Hybu Cig Cymru
Meat Promotion Wales

Controlling BVD & Johne's

Improving production by protecting your herd

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Controlling BVD & Johne's | Improving production by protecting your herd

BVD and Johne's in Beef herds

Bovine Viral Diarrhoea (BVD) and **Johne's** are economically expensive diseases that have a profound welfare effect on beef herds. The control of these diseases will ensure the future sustainability and profitability of herds in Wales. The consequences of disease entering the herd could be disastrous and so if a farm is currently disease free efforts should be focused on preventing the disease getting onto the farm through good biosecurity.

Bovine Viral Diarrhoea

Background

BVD is a viral disease of cattle that is found in cattle herds worldwide including the UK. Classified as a pestivirus it infects cattle through nose to nose contact between cattle infected with the virus and cattle that have never experienced the disease – often called naïve cattle – as well as being transmitted from pregnant dam to unborn calf. Once it has entered the farm, the impact of the disease includes abortion, infertility, deformed calves and poor health of the cattle herd but particularly the calves.

The purchase of infected animals is probably the most common way the disease is introduced. Once in the herd, the infection is maintained by the virus infecting other adult cattle as well as creating persistently infected (PI) animals. PI calves shed large volumes of virus throughout their life. This virus is shed into the environment and passed on through nose to nose contact. PI animals are crucial for the maintenance of infection within a herd. However, in herds with sufficient numbers of cattle it is likely that there will always be sufficient naïve animals available to maintain the virus through transient or short term infections.

Persistently infected (PI) animals

PI animals are central to BVD. Their presence on a farm will compromise the health of all animals as they will shed virus which the rest of the herd will have to fight off. This will require energy which could be used for other activities such as growth, reproduction and controlling other diseases.

PI animals occur when a cow is exposed to the virus while she is pregnant. If this occurs between 45 and 120 days of pregnancy the unborn calf will be unable to recognise and fight off the virus and becomes persistently infected (PI).

1-2% of animals in any affected herd will be PI so in a 100 cow herd it is likely that one or two animals will be identified as PI and will need to be culled. The removal of these will have a major benefit to the health and productivity of the herd.

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Types of infection

Hit and Run
Known as a transient infection; the infection enters the herd and causes damage such as abortions and infertility. The animals will develop BVD antibodies and be protected for the rest of their lives. If there are no susceptible animals then the infection in the herd will be short lived.

Infect and Persist
Where a dam with a foetus that is 45 -120 days in gestation is infected the calf is born constantly shedding the virus (persistently infected). This will keep the virus on the farm constantly challenging the herd and causing losses through increased level of disease.

Any calves born to a PI dam will themselves be PI prolonging the infection on farm.

From surveys sponsored by Hybu Cig Cymru it is estimated that 30% of farms in Wales are infected. Where there is no control programme in place it is estimated that 1-2% of the calves born will be PIs. At a large calf market in England or Wales there is a high risk that a PI animal is present. This animal may be bought as it is not possible to spot it when looking in a pen. Additionally, the PI animal will infect all naïve animals that it comes into contact with at the market further spreading the disease.

Little work has been done to quantify the welfare and greenhouse gas (GHG) impact of BVD. Inefficient food production however, increases production costs and growth rates are reduced when part of an animal's energy intake is used to fight off disease. This means that the feed conversion and growth rates are poor. This will use more resources reducing productivity and increase the impact of that enterprise on the environment.

Similarly animal welfare, although not extensively studied, must be expected to deteriorate with BVD infections as the reduced immunity in the rest of the herd will allow other diseases to become worse. It is common to see increased cases of calf pneumonia in herds infected with BVD and those affected do not respond well to treatment and have poorer survival rates. Eradication of BVD at the farm level and the national level will have welfare, productivity and environmental benefits.

Economic impact

BVD has a significant economic impact on farms where the infection is present. Studies have estimated that the loss to the farm is £4500 per year where the infection is present. This is shown in more detail on page 14. At a national level the benefit to the industry in Ireland has suggested that for every Euro invested a five times return is to be expected. Scotland has suggested similar benefits will be found.

