



Bovine Trichomoniasis: Health and Economic Impacts on Arizona Cow-Calf Operations

Ashley Wright, MS and Peder Cuneo, DVM, MS



Figure 1: The *Trichomonas foetus* organism

Trichomoniasis (or Trich, as it is commonly referred to in the industry) is a reproductive disease in cattle that can seriously impact the bottom line of Arizona ranches and the cow-calf industry. This disease has been recognized in all major cattle-producing countries and is endemic in the western and southwestern United States, including Arizona. Cattle operations in this region have unique challenges to controlling Trich: cattle graze very large, open tracts of land and because of this are often less intensively managed and unintentional co-mingling is relatively commonplace. Currently, the most effective means of disease control is testing for and culling positive bulls. Most western states have enacted legislation which requires bull testing in an attempt to control the disease. These measures range from only testing bulls being sold for breeding purposes to requiring annual testing for all bulls grazing on public land. In addition to regular testing, taking proactive management steps to prevent the introduction of Trich into a herd is key to decreasing its impact both at the individual ranch and cow-calf industry level.

Transmission and Infection

Trich is caused by a microscopic, one-celled protozoa, *Trichomonas foetus* (*T. foetus*) which infects the cow's uterus, and can result in early fetal death, abortion, and infertility. The bull is the most important link in the transmission of the disease in the herd. The parasite is present on the mucosa of the penis and in the crypts of the prepuce of the bull. These crypts are created by folds in the epithelium which form the lining of the prepuce, and they offer a favorable environment for the proliferation of the trichomonas organisms. Trichomoniasis causes a very mild inflammation of the affected tissues in the bull, thus there may be virtually no clinical signs of disease. Older bulls (4 years or older) tend to have more developed prepuccial crypts and are more likely to be chronically infected, however young bulls can still pick up and transmit the disease, and may be infected for life. There is no definitive treatment for bulls infected with the trichomonas organism.

Cows become infected with *T. foetus* when they are bred by an affected bull. The organism infects the cervix, vagina and uterus of the cow. As with the bulls, clinical signs of the disease are not usually apparent; although infrequently, a cow may show a slight vulvar discharge. This clinical sign may be easy to miss in the case of beef herds grazing on large geographic areas, as is common practice in Arizona. The uterine infection caused by *T. foetus* eventually disrupts the intrauterine environment and the infected cow, resulting in abortion of her fetus between 18 days and five months of gestation, with losses most commonly occurring at days 40-60 of the pregnancy. Following the initial infection and abortion, the cow will likely have temporary immunity, during which time she may be able to conceive and carry a calf to term. While actively infected she can transmit the organism to another bull if he attempts to breed her.

Cows are generally able to fully clear an infection with *T. foetus* if allowed a period of sexual rest (no exposure to infected bulls) for several heat cycles following infection, however there have been reports that a carrier condition occurs with this disease. If this is the case, the infected cow can conceive and carry the organism through gestation, calving, and maintain the infection for at least six to nine weeks following calving. It is believed that this is not a common occurrence, and the majority of cows that have calved normally are uninfected. The cervical mucus of cows can be tested for *T. foetus* if a carrier cow condition is suspected. One indication that cows have or have had Trichomoniasis is the presence of pyometra (a uterine infection) at the time of pregnancy checking, or observation of large, firm reproductive tracts, resulting from metritis (inflammation) and scarring in the uterus.

Effects on Production

Calf production losses are the most common identifier in cow herds that become infected with Trichomoniasis. In newly infected herds, pregnancy percentages may drop off sharply, alerting herd managers that there is a problem. However, herds that are chronically infected may not see a significant drop in pregnancy, instead their average percentage may hover around 60-70% over several years. If herd animals are not tested to positively identify the Trich organism, infection related calf losses, decreased pregnancy percentages, and an extended calving season may be incorrectly attributed to drought or other factors. Arizona ranches tend to follow one of two types of reproductive management systems. Some operations use short, defined breeding seasons where the bull is left with the cows for 45-90 days and then removed from the herd. On these types of operations, the rancher is likely going to experience a significant drop in pregnancy percentage as cows become infected and abort their pregnancy. The other

type of management is an extended breeding season where bulls are left out with the herd for most or all of the year. In these types of management scenarios, a Trich infection may be particularly difficult to catch early on. There will be only a small decrease in pregnancy percentage since cows will have time to become infected, abort, develop immunity and go on to conceive again and carry the calf to term. It is possible that a cow can go through this cycle more than once before finally carrying a calf to term. This results in fewer non-pregnant animals, but an increase in calves born later in the calving season and a lengthened calving interval. These later born calves will have lighter weaning weights and cows that have fallen behind the calving season are difficult or impossible to catch back up, contributing to Trich's devastating impact on ranch income.

