

Guarding Reproduction

Leptospirosis can steal potential.

by Lowell T. Midla VMD, MS

Reproductive efficiency is a major factor contributing to cow-calf profitability. Conversely, reproductive inefficiency robs profit potential. There are myriad causes of reproductive inefficiency, but infectious diseases can be significant contributors. Two of the most common infectious agents linked to reproductive losses are Bovine Virus Diarrhea Virus (BVDV) and bacteria of the genus *Leptospira*¹. While *Leptospira spp.* can cause clinical disease in cattle (and humans), the disease in cattle is typically mild and of short duration. This article focuses on Leptospirosis as a cause of reproductive failure.

The two main species of pathogenic *Leptospira* that affect cattle in the U.S. are *L. interrogans* and *L. borgpetersenii*. The former, most commonly *L. interrogans* serovar pomona, primarily causes third-trimester pregnancy wastage but can also lead to stillbirths and weak newborn calves. On the other hand, *L. borgpetersenii* serovar hardjo type hardjo-bovis (LHB) is associated primarily with first-trimester pregnancy

loss, typically manifested as repeat breeder syndrome.

Animals, including cattle, are either maintenance hosts or incidental (accidental) hosts with respect to *Leptospira spp.* organisms. Maintenance hosts serve as reservoirs of the pathogen, and in the U.S., cattle are the maintenance host of LHB. Infected cattle maintain LHB in the kidneys and reproductive tract. Carriers usually show minimal, if any, outward signs of disease. Colonization of the kidneys results in long-term urinary shedding of LHB into the environment. Transmission of LHB to other cattle can occur via several routes, but a suspected common mode of transmission occurs when an infected animal urinates and urine splashes from a hard surface into the eye of another animal.

In the U.S., cattle are incidental hosts for the various serovars of *L. interrogans*. Infection with *L. interrogans* occurs when there is direct exposure to organisms shed into the environment by other animals. Maintenance hosts of *L. interrogans* serovars include: dogs (canicola); rats (icterohaemorrhagiae);

raccoons, skunks, and opossums (grippotyphosa); pigs, skunks, and opossums (pomona)².

Leptospira spp. can survive in the environment for considerable periods of time, especially in warm, moist conditions. Survival is rare in dry, very cold, or very hot conditions². As a result, the risk to pastured cattle is greatest during spring and autumn in U.S. temperate climates.

Three point control of *L. borgpetersenii*

Point #1: Do you have a problem?

Prevalence of LHB carriers in female beef cattle was recently estimated to be approximately 7%³, but the fraction of herds with at least one carrier is likely higher. Given the cost to implement a control program, a logical first step is to determine whether you have carriers in your herd. This is done by testing post diuretic urine samples of a subset of cows in the herd.

Point #2: Eliminate the carrier state in infected cows.

Vaccination does not clear the kidneys of LHB in infected carrier animals. Treatment with an appropriate antibiotic is necessary to clear the carrier state.

Point #3: Vaccination.

When it was first recognized that cattle in the U.S. were the maintenance host of *L. borgpetersenii* serovar hardjo type hardjo-bovis, it was suspected that traditional 5-way vaccines might not provide effective cross protection against LHB. That's because these vaccines were developed with what turned out to be the mistaken belief that U.S. cattle were maintenance hosts of *L. interrogans* serovar hardjo. As it turns out, several commercially available 5-way Leptospirosis vaccines have been shown to provide cross protection against LHB and have been approved by USDA to be labeled as such.

In the first year, all cows need both a dose and booster of an appropriately labeled vaccine and must also be contemporaneously treated with an appropriate antibiotic to clear chronic carriers. Cows must then be revaccinated at least annually. Heifers need both

a dose and a booster of vaccine and must also be treated to clear any infections that might have been acquired from cows prior to vaccination. Similarly, purchased cows need both a dose and a booster of vaccine and must also be treated to clear potentially existing infections. Finally, don't forget about bulls, as they can be carriers and can transmit LHB.