Basic concepts of disease testing

CHeCS

The eradication and monitoring of BVD infection on farms can be complex and require detailed recording. To help farmers succeed many laboratories run schemes that will help. These are all members of CHeCS (Cattle Health Certification Standards) accredited schemes for demonstrating BVD disease freedom. Being a member of one of these schemes will allow the marketing of cattle as having high health status with BVD freedom. CHeCS accredited schemes for demonstrating BVD disease freedom require antibody testing to show that the farm has not been exposed to BVD in the previous 12 months.

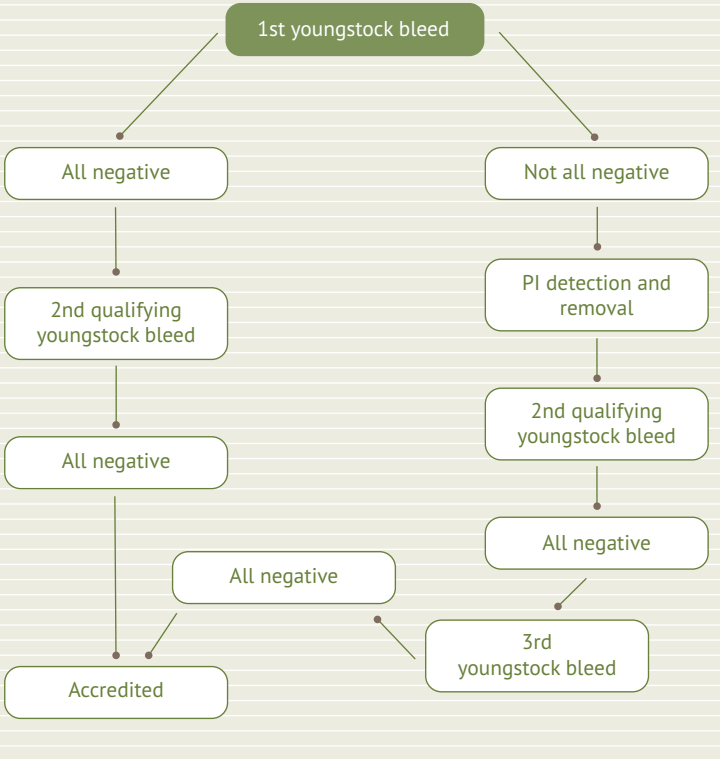
BVD testing relies on the detection of specific markers in samples taken from the animal. Testing may identify the presence of antibodies in the sample (blood or milk) or the presence of virus (antigen) in the sample (blood, milk or tissue). Understanding what each of these means will allow the farmer to better understand the disease picture on their farm.

Antibodies are proteins produced by the animal in response to infection by viruses and bacteria. They can persist long after any disease has occurred and the animal has recovered. If the virus is present in the herd then many animals will be positive and testing a small sample is a cost effective way of determining whether disease is present on the farm. As the antibodies can persist for a long time selection of animals for sampling is important to allow a sensible interpretation. Youngstock (9-18month old cattle) will provide the most useful snapshot of the disease picture.

Figure 2

Gaining accreditation. The route towards accreditation depends on whether the herd is negative or positive.

If all youngstock test negative then a second test 12 months later will allow accreditation. If the young stock are positive then PI detection and removal followed by 2 tests 12 months apart will be required.



Each separately managed group of the new calf crop will have blood samples taken from five animals. This group should have been in at least nose to nose contact for two months. Separate pens may be part of a management group if the calves in the pens can touch each other and pass on the virus.

These will be tested for antibodies. This can be done without joining a scheme and some vets will use 10 samples to increase the confidence in the final interpretation. The result from this will be used to decide whether the herd is affected by BVD and eradication of the virus is required. Alternatively the herd may be disease free and the focus will be on maintaining this valuable status.

Sampling for BVD at the Tb test

The Tb test represents an ideal opportunity to test cattle annually for BVD as the samples can be taken when the cattle are in the crush.

As the testing is a blood sample there is no interaction with the Tb test to be concerned about.

Interpreting results

All youngstock samples negative

Typically, where the virus has not been present on the farm in the previous 12 months all the samples from the new calf crop will be negative. No test is perfect and there may be some that are misclassified as positive or negative. Some vets prefer to take ten samples to reduce the proportion that fall into this category and increase confidence in the herd diagnosis.

A negative herd is a valuable asset as it will not have the economic losses associated with the presence of the virus. Protection against the virus entering the herd is the most important risk to be addressed. The most likely route is the purchase of a PI or acutely infected animal. Ideally, purchases should be made direct from farms which are also disease free (preferably CHeCS accredited).

