Other animal health issues

Brucellosis

An evaluation of Irish cattle herds with inconclusive serological evidence of bovine brucellosis

Hayes, M.[1,2], Ashe, S.[1,2], Collins, D.M.[2], Power, S.[3], Kenny, K.[4], Sheahan, M.[1], O'Hagan, G.[1], More, S.J.[2]

[1] Department of Agriculture, Fisheries and Food, [2] UCD CVERA, [3] Blood Testing Laboratory, Department of Agriculture, Fisheries and Food,

[4] Central Veterinary Research Laboratory, Department of Agriculture, Fisheries and Food

Irish Veterinary Journal 62, 182-190 (2009)

Since 1998, there has been a steady decline in herd restrictions and de-populations in Ireland due to bovine brucellosis. There is concern that the interpretation of laboratory results may become increasingly problematic, as brucellosis prevalence falls in Ireland. Therefore, the purpose of the current study was to evaluate the infection status of Irish herds and animals with inconclusive serological evidence of bovine brucellosis. During 12 months from September 1, 2004, laboratory and observational epidemiological data were collected from all Irish herds where animal testing identified at least one animal with a complement fixation test (CFT) reading greater than zero and/or a positive result to the indirect enzyme-linked immunosorbent assay (iELISA). Due to the observational nature of the study, we have robust estimates of the relative, but not the absolute, performance of the CFT, iELISA and brucellin skin test (BST). Herds were divided into three categories (Group A, B or C) on the basis of test results at initial assessment. A total of 639 herds were enrolled into the study, and observed for at least two years following enrolment. A rising CFT titre, with a CFT reading of 111 International CFT Units (IU) or greater at the subsequent blood test, was generally associated with herds where other evidence of infection was also available. Knowledge of the CFT reading at the initial and a subsequent blood test proved useful in distinguishing false-positive and true-positive brucellosis results. There was poor correlation between the CFT and iELISA results, and between the CFT and BST results. As a result of this study, national policy has been modified to include re-sampling of all animals with CFT readings of 20 IU or greater. This project has also led to a reduction in the number of herds restricted, as well as restriction duration. It has also contributed to a reduction in the number of herds listed for contiguous tests, and therefore the potential for contiguity testing of false positive results.

Outbreak of bovine brucellosis in County Clare, Ireland, in 2005

Hayes, M.[1,4], Kilroy, A.[1], Ashe, S.[1,4], Power, S.[2], Kenny, K.[3], Collins, D.M.[4], More, S.J.[4]

[1] Department of Agriculture, Fisheries and Food, [2] Blood Testing Laboratory, Department of Agriculture, Fisheries and Food,

[3] Central Veterinary Research Laboratory, Department of Agriculture, Fisheries and Food, [4] UCD CVERA

Veterinary Record, in press

This paper describes an investigation of an outbreak of bovine brucellosis in County Clare, Ireland, during 2005. It is likely that infection on the index farm was linked to a previous outbreak of brucellosis in County Clare. During March to May 2005, transmission of brucellosis within the herd was rapid; this was facilitated by a range of factors, including close contact between cattle kept in winter housing, and the mixing of animals, both during grazing and at housing, throughout the year. Containment of the disease, including only limited spread to one contiguous herd, was facilitated by the recent construction of a shed for winter housing.

Equine infectious anaemia

Management of the national programme to eradicate equine infectious anaemia from Ireland during 2006: a review

Brangan, P.[1], Bailey, D.C.[1], Larkin, J.F.[1], Myers, T.[1], More, S.J.[2]

[1] Department of Agriculture, Fisheries and Food, [2] UCD CVERA

Equine Veterinary Journal 40, 702-704 (2008)

Ireland experienced an outbreak of equine infectious anaemia (EIA) in 2006. The infection was first detected on 15th June 2006, in a mare following euthanasia at a veterinary hospital. During the following 6 months, a total of 38 cases were detected, in 2 distinct epidemiological clusters (centred on counties Meath and Kildare). The outbreak affected horses from 18 separate home premises in 8 Irish counties (Kildare, Meath, Dublin, Wicklow, Wexford, Limerick, Louth and Monaghan) and one county (Derry) in Northern Ireland. There is growing concern about outbreaks in equine populations (Herholz *et al.* 2008). A number of agents, including equine influenza (EI) and African Horse Sickness (AHS) have the potential for rapid spread within equine populations. Information is available about the management of animal health emergencies in production animals. As yet, there are limited published examples highlighting issues relating to the national management of equine disease emergencies. This paper presents the national response (control and eradication strategies, programme management, linkages with industry and the international community, resource issues) to the 2006 EIA outbreak in Ireland and lessons learned.

An outbreak of equine infectious anaemia in Ireland during 2006: investigation methodology, initial source of infection, diagnosis and clinical presentation, modes of transmission and spread in the Meath cluster

More, S.J.[1], Aznar, I.[1], Bailey, D.C.[2], Larkin, J.F.[2], Leadon, D.P.[3], Lenihan, P.[4], Flaherty, B.[2], Fogarty, U.[3], Brangan, P.[2]

[1] UCD CVERA, [2] Department of Agriculture, Fisheries and Food, [3] Irish Equine Centre, [4] Central Veterinary Research Laboratory, Department of Agriculture, Fisheries and Food

Equine Veterinary Journal 40, 706-708 (2008)

Equine infectious anaemia (EIA) was confirmed in Ireland on 15th June 2006. Over the following 6 months, until 10th December 2006, a total of 38 EIA cases were identified. No further cases have been identified, despite ongoing surveillance, suggesting that the infection has been successfully eradicated. This was the first outbreak of this disease in Ireland with evidence of transmission of infection. Infectious disease outbreaks are of considerable concern to the international equine industry, and a number of agents (e.g. equine influenza, African horse sickness) have the potential for rapid spread within equine populations. Despite its importance, however, there have as yet been few reports in international peer-reviewed journals of outbreak investigations in equine populations, either in Europe or elsewhere. This paper describes the investigation of the equine infectious anaemia outbreak in Ireland during 2006, with emphasis on the investigation methodology, initial source of infection, aspects of diagnosis and clinical presentation during the outbreak, and modes of transmission and spread in the Meath cluster.

