



BVD:

A Cattleman's Perspective

A look at the diagnostic tests and preventative measures to help producers deal with BVD.

by **Heather Smith Thomas**

Since scientists discovered the bovine viral diarrhea (BVD) virus, researchers have been trying to find ways to help cattle producers detect and prevent the disease. A modified live virus (MLV) vaccine was developed more than 30 years ago giving ranchers their first good weapon to protect susceptible animals.

After vaccination came into use the incidence of dramatic BVD “wrecks” decreased. Killed vaccines came on the market 20 years ago. This gave ranchers more vaccination program options since live vaccine can’t be used in pregnant animals without risk of passing the virus to the fetus, which could lead to abortion, birth defects or persistently infected (PI) calves. Scientists have also worked on ways to test cattle to find out if they are infected.

Diagnosis and testing

Cattle can be blood tested to determine whether or not they are infected with the virus. If the virus is

present it can often be isolated from a blood sample or from tissues of an aborted fetus or from an infected “weak” or unthrifty calf. A small skin sample such as an ear notch can be checked for the presence of viral proteins. But a negative test does not always mean the animal is (or was) not infected with the BVD virus. You might test a cow because she aborted or gave birth to a weak or abnormal calf, but the infection that caused the problem may have occurred much earlier and the virus or its proteins or genes may no longer be detectable in the cow or in the calf.

The blood can be checked for antibody levels, but this test is only useful if the animal has never been vaccinated or has never been exposed to the virus. Most cattle have antibodies due to previous vaccination or exposure. If a calf has nursed it will have obtained antibodies from its dam’s colostrum.

When checking for BVD in a herd, animals that test positive need to be checked again in four weeks, to determine if they had an acute infection or are PI. The virus level will be dropping by the second test if the animal had an acute infection but will remain at the same level in PI animals. PI animals should be culled since they are the primary source of infection for most herds and produce calves that also carry the virus.

Commercial producers are usually reluctant to test their herds because of the high cost. Now there are improved tests that more quickly and accurately help with PI diagnosis. The tests utilize the reverse transcriptase polymerase chain reaction (PCR) technology that allows for pooling a large group of tissue samples such as ear notches. This is a more cost-effective method for screening a herd that may have just a few PI animals. A single PI animal can be detected in a pool of up to 250 samples. If the pool of samples comes up positive, retesting is necessary to find the one or more animals that are infected.

The first year a producer tests his or her herd, all calves, open cows, replacement heifers and bulls should be tested. If tissue samples are taken from suckling calves before the cows are bred, you can test the dam of

any calf that tests positive. All PI calves and their dams can then be removed from the herd before they come into contact with any pregnant animals, thus eliminating the risk for passing the virus to a fetus. If you can keep BVD from reaching the fetus, there will be no more PI calves produced. In subsequent years, only the suckling calves and any newly purchased animals need to be tested for BVD. If an animal is PI positive it will always be infected, and if it’s negative it will never become PI.

In addition to testing live animals, it pays to necropsy any calves that die to check for the virus. This means calves that die of scours, pneumonia or any other cause, and any stillborn calves or aborted fetuses. If the calf is PI the dam was infected.

The best way to eliminate a BVD problem is to check all animals and cull any that are shown to be PI. Then keep the herd on a good vaccination program. If you can keep the virus from reaching the fetus — making sure all pregnant cows have strong immunity — your herd will never produce a PI calf. No new animals — cows, pairs, bulls, replacement heifers, calves for grafting — should be added to the herd unless they are known to be free of BVD.

Diligent herd management is just as important as vaccination, and this may mean not grazing in common with neighbors’ cattle.

Vaccination

There are several brands of modified live virus (MLV) and killed virus vaccines available, containing different strains and concentrations of BVD. Herd health programs that include vaccination of the cow herd are aimed at preventing fetal infection; this is more difficult than just protecting an animal against clinical infection. Calthood vaccination — if properly boosted to stimulate adequate immunity, and then boosted annually with a MLV — will protect the animal itself from BVD unless it was born PI. But it is harder to obtain 100% protection for the fetus if the dam is exposed to BVD. She may have enough immunity that she herself won’t get sick, but the virus may

still, in some cases, infect the fetus. And if the cow is exposed to the BVD virus in early pregnancy, the damage is already done; vaccination in the fall will not correct the problem after it has occurred. So the best protection against BVD is to eliminate all sources of infection within the herd, keep up a regular vaccination program — making sure cows have the strongest possible protection in early pregnancy, vaccinating them ahead of breeding — and never let your cattle become exposed to other cattle that might harbor the virus.