If that is not possible, testing the purchased animals is required. Animals should be tested (preferably before arrival) for the virus to ensure that they are not bringing virus onto the farm. A detailed quarantine protocol should be developed with the farm's veterinary surgeon integrating all of the disease protocols required to protect the health status of the farm.

Fence lines should not allow over the fence nose to nose contact and should be secure to prevent both escape and the entry of unknown animals. Vaccination may be considered to further protect the herd.

Youngstock samples positive

If all or most of the samples are positive this is evidence that there has been virus circulating in the last 12 months. The farm should follow the same advice regarding biosecurity and purchase of animals but eradicating the virus from the herd is also critical. This is best planned with the farm veterinary surgeon. The core of BVD eradication is the detection and removal of PI animals. This can be done through:

- blood samples
- tagging and testing (ear tags that remove a tissue sample when they are inserted)
- using milk samples (in the case of dairy herds)
- a combination of all three

Planning the most suitable approach for each farm requires a discussion with the farm's veterinary advisor.

After the initial virus screening of the herd, the calf crop for the following 12 months must be tested to find any calves that were exposed during the dam's pregnancy.

Testing for the disease is a relatively modest investment and the payback time is likely to be less than a year on any investment in BVD eradication.

Vaccination

Vaccines can provide protective immunity to BVD if used before infection occurs. Cattle should be vaccinated before any challenge occurs and this means that eradication of PI animals is required.

Field experience suggests that vaccines cannot eradicate BVD from farms on their own but can provide valuable protection once eradication has been completed.

National eradication programmes

Scotland and Ireland have started BVD eradication programmes; In Scotland since 2010 and in Ireland since 2012. In both of these countries the control programmes reduces the risk of purchasing the virus either through the purchase of a PI animal or an animal that has just become infected. In Wales, there is a desire within the industry that the Welsh cattle herd should pursue a similar path in order to ensure that the Welsh sector remains competitive.

Summary

BVD is a costly disease and reduces the efficiency of farms. Eradication of the disease is straightforward, cost effective and has been carried out at farm, regional and national level in many places. BVD eradication is something that every farmer in Wales should strive to achieve.

Johne's disease

Introduction

Johne's disease is a bacterial disease of cattle that is long term both in causing clinical cases on farm and when considering an eradication programme. This disease is associated with a loss of productivity on a farm and is a major focus for control in many countries throughout Europe. Mycobacterium avium subspecies paratuberculosis infects young animals. Calves up to 1 year old are susceptible but the majority of new infections occur in the first 48 hours of life. Introduction of the disease is most commonly through the purchase of an infected animal. This is easy to do as clinical signs are not apparent until two years of age at the earliest.

The clinical signs of Johne's are a result of an infection in the gut. The bacterium lives in the surface of the gut and cause an inflammation along the whole of the gut (particularly in late stage infection). This increases the thickness of the gut and blocks the absorption of nutrients. This reduces the energy available for maintaining weight, producing milk to feed calves, reproduction and fighting disease. The result is poor calf performance, weight loss, poor fertility and susceptibility to disease.

The economic impact of Johne's on a beef farm is thought to be at least £4,500 per year but reliable estimates for the beef herd are difficult to find and this figure is probably on the low side.

Johne's can cost a considerable amount of money and knowing that the disease is on farm is an important first step in deciding what interventions are required and are likely to be cost effective.

Determining the presence of disease

Detection of Johne's disease on a farm is difficult as the tests are problematic. The sensitivity and specificity of the tests are such that the ability to accurately determine the presence of disease on the farm is relatively poor.

If the status of the farm is not known then there are two approaches that can be considered.

1. All animals over two years old can be sampled and tested for antibodies to Johne's. The results of the test can be used to decide on the management of individuals and the herd. Discussion with the farm's veterinary advisor will allow a detailed plan to be put in place on the farm based on the results.
2. Sampling a subset of animals with other health problems is an alternative solution. Targeting those that are compromised due to another disease such as lameness or suffering from clinical signs that may be associated with Johne's (diarrhoea, weight loss, poor fertility). This can give an indication of the status of the herd. Individual animals would still need to be tested if a control policy is to be put in place.

