BOVINE BRUCELLOSIS

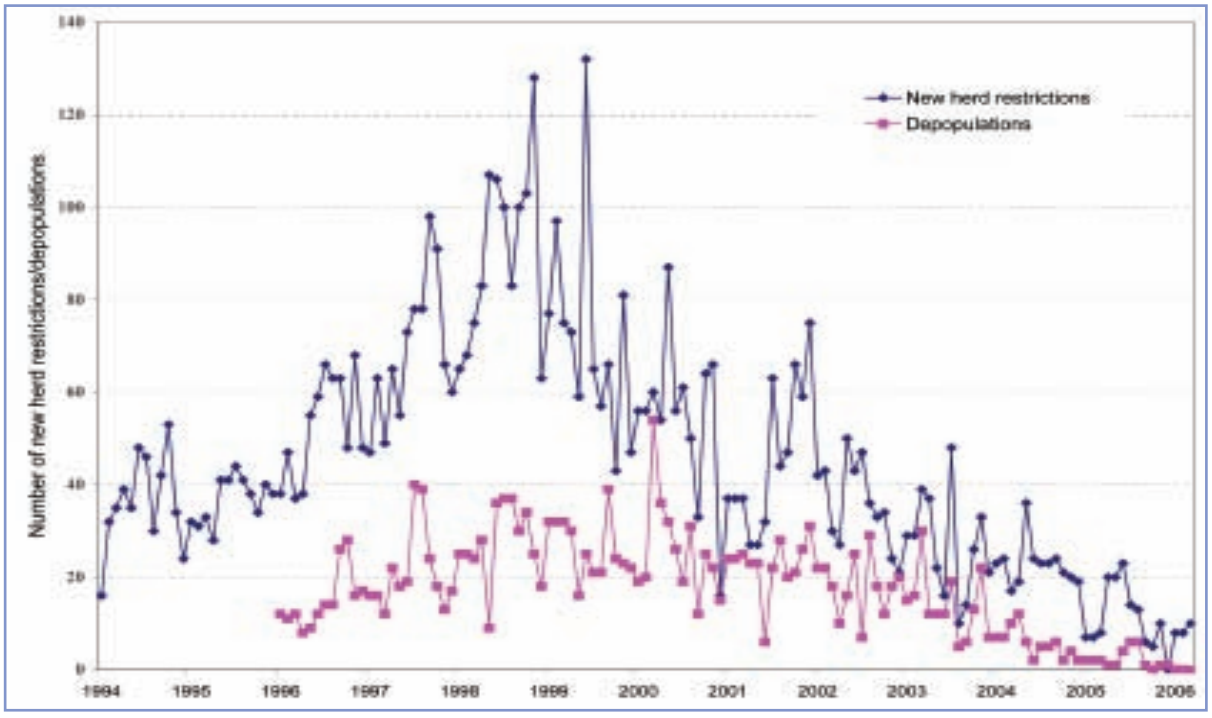
Chapter Content

Overview

A national programme to eradicate bovine brucellosis from Ireland commenced in 1965. At this time, between 12% and 15% of herds were infected, with disease incidence being higher in the south than the west and north-west. Early progress towards eradication was good, with herd prevalence falling to approximately 0.2% by 1986. By this date, herd restrictions were limited to north Cork, Limerick and Tipperary. However, these rapid gains were not sustained and brucellosis re-emerged as a significant problem in Limerick and Tipperary in the late 1980s. By 1992 the number of herd restrictions had increased in Limerick and Tipperary, and disease was also detected in counties that had been clear for a number of years. A number of additional controls were introduced nationally in the late 1990s. The herd prevalence subsequently peaked at 0.74% in 1998 (Griffin and Collins 1999), and has since been in steady decline. Of 126,084 herds nationally, 323 (0.3%) herds were restricted and 68 of these (0.05% of all herds) were depopulated during 2004.

As part of the Irish brucellosis eradication programme, annual serological testing is conducted on all female cattle and bulls over one year of age. Additional serological testing is also carried out on herds that are contiguous to disease, on animals pre- and post-movement, as well as on animals that have been traced from diseased premises. The whey ELISA test are carried out on bulk milk tank samples and all abortions should be notified to the Dept. of Agriculture. Cull cows are also tested at the point of slaughter. Herds that test positive for brucellosis have movement restrictions imposed and if disease is thought to be present will be depopulated.

