

# Infectious bovine rhinotracheitis

**The future control of infectious bovine rhinotracheitis in Ireland is outlined by Joanne Cregg, technical adviser – Ruminant Division, MSD Animal Health**

As many European countries are currently engaged in infectious bovine rhinotracheitis (IBR) control programmes, it is widely believed that an Irish IBR eradication scheme will be realised in the very near future. In fact, a growing movement across the EU to eradicate IBR could be a barrier to trade for Irish livestock as, under EU legislation, Member States who have compulsory disease eradication programmes in place (Article 9 status) or who have freedom from particular diseases (Article 10 status), such as IBR, are entitled to additional guarantees when bovine animals are being traded into these states or regions. Currently, IBR eradication has been prioritised for action by Animal Health Ireland (AHI) and a Technical Working Group of AHI has been considering options for such an eradication programme over the last number of years.

Furthermore, Foodwise 2025 states that a national eradication programme will be initiated in 2019. This is subject to a cost-benefit analysis which is currently underway. IBR, caused by a herpes virus, BoHV-1, has been diagnosed in cattle in Ireland since 1989. It is, primarily, a viral respiratory disease of cattle, spread by nose-to-nose contact, through the air or even on contaminated equipment and personnel. It can also be transmitted venereally or spread via semen.

Therefore, bulls with any evidence of BoHV-1 exposure, are prohibited from entering semen collection centres. Infection with IBR virus is very common in Irish dairy and beef herds, with evidence of exposure in 70%-80% of herds.<sup>1</sup> Infection with BoHV-1 may result in either clinical or subclinical disease (see Table 1) and following infection, cattle are considered to be lifelong carriers of the virus which can subsequently be shed intermittently from the airways and reproductive tract.

<b>Pyrexia</b>
<b>Sudden milk drop</b>
<b>Nasal and/or ocular discharge +/- inflammation</b>
<b>Pharyngitis</b>
<b>Dyspnoea with/without coughing</b>
<b>Poor conception rate/abortion</b>
<b>Dullness</b>
<b>Anorexia</b>
<b>Death</b>
<b>Neurological signs in calves</b>

**Table 1: Clinical signs associated with IBR.**

Immunosuppression, which can occur during times of stress, allows the latent virus to become reactivated and shedding occurs. In some instances, the clinical signs may also recrudescence. Latently, infected animals may appear normal but as permanent carriers of the virus, they remain a continuous threat to herd health. To reduce the number of animals that become latent carriers, vaccination of young stock should be considered.

Even subclinical infection can result in a reduced milk yield. In fact, one recent UK study concluded that BoHV-1 seropositive cows produced 2.6kg less milk per day compared with cows that were seronegative over a two-year study period.<sup>2</sup> Subclinical disease has also been associated with fertility issues in some herds although the exact mechanism of how the virus affects fertility is poorly understood.<sup>3</sup>

As these effects are subclinical, it is essential that an effective monitoring strategy such as milk recording and bulk milk antibody testing is in place on each farm so that warning signs are not missed.

