

DID YOU KNOW...

A bull can be normal on general physical and reproductive organ examination and still have low fertility due to poor semen quality?

by
Theresa Becchetti

Livestock and
Natural Resources
Farm Advisor

BULL MANAGEMENT – FALL BREADING

With breeding season approaching, now is a good time to conduct a breeding soundness exam. A basic breeding soundness evaluation consists of:

- Physical examination of the animal
- Examination of reproductive organs
- Measurement of scrotal size
- Semen evaluation

The physical exam should ensure that the bull is able to see, eat, smell, and move freely to successfully breed cows. Structural soundness is important if the bull is expected to travel across a range of conditions and mount a cow. Also many structural defects are hereditary and may be passed on to the calves. Body condition should also be examined to ensure the bull has enough condition to breed the cows, with a score of 7 recommended for range bulls entering the breeding season.

Internal reproductive organs should be examined for any inflammation, adhesions, or fibrosis. The spermatic cord, scrotum, testicles, and epididymides are examined for evidence of abscess, injury, frost bite damage, or tumors. The testicles are the factory where sperm cells are produced, and they should be firm, resilient, equal in size, and adequate to large for the bull’s age. Degenerative change in any of these organs is a frequent cause of reduced fertility. Testicular hypoplasia (underdevelopment) is also evaluated at this time. Hypoplasia reduces fertility and is highly heritable. With this condition one or both testicles are one-third of normal size.

The penis and sheath should be examined for any sores, lacerations, abscesses, scar tissue, or adhesions. On erection with the electro-ejaculator, the penis

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

Bull Management Fall Breeding.....	Pg. 1-2
Trichomonosis in Cattle, a Review.....	Pg. 2-5
New Forage Loss Tool.....	Pg. 5
Local Forage Production.....	Pg. 6
Westside Fall Field Day	Pg. 6-8

The University of California prohibits discrimination or harassment of any person on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (covered veterans are special disabled veterans, recently separated veterans, Vietnam era veterans, or any other veterans who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized) in any of its programs or activities. University policy is intended to be consistent with the provisions of applicable State and Federal laws. Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Equal Opportunity Director, University of California, Agriculture and Natural Resources, 1111 Franklin Street, 6th Floor, Oakland, CA 94607-5200 (510) 987-0096.

should come from the sheath in a straight line with the body of the bull. Persistent penile frenulum (tied back penis) is occasionally found during this part of the examination. Injuries to the penis usually occur during the active breeding season, but may be resolved enough to be missed until the breeding soundness exam. Old lacerations and adhesions usually prevent the penis from being fully extended or cause pain during breeding. Bulls with any type of painful lesion will usually quit trying to breed cows. Warts on the tip of the penis are a relatively common finding in young bulls.

Because scrotal size correlates well with daily sperm production and is highly repeatable, scrotal circumference is a valuable indicator of semen production. Bulls with bigger testicles produce more semen and sire sons with bigger testicles. Bulls with larger testicles will reach puberty at an earlier age and will sire heifers that reach puberty at an earlier age also.

A bull can be normal on general physical and reproductive organ examination and still have low fertility due to poor semen quality. Sperm cell concentration (number of normal sperm cells), motility (vigorous, active sperm), and morphology (shape of the sperm cells) evaluations are the basis for the scoring system developed by the Society of Theriogenology. This scoring system has become the standard across the country and is used by almost all veterinary practitioners.

In addition, the following tests or procedures may be included in a breeding soundness evaluation:

- Mating ability: Some assessment of the bull's desire (libido) and ability to breed a female in heat (termed serving capacity).
- Pelvic measurement. Believed to be a heritable trait and predictor of early maturity in heifers as well as reducing calving problems.
- Trichomonosis testing. A review from Dr. Maas follows.

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 months, 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'd) 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 is 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 *Trichomonas 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 *Trichomonas 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).

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

UPDATED PUBLICATION – NEW FORAGE LOSS TOOL

ANR Publication 21494 "Estimating the Cost of Replacing Forage Losses on Annual Rangeland" has been used for many years. The publication helps estimate the amount of forage lost from disturbance, and has been very helpful to area ranchers that have been affected by a fire. The basics of the paper have remained unchanged. What has changed is the addition of Excel spreadsheets to automatically calculate forage loss for you. In this article I will highlight the publication.