Work within CVERA has sought to contribute information to assist with national decision-making. In collaboration with colleagues in the field, detailed investigations have been conducted on several recent outbreaks of brucellosis to determine the source of infection, likely mechanisms for spread and other farms at-risk. Studies have also been conducted to determine the dispersal and survival of a defined cohort of Irish cattle, and to undertake a descriptive analysis of data routinely collected at brucellosis herd de-restriction during 2000. Finally, as Ireland moves towards effective eradication, the interpretation of diagnostic tests may become increasingly problematic. Work is currently underway to critically evaluate the true disease status of Irish cattle herds with inconclusive evidence of bovine brucellosis.



New herd restriction and depopulations due to brucellosis, 1994-2006

Work in progress

"Outbreak investigations have been conducted to gain a detailed understanding of the source and spread of infection"

Investigating outbreaks of brucellosis

Principal investigators: Martin Hayes (CVERA), Ascinta Kilroy (DAF), Simon More and Seán Ashe (CVERA)

With the ongoing drop in disease incidence, outbreaks are becoming less common and (often) more isolated. These outbreaks present new challenges for those overseeing the national disease eradication programme. The purpose of these investigations is to gain a detailed understanding of the source and spread of infection. It is hoped that this information will contribute to ongoing improvement in national and local disease control efforts. In these investigations, DAF staff, relevant farmer(s) and CVERA staff worked in partnership to examine relevant epidemiological and other information.

"Data collected by veterinary inspectors at the time of herd de-restriction are being used to gain insights into the epidemiology of bovine brucellosis in Ireland"

Descriptive analysis of data routinely collected at brucellosis herd de-restriction during 2000

Principal investigators: Seán Ashe (DAF), Martin Hayes, James O'Keeffe and Simon More (CVERA)

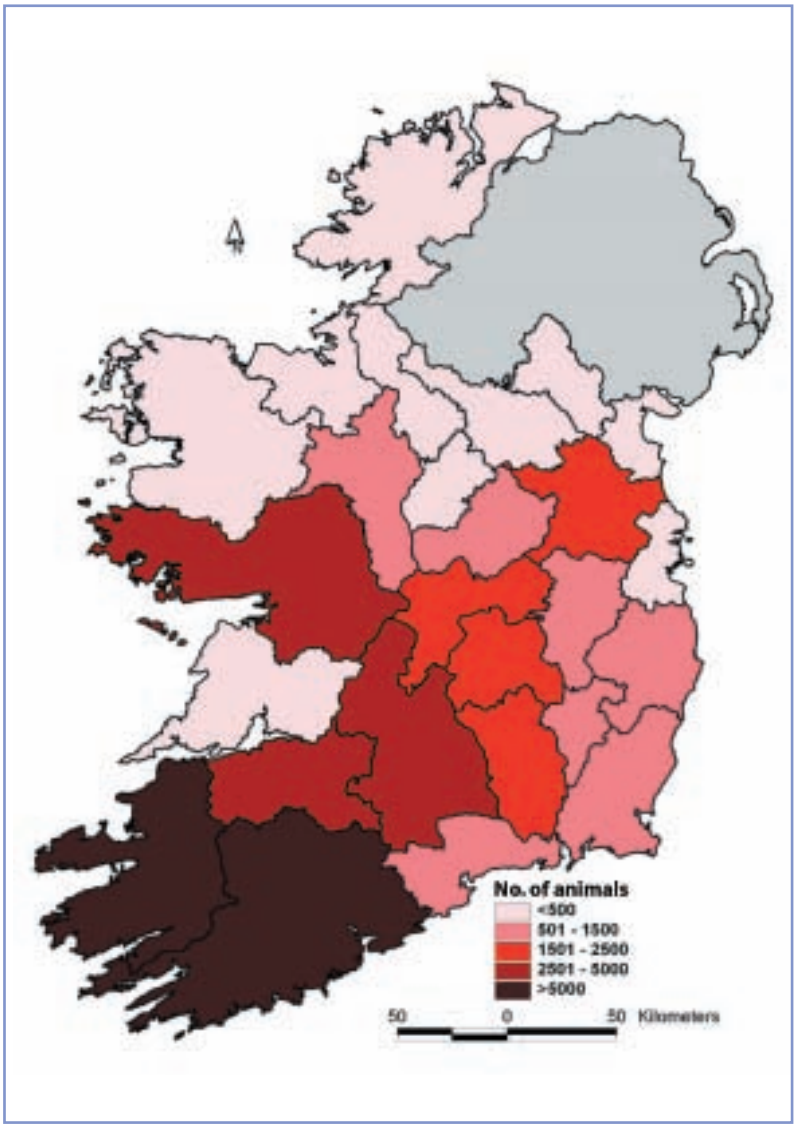
In the year 2000, field veterinarians gathered information from herds at the time of de-restriction from an earlier brucellosis outbreak. These data were used to gain an insight into the epidemiology of brucellosis on these farms and the local management of the eradication programme. Key data were collected to enable the spatial and temporal distribution of cases to be described, as well as methods of disease identification, the likely source of disease, characteristics of isolation and culture technique, and the overall disease risk associated with restricted herds that were and were not subsequently depopulated. This database is currently being analysed.