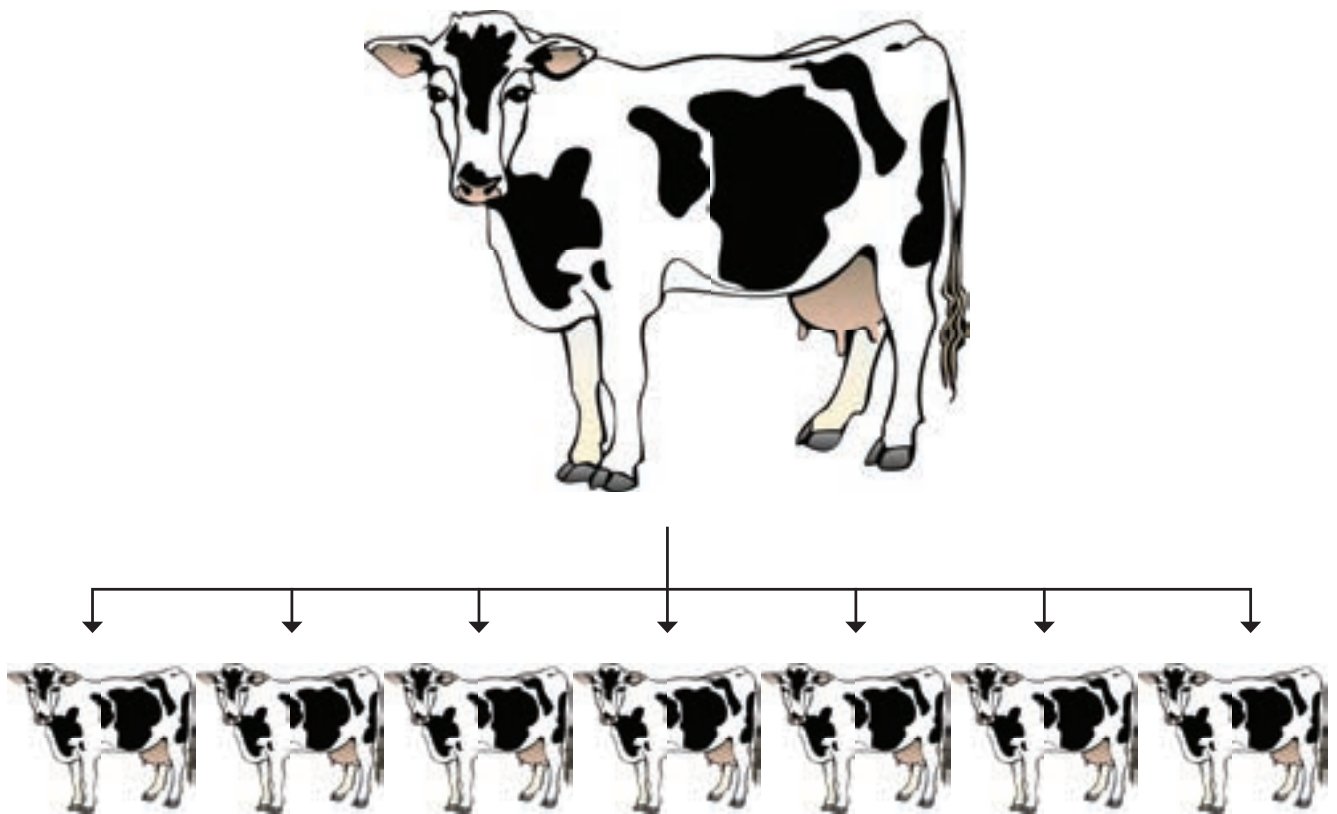
## DIAGNOSIS

The ability to diagnose IBR infection is vital to the successful control of the virus. IBR is relatively easy to diagnose within a herd as affected animals test positive on an antibody test performed on blood. Most latent carriers should test positive. To be certain that no latent carriers exist within a herd, all animals should be tested. Due to financial constraints however, it is likely that for herds participating in an eradication scheme a set sample size for testing will be chosen depending on overall herd size.

In lactating animals, it is recommended to monitor bulk-milk antibody levels on a regular basis. If there is spread of the virus within the milking herd then antibodies will become detectable or levels will increase. Recent vaccination may also give rise to an increase in bulk milk tank antibodies depending on the antibody test chosen. It is also important to remember that a negative bulk milk tank (BMT) result does not rule out IBR in a herd. In fact, it is estimated that 15-20% of the herd must be latently infected carriers before the BMT turns positive.<sup>4</sup>

Luckily, only IBR marker vaccines have been licensed for use in Ireland since 2004. Marker vaccines have all the benefits of a traditional IBR vaccine. However, they do not contain the glycoprotein gE. The development of marker vaccines has facilitated the establishment of control programmes aiming at eradication of the disease as it is now possible to test for IBR in vaccinating herds using the gE-specific ELISA. The other commercially-available gB ELISA is only suitable for use in non-vaccinating herds.

Antibody-negative latent carriers are an exception to the standard detection of infected stock via antibody testing. These seronegative latent carriers (SNLC) may occur when young animals with maternal IBR antibodies become infected. When maternal antibodies wane, the latent carrier animal may become antibody-test negative. As these SNLC animals occur infrequently, it is not likely that they pose a significant threat to national control of the virus, assuming all other critical control points are addressed.