After a fire has gone through rangelands, the grass community takes up to three years to reach full forage potential. The year of the fire, depending on time of the fire and seasonal use of the pasture, there is a potential of losing all of the available forage. The next year research has shown that there is a reduction in growth ranging from 50 to 70% and the second growing season after the fire there is still a reduction of 20% before full forage production can be expected again. So, if there is a fire where you are able to collect insurance, it is important to not only estimate the year of the fire forage loss, but to also plan for the next two years.

Estimating the current year's forage loss is the first part, and the hardest part, of estimating the entire forage loss. You can use published data easily accessible from the Natural Resource Conservation Service (NRCS) through Soil Surveys or Ecological Site Descriptions to estimate forage production, local forage production data, or the best way would be to measure an adjacent unburned area. After determining your starting forage production, you are ready to enter information into the spreadsheet. Besides the current year's forage production, you will also need to know the acres burned. The spreadsheet will calculate for you tons per acre of forage for the three years. You can see the loss per year on each worksheet in the file. Tabs at the bottom of the spreadsheet allow you to move through the different years, and finally lead you to the last tab, and maybe of most interest, the "Substitution Value" worksheet. In this worksheet you need to enter a cost for delivered hay used as the substitute, you can view each year's tons per acre lost forage, and see the total dollar amount necessary to replace the lost forage.

These are just the highlights of the paper and the Excel files that go with it. The complete document should be available soon at all UCCE offices as well as on-line as a free publication. The Excel files will be available to download for free from <http://ucanr.org/forageloss> by October 2010 at the latest.

LOCAL FORAGE PRODUCTION

One of the options for estimating beginning forage production is local forage production data. Each spring along with NRCS staff, I have been compiling forage production for the county. Below is a summary of this year's results:

Westside. Westside production varied more dramatically than the East, with a range from 63% of normal to 175% above normal. Most of the sites were in the 85 to 130% range. As with the Eastside, we are compiling our years of data to improve the forage production data available since we feel that the Soil Survey data over estimates actual normal production.

Eastside. All of our sites were above normal according to the Soil Surveys. Some of our sites had forage production over 5,000 lbs/acre. Comparing to the soil survey data where available, we ranged from 120 to 350% above normal. Comparing this year to our running three year average, we ranged from 101 to 250% above our average.

FALL FIELD DAY

October 14th there will be a fall field day on the Westside. Working with NRCS, we will be demonstrating field practices that you can use in your ranch such as a discussion on solar pumps, rating your soil stability, how and why you should care about clipping for forage production and Residual Dry Matter (RDM), and how a GPS can be helpful on the ranch. We plan to alternate Westside and Eastside for a Fall Field Day each year, so next year will be somewhere on the Eastside. Thanks to our sponsors (American Ag Credit, Swenson Solar and Yosemite Farm Credit), we will be able to have door prizes for those who attend.

