IBR (infectious bovine rhinotracheitis)

IBR and symptoms

IBR (infectious bovine rhinotracheitis) is a viral infection in cattle. Symptoms of IBR are:

- Nasal discharge, sometimes in the form of mucous excretions
- Ocular discharge
- Fever
- Decreased appetite
- Decline in milk production
- Redness and lesions (damage) of the nasal mucosa
- Abortion
- Sometimes mortality

Often the virus infects cattle within a herd without visible symptoms are noticed. Sometimes only fertility problems and/or reduced milk yield are noticed. Most outbreaks occur during the stable period.

Cause

IBR is caused by bovine herpesvirus type 1 (BoHV1). This virus is related to the Aujeszky's disease virus, and other herpes viruses. After infection, the animal will become virus carrier. The virus can remain present in cattle for many years, without causing disease. The virus can suddenly become active again (reactivation), for example after immunosuppressive treatments or stress induced by e.g. transportation, illness or calving. The animal starts excreting the virus again for several days and can infect other animals.

Infection Route

Between animals on the same farm

Research shows that, in case an IBR-free farm becomes infected with the BoHV-1 virus, a large outbreak will occur and the majority of the cattle herd (more than 50% of the free animals) will become infected. Depending on the farm management, the infection can spread and the entire farm will become infected within 4 to 8 weeks. Virus spreading occurs faster in intensive contact situations, for example when animals are housed in one shed.

Between farms

When an outbreak of IBR occurs on a farm, limited spreading to other farms is noticed. There is a greater chance of transmission of IBR to other farms at a density of more than 20 cattle farms within a range of one kilometre.

Damage

Although the majority of IBR infections remain free of clinical symptom, an IBR outbreak can cause considerable damage due to mortality, decreased milk production, infertility, abortion and limitations in the sale of breeding stock and semen (export and Artificial Insemination), in particular when the herd is not vaccinated.
Several countries require that the imported animals are free from antibodies against IBR-virus. Export of animals or semen to these countries is only possible from IBR-free countries.

Effects on humans

IBR is not contagious to humans.

Diagnosis of IBR

Suspicion of IBR may arise on the basis of clinical symptoms. The animal will stay carrier of the virus after infection for many years, and the virus can become active again. The cow will excrete

the virus again and other cows can be infected. After an infection, antibodies are formed which can be detected in blood and milk a few weeks after infection. In the acute phase of an outbreak, the IBR diagnosis can be made by demonstrating the IBR virus in nasal swabs by PCR or by virus isolation techniques.

Bulk (Tank) milk research
The farmer can get an idea about the level of contamination on the farm through the examination of a bulk milk sample. In case antibodies are found in the bulk milk sample, it can be assumed that more than 10% of the lactating cows is infected. If there are no antibodies detected in the bulk milk sample, in general less than 10% of the lactating cows is infected.

Individual milk research
With individual milk samples, you can examine which cows are infected. In case antibodies are found in the milk sample, it can be concluded that the cow is infected and therefore a potential source of infection for the rest of the herd. The advantage of the examination of milk samples (bulk or individual milk samples) is that the farmer can do it easily by himself.

Blood (serum) tests
The infection can be detected also through blood tests. Again, in case antibodies are found, the cow is infected. In general, blood tests are more sensitive in the detection of BoHV-1 antibodies than milk samples.

Clinical outbreak
The IBR diagnosis can be made in an outbreak situation by means of nasal swabs. As part of the (voluntary) IBR certification program, IBR-free farms must perform examinations of cattle suspected of clinical signs related to IBR. It is urgently required to report a suspicion of an IBR outbreak at an IBR-free certified farm directly to your veterinarian, to reduce the spreading of the IBR virus between farms.

Presence of infected cattle
Infected cattle on the farm may start to excrete virus again after a period of stress (immunosuppression) and these animals can infect other cattle on the farm. This risk can be reduced by the following measurements:

- Detection and removal of infected animals
- Vaccination (reduces the risk of virus excretion and spreading of the virus)

Purchase of cattle
IBR can be introduced on your farm through the purchase of infected cattle or trough contacts with non IBR-free cattle. After a stressful period or immunosuppressive action, for example after transportation, disease or mixing with other cows within the herd, the BoHV-1 infected animal starts to excrete the virus again and infects other cattle on the farm. This can be reduced by the following measures:

- Closed farm system, so no supply of or contact with non-free cattle
- Only purchase of cattle from infection-free and IBR-certified farms
- Transport exclusively with other infection-free cattle, and using trucks that have been cleaned and disinfected prior to transport
- Vaccination

Contacts with non-IBR-free cattle
Contacts with non-IBR-free cattle are possible through contacts with cattle from other herds, contacts with cattle via over-the-wire contacts, and contacts during visiting a non-IBR-free cattle auction. You can prevent infection through over-the-wire contacts by a second fence that increases the distance to the pasture section of potential contamination source to 3 to 4 meters. The best prevention of getting IBR, and many other diseases, is that cattle will not be mixed with

other cattle and do not go to a non-IBR-free cattle auction. If the farmer chooses to mix cattle or go the auction, it is advisable to vaccinate the animals against IBR.