Control within the herd

Testing will allow the removal of infected animals and reduce the amount of bacteria. Once identified infected animals can be managed separately from uninfected animals and removed as soon as practical.

Testing

The results from testing can be used to identify those animals that are a high risk to others within the herd.

- High risk animals should be calved away from youngstock
- High risk animals should be culled as soon as possible
- Faeces from these animals should be treated as an infection risk

Faeces management

Control of faeces is central to stopping the spread of Johne's from the cows to uninfected calves. Where calving boxes are used cleaning and disinfection will reduce or eliminate spread. If yards are used to calve cows down in then testing the herd will allow test negative animals to be calved down in a separate yard from those that have inconclusive tests. Removal of positive animals should be as rapid as possible.

Water access

Johne's disease can be transmitted through water from other infected farms so allowing access to mains or borehole water only should be allowed. Ponds and other watercourses should be fenced off to prevent drinking contaminated water. Manure from the yard poses a risk to susceptible stock. This should not be spread on areas where it will come into contact with stock under 1 year old that are intended as replacement/breeding animals.

Contamination of food

Contamination of food by faeces is a risk to calves and reducing this will stop spread to uninfected calves. Troughs should be raised to prevent faeces getting into the feed and allowing susceptible calves to come into contact with faeces.

Farming other species

Other species – particularly sheep will be a risk as they may also harbour the disease. Susceptible animals (youngstock) should not come into contact with faeces from these animals.

All of this will slow the spread of disease but the interventions will take a long time and require commitment to see success.

CHeCS schemes

The monitoring of Johne's disease is complex and time consuming but schemes have been set up to help farmers control this disease. The CHeCS schemes that are run by various laboratories will aid the farmers to control the disease and market their stock as being low risk for farmers who wish to purchase animals.

Summary

Johne's is an economically important disease that will take sustained commitment to remove from a farm. The control of faeces and rapid removal of test positive animals will remain central to the control of this disease.

Economics of disease

Both Johne's and BVD have an impact on the productivity of beef farms in the UK. Disease causes problems in many areas across the farm and these are common to all the diseases. Growth rates, fertility and reproductive issues are typically the most costly on farms but frequently are under estimated. Treatment costs, labour and deaths also can be expensive. The control of diseases through testing, vaccination and biosecurity has costs but these are likely to be less than the cost of the disease being on farm.

Fertility

Both Johne's and BVD will have an impact on the fertility of the beef farm. BVD damages the embryo in early pregnancy and Johne's results in animals being in poorer condition and that therefore struggle to get in calf. In both cases cows and heifers will take longer to get in calf or may be completely infertile. Lowered fertility associated with BVD is estimated to cost £1980 per year per 100 breeding cattle. The cost associated with Johne's is harder to define but the overall cost to the same herd are estimated to be £1700 per year at a minimum but some have put the figure at £4500 per year.

Poor growth rates/weight loss

Infection with a disease can lower the rate at which animals grow. For example, due to reduced milk yields available for suckled calves. BVD infection will require energy to eliminate it in acutely infected calves (PI calves will not eliminate infection).

Poor growth rates can also be a result of other diseases that infect and challenge the animal. BVD and Johne's can both be associated with increased amounts of other diseases such as pneumonia (BVD) or lameness (Johne's) and the energy required to deal with these will either result in weight loss or reduced weight gain.

The estimated cost of this for BVD is £225 per year per 100 breeding cows. Johne's again has limited information available to determine the proportion of the overall estimation of Johne's impact.

Table 1

Detailed breakdown of BVD costs per year. Source SRUC

Immunosuppression of calves (Costs associated with diseases that affect the calves at the same time)	**£315**
Immune calves (Congenital defects and poor weight gain associated with BVD infection but not diarrhoea, pneumonia or other diseases)	**£225**
PI calves (lost before they can breed)	**£855**
Abortions	**£405**
Reproductive losses in heifers (failure to conceive)	**£1,215**
Reproductive losses in cows (failure to conceive)	**£765**
PI Cows and heifers (that survive to breed)	**£720**
Total losses per year	**£4,500**

Treatment

The presence of both BVD and Johne's will be associated with more disease on the farm. This disease will increase the amount of treatments that are administered. Removing the diseases will reduce the amount of veterinary medicines that need to be bought. The amount of money spent on diseases can be used as an indication of the success of any control programme.