In a herd that has already experienced BVD problems, starting a vaccination program may not show immediate results unless you also test

for and eliminate PI cows. Since they are incapable of producing an immune response to vaccination, PI cows will continue to carry the virus throughout their lives and continue to infect their unborn calves. Without testing, it may take three years of vaccination and culling — removing any cows that are late breeders or produce unthrifty calves — to rid the herd of BVD.

An added benefit to vaccination and keeping the herd free of BVD is stronger immunity against other diseases, since BVD hinders the animal's ability to mount immune defenses. If a cow harbors BVD, it does no good to vaccinate her for anything; she can't develop immunity or produce antibodies for her colostrum.

Biosecurity

Once you've tested your cattle and know you have no PI animals, or have culled any PI cattle from your herd, a good vaccination program and "closed herd" can ensure you won't have future problems. Biosecurity measures such as isolation and quarantine of new arrivals — any purchased bulls, replacement heifers, calves to graft onto cows — until they can be tested are crucial. You must protect your cattle from direct exposure to other animals that might have the BVD virus either as an active but temporary infection or as a PI.

One of the pioneers in this type of biosecurity is Lucy Rechel, Yerington,

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MLV versus killed vaccines

A modified live virus (MLV) vaccine contains the actual virus that causes a disease, but the virus has been modified (altered and inactivated) so it's unlikely to cause the disease. The virus retains some of its original characteristics so that the body will recognize it and mount a strong immune defense, just as it would do if confronted with the actual disease organism.

The MLV starts to multiply within the tissues of the vaccinated animal — in essence creating a mild and generally harmless form of the disease — stimulating production of antibodies against it. This type of vaccine produces a stronger and longer lasting immunity than can be obtained with a killed vaccine. In many herds an annual booster shot after the initial series of shots in the young animal with a MLV vaccine is enough to keep the animal protected.

Because the MLV vaccine is so potent there is some risk that giving it to a pregnant cow might result in infection of her fetus, or that a vaccinated calf, still nursing its dam, as in instances of preweaning vaccinations, might pass the virus to the cow and infect her fetus.

Use of MLV bovine viral diarrhea (BVD) vaccine in cows during the first two-thirds of pregnancy, before the fetus has developed a competent immune system, may result in abortions, weak or persistently infected (PI) calves. Label directions recommend that MLV vaccines be given only to nonpregnant animals and to weaned calves. This type of vaccine is usually given to young, nonpregnant animals and once a year to the cow herd after calving and before rebreeding (preferably at least two to three weeks before breeding). MLV vaccine given at the time of breeding or soon after will generally result in death of the embryo.

In contrast a killed vaccine will not replicate — the virus cannot reproduce in body tissues — and there is no chance for it to cause disease. Thus it is safe to administer to pregnant cows or to calves nursing their pregnant dams.



The downside of using a killed vaccine is that it does not give long-lasting or strong protection. It does not replicate and stimulate the body's immune system as much as a MLV vaccine, thus it must be repeated more often. Most veterinarians recommend giving it twice a year to cows, and calfhood vaccination

requires boosters. Killed vaccines always require two doses at least two weeks apart to produce protective immunity. They are also more expensive than MLV vaccines.

Some ranchers feel they get the most protection by giving the MLV vaccine to the herd in the spring after calving and before rebreeding, then using a killed vaccine in the fall on their pregnant cows. Some herds appear to benefit from a killed BVD booster — stimulating more immunity during winter and possibly giving better quality of colostrum at calving time.

Regarding calf vaccinations, many ranchers like to vaccinate calves preweaning to develop immunity before calves are stressed and more vulnerable to disease. They use the killed vaccine to make sure BVD is not passed from the vaccinated calves to the cows. But this does not give as much protection to the calves as does a MLV vaccine and must be boosted according to label recommendations before the calf gains immunity.

Some ranchers, working with their veterinarians, have found that if the cow herd has strong immunity with annual vaccinations kept up to date, there is little risk of cows developing reaction to their calves' vaccinations with a MLV product. If the cows were vaccinated with MLV vaccine before breeding it is safe to give their calves MLV vaccine preweaning. It doesn't seem to have an adverse effect on the pregnant cow. Thus some ranchers use the MLV vaccines in preweaning vaccinations for the calves, since it gives them greater and longer-lasting protection.

BVD vaccination is something you should discuss with your veterinarian, and tailor the vaccination program to best fit your own herd situation. **BW**

Nev., who manages Snyder Livestock, a 4,000-head bull and heifer development program for breeders in several Western states. A few years ago she decided to require all cattle coming into the feedyard to be tested to see if they were PI. This practice made a significant difference in the health of the animals.

