

Trichomonosis: Part I: Trichomonosis in Cattle, a Review.

This month we will begin a three part discussion of Trichomonosis, the devastating venereal disease of cattle. Two co-authors join me in this discussion. Dr. Bob BonDurant is the lead Trichomonosis researcher at the School of Veterinary Medicine and Dr. Chuck Palmer is the Branch Chief of CDFA in Redding. Both have extensive experience with this problem and together we are going to share our thoughts about the disease, the status of the control program, and the proposed changes to the program. This first article will focus on a review of the disease itself. One of the changes many will notice is the name: Trichomoniasis (the old term) has been changed to ***Trichomonosis***.

What causes Trichomonosis? A protozoan (a mobile, complex, single-celled organism), called *Tritrichomonas foetus* is the microbe that causes this condition. It is similar to - but not the same as - a venereal organism in humans called *Trichomonas vaginalis*. The cattle organism lives in the microscopic folds of the skin that line the bull's penis and internal sheath. As the bull gets older, this skin grows, and folds more and more, creating additional places where the organism can thrive. Therefore, older bulls (more than three years of age) are more likely to harbor the "Trich" organism than younger bulls and therefore, pass it on to the cows and heifers more easily. In the cow or heifer, the organism is deposited in the cavity of the vagina, and ascends into the uterus and Fallopian tubes in the hours/days following mating. In nearly all cases, the infection in the female is temporary, i.e. her immune system eventually clears the infection from the reproductive tract, typically within 2-4 months. The immunity is short-lived, so a cow or heifer can become infected again, e.g., in the very next breeding season.

What are the signs or symptoms of "Trich" in cattle? Neither the infected cow nor the infected bull appears ill at any time. The cow, after having been infected at breeding, may rarely show a very subtle, very mild vaginal discharge, 1-3 weeks later. Most of us would never notice it. The bull shows no indication that he is infected. So, there are no outward signs that the bulls, cows, or heifers are infected with "Trich".

What if Trichomonosis gets into my herd? If it is a *new* infection (that is, if your herd has never been infected before), you can expect a long, drawn-out calving season, with a disappointing total calf crop. In such herds, it is common to end up with a 70% (or less) calf crop, strung out over 3-8 month, depending on how long the bulls were left in with the cows. If the herd has been infected for a long time, the effect may be slightly less. That is, a higher number of cows will get pregnant, but that number will never equal what would normally be achieved if there were no "Trich" present. Because "Trich" often gets into a herd via the introduction of one infected animal, especially an infected bull, another scenario is possible. In this case, after the first year, the percentage of

pregnant cows may fall from 95% to 90%, for example. In the second year, there may be a further, dramatic fall to 70% or less, as more bulls become infected.

Rarely, a cow may become infected but instead of clearing the infection, she continues her pregnancy and the infection right through to term. Some of these will shed the infection at parturition, but a small percent may continue, infected, right on into the following breeding season. This has been documented, but is a rare event. Our best guess as to the frequency of such “carrier cows” is a range, from 0.05 % to about 0.1 % of all cows in the herd (1 or 2 per 2,000 cows).

Does the disease cause abortions? It can, but most cows do not abort a fetus big enough to find. The crows, buzzards or coyotes probably find them before we do. Instead, these cows come back into heat at some extended interval (more than 21 days) after breeding. At pregnancy check time, these cows are diagnosed open; or if they have conceived to a second breeding after losing the first pregnancy, they may be diagnosed as pregnant, but with a short-gestation calf that will be born late. The reason for the open or late cows is that the *Trichomonas* organism causes the loss of the early fetal calf, beginning about 2 months into the pregnancy. A few "Trich"-infected cows in the herd may actually abort a fetus big enough to be found, nearly always **before six months' gestation**. (Note: At six months' gestation, a typical bovine fetus is about the size of a beagle.) However, there are many causes of such “frank abortion”, and Trichomoniasis is just one, and a less common one at that. Trich does most of its damage earlier in gestation. So don't assume that every abortion is a sign of "Trich".

A few cows (perhaps another 1-2%) may develop **pyometra**, i.e., a heavy, pus-filled uterus, after being infected. A qualified veterinarian can detect this pyometra at pregnancy check time. Cows or heifers with pyometra **at the time of pregnancy check** (as opposed to after calving) should make you very suspicious about Trichomoniasis.

How is Trichomonosis transmitted? Trichomonosis is a **venereal disease** of cattle (all breeds). It is transmitted from cow to cow by a bull, so it is nearly always a disease of cattle that are naturally bred, as opposed to artificially inseminated (AI'ed) cattle. Very rarely, it can be transmitted by contaminated semen or AI equipment, but this is highly unlikely if semen is purchased from reputable bull studs. If you use AI, look for semen carrying the “CSS” logo on the straw. This label certifies that the hygienic procedures for ensuring that AI bulls are negative for Trichomonosis before their semen in collected have been followed. Reputable AI studs take great pains to assure that their product (bovine semen) is free of *Trichomonas foetus*. This is part of the reason that AI is commonly recommended for a herd that is experiencing Trich.

