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VM115

Vibrio[1]

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Vibrio, short for vibriosis, is a venereal disease that causes reproductive problems in cattle. The disease is caused by *Campylobacter fetus*, a bacterium formerly called *Vibrio fetus*, hence the name vibriosis.

The reproductive problems are manifested in the cow and are characterized by infertility, early embryonic death, and, in some cases, abortion. The disease can be introduced into a susceptible herd with a single breeding of an infected cow or bull. The organism survives in the vagina of the infected cow and is transmitted onto the penis of the bull during mating. The bull then transmits the organism to another cow during mating. Regardless of age, cows not previously exposed to the organism are very susceptible to infection. The organism invades the uterus and attacks the early developing embryo causing death of the embryo with subsequent reabsorption or expulsion by abortion. Depending upon the length of time it takes for this process to occur, the cow may "skip" her next normal cycle, resembling a cow that is bred, and then show signs of heat again at her next cycle. If the disease process is prolonged, then you may see abortion of a more developed embryo or fetus; detected abortions are not frequently seen with this disease.

Following infection, most cows will develop some degree of resistance against the vibrio organism (Figure 1). If the resistance level is high enough, the cow will clear herself of the infection and be able to become pregnant and stay pregnant on subsequent breeding.

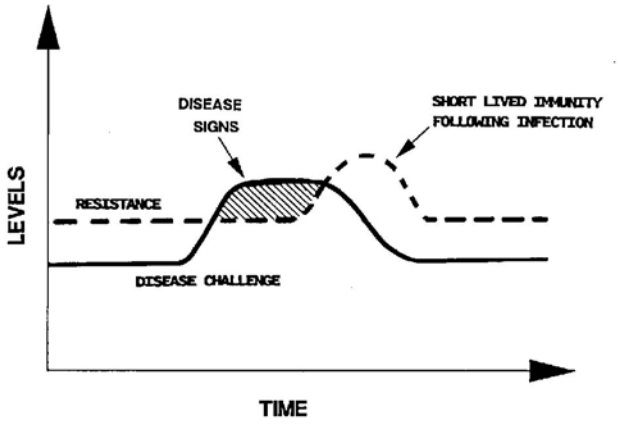

Figure 1. Most cows will develop some degree of resistance after infection.

If the resistance level is low, the process may have to repeat itself several times before the cow develops enough resistance to overcome the disease challenge. In this case, the cow may not be able to re-cycle and get bred during the breeding season, even a long breeding season. The resistance is

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relatively short-lived, and the "cleared" cow can become reinfected at a later time. Some cows never are able to clear the infection, thus they will remain infected and serve as reservoirs of the disease. The infected cows will continue to cycle as long as they remain open, or unbred.

Bulls generally act as only a mechanical transporter of the organism by carrying the organism on the penis from one cow to another. In some cases, especially with older bulls, the crypts and folds of the prepuce become contaminated with the organism and the bulls become permanently contaminated or infected. Some bulls remain infected for years. In the bull, there are no observable signs or lesions to indicate infection, but because of the strain of extra breeding, the bulls may show excessive fatigue, loss of condition, and decreased libido.

The degree or severity of the reproductive problems seen in a vibrio-infected herd depends upon the degree of resistance that a herd has developed against the disease. Newly infected herds exhibit more severe problems than chronically infected herds (herds that have been infected for many years). In a newly infected herd, where there is no buildup of resistance, we will usually see a "strung out" calving season affecting up to 80% of the herd with the problem starting after adding new females or new bulls to the herd. In chronically infected herds, 80 to 85% of the cows may conceive and carry the fetus to term, yet pregnancy rates are very low in the young cows. The chronically infected herds may have a 3 to 5% abortion rate each year, generally at four to six months of pregnancy.

A review of the herd reproductive history is an important step toward determining if vibriosis is a problem in a herd. A herd with a long calving season or a decrease in calf crop is a prime suspect for vibriosis. If a review of the reproductive history is not feasible and you wish to examine a herd for vibrio, young cows are the ones to examine, especially young cows that have been bred only one time in the main herd. The reason: as virgin heifers, and even first calf heifers, they were probably bred to bulls that were not exposed to the main breeding herd, hence they may not have been exposed to vibrio and would not have developed a resistance to the organism. Without an elevated resistance to the disease, they are very susceptible and become easily infected when mating a contaminated bull. Unfortunately, a blood test will not provide you with a satisfactory diagnosis. Collecting mucus samples from the vagina and sending them to the diagnostic lab for culturing appears to be the best way of confirming the disease.