An outbreak of equine infectious anaemia in Ireland during 2006: the modes of transmission and spread in the Kildare cluster

More, S.J.[1], Aznar, I.[1], Myers, T.[2], Leadon, D.P.[3], Clegg, T.A.[1]

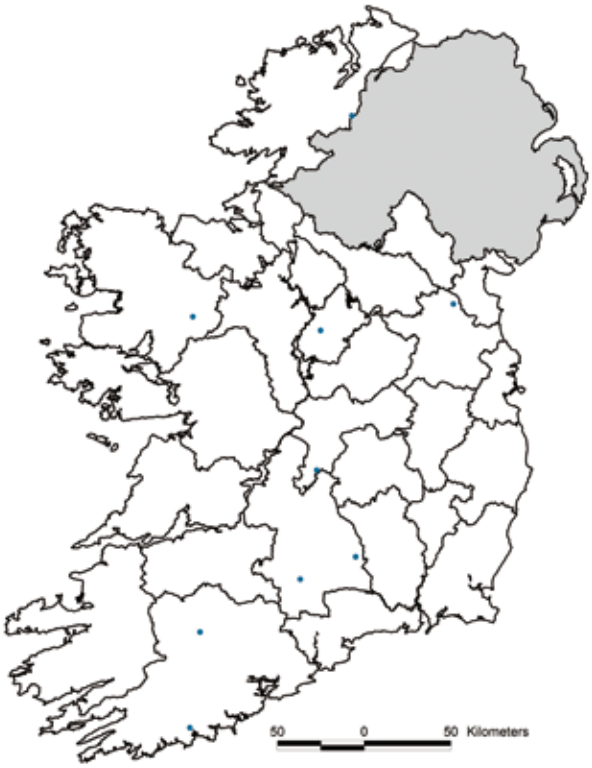
[1] UCD CVERA, [2] Department of Agriculture, Fisheries and Food, [3] Irish Equine Centre

Equine Veterinary Journal 40, 709-711 (2008)

Equine infectious anaemia (EIA) was confirmed in Ireland on 15th June 2006. During the following 6 months, until 10th December 2006, a total of 38 EIA cases were detected, including a single case in Northern Ireland. These cases were linked within 2 clusters, centred in counties Meath and Kildare. The Meath cluster was primarily related to 'Veterinary Practice X and its associated clinic' and the Kildare cluster to 'Veterinary Hospital Y' (subsequently termed 'the hospital'). Aspects of this outbreak have been presented elsewhere, including an overview of the outbreak (Brangan *et al.* 2008), information about the initial source of infection, aspects of diagnosis and clinical presentation during the outbreak, and of the modes of transmission and spread within the Meath cluster (More *et al.* 2008). This paper presents the findings of an epidemiological investigation of the Kildare cluster, with emphasis on the mode(s) of transmission and spread of infection.

Transmissible spongiform encephalopathy (TSE)

Confirmed BSE cases in Ireland during 2008



Confirmed BSE cases in Ireland during 2009

Avian influenza

A review of Ireland's waterbirds, with emphasis on wintering migrants and reference to H5N1 avian influenza

Crowe, O.[1], Wilson, J.[2], Aznar, I.[3], More, S.J.[3]

[1] Birdwatch Ireland, [2] National Parks and Wildlife Service, [3] UCD CVERA

Irish Veterinary Journal 62, 800-811 (2009)

Ireland is characterised by its diversity and large abundance of wetlands, making it attractive to a wide variety of waterbirds throughout the year. This paper presents an overview of Ireland's waterbirds, including ecological factors relevant to the potential introduction, maintenance, transmission and spread of infectious agents, including the H5N1 avian influenza virus, in Ireland. Particular emphasis is placed on five groups of wintering migrants (dabbling and sieving wildfowl, grazing wildfowl, diving wildfowl, waders and gulls), noting that the H5N1 avian influenza virus has mainly been isolated from this subset of waterbirds. Ireland's wetlands are visited during the spring and summer months by hundreds of thousands of waterbirds which come to breed, predominantly from southern latitudes, and during the autumn and winter by waterbirds which come from a variety of origins (predominantly northern latitudes), and which are widely distributed and often congregate in mixed-species flocks. The distribution, feeding habits and social interactions of the five groups of wintering migrants are considered in detail. Throughout Ireland, there is interaction between different waterbird populations (breeding migrants, the wintering migrants and resident waterbird populations). There is also a regular and complex pattern of movement between feeding and roosting areas, and between wetlands and farmland. These interactions are likely to facilitate the rapid transmission and spread of the H5N1 avian influenza virus, if it were present in Ireland.

A qualitative assessment of the risk of spread to and within the commercial poultry industry, following the introduction of H5N1 avian influenza into Ireland, and of potential risk mitigation measures

Aznar, I.[1], Crowe, O.[2], Wilson, J.[3], Duignan, P.J.[4], Gaynor, S.[4], Neilan, R.[4], McLoon, D.[5], McArdle, P.J.[4], More, S.J.[1]

[1] UCD CVERA, [2] Birdwatch Ireland, [3] National Parks and Wildlife Service, [4] Department of Agriculture, Fisheries and Food, [5] Monaghan Veterinary Consultants

As required under EU legislation (European Commission, 2005a), Ireland has developed an Avian Influenza (AI) operational manual and contingency plan. Relevant to ongoing preparations for an AI incursion, this paper describes work to qualitatively assess the risk of spread to and within the commercial poultry industry, following the introduction of H5N1 avian influenza into Ireland, and of potential risk mitigation measures. Four transmission routes were considered, including spread among wild waterbirds, spread from wild waterbirds to non-commercial avian operations, spread from wild waterbirds to commercial poultry (directly or via non-commercial avian operations) and spread within the commercial poultry industry. Data for the assessment was drawn from the scientific literature, from national expert opinion, from national databases and unpublished national reports. There is considerable potential in Ireland for spread of H5N1 avian influenza among wild waterbirds, and from wild waterbirds to non-commercial avian operations. In contrast, the opportunity for spread to and within the commercial poultry sector is variable, depending on a broad range of factors including production system, water source and management. A number of important risk mitigation measures were identified, focusing on improved information and awareness, risk based surveillance and maintenance of up-to-date databases. Each of these issues has now been considered in detail, both by DAFF and industry.

Animal movement and population structure

Survival and dispersal of a defined cohort of Irish cattle

Ashe, S.[1, 2], More, S.J.[2], O'Keeffe, J.[1, 2], White, P.[1, 2], McGrath, G.[2], Aznar, I.[2]

[1] Department of Agriculture, Fisheries and Food, [2] UCD CVERA

Irish Veterinary Journal 62, 44-49 (2009)

An understanding of livestock movement is critical to effective disease prevention, control and prediction. However, livestock movement in Ireland has not yet been quantified. This study has sought to define the survival and dispersal of a defined cohort of cattle born in Co. Kerry during 2000. The cohort was observed for a maximum of four years, from January 1, 2000 to December 31, 2004. Beef and dairy animals moved an average 1.31 and 0.83 times, respectively. At study end, 18.8% of the beef animals remained alive on Irish farms, including 6.7% at the farm-of-birth, compared with 48.6% 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 four-year survival probability was 0.07 (male beef animals), 0.25 (male dairy), 0.38 (female beef), and 0.72 (female dairy). Although there was considerable dispersal, the number of moves per animal was less than expected.