How common is Trichomonosis in cattle? Bovine Trichomonosis has been--and continues to be an important cause of economic loss in cattle operations that use natural service. In the Western U. S., where extensive grazing (vs. intensive grazing on permanent pasture) management practices are employed, the disease is prevalent at surprisingly high rates. In 1990, a random survey of California beef cattle operations revealed that nearly 16% of herds were infected (i.e., they had at least one infected bull).

Several factors such as shared grazing, renting or borrowing bulls, large areas of common fence lines, etc. favor transmission of "Trich" from one herd to another.

How can I tell if my herd has it? In spite of the fact that bulls don't show any signs, the organism is easier to find in bulls than in cows, because bulls become "carriers" while cows eventually shed the infection. Special culture media have been developed that can support growth of the organism in an incubator. Scrapings of preputial (internal sheath) fluids are taken, and placed in this medium, which is then cultured for up to a week. If even one bull is positive, you have to assume that the herd is infected.

Is the diagnosis a sure thing? No, but the technique used is quite good, as diagnostic tests go. Studies of known "positive" bulls have shown that the culture method may miss about 10-19% of infected bulls if we only test them once. But testing the **herd** (all the bulls in the herd) once gives us a 90% chance of finding the disease if it's there. If no infected bulls are found on the basis of a single culture of all bulls, then we can be about 90% sure that the bull herd is "clean". Repeat testing (up to three times, at weekly intervals) is necessary if we want to be 99% sure that the entire bull herd is negative. It's important to give the bulls 1-2 weeks' of sexual rest before beginning to test them for Trich. This allows time for the numbers of organisms to build up to a level that can be detected.

Are there false positives as well as false negatives? Yes. The false negatives (missed diagnoses) are discussed above. False positives, that is, misclassification of diagnoses as positive when the bulls in question are actually not infected with *Tritrichomonas foetus*, have recently been recognized. Apparently, harmless members of the trichomonad family can also live in the sheath and on the penis. Through a microscope, these harmless trichomonads are difficult to distinguish from the "real thing." Recently, CCA-sponsored research has helped to develop a DNA test that can more accurately determine whether any detected trichomonads are truly *T. foetus*. In California, any specimen diagnosed as culture-positive by the practitioner or his/her laboratory must be confirmed by the DNA test (and perhaps other tests) at a certified laboratory. At this time (December, 2006), only the CAHFS laboratory system in California or the Nevada Department of Agriculture, Animal Disease Laboratory in Reno is certified to run the DNA test. A positive DNA test is 99.99+ % specific for *Tritrichomonas foetus*.

Is there a vaccine? Yes. Fort Dodge currently markets a vaccine made from killed whole cells of T. foetus. Tests of this vaccine have shown that experimentally infected, vaccinated females "clear" a vaginal infection in a matter of a few weeks, whereas control (unvaccinated) females remain infected for months. As of this date, no efficacy for bulls has been shown, i.e. the vaccine has not been shown to protect bulls from becoming infected.

Is there a treatment for the bulls? Technically, ethically and legally, no. There is no FDA-approved treatment for "Trich" in cattle. Several years ago, some bulls were successfully treated with a poultry product, but the drug is not cleared for such use in

cattle. Not only that, but the FDA has declared that the use of this poultry product, or any other product in this family of drugs in cattle, is outright illegal.

What about the cows and heifers? Most studies have shown that the disease is **self-limiting** in the female, as opposed to the male, who can carry it for years. After a few heat cycles, most cows and heifers clean themselves up, but this may take months. Research is showing that up to six months may be required in some cases, but 1-4 months is more common. At pregnancy check time, non-pregnant females, especially those with reproductive tracts that the veterinarian declares "abnormal" (e.g. with pyometra or some other uterine pathology) should be sold, for slaughter only. They might represent "carrier cows" that could maintain the disease in the cow herd even if the bulls were cleaned up. Non-pregnant females with "normal" tracts may be kept over for rebreeding, if a "split" calving season is practiced, but they should not be mingled with the normal cows; nor should the same bulls breed both groups of cows.

How do I prevent this disease in my herd? The old saying, "Good fences make good neighbors." is very appropriate for this disease. Other good practices include:

1. Test all bulls in your herd for Trich before the breeding season. This is usually done at the same time your veterinarian performs the breeding soundness exam (semen and health check).
2. Don't add bulls or cows to your herd from the sales yard or other sources without working with your veterinarian to be sure you are not bringing home Trich or some other disease.
3. Buy bulls from trusted breeders who have had the bulls tested for Trich by their veterinarian (or by your veterinarian).

Next month we will discuss the experiences of the California Trichomonosis Control Program to date.

Bob BonDurant, DVM
Department of Population Health and Reproduction
School of Veterinary Medicine
UC Davis

Chuck Palmer, DVM, MPVM
California Department of Food and Agriculture
Animal Health Branch

John Maas, DVM, MS, DACVN, DACVIM
Extension Veterinarian
School of Veterinary Medicine
UC Davis