Identification of cattle and deer as a movement traceability aid in the eradication of bovine tuberculosis

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ABSTRACT

The Biosecurity (Animal Identifications Systems) Regulations 1999 oblige the owners of cattle and deer to use an identification (ID) system, that has been approved under those regulations, when moving cattle or deer aged over 30 days of age. The use of such an identification system is required for the purposes of the National Bovine Tuberculosis Pest Management Strategy (NBTPMS). It involves the permanent unique identification of cattle and deer to the herd from which they are first moved after 30 days of age. The ID technology currently employed consists of optically read ear-tags.

Two approved ID systems are currently in place. One is operated by the Animal Health Board (AHB system) and is mostly used by beef and deer farmers. The Livestock Improvement Corporation provides a system (the LIC MINDA system) that has many additional identification functions required within the dairy industry.

Keywords: deer; cattle; identification; movement; disease control.

INTRODUCTION

Purpose of the system

New Zealand (NZ) has an operative National Bovine Tuberculosis Pest Management Strategy, that is regulated via an Order-in-Council under the Biosecurity Act 1993. The AHB is the management agency responsible for implementing the NBTPMS. The AHB is an Incorporated Society and its members represent the major funders and stakeholders of the NBTPMS.

The principal objective of the NBTPMS is to achieve an annual period prevalence of no more than 0.2% of cattle and deer herds infected with bovine tuberculosis (Tb) by 30 June 2013. The period prevalence at 30 January 2005 was 0.73%.

In NZ, most cases of bovine Tb in cattle and deer herds are caused by contact with infected wildlife vectors of Tb. The most significant of these vectors is the brush-tailed possum (*Trichosurus vulpecula*). Ferrets (*Mustela furo*) also act as disease vectors in environments where ferret densities are relatively high. An effective Tb control strategy, therefore, must include a combination of disease control measures applied to cattle and deer herds, along with control measures directed at managing infected vector populations.

An historical problem with Tb control in NZ has been identifying where and how cattle or deer have become infected. This information is necessary to answer the key question of whether infection has been caused by movement of infected cattle or deer, or through contact with infected wildlife vectors. Wildlife infection is difficult and expensive to detect directly, so cattle and deer herd infection data (derived from on-farm diagnostic testing or post-mortem diagnosis) is used as a tool for infected wildlife surveillance. In the past, lack of knowledge about the movement history of cattle or deer has greatly limited the precision of this indirect surveillance. Improved surveillance of wildlife infection is necessary so that the limited wildlife vector control resources can be deployed optimally. The cattle and deer ID system has been designed to meet this need.

Use and outcomes of the system

The ID system comes into use when cattle or deer are diagnosed with Tb following on-farm testing or at routine post-mortem carcass inspection following slaughter. Correct use of the ID system means that at the time of diagnosis, the herd that the animal was first moved from after 30 days of age will be known (from the ID ear-tag) and the herd in which the animal was tested or from which it was sent to slaughter will also be known. The owners of both herds can then be interviewed and their records of stock sale, purchase or movement investigated to identify any intermediate herds in which the infected animal may have been resident.

This enables a 'life history' of the herds in which an infected animal has been resident to be assembled. The known and unknown Tb risk factors associated with each of these herds can then be investigated to provide information for any further management intervention. If, for example, the investigation reveals that the animal has been resident in a known infected herd or known area of high Tb risk, then it is likely that appropriate management will already be in place or is already planned. In this case, doing nothing more may be the appropriate management decision. However, if it is found that the animal has only resided in herd(s) with no Tb history and in an area with no previous evidence of wildlife infection, then this will prompt further investigation, herd testing, wildlife Tb surveys and intensive wildlife control in the vicinity of the now

suspect herd(s). These actions are designed to identify and eradicate any new source of wildlife infection as quickly as possible.

Tagging requirements

The legal requirement to identify cattle or deer applies when they are first moved after 30 days of age. The practical requirements in terms of tag application fall into two types according to the nature of the animal's immediate movement destination as follows.