Trends in cow numbers and culling rate in the Irish cattle population, 2003 to 2006

Maher, P.[1], Good, M.[1], More, S.J.[2]

[1] Department of Agriculture, Fisheries and Food, [2] UCD CVERA

Irish Veterinary Journal 61, 455-463 (2008)

Cows are the main economic production units of Ireland's cattle industry. Therefore, demographic information, including overall numbers and survival rates, are relevant to the Irish agricultural industry. However, few data are available on the demographics of cows within a national population, either in Ireland or elsewhere, despite the recent development of comprehensive national cattle databases in many EU Member States. This study has sought: to determine the rate of cow culling from the national herd; to determine the rate of culling by type (dairy, beef), age, method of exit, date of exit and interval between last calving and exit; to calculate the national cow on-farm mortality rate; and to compare the Irish rates with published data from other countries. This work was conducted using data recorded in the national Cattle Movement Monitoring System (CMMS). Culling refers to the exit of cows from the national herd, as a result of death but regardless of reason, and cow-culling rate was calculated as the number of cow exits (as defined above) each year divided by the number of calf births in the same year. Culling rate was determined by type (dairy or beef), date of birth, method of exit (slaughter or on-farm death), month of exit and interval between last calving and exit. The average cow-culling rate during 2003 to 2006 was 19.6% (21.3% for dairy, 18% for beef). While comparisons must be treated with caution, it concluded that the overall rates of culling in Ireland fell within published internationally accepted norms. The on-farm mortality rate of 3.2-4.1% was similar to that reported in comparable studies.

Modelling the demographics of the Irish cattle population

O'Connor, J.[1, 2], More, S.J.[2], Griffin, J.M.[1], O'Leary, E.[3]

[1] Department of Agriculture, Fisheries and Food, [2] UCD CVERA, [3] UCD School of Mathematical Sciences

Preventive Veterinary Medicine 89, 249-254 (2009)

In recent years, national authorities have committed very substantial resources to the creation and maintenance of databases capable of recording important animal event data, such as births, deaths and movements. This has primarily been driven by the need to ensure the quality and safety of animal products. However, it can also be used to assist policy-makers in decision making. Despite the abundance of animal event data, as yet there is little published information about the use of these data to better understand the demography of cattle populations. This study reports the development of, and outputs from, a demographic model using data routinely collected from the Irish cattle population. The demographic model was based on a series of life tables detailing age-specific probabilities of survival up to a maximum of 17 years. These outputs were used to determine characteristics of the Irish cattle population, including estimated mortality rates, life expectancies and age profiles, and estimated cattle numbers by age and date. Separate life tables were developed for each of the 204 monthly birth cohorts born between January 1989 and December 2005. Within the Irish cattle population, the peak estimated mortality rate occurs at 29–33 months. The estimated life expectancy at birth of cattle in Ireland was 42 months. When the survival rates for all the cohorts within a population are calculated, then it is possible to use these rates as a model for determining future population size and answering cohort specific queries.

Companion animal epidemiology

Demography of the pet dog and cat population on the island of Ireland and human factors influencing pet ownership

Downes, M.[1], Canty, M.J.[1], More, S.J.[1]

[1] UCD CVERA

Preventive Veterinary Medicine 92, 140-149 (2009)

Published data on aspects of domestic pet demographics are available in many countries. Several of these studies have linked household demographics, such as the presence of children in the household, to pet ownership. There is very little published information about the demography of domestic pets on the island of Ireland (the Republic of Ireland, Northern Ireland). This study was conducted to describe the demography of the pet dog and cat populations on the island of Ireland and to identify human factors influencing pet ownership. A questionnaire was designed and administered to households to collect data about the demographics of households and their dogs and cats. The questions related to location, building structure, social class, nationality and family structure of the household, and the sex, age and source of each pet dog and/or cat. The survey was administered by a commercial company, using computer-assisted telephone interview techniques to 1250 households selected using random digit dialling and quota controls. In this study, a pet dog was defined as a dog that was been fed by a household and considered a pet by the participant of the study. A pet cat was defined as a cat that was both fed by the household and allowed into the house. The results show that 35.6% of households in Ireland have one or more pet dogs and 10.4% of households have one or more pet cats. In total, 47.3% of pet dogs and 76.1% of pet cats were neutered. Females of both species are more likely to be neutered than males. Factors associated with dog ownership included location, house type, household social class, household composition, the presence of school children in the house, and the presence of a cat in the house. Factors associated with pet cat ownership included the type of house structure, the presence of a dog in the house and the gender and age of the participant. Cats tend to stray into households. This study was the first to provide detailed information about the demographics of the pet dog and cat populations on the island of Ireland, and has identified areas for further research, in particular the effect of stray dogs and cats on the owned pet dog and cat population, and of future demographic trends in these populations.

Factors associated with pet ownership among patients with asthma

Downes, M.[1], Roy, A.[2], Wisnivesky, J.P.[3]

[1] UCD CVERA, [2] Department of Pediatrics, Mount Sinai School of Medicine, New York, USA, [3] Division of General Internal Medicine and Pulmonary, Critical Care and Sleep Medicine, Department of Medicine, Mount Sinai School of Medicine, New York, USA

Exposure to indoor allergens is an established risk factor for poor asthma control. Current guidelines recommend removing pets from the home of patients with asthma. This study was conducted to identify factors associated with pet ownership in asthma sufferers. Using data from The National Asthma Survey, we carried out univariate and multiple regression analyses to identify independent predictors of pet ownership in asthma sufferers after controlling for potential confounders. Overall, people with asthma were more likely to own a pet (49.9% vs. 44.8% $p < 0.001$). Additionally, 68.7% of patients with asthma who own a pet allowed them into their bedroom. Multivariate analysis showed that female sex, adults, white race and high income were independent predictors of pet ownership among

asthmatics. Higher income and having only an adult with asthma in the home were also associated with increased likelihood of allowing a pet into the bedroom. Pet ownership is common among asthmatics and the majority of patients allow their pets into their bedroom. Addressing this problem may help improve asthma morbidity.

Pet owner attitudes towards ownership, neutering and nutrition of their pets

Downes, M.[1], McKenzie, K.[2], More, S.J.[1]

[1] UCD CVERA, [2] UCD Geary Institute

The aim of this project is to generate new insights and hypotheses into the reasons for pet ownership, neutering and owners attitudes towards obesity and nutrition. Focus groups were deemed the appropriate method for data collection. Because little previous research has examined the attitudes and beliefs underlying human-pet interactions, qualitative methods employing a bottom-up approach will be used to generate data driven by participants.

Spatial analysis of the pet dog and cat population of Ireland

Downes, M.[1], More, S.J.[1]

[1] UCD CVERA

Using geographical information systems (GIS) and probability data obtained from the study entitled 'Demography of the pet dog and cat population on the island of Ireland and human factors influencing pet ownership' we are matching geographical positioning data with Census 2006 data and socio-demographic influencing pet ownership to produce a spatial distribution map of the pet population of Ireland.

Photograph by M.J. Canty.