**Figure 1: One newly infected animal can transmit the virus to seven naive in-contact animals.<sup>7</sup>**

#### **ROLE OF BIOSECURITY IN REDUCING SPREAD OF IBR**

The most suitable control measures for IBR depend on several factors including the level of latent carriers, the environment and herd management. If IBR is not in the herd then bioexclusion is the goal. Maintenance of a fully-closed herd alongside good biosecurity is recommended in negative herds. If herd prevalence is low, testing and culling of carriers followed by bioexclusion should be considered. If herd prevalence is high, then vaccination and bioexclusion are likely to be the only financially-viable options. In low-prevalence or negative herds, vaccination should be considered to reduce the risk to the herd if animals are exposed to infection.

The nature of Irish farming including the widespread trading of animals between herds and the scattered geographical nature of grazing land means that breakdowns in biosecurity on Irish farms are almost inevitable.

In this case, it is worth prioritising biosecurity measures that reduce higher-risk practises, such as introducing new animals to the herd, contract rearing, poor maintenance of boundary fencing and attendance of stock and personnel at marts and shows.

#### **VACCINATION AS A TOOL IN IBR ERADICATION**

It is unlikely that a test-and-cull strategy could be implemented in Ireland to control IBR due to the high level of seropositive animals. In fact, the use of marker vaccines have been an integral part of the IBR eradication measures introduced in many parts of Europe. It is likely that, due to the high seroprevalence of BoHV-1 in Irish herds, vaccination and eventual removal of gE-positive animals will be significant

components of the early stages of an eradication scheme here. The aim of such a programme would be to reduce the level of seropositive animals to a level where culling would be feasible; the current accepted level is below 5% seropositive.<sup>5</sup> In Belgium for instance, many herds were vaccinated twice annually to protect animals against clinical disease and to reduce shedding of the virus even in latent carriers. Currently, many herds in Ireland only vaccinate adult-breeding animals or growing stock at housing. However, vaccination of young stock can be performed intranasally in animals as young as two weeks of age. A strategic vaccination programme that includes all stock from two weeks of age would greatly reduce the risk of animals attaining carrier status.

A recent field study in three European countries (Germany, Hungary and Italy) reviewed the efficacy of vaccination using a live IBR vaccine in the progress towards eradication of the virus. In all three countries, herd vaccination was widely practised with young-stock vaccination occurring intranasally from two weeks of age, followed by a booster at three to four months of age, and animals were subsequently revaccinated every six months.

In all three participating countries, results within the recruited herds suggested that IBR vaccination was an effective tool in IBR eradication. In Hungary, this field study took place at the very start of an IBR control programme and reactivations were, therefore, likely to be high during the study period. In spite of this, the seroprevalence did not increase in any of the categories of animals subsequently sampled.

In Germany and Italy, new seroconversions steadily decreased over the study period, which showed that the vaccination

programme successfully contained the spread of the virus. In one large participating German herd (730 cows), the seroprevalence of IBR in cows was reduced from 32% to 6% over the two-year study period and the seroconversion rate over the two years was 0%.<sup>6</sup>