She ran ads featuring a photo of a notched ear and called it the "mark of excellence" or the "mark of breeders who care." The first year her feedlot medicine cost dropped to 10% of what it was the previous winter. "In the herds that found PI animals, we were able to meet the problem head on and help them get the BVD virus out of their herd. After we required the test, Cal-Poly began requiring all cattle in their feeding program to be ear notched, so I feel we've had a positive impact in our part of the country," Rechel says.

The health issue is important since Snyder Livestock develops and breeds 2,500 heifers each year, synchronizing

and breeding them by artificial insemination (AI). "I realized that a program like ours could be breeding heifers and inadvertently sending BVD home to a herd that never had it previously. So this was a major factor behind establishing our biosecurity measures. It has certainly made a big difference on animal health issues in the feedlot," Rechel adds. **HW**

Editor's note: Heather Smith Thomas is a freelance writer and rancher from Idaho. She has more than 40 years of experience in the cattle business. The information in this article comes from her experiences, research and conversations with several veterinarians through the years on ways to control BVD. She says that her ranch had a problem with BVD when it first "hit" her part of the country in the early 1970s. "We lost a couple yearlings and a young cow to BVD in the mid-1970s and worked with our local veterinarians to get rid of it in our herd," she explains. For more information about BVD visit the "BVD Information Links" on the Academy of Veterinary Consultants Web site, <http://gpvec.unl.edu/avc>.

Calfhood vaccinations

If calves are vaccinated in the fall they gain the best and longest-lasting immunity from live virus vaccines, but if the immune status of the cow herd is in question, these vaccines can't be given until after weaning. Many ranchers prefer to vaccinate calves ahead of weaning, to start building the calf's immunity before the stress of weaning, but are hesitant to give live-virus vaccines to calves nursing pregnant cows.

A 1992 study showed that use of killed IBR-BVD (infectious bovine rhinotracheitis-bovine viral diarrhea) vaccine given at branding time, or when calves are 1-3 months old, resulted in better immunity at weaning when a booster was administered. The first dose of a killed vaccine gives very little protection, but boosting it a few months later, just before weaning, stimulates the calf to build immunity.

Some ranchers and vets who adopted this program began using modified live virus (MLV) vaccine on calves at branding time, when their dams were not yet pregnant, instead of the killed vaccine, and found a second benefit; the calves developed immunity after only one dose and had less incidence of calfhood illnesses — pinkeye, diptheria, foot rot, pneumonia, ruptured stomachs from abomasal ulcers — that sometimes occur at 2-3 months of age. Thus if you brand calves before breeding begins, it pays to use a MLV vaccine on the calves as well as the cows at this time. If the bulls have already been turned in, killed vaccine is safer, but won't give the calves any real protection until they receive a booster at weaning. Even if you use MLV vaccine at branding, a booster at weaning time is essential, since immunity the young calf gained in the spring only lasts a few months.

The best protection for young stock, especially for heifers going into the herd as replacements or young bulls, is to have three vaccinations, preferably with MLV vaccines before breeding age. The first shot can be given at 1-2 months of age before the dam is bred, a second shot at weaning time and another vaccination just ahead of the breeding season. This will give a heifer the strongest protection against becoming infected during early pregnancy. After that annual vaccination prebreeding is adequate for the rest of her life. **HW**

Liver Flukes, the Danger Within

In many areas of the country, liver flukes are recognized as one of the most damaging parasites of cattle, yet their affect is often mysterious and sometimes hidden. "With worms, a heavy infection is fairly easy to see, but flukes are a different story," says James Hawkins, associate director of Merial Large Animal Veterinary Professional Services. "Flukes can affect pregnancy rates, weaning weights and rate of gain, which can all be blamed on factors other than flukes if producers are not aware they have a fluke problem."

Flukes can result in abscesses on the liver and there is often associated weight loss — maybe only 15 lb. in a year, but that could amount to \$15 or \$20 a year per calf. With heavy infections, diarrhea, weight loss and jaundice can result.

More importantly flukes can affect reproduction. Research has shown a delay in the onset of puberty in fluke-infested heifers by 39 days. "Some research has demonstrated decreased pregnancy rates in replacement heifers with fluke infections as well," Hawkins says.

Don Crum, a veterinarian in Alturas, Calif., agrees that flukes are hard to diagnose and can severely affect a producer's bottom line.

He has worked with a ranch for 30 years that hasn't had any obvious problems until this year — cows started dying. Necropsies revealed a fluke problem.

"If you run in wet meadows in the spring, you probably have flukes. Most of our people probably have problems with cows and calves, but bulls and yearlings will get infected, too," Crum says.

The best way to ensure all cattle are protected against liver flukes is to use an endectocide that is effective for the treatment of internal and external parasites as well as liver flukes.

"Since liver flukes are difficult to diagnose, producers should treat for them during every stage of their strategic parasite control program," Hawkins says. **HW**

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