Aquatic animals

An introduction to import risk analysis for aquatic animals

Baldock, F.C.[1], More, S.J.[2], Peeler, E.J.[3]

[1] AusVet Animal Health Services, Queensland, Australia, [2] UCD CVERA,

[3] Centre for Environment, Fisheries and Aquaculture Science, Dorset, United Kingdom

Fish Veterinary Journal 10, 29-53 (2008)

With increasing international trade, there are increasing risks to countries that unwanted aquatic animal pathogens will enter and spread. Import risk analysis (IRA) provides an objective, transparent and defensible method of assessing disease risks associated with imports. The International Aquatic Animal Health Code provides internationally recognised guidelines for import risk analysis. This paper describes and illustrates the main elements of an IRA for aquatic animals and their products, including hazard identification, risk assessment, risk management and risk communication. Sources of additional information are listed, both on concepts and methodology, and also the application of import risk analysis in aquatic animal health management.

Animal welfare

Equine welfare

The structure and regulation of the Irish equine industries: links to considerations of equine welfare

Collins, J.[1], Hanlon, A.[2], More, S.J.[1], Duggan, V.[2]

[1] UCD CVERA, [2] UCD School of Agriculture, Food Science and Veterinary Medicine

Irish Veterinary Journal 61, 746-756 (2008)

The equine industries in Ireland are vibrant and growing. They are broadly classified into two sectors: Thoroughbred racing, and sports and leisure. This paper describes these sectors in terms of governance, education and training in equine welfare, and available data concerning horse numbers, identification, traceability and disposal. Animal welfare, and specifically equine welfare, has received increasing attention internationally. There is general acceptance of concepts such as animal needs and persons' responsibilities toward animals in their care, as expressed in the 'Five Freedoms'. As yet, little has been published on standards of equine welfare pertaining to Ireland, or on measures to address welfare issues here. This paper highlights the central role of horse identification and legal registration of ownership to safeguard the health and welfare of horses.

Policy Delphi with vignette methodology as a tool to evaluate the perception of equine welfare

Collins, J.[1], Hanlon, A.[2], More, S.J.[1], Wall, P.G.[3], Duggan, V.[2]

[1] UCD CVERA, [2] UCD School of Agriculture, Food Science and Veterinary Medicine, [3] UCD Geary Institute

The Veterinary Journal 181, 63-69 (2009)

A three-round Policy Delphi using vignette methodology was employed as a new approach to study stakeholder perceptions and experiences of equine welfare. Forty-four representatives from stakeholder groups in the Irish equine industry participated. In Round 1, vignettes (narratives illustrating potential infringements of equine welfare) were presented to assess perceptions of 'Acceptability' and experiences of 'Frequency of occurrence'. In Round 2, lists of situations where equine welfare might be compromised, possible drivers of behaviour and potential solutions were presented for grading. In Round 3, two composite issues were formed from an analysis of responses to the previous round, namely (1) the disposal of horses trade, and (2) behaviour at unregulated gatherings; these were illustrated using vignettes to establish stakeholder attitudes to the desirability, feasibility and means of improving standards of welfare for horses. All respondents completed all rounds demonstrating their engagement with the method.

Evaluation of current equine welfare issues in Ireland: causes, desirability, feasibility and means of raising standards

Collins, J.[1], Hanlon, A.[2], More, S.J.[1], Wall, P.G.[3], Kennedy, J.[3], Duggan, V.[2]

[1] UCD CVERA, [2] UCD School of Agriculture, Food Science and Veterinary Medicine, [3] UCD Geary Institute

Equine Veterinary Journal, in press

Significant potential threats to the health and welfare of horses exist in Ireland when supply exceeds demand and the identification system for horses is not yet robust. This study was conducted to secure engagement with stakeholder groups and to determine their perception of equine welfare in Ireland and to encourage the development of inclusive, rather than imposed, policy solutions. A 3 round, web-based Policy Delphi incorporating novel vignette methodology was conducted from November 2007–March 2008 to canvass opinion (in both quantitative and qualitative forms) on the perceived most significant equine welfare issues. Vignettes (narratives depicting potential compromise to equine welfare) were employed. Quantitative data were collected in the form of scoring on a 9 point Likert scale with labelled end-points, qualitative information as text subsequently analysed for themes. All 44 respondents completed all rounds. Major equine welfare issues were identified as welfare of horses during the disposal process and at unregulated gatherings. Assessed quantitatively on a 9 point Likert scale (0 = minimal; 8 = maximal), respondents scored the desirability and feasibility of improving standards, median 8 and 6, respectively, for both issues identified. Basic themes identified in respondents' quotes as reasons to raise equine welfare standards were ideological, protection of animal welfare, safeguarding the reputation of the equine industry and safety (of people, horses and environment). Themes for reasons for low standards were societal norms, fiscal pressures, indolence, indifference and ignorance. Themes underpinning potential means for achieving meaningful change (solutions) were legislation, enforcement, education/ training, fiscal remedies, increasing awareness and a combination of these. Mechanisms aimed at raising standards must be based on an understanding of motivational drivers for currently low standards. The challenge is to translate the findings and this heightened awareness into meaningful change to the benefit of horses and those who care for them.

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A case study of equine welfare on an Irish farm 2007-2009

Collins, J.[1], More, S.J.[1], Hanlon, A.[2], Duggan, V.[2]

[1] UCD CVERA, [2] UCD School of Agriculture, Food Science and Veterinary Medicine

Veterinary Record, in press

Since 2007 there has been a growing concern for equine welfare in Ireland, in particular the issue of unwanted horses in a faltering economy. This report describes the progression in welfare standards for horses on a horse farm in Ireland during 2007, 2008 and 2009. Visits to the farm were undertaken and information, in the form of written notes and digital recording of observations and examinations, was gathered in consultation with officials from the Gardaí (the Irish police), the Department of Agriculture, Fisheries and Food (DAFF) and the Irish Society for the Prevention of Cruelty to Animals (ISPCA). Further independent veterinary corroboration of clinical findings and laboratory support occurred post seizure of horses. The complex reality of on-farm equine welfare problems and the difficulties in achieving a resolution are discussed compared to other species conventionally considered to be food-producing animals. This case report describes the conditions for horses on a commercial farm in Ireland during a period of growing concern for equine welfare, the inappropriate response (by the owners/keepers) to assistance and advice offered, and the largely futile though well-intentioned efforts made (by the relevant authorities) to address deficiencies until the effective abandonment of the animals forced the first ever seizure of horses for disposal and destruction under the terms of the European Communities (Welfare of Farmed Animals) Statutory Instrument no. 14 of 2008.