Diagnosis and Control

The definitive diagnosis of Trichomoniasis depends on the collection and identification of the organism from cervical mucus (cows) and/or prepuccial smegma (bulls). In most cases, the recommended course of action involves sampling the entire bull battery for the organism and culling positive bulls. Ideally, testing should be done 60 days prior to the breeding season to allow for identification and replacement of any Trich-positive bulls. Bulls should also be tested at the conclusion of the breeding season, especially if the herd has had a previous issue with Trichomoniasis. If Trich is identified in your herd, work with your local veterinarian to develop a plan to eradicate it from your operation. This plan may include more frequent testing of bulls and/or cows and allowing cows a period of sexual rest to clear themselves of the organism. Controlling and eliminating a Trich outbreak could take several years.

Herd Strategies

There is no effective treatment defined for Trich, the primary mechanism of control is prevention. There are several management recommendations that can help prevent the introduction of the disease in the herd or limit its spread. These strategies include:

- Only purchase virgin replacement bulls and heifers and use, as much as possible, home raised heifers
- Don't add cattle to your operation from unknown sources or with unknown calving histories (especially open cows)
- Do not share or lease bulls with neighboring operations
- Maintain fences to discourage bulls and cows from wandering
- Test all bulls introduced into the herd before exposure to cows
- Test all bulls yearly 60 days prior to the breeding season and at the conclusion of breeding season

- Bulls should be replaced after 4 years of service
- Remove any neighboring animals that trespass on your operation
- Consider transitioning to a defined breeding season

Pregnancy checking the cow herd can help identify a potential issue early. Cull open cows, or any cow with possible pyometra or uterine scarring. There is a vaccine available for aiding in the control of the Trichomoniasis organism. Vaccination can be effective if used with other control measures. Initial vaccination requires 2 shots 6-8 weeks apart, followed by an annual booster. Cattle, including bulls, should be vaccinated before the start of the breeding season as the antibody response is relatively short lived.

Economic Impacts

Economically, a Trichomoniasis infection can cause significant damage to a ranching operation's bottom line. The profitability of a ranching operation depends upon the difference between the cost of raising cattle (feed, grazing fees, health care, overhead) and the profit from selling live,

weaned calves. Trich affects both ends of this equation. It increases expenditures in the areas of health care (testing costs), feed (feeding confined bulls during the testing period), and increases the number of replacement heifers that must be retained or purchased. Positive bulls must be sold for slaughter only (reduced value) and replaced at a higher price. On the other side of the equation, a Trich infection seriously undermines profitability by decreasing both the number of calves to sell and their total weight as calves born later in the calving season are lighter at sale time.

A 2017 New Mexico State University survey of producers who had experienced Trich on their operations indicated that during the outbreak, they experienced an average of 27% decline in number of weaned calves (91% to 64%). Additionally, they culled nearly twice as many cows (10% vs 19%) and almost half of their bulls (46% during Trich vs 12% before Trich). When they applied the economic impact of these effects on a hypothetical, average New Mexico cow-calf herd they determined a loss in profit of nearly \$400 per cow (Prior to Trich a profit of \$192.56 per cow and with Trich a loss of \$209.27 per cow).

Table 1. Economic Profile of Trichomoniasis in New Mexico

	Without Trich	Per Cow	With Trich	Per Cow
Number of Cows	400		400	
Calf Crop Percentage	91%		64%	
Weaning weight				
Heifers	495		486	
Weaning Weight Steers	515		509	
Trich Test/Bull	\$0.00	\$0.00	\$46.25	\$0.12
Bull Cost	\$8,000.00	\$20.00	\$91,107.14	\$227.77
Total Return	\$242,063.00	\$605.16	\$166,114.00	\$415.29
Total Cost	\$165,037.00	\$412.59	\$249,822.00	\$624.56
Return Above Total Cost	\$77,025.00	\$192.56	-\$83,708.00	-\$209.27
Change in Return				-\$401.83

Table adapted from Economic Impacts of Trichomoniasis (Wenzel, et. al., 2018)

Summary

Controlling Trichomoniasis on a cattle operation requires a multifaceted approach of good management strategies and regular surveillance and testing. A breeding infection can be difficult to identify, and the repercussions can impact your profitability for several years. Testing bulls yearly, having a defined breeding season, and pregnancy checking cows can aid in the early identification and control of the disease should it infiltrate an operation. Additionally, there is significant potential for disease spread between neighboring ranches, making this disease a community wide problem.

For More Information

For more information regarding Arizona state regulations contact the Arizona State Veterinarian's Office, including information on testing requirements for bulls entering the state of Arizona visit <https://agriculture.az.gov/animals/state-veterinarians-office> or call (602) 542-4293.