Professional farm visitors
Visitors who regularly visit other cattle farms may carry the virus on clothing, footwear and materials. By making consistently use of industrial clothing and footwear, that is owned by the farm that is visited, the risk of introducing new infections is limited.

By air
The IBR virus can be spread over short distances through the air. To reduce this risk, it is important to induce a distance of several meters between infected and uninfected animals. The distance that the virus can spread by air depends on several factors, such as the air flow and air humidity. Therefore, it is not possible to say what the distances should be to prevent contamination by air. It is often recommended that the distance should be at least 3 meters.

Through adjacent farms
Research shows that during an outbreak of IBR there is a limited degree of spread to other farms. The higher the cattle density, the greater the chance of disease spreading. At a cattle density of more than 20 farms within a radius of one kilometre, there is a significantly higher risk of transmission. The risk of transmission between farms can be reduced by vaccination. Farmers in these areas are also encouraged to take measures against the introduction of the virus.

Approaches in clinical outbreaks situations
In a classical clinical outbreak of IBR, further damage can be prevented by vaccinating the herd with a live vaccine. Animals should be vaccinated by the intranasal route, as soon as possible. The risk of infecting non-infected groups of animals can be reduced by, for example, spatial separation, additional hygiene measurements and vaccination.

Approach in relation to the IBR-status
In order to determine which approach is the most appropriate one for farms, it is important to known how many, and preferably also which animals are infected. Bulk milk analyses provide information about the IBR status on the farm. This information can be used to determine which approach is the most suitable one for the farm.
Based on the detection of antibodies in bulk milk samples, it is advised to vaccinate the herd or to continue with the screening of individual animals using blood sample analyses.

IBR-free certification through blood sample analyses
In case the percentage of infected cattle on the farm is low (<10%), and the farmer is willing to withdraw the infected individual animals, the farm can participate the IBR-free program and to get the IBR-free certificate. A direct approach, to become a certified-free farm, can be achieved through blood tests. Blood tests provide a high security to determine an outbreak of IBR. On IBR-free certified farms, the risk of an outbreak is much lower than on farms without a free-certificate. Blood tests can be used to trace infected animals present on the farm and the positive animals can be eradicated or sold. It is advised to purchase only IBR-free cattle in conjunction with hygiene measures to prevent the introduction and spread of IBR.
When a farmer doubts about to start a certification program, the farmer can start the certification program by starting to examine some of his cattle on IBR, such as the elderly cows or cattle that you definitely do not want to sell. If the principal investigations are favourable to continue, the farmer can continue to examine the remaining animals.
In case the principal results are unfavourable, the famer can continue the IBR-free program by monitoring the herd using bulk milk sample analyses. Bulk milk analyses can be used to monitor the IBR status on the farm. After 2 years, the farm can be certified by a simplified procedure in case the test results are promising.

Bulk milk sample ubscription
Is the percentage of infected animals on a dairy farm less than 10%, but you do not want to follow a certification program, you can take part in the bulk milk monitoring program. Based on the bulk milk analyses you can follow the IBR situation in your farm. The collection of bulk milk sample can be done for example via the diary processor plants or the milk collection centres and at least nine times a year the bulk milk samples must be analysed for antibodies against IBR. In addition, the blood from aborted calves will be investigated too. After 2 years of examination of bulk milk samples, with favourable test results, the farm can be certified as IBR-free through a simplified procedure. These have no or only a limited number of cattle to be tested via blood testing.

Closed farms
It is important to prevent the introduction and reactivation of the virus by the purchase of infected cattle. IBR and other bovine diseases (such as BVD, salmonella and para-tuberculosis) can be introduced by purchasing infected cattle, but also through on-the-wire contacts, import and mixing of cattle, participation on auctions and through professional farm visitors. Researchers at the Wageningen University, the Netherlands, have calculated that the costs of measurements, to achieve a closed farm system, is less than the damage caused by a disease outbreak.

Replacement policy of animals
In case you known that cattle on your farm is infected, you can use a replacement policy for these animals. This means that you no longer keep infected cattle on your farm than (economic) necessary. There are different ways to determine which animals are infected:

- **Company history**: If there has been an IBR outbreak at the farm in the past, then, most of the animals present on your farm still have antibodies against IBR.
- **Individual milk sample investigations**: Individual milk samples can be analysed using the milk samples collected via e.g. the milk collection and control system.