Development and application of a protocol to assess the welfare of equidae at fairs and markets in Ireland

Collins, J.[1], Johnson, J.[2], Hanlon, A.[2], More, S.J.[1], Duggan, V.[2]

[1] UCD CVERA, [2] UCD School of Agriculture, Food Science and Veterinary Medicine

Unregulated horse gatherings, such as fairs and markets, are considered to be of high value culturally, socially and economically to Ireland. However, a Delphi study completed in 2008 by Collins and others (2009; 2010 in press) identified welfare standards for horses at such events as one of the two most significant equine welfare concerns in Ireland. In this paper we describe the development of an equine welfare assessment protocol, based on the Five Freedoms, which employs measurement of both welfare inputs and outputs, and early attempts to apply this protocol at fairs and markets in Ireland. Thirty parameters (based on a semi-qualitative 5 point Likert scale) were each measured on thirty occasions alongside details of weather, horse numbers and the presence of an organising committee. The data set (n=30) was divided into three subsets (with some overlap) to enable the analyses of welfare scores for individual events (n=14), inter-observer variability in scores at events scored simultaneously but independently by the first two authors, JC and JJ (n=5), and change over time at any one event (n=8). By the criterion of importance adopted by the authors, the freedom of horses to access water, feed and shelter (resource input) and the ability of horses to drink and feed (current output) were deemed to be unduly compromised. The presence of an organising committee was not found to be protective of equine welfare. It is suggested by the authors that a combined approach (input and output-based measures) to the assessment of equine welfare at unregulated gatherings be adopted but that further work is required to refine the protocol to ensure that repeatability and reproducibility of scoring are achieved in its implementation.

The keeping and disposal of horses: an Irish perspective

Collins, J.[1], Hanlon, A.[2], More, S.J.[1], Wall, P.G.[3], Duggan, V.[2]

[1] UCD CVERA, [2] UCD School of Agriculture, Food Science and Veterinary Medicine, [3] UCD Geary Institute

Links between the structures, governance and funding of the Irish equine industries and potential concerns for equine welfare have already been reported (Collins *et al.,* 2008). The role of Local Authorities, social horse projects, the Farm Animal Welfare Advisory Council (FAWAC) and routes for the disposal of horses in relation to the keeping of horses in Ireland are further described in this paper with particular reference to equine health and welfare. Primary information was gathered through visits conducted to horse pounds, social horse projects, FAWAC and its Equine Welfare Working Group, horse dealer yards, ferry ports, horse slaughter plants and knackeries. Supplementary information was gathered through internet and telephone research. The contribution each makes to defining how horses are kept and disposed of in Ireland is described. Differences in the approach adopted between members of a given group (for example, different Local Authorities or different ferry ports) are highlighted. Inferences are drawn that should help to improve the landscape for all who aspire to keep horses with due regard to safeguarding their health and welfare. A fundamental issue remains the provision of a comprehensive, integrated system for the identification of equidae.

A qualitative approach to identifying solutions to selected equine welfare problems in Ireland

Collins, J.[1], Hanlon, A.[2], More, S.J.[1], Wall, P.G.[3], McKenzie, K.[3], Duggan, V.[2]

[1] UCD CVERA, [2] UCD School of Agriculture, Food Science and Veterinary Medicine, [3] UCD Geary Institute

This study was conducted to engage those who own, keep or manage horses or horse enterprises with efforts to safeguard equine welfare, and to provide informed perspective to those who are charged with the governance of equine health and welfare matters in Ireland. This paper aims to explore the views of those in industry and government regarding necessary improvements to equine welfare in Ireland at unregulated gatherings and during the disposal process. Qualitative research methods were employed, namely recorded semi-structured interviews, focus groups and a structured, facilitated workshop. Representatives from industry, welfare societies, socially disadvantaged social groupings and government engaged with the process, and shared their views regarding horse welfare priorities and solutions with merit to address welfare problems. A consensus was achieved that equine welfare in Ireland could be improved by the development of a comprehensive identification system, a Code of Practice for horse gatherings, a horse licensing scheme, a method to ensure that funds are ring-fenced to benefit humane horse disposal and improved means of raising awareness of the value of safeguarding horse welfare. The information gathered and the methods used have been and could be further employed to improve dialogue between the key players in industry and those in government charged with overseeing the sector to ensure practical evidence-based policies are produced to improve the welfare standard of horses in Ireland.

Development and application of a bio-security assessment protocol at equine events in Ireland

Johnson, J.[1], More, S.J.[2], Collins, J.[2], Duggan, V.[1]

[1] UCD School of Agriculture, Food Science and Veterinary Medicine, [2] UCD CVERA

There is the potential for disease transmission wherever horses gather in groups. The inconsistent application of disease control measures across the horse industries in Ireland, the highly contagious nature of many of the equine infectious diseases, the potential for the spread of disease from sub-clinically infected horses and increased transport of horses to international events together mean that all horses are put at risk of disease transmission, particularly in the event of an outbreak of an exotic equine disease. The objectives of this study were to develop a bio-security assessment tool for use at equine events, to apply the tool in the investigation of the potential for contagious disease transmission at equine events in Ireland, and to determine the influence of the degree of regulation of event on risk of disease transmission. A scoring system was developed to identify bio-security risks at equine events. This was based on both direct and indirect risk factors which contribute to contagious disease transmission. Risk factors included categories such as contact between horses, contact with fomites, feeding facilities, degree of public access, control of wildlife, sanitation of stables and housing ventilation. The regulation status of each event was determined based on a combination of published governing rules and observation of their enforcement during on-site visits. Highly regulated events had significantly lower overall risk levels than partially regulated events (P<0.003); overall risk level of partially regulated events did not differ significantly from that of unregulated events (P=0.051).

Bovine welfare

Beef farmers' perception of farm animal welfare

Dwane, A.[1], More, S.J.[2], McKenzie, K.[3], Blake, M.[4], Wall, P.G.[3], Hanlon, A.[1]

[1] UCD School of Agriculture, Food Science and Veterinary Medicine, [2] UCD CVERA, [3] UCD Geary Institute, [4] Department of Agriculture, Fisheries and Food

The role of farmers and other stakeholders in developing and implementing policy on farm animal welfare is likely to underpin the success of such initiatives. This ongoing research explores the perceptions of beef farmers to animal welfare and mechanisms to further improve on-farm welfare, using the 'Animal Welfare, Recording, and Breeding (AWRB) Scheme for Suckler Herds' as a case study.

Refining current systems of early warning and prevention of on-farm animal welfare incidents

Kelly, P.[1], McKenzie, K.[2] More, S.J.[3], Blake, M.[1], Hanlon, A.[4]

[1] Department of Agriculture, Fisheries and Food, [2] UCD Geary Institute, [3] UCD CVERA, [4] UCD School of Agriculture, Food Science and Veterinary Medicine

In 2004, the then Minister for Agriculture and Food in Ireland announced that he had accepted the recommendation of the Irish Farm Animal Welfare Advisory Council for the establishment of a collaborative, nationwide early warning / intervention system for farm animal welfare cases. The Early Warning System currently involves a partnership between the Department of Agriculture, Fisheries and Food, the Irish Farmers Association and the Irish Society for the Prevention of Cruelty to Animals that aims to identify and address real or potential cases in which the welfare of farm animals is compromised. This study seeks to better identify and understand risk factors associated with on-farm animal welfare incidents in Ireland and thereby provide opportunities to refine current systems of early warning and prevention.

