

HERD SCREENING:

Herd test can be accomplished with pooled sampling. Pools can be 25-50 animals. Individual samples should be submitted for pooling by laboratory so, if needed, BADDL can “open” pools to determine which animals were positive. Samples should be clearly identified and a list of each sample identified should be noted on the submission form.

- **Pooling:** It is possible to pool samples for the **PCR test only**. Up to 25 ear notches or up to 50 blood/serum/plasma samples may be pooled. Ship samples individually – lab technicians will create the pools at BADDL.
- **Samples will NOT be pooled for the ELISA test.**

SHIPPING/TRANSPORT

- Temperature control is crucial to the validity of PCR and ELISA results. Take appropriate measures to ensure samples are chilled shortly after collection and kept cold during transport. Ship samples to BADDL as quickly as possible.
- Vials should be placed inside a plastic zippered bag or a vial box and then in a shipping container with frozen gel packs and packing materials such as bubble wrap to prevent excessive shifting during transport. Include a BADDL submission form in a zippered plastic bag inside the container or between the container and the box. The submission form should indicate whether individual or pooled testing is preferred, by writing either “**BVDV PCR**” or “**Pooled BVDV PCR**” or “**BVDV – ELISA**” under “Tests Requested.” **Sample collection date must be included on the form.**
- Samples **MUST** be:
 1. Received at the lab within 48 hours of collection
 2. Protected from light
 3. Received chilled

SHIPPING ADDRESS

BADDL – 2700 N. John Young Parkway, Kissimmee, FL 34741-1266

TURNAROUND TIME (TAT)

Test results can be expected within 2-3 business days of the sample arriving at the lab. Please contact the Bronson Animal Disease Diagnostic Laboratory at (321) 697-1400 with any questions.

Bronson Animal Disease Diagnostic Laboratory
2700 North John Young Parkway
Kissimmee, FL 34741

(321) 697-1400 Phone
(321) 697-1467 Fax

FreshFromFlorida.com/BADDL

BOVINE VIRAL DIARRHEA VIRUS (BVDV)

Testing at the Bronson Animal
Disease Diagnostic Laboratory

WHAT IS BOVINE VIRAL DIARRHEA VIRUS (BVDV)?

Bovine Viral Diarrhea Virus (BVDV) is one of the pestiviruses known to infect ruminants, camelids, and swine. For bovine producers, the virus causes economic losses through decreased weight gains, decreased milk production, reproductive losses, and death. The *BVDV* is classified as Type I and Type II, and both *BVDV* types are detected by current test methods. This type of *BVDV* does not predict disease severity; however, there are two categories of *BVDV* infection based on severity and progression of disease.

Despite the name, many animals with *BVDV* do not have diarrhea. Other manifestations of the virus include subclinical infections, immunosuppression, abortions, congenital defects, persistent infection, and mucosal disease. The majority of infected cows are either subclinically ill (do not appear sick) or have only mild clinical signs such as low grade fever and diarrhea. Because *BVDV* suppresses the immune system, some animals will become ill with other infections, usually pneumonia; other animals will display classic signs of *BVDV* with fever, discharge from the nose and eyes, erosions of the muzzle and in the mouth, and severe diarrhea; others may have severe hemorrhagic (bloody) diarrhea and die. Severity of illness is influenced by the age of the animal and its immunological and physiological status, and the particular strain of the virus involved.

The most important aspect of *BVDV* is its effect on the developing fetus. *BVDV* can cause abortions at any stage of gestation – from early embryo loss to stillbirths at term. Even a subclinically infected cow can abort, and abortions may occur up to several months after exposure to the virus. A unique feature of the *BVDV* is its ability to produce a persistently infected (PI) calf, which occurs when the cow is exposed to the virus at a critical phase of her gestation (approximately 40-120 days) and does not abort. The developing fetus is not immunocompetent at that stage of development, so it becomes immune-tolerant to the virus (does not recognize the virus as foreign). Therefore, the calf is unable to evoke an immune response to rid itself of the virus, and once born, is a permanent carrier and sheds large amounts of the virus in body secretions, including: tears, nasal discharge, saliva, urine, and feces. PI calves are the major source of the spread of *BVDV*. PI calves can shed several billion viral particles each day, which is about a thousand times more than what is shed by a transiently infected non-PI animal.



Florida Department of Agriculture and Consumer Services

Testing for *BVDV* is complicated, with different tests being used in different situations. Having antibodies (blood test) to *BVDV* shows that the animal was exposed to the virus (from a clinical or subclinical infection, or from immunization), but it is unknown how long antibodies are detectable after exposure. Any positive *BVDV* test results, considered in conjunction with the herd history, may suggest the need for further testing within the herd. For *BVDV* herd screening, every animal in the herd should be evaluated for the virus in some way, either by PCR, Antigen capture ELISA, or Immunohistochemistry.

