

A bug's tale: Johne's

Teagasc research is shedding new light on this sneaky disease

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Johne's disease (JD) is an incurable disease of ruminants caused by infection with bacteria known as *Mycobacterium avium* subspecies *paratuberculosis* (MAP).

Young calves are most susceptible to JD infection, which primarily occurs when they ingest faeces contaminated with bacteria – when calves suckle an infected cow's dirty udder. Infected cows can also shed the bacterium in their colostrum and milk which can lead to infection of calves fed this milk.

One of the key issues stimulating interest in JD is an, as yet unproven theory, identifying JD as a possible cause of Crohn's disease in humans.

Clinical signs of JD

In the initial stages, animals appear healthy and the disease is virtually undetectable, even using diagnostic tests. Once an animal becomes infected, JD progresses slowly. Clinical signs are most common in animals of three to five years of age.

The disease primarily affects the wall of the gut causing it to thicken, which leads to difficulty in absorbing nutrients. This can lead to weight loss, diarrhoea and eventually death.

Diagnostic tests

Due to the slow progress and prolonged nature of the disease, JD is notoriously difficult to diagnose. None of the commonly used tests (ELISA, PCR or microbial culture) are 100% perfect. Interpretation of JD results is not clear-cut and test results are best interpreted by a combination of farmer and their vet on an individual farm basis.

Both false positive (animal not infected with JD but yielding a positive test result) and false negative (animal infected with JD but yielding a negative result) results can be generated during a testing programme. The more test results available for an individual cow, therefore, the greater the



level of confidence associated with her test status.

Based on results of a study by Teagasc, where a number of ELISA positive animals were found not to have lesions consistent with JD at post-mortem, it is always advisable to submit a dung sample for faecal culture to confirm shedding of the bacterium and possible infection.

TB-testing and Johne's disease

A further issue complicating JD tests in Ireland is the bovine tuberculosis testing (bTB) regimen. Testing for bTB has been shown to interfere with JD blood and milk ELISA testing.

A study conducted at Teagasc Moorepark examined the effect of the bTB skin test on both blood and milk ELISA results to provide appropriate advice on the optimal timing of JD ELISA testing in Irish dairy herds.

The results of our study showed that blood sampling for JD ELISA testing should be avoided for at least 71 days

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disease in the spotlight



post administration of a bTB test. Milk samples should not be collected within 43 days of the bTB test.

National control programme

Animal Health Ireland launched a JD pilot control programme in 2013. This programme involves on-farm risk assessments with a trained veterinarian, to identify management practices placing farmers at risk of spreading the disease. The diagnostic element of the programme involves using a blood or milk test (ELISA tests) to identify suspect animals and a faecal-based test to confirm the infection status of the animal.

High-risk management practices

Control programmes aim to break the cycle of disease transmission through identification and removal of infected animals and optimal calf management. As contact with infectious faeces is a major risk factor for transmission of JD, hygiene is a

key element in control. A nationwide survey by Teagasc showed the majority of Irish dairy farmers engage in a number of JD high-risk practices. These practices include housing sick cows in the calving area, overcrowding and not cleaning the calving area.

Additionally, over 70% of farmers pool colostrum and use waste milk to feed heifer calves. While such practices are often seen as labour and cost management procedures, they are placing farms at undue risk of spreading JD and should be avoided.

Economics

The economic effect of JD varies considerably between farms as it depends on the number of animals infected and how advanced the disease is in infected cattle. In Ireland, however, the economic effect of JD on many farms can appear minimal, which could perhaps be seen to negate the requirement for a national control programme.

It should always be noted, however, that Ireland is an exporting nation and the quality of our milk and milk-derived products must be above reproach.

A JD national control programme must, therefore, be given serious consideration and support. The long-term commitment needed for such a programme should not be underestimated however.

Conclusion

JD is a slow and insidious disease and immediate improvements in herd status may not be noticeable in the short term. However, studies have shown additional herd benefits, such as decreased calf morbidity, from implementing the hygienic farm management practices promoted in JD control programmes.

Our international markets demand high-quality products and JD control will play a pivotal role in ensuring our market leadership into the future.