Vaccination
If your farm contains BoHV-1 infected cattle, and you do not want to cull or sell infected animals or you do not have a closed farm system, the risk to introduce an IBR outbreak can be reduced through a vaccination with a marker vaccine. A vaccination scheme, in which you vaccinate all animals on your farm two-times a year (according to the leaflet) will provide the highest security. In case the last vaccination has been carried out for more than one and a half years ago, in some cases it is advised to perform a double vaccination. Consult your veterinarian.

To ensure the free status of your farm, and to guard its free status, it is necessary that a certified-free farm strictly follows certain rules regarding the prevention of introduction of IBR. In addition, check the free status of your farm through regular sample analyses.

Monitoring IBR-free status
The IBR-free status of your farm can be monitored by:

- Investigation of bulk milk samples (dairy farms). The monitoring of the infection-free status of dairy farms is done by bulk milk analysis on the presence of antibodies against IBR. This needs to be performed at least nine times a year.
- Blood tests (non-dairy farms). The monitoring of the infection-free status of non-dairy farms is performed by the analysis of blood samples taken at the slaughterhouse. The blood samples will be analysed on IBR antibodies. For each farm, at least one blood sample needs to be examined every two months. As long as the test results are favourable, the farm will keep its IBR-free status. In case farms do offer little or no animals to the slaughterhouse for blood collection, additional blood samples can be taken from the farm itself to monitor the IBR-free status.

- Investigation of aborted calves (the calf is born between 100 and 260 days of gestation). Abortion can have various causes, including infection with abortion Bang (brucellosis), BVD, IBR and leptospirosis. In connection with the risks to human health, it is expected that you investigate all aborted foetuses/calves by blood sample within seven days. The blood sample of an IBR-free farm is automatically analysed on brucellosis and IBR.

Preventing the introduction of IBR
The risk of an introduction and spread of IBR, but also of other contagious animal diseases, can be reduced by:

- Supply professional farm visitors with farm owned clothes and boots
- Avoid animal contacts with non IBR-free farms, avoid wire contacts, public auctions, demonstrations, etc
- Purchase only animals from IBR-free certified farms
- During transport; do not have contacts with non-IBR-free cattle (infected cattle)
- Only use clean material. Think about clean and sterile material that is used by inseminator, veterinarians and hoof trimmer
- Prepare a special room to be used as a delivery device room for discharging cattle.

The purchase and supply of cattle from non-free farms, and participation in non-IBR-free auctions, will lead to the suspension of the IBR-free certificate.

Suspension of the IBR-free certificate
If there is evidence that the farm is IBR infected, the farm will be under close observation and the IBR-free certificate is suspended. The evidence may arise after a positive bulk milk analysis, or an IBR-infected animal was mixed with cattle within the herd. Further research is necessary to determine whether the company is actually infected. When further investigations turn out that the farm is still free, then they will receive the certificate back again. If the farm turns out to be infected, the certificate expires.

Farms under observation
Farms "under observations" have to follow a list with actions, depending on the farm situation. The farmer can get support and advices from veterinarians and consultants.

If an infection occurs in an IBR-free certificated farm, the farmer or the veterinary practice is strongly advised to report it directly. After this notification, the farm will receive the "observation status".

Nasal swabs
If the farmer or veterinarian has a suspicion of an IBR infection, it is recommended that the vet will take nasal samples (nasal swabs), as soon as possible, from animals with the most typical symptoms, and requests an investigation for IBR (BoHV-1) virus research.

Results nasal swabs and blood investigations and effects

- Nasal swabs:
    - No BoHV1 virus detected:
        - The certified farm holds its IBR-free status, but the farmer is required to collect and analyse blood samples of all bovine animals showing clinical signs of IBR within four to eight weeks after the onset of symptoms (time of reporting the suspected IBR outbreak).
        - The results of the blood tests can have the following results:
            - No antibodies demonstrated:
                - The company holds the certificate, and the "observation status" is stopped.

        - Antibodies demonstrated:
            - The farm is classified as infected and the farm will loose the IBR-free certificate.
    - BoHV1 field virus demonstrated:
        - The farm is classified as an infected herd and looses the IBR-free certificate. To be eligible for re-certification, you'll have to withdraw all animals that have had the infection (either clinically detectable), and the remaining animals within the herd, older than 1 year, have to be analysed for IBR antibodies by blood sampling. For cost reasons, it may be wise to start the examination of individual milk samples, instead of blood samples, to determine the degree of infection.

Prevent spreading of an IBR infection

The outcome of the IBR infection can be reduced or prevented by vaccination of all animals via the intranasal route. In addition, the spreading of the virus in an outbreak situation can be reduced too by vaccination.

When a large number of animals show clinical signs of IBR, the effects of vaccination is much less effective in controlling the outbreak. In addition to the intranasal vaccination, the risk of infection, of not yet infected animals, can be reduced by spatial separation and additional hygienic measurements.

It is advisable to warn professional farm visitors and neighbouring farms. Neighbouring farms can protect their animals against infection by herd vaccination.