Dispersal and survival of a defined cohort of Irish cattle

Principal investigators: Seán Ashe (DAF), Simon More, James O'Keeffe and Paul White (CVERA)

An understanding of livestock movements is critical to effective disease prevention, control and prediction. As yet, livestock movement in the Republic of Ireland has not been quantified. This study has sought to define the survival and dispersal of a defined cohort of cattle, born in county Kerry during 2000. The cohort was observed for a maximum of four years, from 01 January 2000 to 31 December 2004. Beef and dairy animals moved an average 1.31 and 0.83 times, respectively. At study end, 18.0% of the beef animals remained alive on Irish farms, including 6.7% at the farm-of-birth, compared with 48.5% and 27.7% for dairy animals, respectively. Beef animals were dispersed to all Irish counties, but mainly to Cork, Limerick, Tipperary and Galway. Dairy animals mainly moved to Cork, Limerick, and Tipperary with less animals going to Galway, Meath and Kilkenny. The 4-year survival probability was 0.09 (male beef animals), 0.27 (male dairy), 0.39 (female beef), and 0.77 (female dairy). Although there was considerable dispersal, the number of moves per animal was less than previously thought.

"An understanding of livestock movements is critical to effective disease prevention, control and prediction"



The location, on 1 January 2002, of beef cattle born in County Kerry during 2000

A critical evaluation of the true disease status of Irish cattle herds with inconclusive evidence of bovine brucellosis

Principal investigators: Martin Hayes, Seán Ashe (DAF), Daniel Collins, Simon More (CVERA), Seamus Power, Kevin Kenny, Michael Sheahan and Garry O'Hagan (DAF)

> "As Ireland moves towards effective eradication, the interpretation of diagnostic tests may become increasingly problematic"

As Ireland moves towards effective eradication, the interpretation of diagnostic tests may become increasingly problematic. With this in mind, work is currently underway to critically evaluate the true disease status of Irish cattle herds with inconclusive evidence of bovine brucellosis. All cattle herds in Ireland are subjected to an annual round test, with blood being collected from all breeding cattle of 12 months of age or greater. In this study, results from all testing conducted in Ireland during 1 September 2004 to 31 August 2005 were used to identify and classify all herds with any evidence of a serological response to testing, as follows:

- *Group A herds*, where at least two animals had a CFT result of 111 international units or more at the annual test, and/or clinical evidence of abortion in association with serological evidence of infection with Brucella abortus, and or bacteriological evidence of B. abortus from any herd sample;
- *Group B herds*, where one or more animals had a positive CFT result, but the Group A herd criteria were not met; and
- *Group C herds*, where one or more animals had a positive ELISA result, but the Group A and/or B herd criteria were not met.

Detailed examination of these herds following initial detection was constrained by the nationally-accepted disease control policy. For example, Group A herds are depopulated as a matter of urgency. When feasible, detailed epidemiological and further testing data were collected following the initial positive testing result. Each of the study animals was re-bled for testing using MSAT, CFT and ELISA. Further, a brucellin skin test was conducted by the field veterinary inspector on the CFT-positive study animals, coinciding with the re-bleed visit. The status of a range of risk factors and related data was also collected. When CFT-positive animals were removed, retro-pharyngeal and mammary lymph nodes were collected for culture at the State Veterinary Laboratory at Abbotstown. A post calving serological test will also be carried out on the remaining animals of the study herds to determine the future disease status of study herds. Analysis of these data is ongoing.

New work

Whole-of-island tuberculosis and brucellosis statistics

Principal investigators: Guy McGrath, Daniel Collins, Simon More (CVERA), and Darrell Abernethy (DARDNI)

The whole of the island of Ireland can be considered a single epidemiological unit, particularly with the pending removal of restrictions to the movement of cattle from north to south. Consequently, effective disease control will increasingly rely on shared information for improved decision-making, particularly in border counties. At a recent N-S meeting on 11 October 2005, it was agreed that whole-of-island tuberculosis and brucellosis statistics should be created. This project will seek to act on this decision, in collaboration with northern colleagues.

Key meetings/presentations

Simon More, Martin Hayes, Seán Ashe

- DAF meeting (ER19B) (Longford, 24 May 2005; Kilkenny, 25 May 2005)
- DAF meeting (brucellosis) (Drumshanbo, 7 October 2005)