	Transient (acute) infection (TI)	Persistent (chronic) infection (PI)
Duration of the disease	Short-term infection, usually weeks.	Lifelong infection.
When the animal acquired the virus	Acquired after birth.	Acquired in utero. Thus, only fetal infection results in <i>BVD-PI</i> . The only way to be a PI animal is to be born as a PI animal
Frequency	>95% of <i>BVDV</i> infections are TI	<5% of <i>BVDV</i> infection are PI
Clearance of the infection	TI cattle become immune and clear the virus.	PI cattle never become immune and carry the virus for life.
Source of the virus	TI animals are a minor source of the virus spread in a herd.	PI cattle are the major source of virus spread in a herd.
How PI calves are born	Over 90% of <i>BVDV-PI</i> calves are born from normal dams (no prior <i>BVDV</i> exposure) which were likely TI animals. PI animals have a low likelihood of surviving but always give birth to PI calves.	

DIFFERENTIATING PERSISTENT INFECTION (PI) AND TRANSIENT INFECTION (TI)

PI animals will not have antibodies, unless they were tested as newborns soon after ingesting their mother’s antibody-containing colostrum. To accurately detect a PI animal, testing for the virus must be done twice, 3-4 weeks apart, with both results being positive for the virus.

Even the PCR test cannot distinguish between a transiently (acutely) infected animal and a PI animal. PCR positive animals must also be retested 3-4 weeks after the initial testing. As with other *BVDV* testing, acutely infected animals that have recovered will be virus negative, while PI animals will be positive on the second test.

BVDV TESTING FOR THE DAIRY INDUSTRY:

Bulk tank milk testing: Many PI animals die before 2 years of age, but some may survive longer. Bulk tank milk samples can be used to identify PI animals that become part of a milking group. A sample of 200 mL of milk from a well-stirred bulk tank may be submitted for testing. The sample should represent a pool of not more than 400 animals. Keep the milk chilled - DO NOT FREEZE.

- If the test is negative, then individual animals need not be tested.
- If the test is positive, the milk should be retested in 3-4 weeks to rule out acute infection.
- If the bulk milk sample is positive a second time, evaluate animals individually.

To decrease the cost (number of individually tested animals), initially test only first-lactation animals, removing any positives, followed by testing another bulk milk sample. If this is negative, remaining 2nd and 3rd lactation animals that contributed to the bulk milk sample do not need to be tested. An alternative strategy is to milk half the herd, take a milk sample, milk the remaining half of the herd, and take a second sample. If only the second sample is positive, then individually only test the animals that contributed to the second milk sample.

ADDING ANIMALS TO A HERD:

Herd biosecurity is important to protect your herd from diseases that new animals may bring with them. It is important to keep new animals separate from the main herd to prevent *BVDV* and other diseases. The recommended minimum isolation time before introducing new animals to a herd is 30 days. This isolation period should be used to screen for *BVDV* and other diseases.

How to Manage New Animals Tested from *BVDV* during isolation

- If the initial test is negative (*BVDV* not detected) = no *BVDV* infection. After 30 days of isolation and no evidence of disease, these animals can be introduced into the established herd.
- If the initial test is positive (*BVDV* detected) = persistent OR transient *BVDV* infection is suspected. Keep the new animals in isolation until retested in 3-4 weeks. If the retest is negative, the initial result was most likely due to a transient infection. If the retest is positive, a persistent infection is likely and culling of PI animal is recommended.

A negative-tested dam can be returned to the herd, but it is recommended that she be isolated just before delivery until the newborn is tested with PCR.

BVDV IN ALPACAS:

Bovine Viral Diarrhea Virus (BVDV) can cause abortions and persistent infection in alpacas. If an alpaca is exposed to *BVDV* during early pregnancy, she can produce a persistently infected (PI) cria who sheds large amounts of virus its entire life and is the major source of the spread of *BVDV*. Aborted or stillborn fetuses and unusually low birth weight or poor doing cria should be tested specifically for *BVDV*. On postmortem exams, there are usually no pathological changes to suggest *BVDV*. This is why specific testing is important. In addition, any pregnant females who may have been exposed to *BVDV* during their pregnancy should have their cria tested for *BVDV* soon after birth using a blood test.

INSTRUCTIONS FOR SUBMISSION

<i>BVDV</i> Test	Sample Type	Purpose	Cost
PCR for Virus Detection	EDTA blood, serum, plasma, tissues, fresh ear notches or milk	Primary test for both PI and acutely infected animals. The test is sensitive and cost-effective. PCR detects <i>BVDV</i> -1, <i>BVDV</i> -2, Border Disease Virus (BDV), and HoBi-like pestiviruses.	\$30.00 Pooled PCR (BADDL can pool up to 25 ear notches and up to 50 serum samples in one test) Individual PCR: \$25/animal
Antigen Capture ELISA for Virus Detection	Fresh ear notches and serum	Usually detects PI animals. It may miss acutely infected animals. If using serum, collect from pre-colostral calves or calves older than 3 months of age.	1-5 samples: \$4.50/test 6-15 samples: \$3.50/test >15 samples: \$3.00/test Samples will NOT be pooled for the ELISA test
Immunohistochemistry (IHC) for Virus Detection	Fixed tissue samples	Used when fresh tissues are not available or as part of postmortem examination for individual diagnostics	\$25.00 per sample