Cadmium exposure in cattle

Cadmium exposure in cattle: a review

Lane, E.A.[1], Canty, M.J.[1]

[1] UCD CVERA

No biological role has been described for cadmium (Cd) in animals and its presence in animal tissue is considered unnecessary. Cadmium is considered to be one of the most toxic substances in the environment due to its wide range of organ toxicity and long elimination half-life. Batteries are an important source of Cd pollution, additionally, combustion of coal, smelting, mining, alloy processing and industries that employ Cd as a dye are also potential sources of Cd pollution. Agricultural practices such as the application of sewage sludge and contaminated fertilizers are also sources of Cd contamination. Absorption of Cd occurs via the respiratory and digestive system. Approximately 10 to 50% of Cd fumes are absorbed by the respiratory system. While, Cd is poorly absorbed via the digestive tract, compared to similar divalent cations, Zn and Fe; approximately 5% of oral Cd is absorbed. Once absorbed, Cd circulates in red blood cells or bound to albumin in plasma. Cadmium interacts with the metabolism of essential minerals; calcium, zinc, iron, copper and selenium. The majority of newborn ruminants have a low Cd burden. Accumulation occurs slowly over time, primarily in liver and kidneys. In the liver it may induce and bind metallothionein, this complex is released slowly into circulation and then accumulates in kidneys. At high levels dietary Cd can cause decreased feed intake, and lowered weight gain, anaemia, decreased bone absorption and abortions and Cd toxicity has been reported in many species including cattle. This paper reviews the literature pertaining to Cd exposure and its effects in cattle.

Teaching methods

Problem-based learning in veterinary education

Lane, E.A.[1]

[1] UCD CVERA

Journal of Veterinary Medical Education 35, 631-636 (2008)

Problem-based learning (PBL) replicates life experiences to stimulate learning, the integration of knowledge, and lifelong learning skills, all of which are requirements for veterinary medical education. As the curricular content of veterinary schools expands to immense proportions following advances in medical knowledge and biotechnology, it becomes impracticable to ensure that all students at the beginning of their careers have such a wide knowledge base. Students who are faced with vast amounts of information to learn by rote, much of which may seem irrelevant to their prospective career, may become disillusioned with their chosen course, hence the temptation to convert to a PBL curriculum. The PBL strategy of teaching is becoming increasingly popular in veterinary faculties worldwide, encompassing both curriculum content and a process of learning. In PBL, clinical cases are carefully selected to provoke deep student learning by the acquisition of both basic scientific and clinical knowledge critical to the case; cultivate problem-solving abilities; and encourage the development of team-building, self-directed learning, communication, and self- and peer-assessment skills. Problem-solving skills, understanding of the basic sciences, and clinical performance are all improved by the PBL process. The aim of this paper is to review a decade of literature pertaining to the inclusion of PBL in veterinary and medical curricula.

Methodological issues

Defining output-based standards to achieve and maintain tuberculosis freedom in farmed deer, with reference to member states of the European Union

More, S.J.[1], Cameron, A.R.[2], Greiner, M.[3], Clifton-Hadley, R.S.[4], Correia Rodeia, S.[5], Bakker, D.[6], Salman, M.D.[7], Sharp, J.M.[8], De Massis, F.[5], Aranaz, A.[9], Boniotti, M.B.[10], Gaffuri, A.[11], Have, P.[5], Verloo, D.[5], Woodford, M.[12], Wierup, M.[13]

[1] UCD CVERA, [2] AusVet Animal Health Services, Cuiseaux, France, [3] Federal Institute for Risk Assessment (BfR), Berlin, Germany, [4] Veterinary Laboratories Agency, Weybridge, Surrey, England, [5] European Food Safety Authority, Parma, Italy, [6] Department of Bacteriology and TSEs, Central Institute for Animal Disease Control, Lelystad, The Netherlands, [7] Animal Population Health Institute, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Colorado, USA, [8] Veterinary Laboratories Agency, Midlothian, Scotland, [9] Departamento de Sanidad Animal, Facultad de Veterinaria, Universidad Complutense, Madrid, Spain, [10] Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna, Dipartimento di Biologia Molecolare, Brescia, Italy, [11] Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna, Sezione Diagnostica di Bergamo, Bergamo, Italy, [12] Algarve, Portugal, [13] Department of Biomedical Sciences and Veterinary Public Health, Faculty of Veterinary Medicine and Animal Sciences, Swedish University of Agricultural Sciences, Sweden

Preventive Veterinary Medicine 90, 254-267 (2009)

Within the European Union (EU), detailed legislation has been developed for cattle, but not deer, to minimise disease risks associated with trade in animals and animal products. This legislation is expressed as input-based standards, providing a detailed outline of the activity required (for example, testing of animals and application of defined control measures), on the expectation that an adequate output (for example, confidence in freedom) will be achieved. Input-based standards are at odds with the increasing shift towards output-based standards, particularly in OIE rules governing international trade. In this paper, we define output-based standards to achieve and maintain freedom from tuberculosis (TB) in farmed deer, with reference to EU member states. After considering the probability of freedom achieved for cattle under existing EU legislation, we defined a 'free farmed deer holding' as one with a probability of freedom from infection of at least 99%. We then developed an epidemiological model of TB surveillance systems for deer holdings, incorporating different surveillance strategies, including combinations of diagnostic tests, and a variety of different scenarios relating to the potential for introduction of infection. A range of surveillance strategies were identified to achieve and maintain a free farmed deer holding, and worked examples are presented. The surveillance system sensitivity for varying combinations of screening and confirmatory tests in live animals, animals at slaughter and on-farm deaths is also presented. Using a single test at a single point in time, none of the TB tests routinely used in farmed deer is able to achieve an acceptable probability of TB freedom. If repeat testing were undertaken, an acceptable probability of TB freedom could be achieved, with differing combinations of the surveillance system sensitivity, frequency of testing and risk of introduction. The probability of introduction of infection through the importation of infected deer was influenced by the use of a pre-movement test (assumed 90% test sensitivity and negative test results), the TB prevalence in the source herd and the number of animals imported. A surveillance system sensitivity of at least 81% was achieved with different combinations of annual live animal surveillance and surveillance of animals at slaughter or on-farm deaths. This methodology has broad applicability and could also be extended to other diseases in both deer and other species with relevance to trade in animals and animal products.