Control

Controlling disease will require testing and/or vaccinations to improve the situation. These will incur a cost to the herd. This cost is not usually considered in economic evaluations and the overall cost will depend on the disease and approach taken. Control is usually cheaper than trying to live with the disease.

Culling rates

Lowered fertility will leave many cattle non-pregnant at the end of the breeding season. This will result in more cattle being culled as not in calf or being barren. Eradicating the disease will reduce this rate and reduce the culling rate. BVD will have a similar effect as cattle fail to get in calf and show reproductive failure.

Biosecurity

Preventing disease getting onto the farm is one of the most useful ways of reducing or eliminating impact of disease on any farm. A relatively small investment in biosecurity and quarantine will produce significant savings on dealing with disease.

Sources of disease

- Purchased animals
- Bought in feed
- Bought in straw
- Visitors (Vets, AI technicians, foot trimmers, etc)
- Vehicles
- Over fence contact

Of all the sources of disease the purchase of infected animals is the biggest risk for buying in disease. The purchase of animals therefore requires the most consideration to protect the farm.

Sourcing replacement animals

- Consider the farm of origin
  - Buy from high health status farms where possible
- Put in isolation (not in airspace contact, manure or slurry contact)
- Test for diseases of interest (if not high health status)
- Vaccinate or treat as required
  - Consult the farm's veterinary advisor for a detailed plan
  - Vaccination may be required to protect the purchased animal
- Allow all treatments and vaccinations time to have full effect before introducing the animal to the herd

A full quarantine protocol can be complex depending on the diseases that are of interest. The farm's veterinary advisor should be involved in the planning of any protocol for bringing in new animals to the farm.

Visitors

Visitors working with animals can carry diseases on clothing and boots or in cars if disinfection is not carried out. This can be a particular risk for those that travel from farm to farm. It is impossible to know if disinfection is carried out adequately at the previous farm. To protect your farm it is advisable to have facilities to allow disinfection before the visitor enters the farm. An alternative is to supply protective clothing on farm.

Vehicles

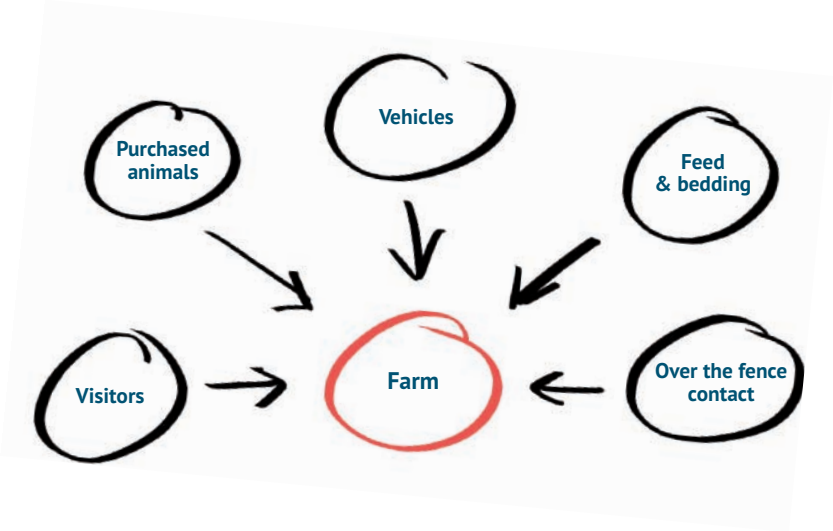
As with visitors, disease can be carried on vehicles entering your farm. Where possible delivery vehicles should not have access to animal areas. If this is required then disinfection should be carried out.

Feed and bedding

Contamination with faeces and other animal secretions can spread disease. Feed and bedding should be protected from contamination by other animals until use.

Over fence contact

Neighbouring farms pose a risk for disease introduction. Ensuring secure boundaries will reduce the chances of diseases spreading from farm. A 3 metre separation is considered adequate to provide protection.



Key points

- **Johne's and BVD have a significant impact on the productivity and profitability of a farm**
- **A new infection on a farm previously free of the diseases will be even more expensive**
- **Determine the status of your farm**
  - *If free then strategies should be aimed at prevention*
  - *If present then control strategies should be implemented*
- **Eradication of these diseases should be the goal**
- **For both Johne's and BVD national plans may require control or eradication.**