References

- Bicknell, E. J., Reggiardo, C., Noon, T. H., Bradley, G. A., & Lozano-Alarcon, F. (1994). Trichomoniasis. In R. Gum, G. Ruyle, & R. Rice (Eds.), *Arizona Ranchers' Management Guide* (pp. 43-46). Tucson, AZ: Arizona Cooperative Extension.
- Cuneo, S. P. (2013). *Bovine Trichomoniasis: Biology, Impact, and Control*. Tucson AZ: Arizona Cooperative Extension.
- Janzen, E. D. (2016) Trichomoniasis. In S. E. Aiello & M. A. Moses (Eds.). *The Merck Veterinary Manual* (11th Ed., pp 1384-1385). Kenilworth, NJ: Merck & Co., INC.
- Wenzel, J. C. (2018, August). *The Economics of Trichomoniasis in NM Beef Herds* PowerPoint presentation at the Applied Reproductive Strategies in Beef Cattle Symposium, Ruidoso, NM. Retrieved from: <http://www.appliedreprostrategies.com/2018/documents/4-3-John-Wenzel.pdf>
- Wenzel, J. C. (2015). *Trichomoniasis in Beef Cattle* (Guide B-230). Las Cruces, NM: New Mexico State University Cooperative Extension Service. Retrieved from: https://aces.nmsu.edu/pubs/_b/B230/
- Wenzel, J. C., Gifford, C., & Hawkes, J. (2018, August 28-29). *Economic Impacts of Trichomoniasis*. Proceedings of the Applied Reproductive Strategies in Beef Cattle Symposium. Ruidoso, NM. Retrieved from: <http://www.appliedreprostrategies.com/2018/proceedings/August-30th/1-Bulls-and-Health/Wenzel-Economic-Impacts-of-Trich.pdf>



Figure 2. Pipette and Syringe set up for sampling



THE UNIVERSITY OF ARIZONA
Cooperative Extension

THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE AND LIFE SCIENCES
TUCSON, ARIZONA 85721

ASHLEY WRIGHT, MS
Area Assistant Agent, Livestock

PEDER CUNEO, DVM, MS
Extension Specialist, Extension Veterinarian

CONTACT:
ASHLEY WRIGHT
awright134@email.arizona.edu

This information has been reviewed
by University faculty.
extension.arizona.edu/pubs/az1806-2019.pdf

Other titles from Arizona Cooperative Extension
can be found at:
extension.arizona.edu/pubs

Any products, services or organizations that are mentioned, shown or indirectly implied in this publication do not imply endorsement by The University of Arizona.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Jeffrey C. Silvertooth, Associate Dean & Director, Extension & Economic Development, Division of Agriculture, Life and Veterinary Sciences, and Cooperative Extension, The University of Arizona.

The University of Arizona is an equal opportunity, affirmative action institution. The University does not discriminate on the basis of race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information in its programs and activities.

Testing Procedures

The supplies needed to test for Trich are available online or at many animal health or livestock supply stores. Collected samples are mailed to a diagnostic lab and the results will be mailed or emailed back to you. Your veterinarian can teach you how to take an adequate sample and ensure an accurate test result. It is important to note that if testing needs to be done to satisfy a legal requirement (i.e. selling a bull for breeding, importing a bull to another state), it **MUST** be done by an accredited veterinarian. If, however, sampling is being done for herd management purposes only it can be done by the producer.

Bull

For best results, an insemination pipette attached to a 10cc syringe is inserted into and as far back in the prepuce (the space between the penis and the sheath) as possible. Any excessive hair or debris around the opening of the prepuce should be removed before introducing the pipette. The prepuce lining is scraped by using a backward-forward movement of the pipette, with the tip against the lining, done in a vigorous manner for 30 seconds to 1 minute. The pipette is withdrawn from the back of the prepuce while pulling back the plunger of the syringe to provide negative pressure on the pipette contents. There should be 4-8 inches of mucus in the pipette. If this mucus recovery is not achieved, the lining of the prepuce was inadequately scraped and the process should be repeated. An adequate sample recovery is important, as it increases the chance of recovering the organisms that lie in the deep parts of the prepuce crypts. Inadequate sample collections can result in false negative results, leaving the disease undiagnosed, and resulting production loss unabated. Excessive blood in the pipette can interfere with correct diagnostic testing.

Cows

A similar procedure is used to test for the presence of *T. foetus* in the cow. The sample is collected from the entrance of the cervix using a pipette attached to a 10cc syringe.

Sample handling

Collected samples should be transferred to a transport container either a two chamber pouch containing an improved trichomonas culture media (InPouch TF, Biomed Diagnostics) a TF-Transit Tube (Biomed Diagnostics), or have the sample placed in a plastic 50mL conical tube with 10mL of sterile saline. The pouches can be sent to the diagnostic laboratory for testing. It should not be sent on ice or under refrigeration, however the sample does need to be protected from extreme heat and **DO NOT** allow the pouch or tubes to sit in direct sunlight. The lab will use Polymerase Chain Reaction (PCR) to find and amplify the DNA of the Trich organism. PCR is less time consuming than the previous method of culturing the sample to grow the organism and examining it under a microscope. Current diagnostic standards are that only one negative test is needed, however be aware that there is always a chance of a false negative result. Contact the lab you will be using to ensure you follow their preferred methods for sample collection and transportation.

Diagnostic Labs In or Near Arizona:

Arizona Veterinary Diagnostic Lab (Tucson, AZ)
<https://azvdl.arizona.edu/>

New Mexico Department of Agriculture Veterinary Diagnostic Lab (Albuquerque, NM)
<http://www.nmda.nmsu.edu/vds/>

Utah Veterinary Diagnostic Laboratory (Logan, UT)
<https://www.usu.edu/uvdl/>