

## BVD Testing

BVDV has important economic and welfare implications for cattle farmers in the UK. Investigating BVD on farms is therefore important and having clear testing regimes is essential to ensure that the right conclusions can be drawn before any action is put in place to alleviate the problem.

### Step 1: How to initially assess BVD status in a herd using serology.

The principle here is to test separate epidemiological groups on the farm.

- a) Bulk milk BVD antibody test.

A negative or low positive bulk milk antibody result suggests that it is unlikely that there is a PI in the milking herd.

If the antibody result is moderate to high positive then this suggests a PI may be present. A clearer indication of recent BVD infection can then be gained by testing a pooled milk sample for antibody from the first lactation heifers;

- i) If the first lactation heifers' sample has a negative or low positive antibody level, then a PI is unlikely to be present in the milking herd.

If the first lactation heifers' sample is medium to high positive, then there has been recent exposure to BVD virus in the herd.

NB vaccination will usually give persistent low antibody levels, as long as no active infection is present.

**PLEASE NOTE:** if the herd is vaccinated with the new live vaccine from Boehringer-Ingelheim, the vaccine may generate significantly higher antibody levels than inactivated vaccines and bulk milk antibody testing should not be used to assess BVD status.

- b) Blood test five young stock (9 to 18 months) from each epidemiological group on the farm for BVD antibody.

An epidemiological group includes all animals that are directly in contact. The contact between animals should have been for a minimum of two months for it to be classed as one group. If there is wide variation in age in the sample group, then test the youngest and oldest animals.

In dairy herds, blood testing should be carried out on young stock groups as above in addition to milk serology.

The presence of strongly seropositive animals will give an indication of recent exposure to BVD, particularly in a non-vaccinated herd. It needs to be noted that animals less than 9 months of age may have maternal antibody which is why such young animals should not be included in this testing if possible. If youngstock are sold before nine months old then testing can be done down to six months old.

If all animals are seronegative, then this strongly suggests there is no PI present in the cohort.

If one or two seropositive animals are present, the possibility that these are slightly younger animals with maternal antibody should be considered. It could also indicate the presence of vaccine antibody as BVD vaccination may give detectable titres for up to 3 months. These possibilities should be investigated further e.g. through retesting the antibody positive animals.

If three or more seropositive animals are present, particularly if they have high antibody levels, it would suggest there has been recent exposure to BVD virus.

**PLEASE NOTE:** if the herd is vaccinated with the new live vaccine from Boehringer-Ingelheim, the vaccine usually generates significantly higher antibody levels than inactivated vaccines and youngstock should be checked for antibody before being vaccinated.

## Step 2: Hunting the PI using virology.

If step 1 indicates recent infection, a whole herd screen is advised;

- a) Bulk milk BVD virus PCR. Up to 400 animals can contribute to the bulk milk sample.

If the result is positive, blood antigen testing will be required to identify the PIs; here, it is best to start firstly with the least productive animals, i.e. the lowest 10% yielders, and secondly with the first lactation heifers, as a PI is much more likely in younger animals.

**PLEASE NOTE:** if the herd is vaccinated with the new live vaccine from Boehringer-Ingelheim, bulk milk PCR should be carried out at least 21 days after vaccination.

- b) Blood antigen testing – include all animals that didn't contribute to the bulk milk sample. In beef herds, this is of course the only form of antigen testing available. If a calf tests as negative for antigen there is no need to test its dam as it will also be negative for virus.

Types of test available:

- i) BVD virus PCR on pooled blood samples. This test can be used to check up to 25 animals with a single test. The advantage of this test is that epidemiological groups of animals with a low suspicion of PI presence can be eliminated from the search cheaply. It is less cost effective where there is increased suspicion of PI status in a group as positive pools then need to be further tested by individual BVD antigen ELISA.
- ii) BVD antigen ELISA on individual blood samples. This test is more appropriate for screening animals in groups where there is increased suspicion of PI status. However, it should be avoided in young calves in the first 30 days of life due to maternal antibody interference.
- iii) BVD virus PCR on individual blood samples. This test is validated for very young calves and is the test of choice for animals less than 30 days old. It is more expensive than the BVD antigen ELISA test.

**PLEASE NOTE:** if the herd is vaccinated with the new live vaccine from Boehringer-Ingelheim, antigen tests should be carried out on blood samples taken at least 21 days after vaccination.

- c) BVD antigen ELISA on ear tag samples. This is validated for very young calves and allows collection of an appropriate sample for testing at the time of ear tag insertion, utilising the sample of tissue removed at the time of tag insertion.

*Note:* with all tests for BVD virus, the possibility of transient viraemic infection needs to be considered. Antigen associated with transient viraemia tends to be detectable for no more than 2 weeks so rescreening the animal(s) with an **antigen** test at least 3 weeks after the initial positive antigen test will differentiate between transient and persistent infection. (BVD virus PCR may detect viral DNA for 50 to 100 days following transient infection so retesting needs to be delayed for a significantly longer period of time).

It also needs to be remembered that acute infections in young seronegative bulls may lead to prolonged infection of the testes despite the animal seroconverting to BVD as the antibodies cannot cross the blood-testes barrier. These animals risk perpetuating infection in a herd by potentially producing PI animals. Semen can be tested for BVD virus using PCR.

## Step 3: How to maintain BVD disease free status

Once PIs have been identified and eradicated, new introductions to the herd should be screened for BVD antigen. This includes calves born into the herd for the next 12 months, animals bought into the herd and calves from animals bought into the herd.

Quarterly bulk milk antibody tests should be carried out and, if these are positive, an additional bulk milk antibody test on first lactation heifers also should be carried out.

It is advisable to continue with young stock screening. In dairy herds, this is most easily carried out on heifer groups prior to breeding. In beef herds, all calf groups should be included.

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