Eliminating LHB from your herd is an achievable goal. However, you must go all-in to achieve that goal. Taking shortcuts and only implementing some of the recommendations mentioned above will result in failure.

Controlling *L. interrogans*

Immunity following vaccination against *L. interrogans* serovars is short-lived, regardless of vaccine brand. Therefore, given that *L. interrogans* is associated with third-trimester pregnancy loss, it may be beneficial to give another round of 5-way Leptospirosis vaccine to females just prior to the start of the third trimester of gestation, even if they received a 5-way Leptospirosis vaccine in combination with a multivalent viral vaccine prior to breeding. Potentially, this can be done at the time of pregnancy diagnosis, depending upon when it is performed. Always discuss changes to your vaccine protocol with your veterinarian prior to implementation and read and follow vaccine label directions.

Summary

Leptospirosis and Lepto vaccines have been around for a long time. As science has progressed and new information has been learned, our understanding of the disease, while not yet perfect, has become clearer. Work with your veterinarian to assess whether you have an LHB problem, the relative risk of *L. interrogans* in your area, and how preventing Leptospirosis-associated pregnancy loss may help you achieve a higher number of calves born per cow exposed. **HW**

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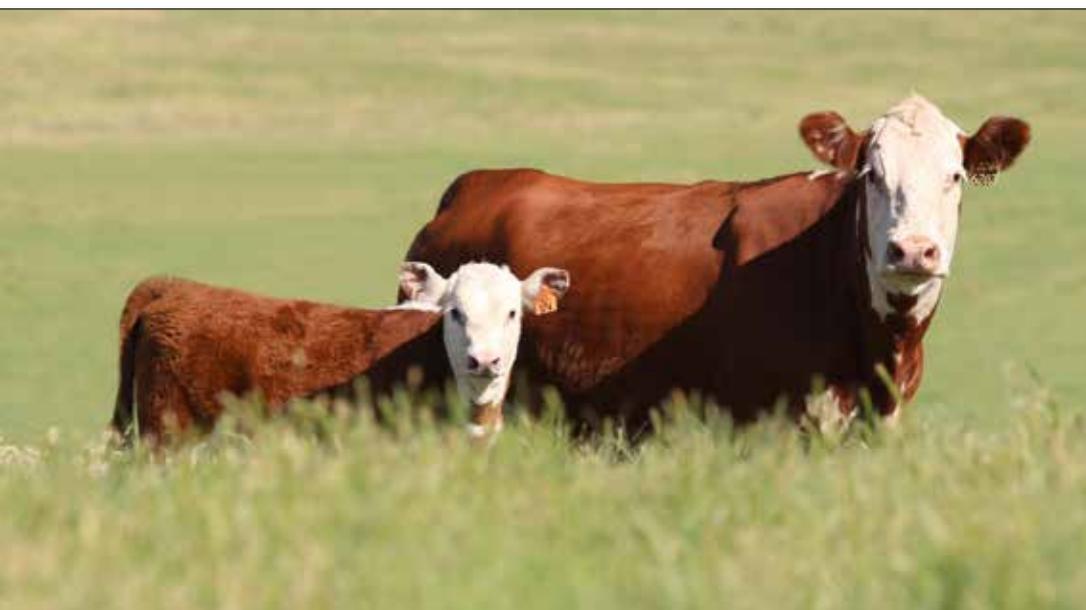


Photo by Grace Verhige

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¹Grooms DL, Bolin, C.A., Diagnosis of fetal loss caused by Bovine Viral Diarrhea Virus and *Leptospira spp.* Vet Clin Food Anim 21 (2005) 463–472.

²Bolin, C.A Diagnosis and Control of Bovine Leptospirosis, Proceedings of the 6th Western Dairy Management Conference, March 12-14, 2003, Reno, NV.

³Nally JE, Hornsby RL, Alt DP, et al. Isolation and characterization of pathogenic leptospire associated with cattle. Veterinary Microbiology. 2018; 218: 25-30.