- If the animal is moving directly to slaughter it must be identified with a Primary ear-tag ***or*** a Direct to Slaughter tag.
- If the animal is moving other than directly to slaughter (for example to another herd, to mixed grazing with other herds or to a show) then it must be identified with a Primary ear-tag ***and*** a Secondary ear-tag.

Subsequent owners of animals thus identified are to do nothing, unless tags are lost from an animal. In this case they are required to replace any missing tag with a Replacement tag.

All tags are marked with a herd identifier. This will either be the herd number used in the Tb control strategy by the Animal Health Board, which is sourced from the Crown-owned National Livestock Database, or it may be the alpha-numeric participant code used in the LIC MINDA system. All tags are also marked with the registered logo of the approved ID system operator. It is an offence to disfigure or remove any of these tags.

Primary tags and Direct to Slaughter tags are additionally marked with an individual animal number, and a barcode that incorporates both the herd identifier and the individual animal number. The barcode facilitates reading of tags at slaughter, which is fundamental to the system.

Primary tags and secondary tags are designed for retention and readability over an animal's lifetime, but in practice some tag loss is inevitable. Replacement tags are used to identify the fact that an animal has lost one of its original tags, and provide a prompt for reading of the other remaining tag, which in most cases will be one of the original primary/secondary tag combination.

Direct to Slaughter tags are in effect a simple, cheaper form of primary tag, designed to last long enough to get an animal from farm to slaughter premises.

Production and distribution

The technical requirements of the ID system are set out in an open specification (which can be found at www.ahb.org.nz). Suppliers of tags are approved on the basis of their demonstrating the capacity to supply tags which meet the performance specifications of system.

Approved suppliers are required to operate web-based ordering systems that enable retailers to order tags on behalf of farmer clients on-line. These systems also interface with a Tag Registry linked to the National Livestock Database to ensure that tags are printed with correct herd numbers and to ensure an individual animal number is never allocated more than once in any herd.

After receiving on-line orders that are verified by the Tag Registry, suppliers print the required tags and dispatch them directly to the farmer.

Other and potential uses

Although the ID system was originally designed to meet the needs of the NBTPMS it has been adopted to meet industry needs in other areas. Regulations administered by the NZ Food Safety Authority (NZFSA) require that any cattle implanted with hormone growth promotants (HGPs) must be identified according to system requirements, and for the ID details of these cattle to be reported to NZFSA and entered into a database of HGP treated cattle. Access to this database enables meat processors to identify any HGP cattle presented for slaughter and exclude them from supply to markets where HGP treated product is unacceptable.

The current design of the ID system limits its application to other uses. The requirement for animals to be identified only from their first movement after 30 days age means that the system is unsuited for applications where the true birth herd of the animal must be known. It remains well suited for its designed purpose, because cattle less than 30 days of age are very rarely infected with Tb – so the system has been designed to ignore this age class of animals and their movements.

The system has been designed so that a movement history for an animal can be reconstructed through knowing the herd it was first moved from after 30 days of age, knowing the herd where the animal was diagnosed with Tb or from which it was sent to slaughter, and using farmer's records to identify any intermediate herds where the animal has lived. Reliance on farmer records is an obvious weak link in the system and in some cases intermediate herds may not be detected or may only be detected after a time-consuming investigation. However, given that most cattle only move through two or three herds, and that Tb is a slow-moving disease, these are not serious problems. The AHB has estimated that reliable movement histories should be obtainable in about 90% of cases investigated. The cost of formal systems to capture all animal movements could not be justified in terms of Tb control benefits.

As a result the ID system in its current form does not support the needs of quality assurance systems requiring full 'paddock to plate' traceability, nor would it provide rapid and accurate tracing of animal movements required to manage an outbreak of a fast-moving disease such as foot-and-mouth disease.

Enhancement of the system to meet such needs is possible, but would most likely require a migration to the use of electronic rather than optically read technology. 'Ownership' of the system would also need to change because the AHB's mandate is restricted to activities required for implementation of the NBTPMS.

ACKNOWLEDGMENT

The author gratefully acknowledges the work of Dr Chris Carter of AgriQuality NZ Ltd, who led the technical development of the cattle and deer identification system.