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The use of Geographic Information System (GIS) and non-GIS methods to assess the external validity of samples post-collection

Richardson, E.[1], Good, M.[2], McGrath, G.[3], More, S.J.[3]

[1] Teagasc Moorepark Dairy Production Research Centre, [2] Department of Agriculture, Fisheries and Food, [3] UCD CVERA

Journal of Veterinary Diagnostic Investigation 21, 633-640 (2009)

External validity is fundamental to veterinary diagnostic investigation, reflecting the accuracy with which sample results can be extrapolated to a broader population of interest. Probability sampling methods are routinely used during the collection of samples from populations, specifically to maximize external validity. Non-probability sampling (e.g., of blood samples collected as part of routine surveillance programs or laboratory submissions) may provide useful data for further *post hoc* epidemiological analysis, adding value to the collection and submission of samples. As the sample has already been submitted, the analyst or investigator does not have any control over the sampling methodology, and hence external validity as routine probability sampling methods may not have been employed. The current study describes several Geographic Information System (GIS) and non-GIS methods, applied *post hoc,* to assess the external validity of samples collected using both probability and non-probability sampling methods. These methods could equally be employed for inspecting other datasets. Mapping was conducted using ArcView 9.1. Based on this *post hoc* assessment, results from the random field sample could provide an externally valid, albeit relatively imprecise, estimate of national disease prevalence, of disease prevalence in 3 of the 4 provinces (all but Ulster, in the north and northwest, where sample size was small), and in beef and dairy herds. This study provides practical methods for examining the external validity of samples post-collection.

Improving the quality of reporting in veterinary journals: how far do we need to go with reporting guidelines?

More, S.J.[1]

[1] UCD CVERA

The Veterinary Journal, in press

Publication in the international peer-reviewed literature is one of the most important outputs of any research, providing a public record of research conducted. However, the quality of reporting is variable, both in the medical and veterinary literature. In response to these concerns, a number of guidelines have been developed by international scientific teams to promote the quality of reporting of research studies. These guidelines are written as checklists, flow diagrams, or in the form of explicit text, specifying the minimum information that is required in each section of a published paper to provide a transparent, accurate and complete account of the research. Increasingly, key medical journals either require or recommend author compliance with the above-mentioned reporting guidelines. As yet, however, a similar approach is not standard practice among veterinary journals. In this Personal View, it is argued that veterinary journals should require author compliance with relevant reporting guidelines, in the interest of high quality reporting of veterinary medical research.

International collaboration

Avian influenza

An outbreak of highly pathogenic avian influenza at a public animal exhibit in Seoul, Korea, during 2008

Yoon, H.[1], Moon, O.-K.[1], More, S.J.[2], Park, C.-K.[1], Park, J.-Y.[1], Lee, Y.-J.[1], Lee, S.-D.[1], Ha, J.-K.[1], Jeong, S.-K.[1], Jeong, J.-W.[1], Lee, S.-J.[1]

[1] National Veterinary Research and Quarantine Service, Republic of Korea, [2] UCD CVERA

Zoonoses and Public Health, in press

This study describes the first recorded outbreak of HPAI in the city of Seoul, in captive birds held in an exhibition for public viewing at a local district office. The index cases were two pheasants, which had been introduced into the exhibit on 24 April, 4 days prior to death, from a store in a local market in Gyeonggi-do. Ducks and chickens from an HPAI outbreak farm, subsequently confirmed on 4 May, had also been held in this store. This outbreak highlights the potential role of local markets in AIV transmission. This outbreak led to considerable public health concern in Korea, however, no human cases were reported. The non-commercial poultry sector needs to be considered in national plans for preparedness and response.

Brucellosis

Surveillance and control of bovine brucellosis in the Republic of Korea during 2000–2006

Lee, B.-Y.[1], Higgins, I.M.[2], Moon, O.-K.[1], Clegg, T.A.[2], McGrath, G.[2], Collins, D.M.[2], Park, J.-Y.[1], Yoon, H.-C.[1], Lee, S.-J.[1], More, S.J.[2]

[1] National Veterinary Research and Quarantine Service, Republic of Korea, [2] UCD CVERA

Preventive Veterinary Medicine 90, 66-79 (2009)

Bovine brucellosis is a major animal health problem in the Republic of Korea. Further, a number of human cases of brucellosis have recently been detected. This paper provides an overview of surveillance (to detect new cases) and control (to clear infection following case detection) of bovine brucellosis in the Republic of Korea during 2000–2006. Using data from AIMS (the national animal infectious disease data management system), we conducted separate descriptive analyses, initially using farm and then episode as our unit of interest. An episode was defined as a period of compulsory herd trading restriction, following detection of infection with *Brucella abortus* in one or more cattle. We also identified risk factors for two measures of disease control: episode duration (logistic generalised estimating equation model) and time to re-restriction (Cox's proportional hazard model). There were 8530 and 52,739 reactor farms and reactor cattle, respectively, during 2000–2006. From 2004 to 2006, there was a substantial increase in the number of new outbreaks, particularly within the beef sector. The probability of a prolonged episode (>150 days) and the hazard of a second episode each increased with herd size. Further, the hazard of a second episode was higher in 2005 (compared with other years) and in the southeast of Korea (compared with other provinces). The effect of outbreak size on control varied between the beef and dairy sectors. The increase in beef cattle reactors in 2004– 2006 is closely aligned to an increase in surveillance effort. Nonetheless, it is likely that this is a genuine reflection of the recent establishment and spread of

brucellosis in the Korean beef cattle population. The recent increase in surveillance coverage in the beef sector is central to national eradication efforts. Current strategies to control infection following detection have generally been effective, leading to rapid clearance of infection on most farms. Control becomes problematic with increasing herd size. This work provides a detailed insight into surveillance and control of bovine brucellosis in Korea, and should assist both policy-makers and field veterinarians to improve the effectiveness of national eradication efforts.

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Characteristics of bovine brucellosis on Korea during 2001-2004

Nam, H.-M.[1], Kim, C.-H.[2], More, S.J.[3], Yoon, H.[1], Kim, S.-J.[1], Lee, B.-Y.[1], Park, C.-K.[1], Jeon, J.-M.[1], Wee, S.-H.[1]

[1] National Veterinary Research and Quarantine Service, Republic of Korea, [2] Ministry for Food, Agriculture, Forestry and Fisheries, Republic of Korea, [3] UCD CVERA

This paper describes the epidemiological characteristics of bovine brucellosis in Korea during January 2001-September 2004, which encompasses the period when the incidence of bovine brucellosis increased abruptly. Data from the national Animal Infectious Disease Data Management System were used for this study. A range of epidemiological measures were calculated including annual herd and animal incidence. During the study period, there were 1,183 outbreaks on 638 farms. Annual herd incidence in beef cattle increased from 0.12 to 11.5 outbreaks per 10,000 from 2001 to 2004 (to September), respectively. On 401 (62.9%) farms during this period, infection was eradicated without recurrence. Recurrence of infection was significantly higher on farms where abortion was reported (53.3%) compared to farms where it was (30.0%). On beef cattle farms, infection was introduced most frequently through purchased cattle (46.2%). Based on the results of this study, the recent establishment and spread of brucellosis in the Korean beef cattle population was mainly due to incomplete or inappropriate treatment of aborted material and the movement of infected cattle. This study has provided scientific data to underpin ongoing revision of national disease control regulations, specifically an extension to the period of movement restriction and of the retest interval in test-positive herds.

