of trichomonad infection. It is believed that cytotoxicity and cyto-adherence are the main mechanisms. It is an extracellular parasite that parasitizes the vaginal epithelium after passing through the mucus barrier. In vivo, *Tritrichomonas foetus* first attaches to and infects the vagina, resulting in vaginitis. It subsequently moves up to the uterus, oviduct, and possibly even the placenta. Adhesion molecules on the parasite's surface, either by itself or in conjunction with other soluble parasite molecules like hydrolytic enzymes, cytotoxic molecules, cell detaching, or cell lytic factors,

are necessary for trichomonads to bind to vaginal epithelial cells for colonization and infection. *Trichomonas foetus* invades the placental tissue of cows, resulting in inflammatory alterations in the oviducts and endometrium. *Trichomonas foetus*'s interactions with host epithelial cells are linked to the activation of several proteases that result in the death of epithelial cells. Different levels of inflammation are caused by this progressive invasion of the genital canal, which can lead to temporary or permanent infertility ((Felleisen and Richard, 1999).

### **Clinical Signs and Symptoms:**

Clinical symptoms in heifers include vaginitis, endometritis, and edema of the vulva, perivaginal tissue, and uterine wall following an incubation period of three to twenty-two months. The conceptus dies between 30 and 50 days of gestation, while some abort as late as five months. Fertilization and implantation are unaffected. Early embryonic mortality, abortion, fetal macerations, and/or pyometra are all signs of a *Trichomonas foetus* infection in cows. After calving, many cows are able to eradicate the illness. For up to two months following the first infection, cows may exhibit visible symptoms of illness, such as a sticky, white vaginal discharge. The illness causes the embryo to be aborted, frequently within 10 days of fertilization. Trichomoniasis may be indicated by signs of infertility or repeat breeding. After the fetus is aborted, the cow may go into estrus again and resume a typical estrous cycle, after which it may be bred again. The cow will eventually be able to carry a fetus to term and cycle regularly. Cows can effectively eradicate the virus, but reinfection is possible, whereas bulls are affected for life. Bulls can infect females during mating, but they do not exhibit any clinical symptoms of illness. The infection is venereal and asymptomatic. Because the deep crypts of the penile integument and preputial mucosa offer a favorable home for the parasite. Bulls aged five years or above frequently become lifelong carriers. Sometimes urethritis is observed (Rodning *et al.*, 2008).

### **Vaccine immunology in Animals:**

The host's capacity to mount innate responses both locally and systemically is demonstrated by convalescent and acquired immune responses to *Trichomonas foetus* infection. Trichomonal IgA and IgM antibodies also rose in serum, although IgG1 was the most common trichomonal antibody isotype. IgA was the most common trichomonal antibody found in cervicovaginal mucus. Cattle benefit from vaccination against *Trichomonas foetus* because it creates inductive sites for a local IgA response in the vaginal mucosa, which makes it a highly promising method of treating trichomoniasis. TF1.17, the bovine *T. foetus* surface antigen, is an adhesin that is shared by all isolates. Cattle vaccinated with the purified antigen have reduced cytopathogenicity and a quicker recovery from infection (Edmondson *et al.*,

2017). For vulnerable females, whole-cell and subunit vaccinations offer protection whether given intravaginally or systemically.

#### **Commercial Vaccine:**

TRICHGUARD is the first and only vaccination approved to lessen *Tritrichomonas* fetal organism shedding and helps to prevent cattle from contracting trichomoniasis, a venereal disease spread by bulls that can result in abortion. This commercially available monovalent vaccination is somewhat protective and contains  $5 \times 10^6$  dead cells of the whole *Tritrichomonas foetus* suspended in a unique oil adjuvant. In addition to helping to lessen *T. foetus* shedding, TRICHGUARD V5L HB offers demonstrated defense against illness brought on by *Campylobacter fetus* (vibrio) and five serovars of *Leptospira* sp.

