

3.9 BVD-Eradication in Switzerland

BVD-Eradication in Switzerland is still in its infancy. A possible concept...
The situation

The BVD virus has been present for a long time in Switzerland. Since 2001, our national animal disease legislation considers Mucosal Disease an epizootic that needs to be monitored. Every single diagnosed case has to be reported. A study conducted in the late nineties by the Institute of Veterinary Virology at the University of Bern provided comprehensive data on BVD. On the basis of a representative population, antibody-prevalence in dairy-herds was shown to be 57.7% (+/- 4.5% [C.I. 0.95]), while antigen prevalence is at 0.64% (+/- 0.34% [C.I. 0.95]) (figure 1). Looking only at cows older than 25 months, antibody-prevalence is even at 70%. On average, one out of eight dairy herds will hold a pi animal. As observed in other countries, there is a correlation between antibody-prevalence and the presence of pi animals. Pi animals were mainly found in herds with an antibody prevalence above 60%. Still, this concerns a great number of herds examined by the Swiss study. This relatively high antibody-prevalence plays a major role when it comes to choosing a control strategy. Risk factors

Apart from general infection causes, specific risk factors could be identified for Switzerland. These account for the broad distribution of BVD. Above all, the infection of early pregnant cattle during transhumance carries weight. The lacking protection of young animals (15-24 months, antibody-prevalence approx. 40%) and the getting together of animals from different farms contribute to a massive generation of pi animals. The next year, the latter produce pi animals themselves on their home farms.

The acquisition of fattening calves is an other risk factor in Switzerland. Research found, the the percentage of pi animals is above average among them. Often, early death of young animals will not be examined in the lab. Therefore, farmers are often unaware that losses or temporary fertility problems are caused by BVD. Financial affairs

Another study provided a model for the estimation of BVD induced economic losses in Switzerland. The calculations are based on available data on the epidemiologic and economic situation (prevalence, incidence, herd- and management-factors, market prices etc.). According to this model, BVD induced losses add up to approx. 9 million Swiss francs per total cattle population (approx. 1,6 million animals) and year. This amount is based on data gathered in 1995-1997 and should therefore be a rather conservative estimation for today's situation. It accounts only for direct losses to the animal keeper (reduced value of breeding animals, early elimination due to bad performance, death by Mucosal Disease, reduced fertility). Compared to similar studies abroad, the calculated sums are rather low. Indirect costs - like, for example, the use of antibiotics in fattening calves - are disregarded. If they were included, the calculated costs would be considerably higher!

Even with this conservative damage calculation, a nationwide BVD eradication campaign should pay off after approx. 5 years. This estimate takes into account all costs caused by veterinary work (visits, taking of blood samples), Diagnostics (virus detection by means of PCR, antibody detection in bulk milk) as well as pecuniary compensation for killed pi animals. Within ten years, cumulative eradication costs would come to approx. 55 million Swiss francs. Control strategies

Control strategies which rely basically on the identification and elimination of pi animals exist in various European countries. Most of these strategies are derived from an original Scandinavian approach. To keep overall costs low, the participating farms are declared "BVD-free" or "BVD-suspicious" by means of an ELISA-based mixed milk test. The subsequent multilevel process of pi animal identification focuses on "BVD-suspicious" farms. Technically, a similar procedure would most likely succeed in Switzerland. However, from a financial point of view, this approach is problematic for the following reasons:

- The broad distribution of BVD in Switzerland (with seroprevalences above 70% in many herds) makes it impossible to identify "BVD-free" herds by means of mixed milk tests. Advanced diagnostic testing on individuals using today's common methods (Ag-capture-ELISA, AB-ELISA, virus isolation) inevitably raises the cost of any control strategy.
- Some of the methods used to identify pi animals do not satisfactorily detect very young individuals. The residual risk implies trade-, transportation- and pasture-restrictions. Especially in Switzerland, with our habit of transhumance (common summer pastures for younger animals in elevated mountain areas), such measures encounter resistance.
- Diagnostic costs in Switzerland are relatively high compared to other countries. RT-TaqMan-PCR

Due to a high antibody prevalence, only a small amount of herds could be identified as "BVD-free" by initial screening using antibody-detection in mixed milk. A rational identification of pi animals without a precedent screening would be a major advantage under Swiss conditions. One possible solution is an automated PCR-procedure developed by the Institute of Veterinary Virology at the University of Bern. It is based on TaqMan-RT-PCR testing of mixed milk and pooled serum samples. Using this method, entire herds can be declared "BVD-free" (for the time being) within a few days. Even young animals in their first months will be detected. Only one out of eight farms houses one or more pi animals. These can be identified with further PCR-testing (pooled samples or not) and eliminated. Thus, trade- and pasture-restrictions can be considerably reduced. With "BVD-free" herds growing in number, the subsequent monitoring will gradually

change back to the more economic antibody testing in bulk milk.

Vaccines

Another option, the use of an orally applicable modified live vaccine, was evaluated experimentally. A simulation showed, that under Swiss conditions, an increase of seroprevalence to >93% would eradicate BVD in the medium term (i.e. after 4 - 6 years). All non-pregnant animals would be vaccinated once a year, which, simply spoken, simulates natural infection. The advantage is, compared to today's commercially available vaccines, a protection that lasts for years. The vaccination of non-pregnant animals usually happens physically apart from the rest of the herd (e.g. on spring pastures). Despite being a promising alternative (especially regarding animal traffic restrictions), practicability and safety still need to be verified by an extended pilot study.

Summary

The virus causing Bovine Viral diarrhoea (BVDV) is widespread in Switzerland. An epidemiologic study in dairy herds showed a seroprevalence (antibody-positive animals) of 57.7% and a pi prevalence (persistently infected animals) of 0.64%. Infection of early pregnant cattle on mixed summer pastures (transhumance) plays an important role in spreading BVDV in Switzerland. Supposably, BVDV has reached a state of natural equilibrium - only a small share of animals is currently vaccinated. The total economic loss caused by BVDV is estimated at 9 million Swiss francs per year (cattle population in Switzerland: approx. 1.6 million). The epidemiologic situation (relatively high seroprevalence) has consequences on the control strategy. A campaign which bases on initial screening by means of Antibody-ELISA in mixed milk proves to be financially problematic. Direct identification of pi animals with TaqMan-RT-PCR in mixed milk and pooled serum seems to be more appropriate.

As an alternative, a concept has been developed which focuses on vaccination of young animals with an orally applicable modified live vaccine. Both procedures are not totally mutually exclusive. Cost-benefit analysis shows, that a nationwide control-program pays off after 4 - 6 years. The decision-making process about further action is currently under way.