In Australia, researchers have cured vibrio-contaminated bulls with high doses of vaccine. They injected bulls with 3-5 times the recommended dose of vibrio vaccine and repeated the injection in two to three weeks. Because the use of multiple vaccine doses could cause a reaction in the animal, and since the method has not been approved by the Food and Drug Administration in the United States and would be considered "Extra-Label," the procedure must only be performed under the supervision of a licensed veterinarian. Bulls cleared of the vibrio organism are still susceptible to re-contamination with vibrio and will require an annual booster vaccination. While antibiotics are not of much value in treatment of the infected female, vaccination will hasten recovery. Although, in most females the disease is self-limiting and will clean up in two to three months by itself, occasionally it may take as long as seven months. Vibriosis in the female can be effectively prevented and controlled by vaccination. The initial vaccination sequence consists of injecting the female with two doses of vibrio vaccine, the first dose administered at least 21 days before the second dose and the second dose given at least 30 days before breeding. In the event that the second dose can not be given this close to breeding, a third dose may be required during the breeding season to maintain a high level of resistance to the disease. An annual booster is required at approximately 30 days before breeding. Again, if the timing is not convenient, another booster during the breeding season may be required each year.

Vaccinations, including boosters, that are given too long before mating season, when the disease challenge occurs, may not stimulate sufficient resistance to last through the challenge (Figure 2).

The same problem also can occur in a protracted breeding season, when the disease challenge persists

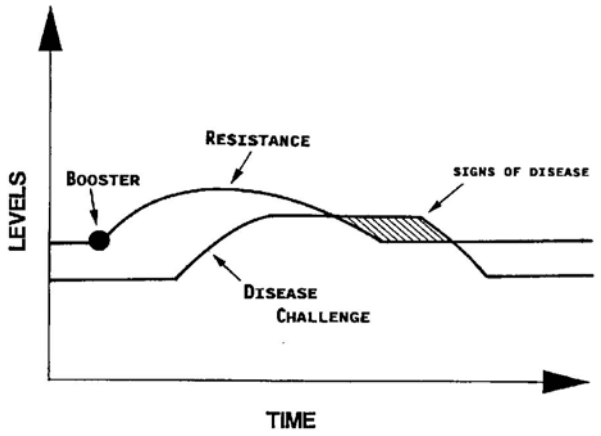

Figure 2. Vaccinations given too long before mating season may not stimulate sufficient resistance to last through the disease challenge.

for too long a time. The resistance stimulated by a vaccine administered before the breeding season may not last long enough, and a second booster may be required to extend the needed resistance level through the breeding season (Figure 3).

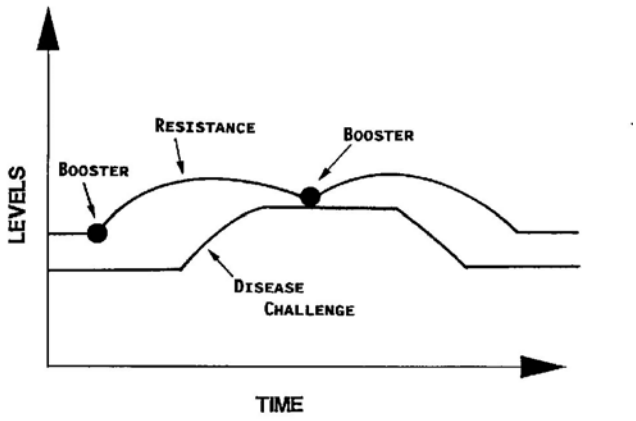

Figure 3. A second booster may be required to extend resistance through the breeding season.

Another alternative would be to select a vaccine with an adjuvant that provides a longer "depot-effect," thus prolonging the antigenic stimulus to the body (Figure 4). This results in higher/prolonged blood antibody levels in the animal, which is thought to be indicative of higher/prolonged resistance levels.

Vibrio is still a potential problem in our beef herds; however, using vaccines properly, which includes timing them properly, using booster vaccinations, and selecting the right vaccine to fit the

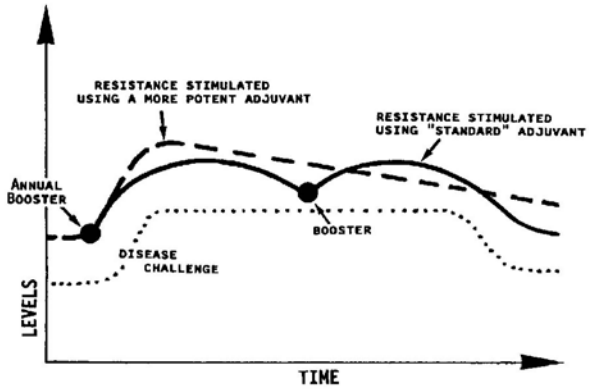

Figure 4. A more potent adjuvant provides a longer "depot-effect."

herd management, can adequately control the disease or prevent it from affecting your breeding herd.