Foot and mouth disease

Using field-based epidemiological methods to investigate FMD outbreaks: an example from the 2002 outbreak in Korea

Wee, S.-H.[1], Nam, H.-M.[1], Moon, O.-K.[1], Yoon, H.[1], Park, J.-Y.[1], More, S.J.[2]

[1] National Veterinary Research and Quarantine Service, Republic of Korea, [2] UCD CVERA

Transboundary and Emerging Diseases 55, 404-410 (2008)

Relevant to foot and mouth disease (FMD), most published epidemiological studies have been conducted using quantitative methods and substantial regional or national datasets. Veterinary epidemiology also plays a critical role during outbreak investigations, both to assist with herd-level decision-making and to contribute relevant information to assist with ongoing national or regional control strategies. Despite the importance of this role, however, little information has been published on the use of applied (field-based) epidemiological methods during disease outbreaks. In this study, we outline an investigative template for FMD, and a case study of its use during the 2002 FMD outbreak in Korea. Suitable for use during field-based epidemiological investigations of individual farms within a broader regional/national response, the template considers three steps including confirming infection, estimating date of introduction and determining

method of introduction. A case study was conducted on IP13 (the 13th infected premises), the only IP during the 2002 FMD outbreak in Korea that was geographically isolated from all other known cases. The authorities first became aware of FMD on IP13 on 2 June, however, infection may have been present from 12 May. Infection was confirmed on 3 June 2002. FMD was probably spread to IP13 by a contract worker who had participated during 2–4 May in the culling operations on IP1. Other routes of spread were ruled out during the investigation. The contract worker lived in the locality of IP13 and worked on a part-time basis at a pork-processing plant that was adjacent to this farm. The contractor became heavily contaminated during the cull, but did not comply fully with cleaning and disinfection requirements once the cull had been completed. The investigative template contributed structure and focus to the field-based investigation. Results from this case study demonstrate the need for strict management of personnel in disease control and adherence to the sanitary rules by all those involved.

Epidemiological characteristics of the 2002 outbreak of foot-and-mouth disease in the Republic of Korea

Wee, S.-H.[1], Yoon, H.[1], More, S.J.[2], Nam, H.-M.[1], Moon, O.-K.[1], Jung, J.-M.[1], Kim, S.-J.[1], Kim, C.-H.[1], Lee, E.-S.[1], Park, C.-K.[1], Hwang, I.-J.[1]

[1] National Veterinary Research and Quarantine Service, Republic of Korea, [2] UCD CVERA

Transboundary and Emerging Diseases 55, 360-368 (2008)

The Republic of Korea experienced a foot-and-mouth disease (FMD) outbreak during May–June 2002. The present study describes epidemiological characteristics of the 2002 FMD outbreak in Korea, including the pattern of the outbreak in both time and space, transmission routes among infected farms, and control measures. One of the notable features of the 2002 FMD epidemic in Korea was that the virus infected mostly pigs [15 of 16 infected premises (IPs)], despite the presence of other susceptible animals on infected and neighbouring farms. The epidemic showed temporal clustering at 8–9 day intervals, suggesting five generations of infection during the outbreak, and 13 of 16 (81.3%) IPs were located within a 10 km-radius of the index case. The clinical signs that prompted notification of infection included vesicles around hooves and snouts. The age of lesions was significantly less among cases reported by farmers compared with veterinarians. The high awareness of farmers from an earlier FMD outbreak greatly helped the animal hygiene authority in efforts associated with disease control and eradication. The outbreak was eradicated within < 2 months as a result of the intensive control efforts of the animal hygiene authorities and the cooperation of the Korean people. Although the outbreak was a costly lesson for the Korean people, the experience gained will contribute to future efforts in the prevention and control of animal infectious diseases.

Tuberculosis

Mycobacterium bovis in Korea: an update

Wee, S.-H.[1], Kim, C.-H.[2], More, S.J.[3], Nam, H.-M.[1]

[1] National Veterinary Research and Quarantine Service, Republic of Korea, [2] Ministry for Food, Agriculture, Forestry and Fisheries, Republic of Korea, [3] UCD CVERA

The Veterinary Journal, in press

This paper reports changes in the cattle population and the incidence of bovine tuberculosis in the Republic of Korea between 1960 and 2007, and discusses potential factors contributing to the recently observed increase in disease incidence, particularly in beef cattle and deer. Although there have been ongoing refinements to the existing programme, further improvements in current strategies are needed, including surveillance of susceptible animal species, both domestic and wild, and ongoing surveillance of the human population.

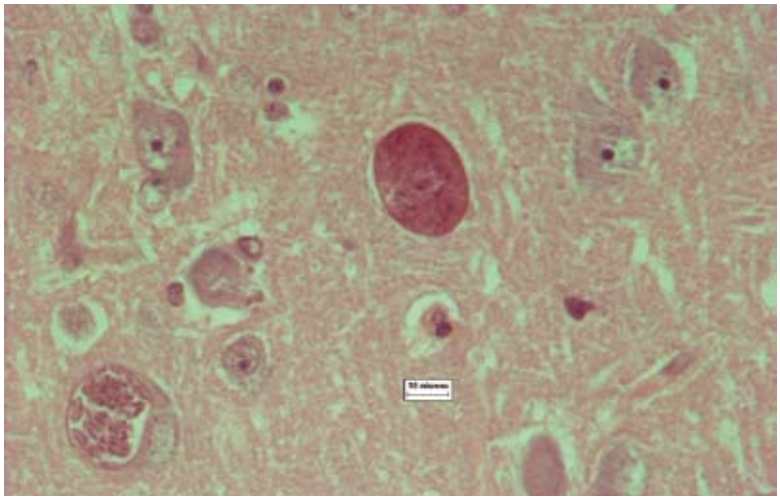
Miscellaneous

Toxoplasma gondii in meat and meat products: detection & risk assessment

Halova, D.[1], Zintl, A.[1], McCarthy, E.[1], Mulcahy, G.[1], Murphy, T.[1], Rafter, P.[2], Collins, D.M.[3], De Waal, T.[1]

[1] UCD School of Agriculture, Food Science and Veterinary Medicine, [2] Department of Agriculture, Fisheries and Food, [3] UCD CVERA

Toxoplasma gondii is a protozoan parasite that can infect virtually all warm-blooded animals including man. Humans can be infected by handling or consuming raw or undercooked meat from infected animals, or food contaminated with cat faeces. Between 37 and 58% of women of childbearing age are seropositive for Toxoplasma in various European countries. Very little data is available in Ireland on the prevalence of *Toxoplasma gondii* in meat and meat products. In order to fill these gaps, a cross-sectional abattoir study was undertaken to determine the prevalence of *T. gondii* in food animals in Ireland. Results to date indicate that 35.5% of sheep, 4.7% of pig, 6.6% of deer and 1% of chicken samples tested positive for *T. gondii* using the Latex agglutination test.



Tissue cyst of Toxoplasma gondii in brain of a sheep. *Photograph by T. de Waal.*