#### **Diagnosis:**

Both males and females can be diagnosed, although bulls are checked more frequently because they are carriers. Cattle infertility symptoms and geography might be used to make a tentative diagnosis. Microscopic analysis of vaginal or preputial smears may be necessary for diagnosis (Yao, 2021). To find parasitic antibodies in vaginal secretions, complement fixation can be used. According to a study by Richard Felleisen, the Polymerase Chain Reaction (PCR) produced a more precise diagnosis of *T. foetus*. It was discovered that the *T. foetus* genome had 12 copies of the 5.8S rRNA gene. This suggested that PCR amplification of this gene could be used to identify the organism. The InPouch TF from a bull's prepuce scrape sample can also be used for diagnosis.

#### **Treatment & Control:**

Bulls can be handled in a variety of ways. Although several imidazoles have been utilized, none of them are both safe and useful for treatment. Although ipronidazole is likely the most effective, it frequently results in sterile abscesses at injection sites because of its low pH. Additionally, even after receiving effective treatment, bulls may remain carriers for the rest of their lives and are readily susceptible to reinfection. In order to give the diseased vaginal and uterine lining time to shed, cows might be treated by being left alone for around three months. Dimetridazole is another effective treatment for semen that can be utilized for artificial insemination. Culling the animals and substituting them with virgin animals following positive test findings is still the most efficient way to eradicate the illness in a herd or an individual. If given enough time to shed the illness, cows can stay in the herd; otherwise, they can be culled like bulls to ensure the herd is free of the infection and to facilitate a quicker turnover (Felleisen and Richard, 1999).

**Conclusion:**

Cattles have a poor prognosis. If a cow is bred to an affected bull, an estimated 42% of cows will contract the disease. Culling infected bulls is recommended; cows should also be culled because they are susceptible to reinfection even after the initial infection has been cleared. There is currently no effective therapy for trichomoniasis. The only solutions are prevention and wise farming techniques. Any bull should be tested before being introduced to the herd. Good preventative measures include reducing the herd's exposure to other cattle and preventing the entry of infected bulls into the herd.

**References:**

- Edmondson, Misty A., *et al.* "Impact of a killed *Tritrichomonas foetus* vaccine on clearance of the organism and subsequent fertility of heifers following experimental inoculation." *Theriogenology* 90 (2017): 245-251
- Dąbrowska, Joanna, *et al.* "Tritrichomonas foetus as a causative agent of tritrichomonosis in different animal hosts." *Journal of Veterinary Research* 63.4 (2019): 533-541
- Felleisen, Richard SJ. "Host-parasite interaction in bovine infection with *Tritrichomonas foetus*." *Microbes and Infection* 1.10 (1999): 807-816
- Singh, B. N., *et al.* "Immunological and biochemical analysis of glycosylated surface antigens and lipophosphoglycan of *Tritrichomonas foetus*." *Journal of Parasitology* 87.4 (2001): 770-777
- Yao, C. 2021. Control and eradication of bovine trichomonosis in Wyoming, USA by testing and culling positive bulls. *Vet. Res.* 52(1), 129
- Rodning, S.P., Wolfe, D.F., Carson, R.L., Wright, J.C., Stockdale, H.D., Pacoli, M.E., Busby, H.C. and Rowe, S.E. 2008. Prevalence of *Tritrichomonas foetus* in several subpopulations of Alabama beef bulls. *Theriogenology* 69(2), 212–217.
- Mendoza-Ibarra, J.A., Pedraza-Díaz, S., García-Peña, F.J., Rojo-Montejo, S., Ruiz-Santa-Quiteria, J.A., San Miguel-Ibáñez, E., Navarro-Lozano, V., Ortega-Mora, L.M., Osoro, K. and Collantes-Fernandez, E. 2012. High prevalence of *Tritrichomonas foetus* infection in Asturiana de la Montaña beef cattle kept in extensive conditions in Northern Spain. *Vet. J.* 193(1), 146–151.