

Bovine Virus Diarrhea Virus Infection in Cattle

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Bovine Virus Diarrhea (BVD) was first identified in New York State in 1946. The BVD virus readily mutates producing a number of types, which vary in their ability to produce disease. BVD is spread mainly by calves that were infected during early pregnancy and not aborted. These animals are referred to as persistently infected or PI calves. The resulting problems are mainly reproductive loss in cows though cattle may have a number of other symptoms. The cost of BVD has been estimated at \$10 to \$14 per cow in the breeding herd. The most critical parts of BVD control are identifying and removing PI calves, vaccination and biosecurity measures to keep the disease out of the herd.

The BVD virus mutates very easily, therefore so many types exist. BVD virus can be classified as Type I and Type II. Type II BVD virus is associated with more severe disease, and Type II vaccine protects better against Type II BVD virus infections. BVD viruses are also classified as cytopathic and noncytopathic, though this classification is not useful for purposes of understanding BVD in the cowherd.

BVD Virus Spread

When a susceptible animal is infected with the BVD virus it may or may not show symptoms. Most (95%) BVD infections in cattle are mild or inapparent, but these animals can spread the disease to other susceptible cattle for 5 to 14 days after they become infected. It can take as little as 1-hour contact with an infected animal for transmission of the virus to occur. Fence line contact is close enough for spread to occur. Bulls can spread the disease through semen. However, the most important source of BVD infections is the persistently infected (PI) calf. The immune system of a developing calf develops slowly and cannot produce immunity during early pregnancy. When a developing calf becomes infected with the BVD virus in the first 40 to 140 days of pregnancy, it cannot produce immunity against the virus or even recognize that it should. Therefore, the virus becomes a normal part of the calf's body and it multiplies very rapidly making the calf a BVD virus factory.

After birth, the PI calf sheds large numbers of the virus in nasal secretions, saliva, urine, tears and manure. PI calves continue to spread large numbers for their entire life and act as a reservoir for the virus within the herd. In a recent feedlot research trial it was found that one PI calf in a pen resulted in more sickness and death in the pen but also an increase in sickness and death in adjacent pens!

It is estimated that about .5% of all calves are PI calves. In a study of young, purebred bulls on test in Kansas, .67% of bulls were persistently infected. Some PI calves appear normal and have a normal lifespan, though PI females will always have a PI calf. However, PI calves are 10 times more likely to get sick and most die before 2 years of age. About half of the PI calves that make it to the feedlot, die there. These calves are generally small, slow growing and are very susceptible to various problems such as sudden death, diarrhea and pneumonia. Identifying and removing these PI calves from the herd is an important part of the control of BVD.

Signs of BVD Infections

The most likely outcome of BVD exposure is inapparent infection. These animals show no outward signs of the disease but undergo a period of reduced ability to make immunity and spread the virus to other susceptible animals for up to 2 weeks.

The most likely symptoms of BVD virus infection in the beef herd are reproductive failure. When a susceptible pregnant cow is newly infected with the BVD virus, one of three outcomes results:

- 1) Infertility and repeat breeding, decreased pregnancy rate, abortion or stillbirth
- 2) The birth of a PI calf
- 3) The birth of a calf that has birth defects of the nervous system (unable to stand, eye defects) or a calf that may appear normal but is more likely to get sick and have lower fertility.

Other signs of BVD virus infection in cattle (mostly young cattle) include pneumonia, diarrhea, mouth ulcers, and lameness.

Control of BVD in Cattle

There are 3 important areas in BVD control:

- 1) Identification and elimination of PI calves. The most commonly used tests are the immunohistochemistry test (IHC) done on ear notches preserved with formaldehyde and the antigen capture ELISA test (ACE) done on fresh ear notches or blood serum. The Kord Animal Disease Diagnostic Lab in Nashville performs the ACE test. Recent research has shown this test to be as useful and accurate as the IHC test. The test has a quick turnaround time but in certain cases it should be repeated in 3 weeks to distinguish between PI calves and newly infected calves.
- 2) A good vaccination program against BVD beginning at about 6 months of age. Many good BVD vaccines are available and if used properly can be expected to be a very useful part of BVD control in the cowherd.
- 3) Biosecurity measures to keep the disease out of the herd. These measures would include maintaining a closed herd or buying only from known BVD free herds, and isolation of newly purchased cattle from the rest of herd for 1 month after arrival.

BVD infections appear to be common in US cattle. The virus can spread through the cowherd rapidly. The PI calf is the most likely animal to be responsible for spreading the virus. The resulting infection is most likely to be associated with reproductive problems of some kind. Control of BVD virus infection is based on the identification and culling of PI calves, a good BVD vaccination program and implementation of biosecurity measures to keep the virus out of the herd.