



Research Facts

Research & Technology Development for the Canadian Beef Industry



A Practical Test for Vibrio

by Alberta Beef Producers

Project Title:

Towards a Practical Test for *Campylobacter fetus* in beef cattle:
Getting to the bottom of Reproductive Failure in Cow-Calf Herds

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- [Application of a new diagnostic approach to a bovine genital campylobacteriosis outbreak in a Saskatchewan beef herd](#)
- [Evaluation of a *Campylobacter fetus* subspecies *venerealis* real-time quantitative polymerase chain reaction for direct analysis of bovine preputial samples](#)

Background:

Reproductive failure is extremely costly for producers, but in many cases the root cause is never found. One cause of reproductive failure is vibrio, caused by *Campylobacter fetus venerealis*, a sexually transmitted bacterium. Vibrio infections cause infertility, early embryonic death and sporadic late term abortions. Infections will usually manifest as a longer calving interval, or more open cows than usual. Newly infected cows will often conceive, but the resulting pregnancy is commonly lost between 40 and 70 days after breeding. Cows that have aborted may start to cycle again, but experience temporary infertility for 1 to 5 months as they clear the infection. Infected bulls will show no clinical signs or changes in semen quality. Testing for vibrio has traditionally been very difficult as the bacteria are quite fragile and often do not survive the trip to the laboratory for culture.

Objectives:

The objectives of this project were to evaluate and optimize a new field collection protocol and PCR (polymerase chain reaction) test for vibrio in beef bulls, and to pilot the use of this test in veterinary practices across Canada.

What They Did:

A laboratory verification study was completed to optimize sample preparation and PCR protocols for the new test to directly measure the presence of *C. fetus* spp. *venerealis* in bull prepuce samples. To further verify the new test protocol, the clinical sensitivity and specificity of this new test was also measured. 202 samples from 13 infected (4 naturally infected and 9 artificially infected) bulls and samples 300 virgin bulls were analyzed with the new PCR test, two culture techniques (the current gold standard for diagnosis), and a direct fluorescent antibody test.

Veterinarians in Saskatchewan and Alberta who were investigating herds with poor reproductive performance also submitted 728 samples. The positive bulls identified were purchased to assist with the test verification work summarized above.

What They Learned:

Out of the samples received from veterinarians in Alberta and Saskatchewan, 38 (5.2%) tested positive for vibrio. Based on all the samples tested, the sensitivity of the new PCR test was 95.4% (false negatives) and the specificity was 92.0% (false positives) for the samples collected in warm weather. The test did not perform as well when samples were collected at temperatures below 5°C, so overall the test detected 85% of the bulls that actually had vibrio (compared to the culture technique at 38%), and also the potential for a false positive result in a disease-free bull was less than 15%. A followup survey distributed to veterinary clinics that provided samples indicated that clinics were favourably disposed to using the new test for vibrio in herds with a history of reproductive problems, as well as promoting the use for bulls going to and returning from community pastures.

What It Means:

This research has resulted in a new practical alternative for diagnosing vibrio under field conditions. This test requires a simple sampling technique and doesn't require transport media for the sample, along with the potential for a much higher throughput of samples. Although the test is not perfect, especially in colder weather, it is much more accurate than the culture test. The testing protocol has been released to a commercial veterinary diagnostic laboratory, and producers can gain access to the new test through their local veterinary clinic. The costs of reproductive failure to a producer are quite high - on average \$800-900 for the loss of a calf, and \$650-750 for maintaining an open cow for a year, so reducing incidences of preventable reproductive failure (like vibrio) means a better bottom line.

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