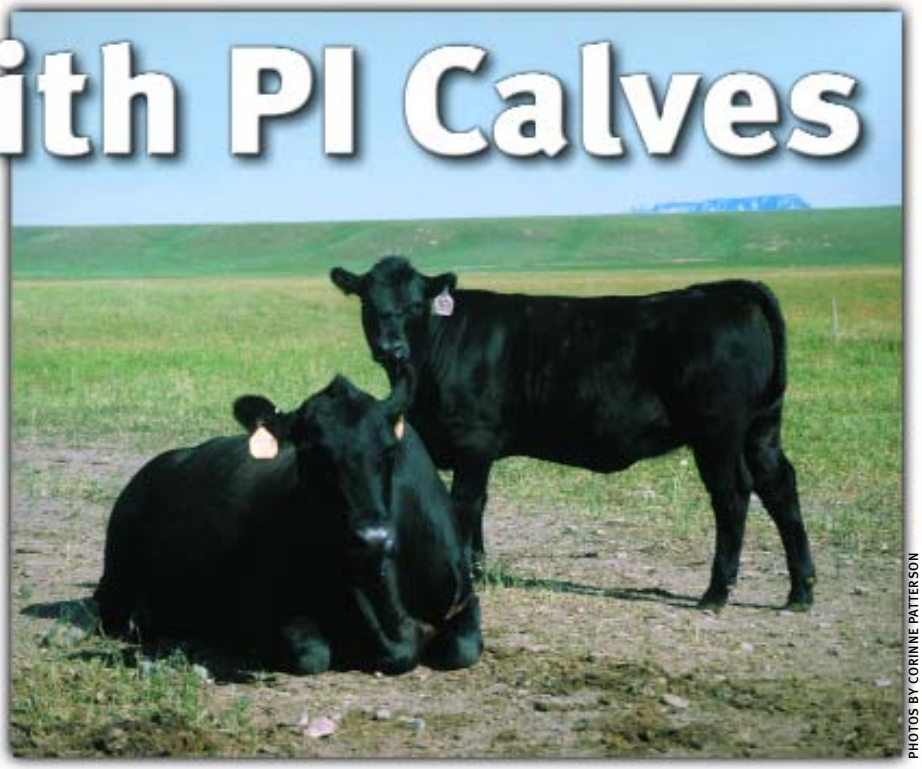
Deal with PI Calves

Options for handling PI animals begin at the cow-calf level.

by ***Micky Wilson***



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► **"This is a cow-calf reproductive disease that has ramifications all the way through," Dan Thomson, K-State veterinarian, said of BVD.**

Calves born persistently infected (PI) with bovine viral diarrhea (BVD) virus have been identified as a leading cause of disease spread at cow-calf, stocker and feedlot levels of the cattle industry. Dan Thomson, Kansas State University (K-State) veterinarian, emphasized that BVD is a reproductive disease best handled at the cow-calf level. He presented BVD background and testing information, options for handling PI animals, and additional insight for cow-calf and feedlot operators at the 2006 K-State Cattlemen's Day in Manhattan, Kan.

BVD background

Thomson began by explaining that BVD has two genotypes and two biotypes. The genotypes are Type I and Type II; the biotypes are cytopathic and noncytopathic.

"*Cyto* means cell; *pathic* means kill. So, if it's cytopathic … it kills the cell," Thomson said. "And if it's noncytopathic, that means it's living within the cellular mechanisms, but it doesn't kill the cell that the virus is in." Cytopathic BVD is the most damaging.

An estimated 1% of calves born are persistently infected with BVD; half of these calves die before weaning. Further research from veterinarian Bob Smith, chairman of the National Cattlemen's Beef Association (NCBA) Cattle Health and Well-being Committee, suggests that up to 2% of the U.S. adult beef cattle population is persistently infected, and about 4% of herds include at least one PI animal.

PHOTO BY MICKY WILSON

BVD has many negative effects on an animal. Arguably the most detrimental are abortions during the first 125 days of gestation, before the fetus has developed an immune system.

A calf contracts the virus from its dam during gestation, Thomson said. "If it is infected with the virus before 125 days gestation, it becomes persistently infected."

Thomson explained that a calf's immune system starts working at about Day 125 of gestation. "When that immune system kicks on, it takes inventory, goes through the body and says 'skin, that's me; hair, that's me; eye, that's me; heart cells, that's me; BVD, that's me,'" Thomson said. Thus, when the immune system of a calf *in utero* turns on, it doesn't recognize the need to have an immune reaction against the BVD virus.

"Once it's born, it carries BVD virus in every cell of its body for the rest of its life," Thomson continued, "and it will spew BVD out of every orifice in its body — saliva and feces being the two biggies."

Further negative effects of BVD are mucosal disease, calf death, inhibited conception in breeding females, and poor performance of stocker and feedlot cattle.

Thomson noted that the PI calves that perish are the ones that are necropsied and found to have the cytopathic form of mucosal disease. "But these aren't the ones that are crippling us right now," he warned. "The ones that are crippling us are the ones that don't show any disease signs."

Timing and testing for BVD

"The gold standard for testing for persistently infected calves is virus isolation," Thomson noted. Two methods for testing animals for BVD besides virus isolation include immunohistochemistry (IHC) and antigen-capture ELISA.

IHC testing currently takes four to five days to return results. ELISA is considered the fastest test, with results appearing as quickly as one afternoon. "Antigen-capture ELISA is a test that we're utilizing a lot, not only in our diagnostics lab, but a lot of practitioners are setting up their own labs for screening cattle for BVD," Thomson said.