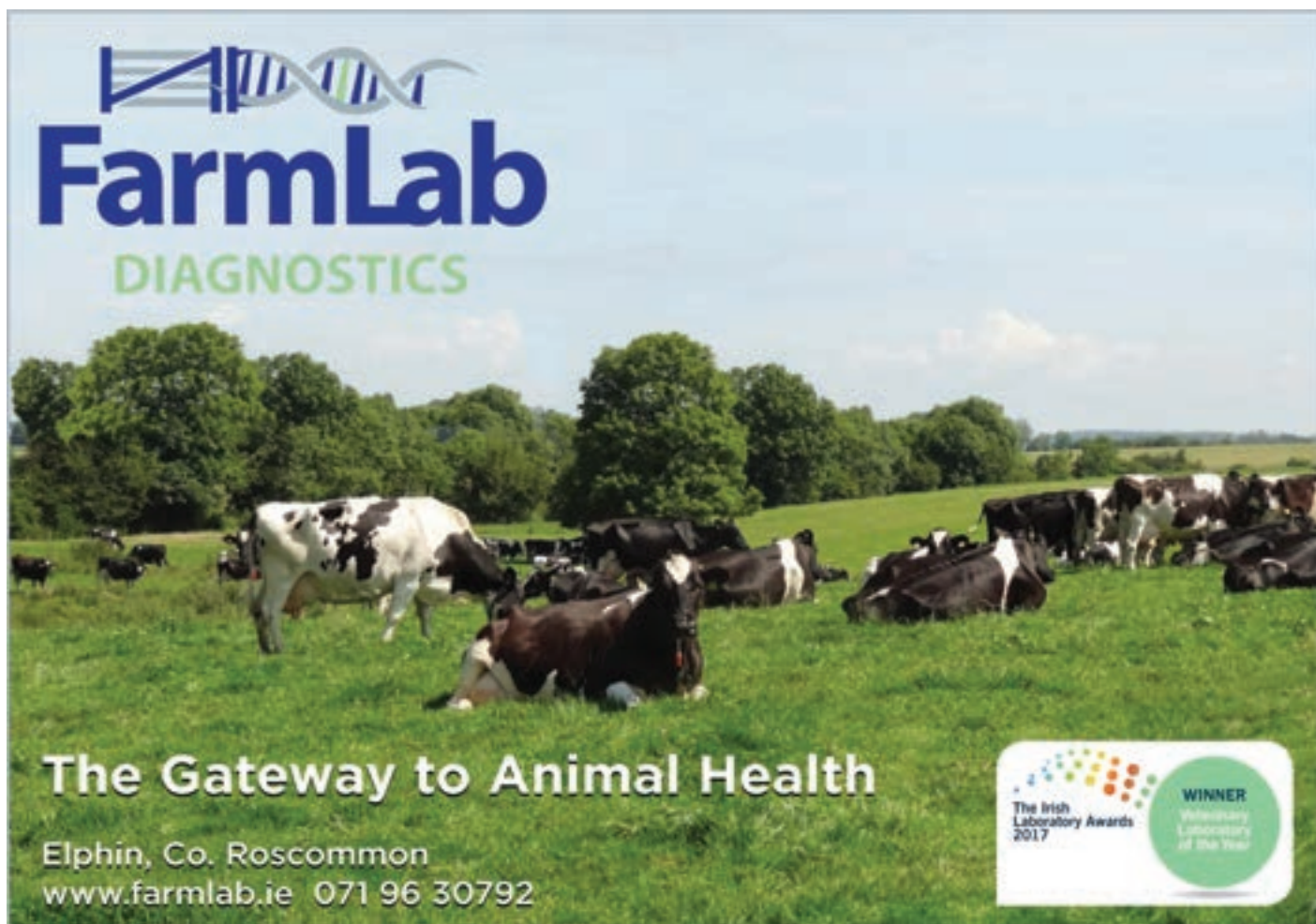
Due to the high seroprevalence of IBR in Irish herds, the eradication of IBR in this country is likely to be challenging. However, the direct cost of the virus to the industry through clinical disease and loss of production is vast. It is also inevitable that trade restrictions will be applied if disease-control measures in Ireland are not aligned with those of our trading partners.

Eradication of disease has been successful in other EU countries such as Austria and Denmark, and in regions of Germany and Italy, through a variety of control programmes based on the following pillars: monitoring, herd accreditation, biosecurity and, in most cases, vaccination.

There is great potential to learn from our European counterparts and to implement our own successful IBR eradication programme.

## REFERENCES

1. Cowley DJB, Clegg AT, Doherty ML, More SJ. Aspects of bovine herpesvirus-1 infection in dairy and beef herd in the Republic of Ireland. *Acta Scandinavica* 2011; 53:40
2. Statham JME, Randall LV, Archer SC et al. Reduction in daily milk yield associated with sub-clinical bovine herpes virus 1 infection. *Veterinary Record* 2015; 177 (13): 339/1-339/4
3. Graham DA. Bovine herpes virus-1 (BoHV-1) in cattle—a review with emphasis on reproductive impacts and the emergence of infection in Ireland and the United Kingdom. *Ir Vet J* 2013; 66(1): 15
4. Graham D. IBR: the complexity of the disease and the challenges of its control. *Proceedings of animal health: a cornerstone of sustainable and profitable farming*. Cork 2013: 33-36
5. Raaperi K, Orro T, Viltrop A. Epidemiology and control of bovine herpesvirus 1 infection in Europe. *The Veterinary Journal* 2014; 201: 249-256
6. Makoschey B, Zehle HH, Bussacchini M et al. Efficacy of a live bovine herpesvirus type 1 marker vaccine under field conditions in three countries. *Vet Record* 2007; 161: 295-298
7. Nardelli S. Dynamics of infection and immunity in a dairy cattle population undergoing an eradication programme for infectious bovine rhinotracheitis. *Prev Vet Med* 2008; 85: 68-80



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