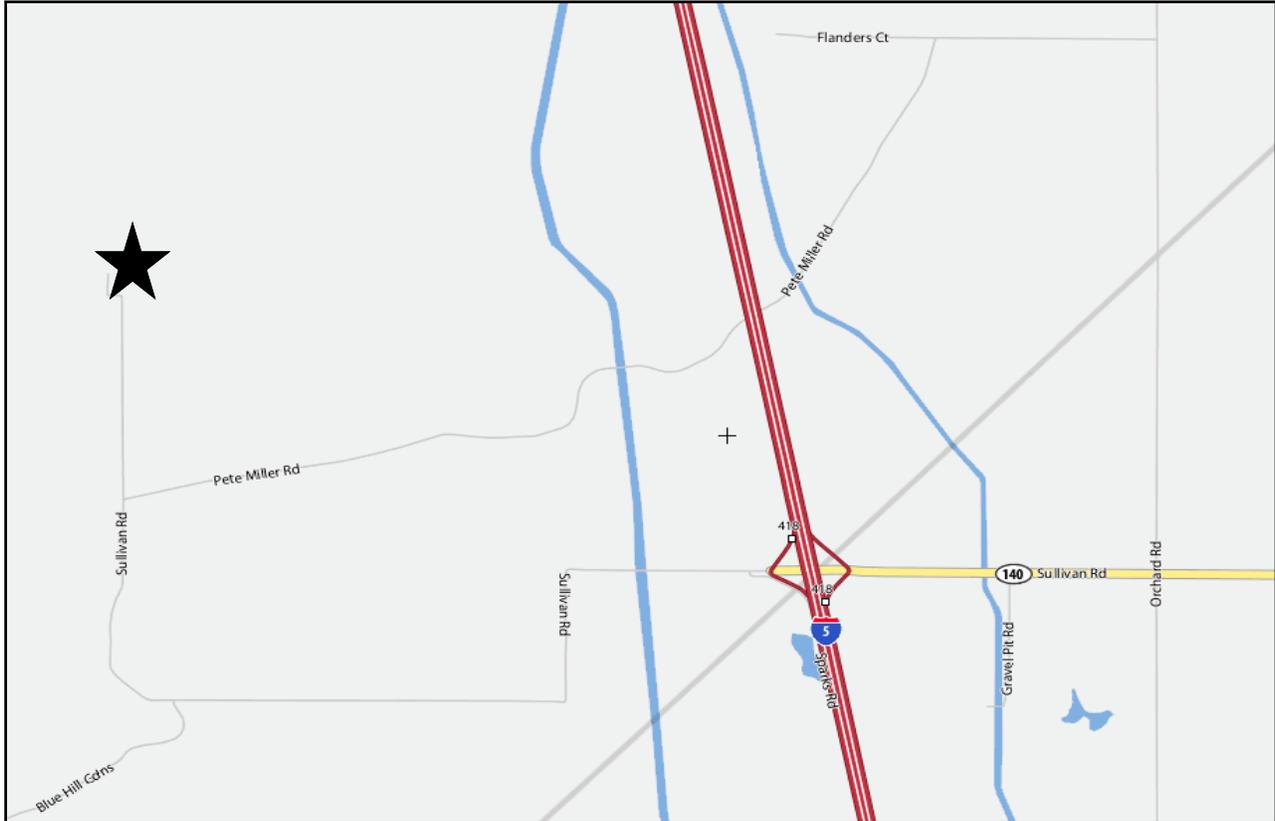
Be sure to be there for your chance to win a GPS and other field supplies to start practicing what we teach that day!

Westside Fall Field Day

Jensen Ranch, end of Sullivan Road, Gustine

October 14th, 9:30 am – 12:00 pm

Everyone goes home with tools to help practice what you learned during the Field Day, as well as a chance to win door prizes including a GPS!



Name: _____

Address: _____

Daytime Phone: (____) _____ Number Attending _____

Please return this form with payment of \$5.00 for each participant. Enclose a check or money order payable to U.C. Regents. Payments & Registration are due by October 1st. There will be no on-site registration due to the need to order equipment for participants.

Mail registration to:
Theresa Becchetti, Livestock Advisor
U.C. Cooperative Extension
3800 Cornucopia Way, Suite A
Modesto, CA 95358
(209) 525-6800

Westside Fall Field Day
Jensen Ranch, end of Sullivan Road, Gustine
October 14th, 9:30 am – 12:00 pm
Sponsored by UCCE and NRCS

Topics and speakers include:

- ✘ **Clipping for Residual Dry Matter**
Dennis Dudley, NRCS
- ✘ **Solar Pumps**
Joanne Boettcher, NRCS
- ✘ **Soil Stability**
Diana Waller, NRCS
- ✘ **GPS 101 – How Can I Use It?**
Theresa Becchetti, UCCE



Win Door Prizes!

Don't miss out, sign up by October 1st. See inside for more details.

The University of California prohibits discrimination or harassment of any person on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (covered veterans are special disabled veterans, recently separated veterans, Vietnam era veterans, or any other veterans who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized) in any of its programs or activities. University policy is intended to be consistent with the provisions of applicable State and Federal laws. Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Equal Opportunity Director, University of California, Agriculture and Natural Resources, 1111 Franklin Street, 6th Floor, Oakland, CA 94607-5200 (510) 987-0096.

Current Resident or:

NONPROFIT ORG.
 U. S. POSTAGE PAID
 MODESTO, CA
 PERMIT NO. 400

COOPERATIVE EXTENSION
 UNIVERSITY OF CALIFORNIA
 3800 CORNUCOPIA WAY, SUITE A
 MODESTO, CA 95358