Polymerase chain reaction (PCR) is another form of testing for identifying PI cattle. "PCR sampling is being readily used by Colorado State [University] now," Thomson said. "They take serum samples or an earnotch sample from the cows, pool the samples and run them all in one test." Up to 100 head of cattle can be pool-tested at one time.

"We're getting the accuracy of our tests," Thomson noted. "The next step is to get the speed of our tests up so that we can match the speed of industry."

With many cow-calf producers interested in permanently eradicating BVD from their herds, Thomson said he is frequently asked when to test. "If you're going to clean up your cow herd, earnotch the calves as they hit the ground," Thomson advised. Then go back and earnotch everything that doesn't have a calf.

When looking at adult cattle, if not culling, test any animal that didn't calve or that aborted. Significant numbers of PI cattle live well into adulthood, so it's very important that PI cattle are removed from the herd. A PI female will always produce a PI calf. In addition to females, it's also very important that bulls be tested. Semen from

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PI bulls can spread the virus.

"Before we decide what to do with one of those persistently infected animals," Thomson cautioned, "let's get a confirmation that *that* animal is truly persistently infected."

Following confirmation

BVD is a transitional disease, which means you can't tell by looking if an animal has BVD, so diagnostics must confirm the status of the animal. After confirmation, the first question likely to enter an operator's mind is, "What am I going to do with this animal now?"

Thomson recognized four S's to keep in mind for handling PI animals for both cow-calf and stocker-feeder operations:

1) shoot the animal;
2) salvage-harvest the animal;
3) seclude the animal; or
4) sell the animal.

For those selling and harvesting PI animals, there are no human health effects from BVD.

Just shooting the animal is not considered feasible for economic reasons, Thomson said. "Salvage — taking them directly to a cow-kill plant or to a salvage facility — is more profitable than shooting, by far. We can seclude them, or quarantine these animals and put some weight on them and then sell them, or we can sell them."

Thomson warned that selling PI calves to others is not recommended, but if done should be done with full disclosure of the animal's state of health and some form of permanent identification (ID). "The thing I think we need to do," he added, "is come up with a brand for BVD PI cattle that permanently identifies them."

Cow-calf cooperation

As an industry, we've learned BVD isn't a feedyard disease; it is a cow-calf disease. "If we're going to test the feeder calves, we need to test them down there at the source. It needs to be done at the cow-calf level," Thomson said. "This is a cow-calf reproductive disease that has ramifications all the way through. We cannot eradicate BVD by just taking care of all the steers before they get to the feedyard."

For the cow-calf producer, once a PI BVD animal has been confirmed, Thomson suggested utilizing the four S's by permanently identifying the animal and secluding it from the rest of the herd. Once secluded, it may be desirable to harvest the animal. This can be done right away after seclusion, or the producer may decide to wait to harvest the animal later to capture a better market. No matter which choice is made, the animal must be sold with full health-status disclosure and a permanent ID marking the animal as a PI BVD animal.

Since the knowledge of disease origin has grown, cow-calf producers have had a heavier load of responsibility placed on their shoulders to prevent BVD from spreading in the cow herd and making it to the feedyard. To cooperate within the industry, Thomson recommended producers precondition calves for the feedyard.

"We're coming to the point in time in our industry that we have to stand up and take ownership. We can't be policemen," Thomson said. "What we have to do is work with the people who want to do it right."

Feedyard facts

Like the cow-calf producer, the feedyard manager has four choices in handling a PI calf. The animal can be shot, but again, it is not recommended. Rather, the animal needs to be secluded and not allowed fenceline contact with other animals. Fences don't provide protection from BVD. Feedyard animals should be placed in a restart program to utilize a recycled market. Thomson created a "biocontainment hospital system," where PI animals are removed from the general population and finished in isolation. Thomson recommended sending cattle more than 850 pounds (lb.) to a normal packer, and cattle less than 850 lb. to a salvage packer.

"If you have one persistently infected calf in a pen of feeder calves, you'll have an increase in pull rates due to respiratory disease [of] 33%. If you have one calf persistently infected in a pen adjacent to a pen of known healthy calves, you will see an increase in pull rates in the pen adjacent to that PI [of] 33% as well," Thomson said.

Thomson reminded feedlot operators "that if you're in the cattle feeding industry and you're testing for BVD, you're trying to manage a cow-calf sector disease after it has occurred, and there is no way of fixing it on your operation. We have to work with our stakeholders in the beginning of the beef industry.

"The biggest things we have to do, not only as veterinarians, but as producers," Thomson said, is "start focusing on our industry, because when you look at the goals from NCBA, … quality products are at the top of the list."

BVD control

Early detection of animals persistently infected (PI) with bovine viral diarrhea (BVD) virus is very important. Producers are urged to identify animals that may be serving as a point of origin for the virus, immediately remove the source animal and implement a vaccination program.

During the 2006 Cattle Industry Annual Convention and Trade Show in Denver, Colo., James Kennedy, Colorado State University veterinarian, recommended a four-step plan for cow-calf producers to effectively control BVD.

1) **Test the entire herd for initial identification of PI BVD animals.**
2) **Implement an annual vaccination program using modified-live virus (MLV) vaccine. For more information about MLV vaccine, see "MLV Manners," page 89.**
3) **Test all new cattle introduced to the operation for PI BVD.**
4) **Test each year's calf crop for PI BVD animals.**