# Reports from Biosecurity New Zealand

### Investigation and Diagnostic Centre – Wallaceville

MAF's Investigation and Diagnostic Centre (IDC) Wallaceville is part of the National Centre for Biosecurity and Emerging Disease (NCBED). This new centre is a collaboration, involving MAF, Institute of Environmental Science and Research Ltd (ESR), AgResearch and AgriQuality, to service the research and reference diagnostics requirements of the New Zealand veterinary and medical communities. It is intended that the centre will allow for synergies in diagnostics (improved capability, new method implementation, access to a wider range of technical skills) and the development of research programmes in areas that cannot be implemented elsewhere (eg high risk zoonotic pathogens, see below). Planning for the new centre is advancing, and infrastructure development is expected to start in 2006.

The Animal Health Laboratory at Wallaceville is part of IDC, and is the national reference centre for diagnostic laboratory testing for exotic pests and diseases of animals. Experts in the disciplines of immunology, virology, bacteriology, molecular biology and aquatic diseases have access to New Zealand's only physical containment level 3+ laboratory for working with high-impact microorganisms.

In 2005, the AHL carried out more than 43,000 tests, of which 70% were provided to submitters on a cost recovery basis (primarily pre-export screening of live animals). A total of 240 submissions for exotic disease investigations was received during the year. The laboratory continued its involvement with international proficiency test programmes, and maintained its accreditation to ISO:17025.

During 2005, the laboratory was restructured to make better use of resources, and to take account of the increasing importance of molecular methods in all technical disciplines. The molecular group was divided into virology and bacteriology, and the laboratory regrouped into Bacteriology, Immunology and Virology teams, and an Aquatic Diseases group.

#### Senior IDC Staff

Incursion Investigation Manager

Director IDC Hugh Davies

Animal Health Laboratory Manager Joseph O'Keefe

Bacteriology Team Manager Wendy McDonald

Immunology Team Manager Clive Pigott

Virology Team Manager Susan Cork

Aquatic Disease Principal Adviser Mike Hine

Incursion Investigation (Animals) Team Manager Paul Bingham

The Exotic Disease Response Centre is part of IDC, Wallaceville. Expert epidemiologists manage the investigation, diagnosis, containment, control and, where required, the eradication of exotic

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and emerging disease of farmed animals, companion animals, bees, birds and aquatic animals. This includes the investigation, diagnosis, containment, control and, where required, the eradication of vertebrate pests.

#### Surveillance and research

#### Avian influenza

The Animal Health Laboratory is actively involved in MAF's response to the current panzootic of avian influenza, caused by virulent strains of influenza A H5N1. For the last two years the AHL has been collecting and testing samples from migratory birds and wild waterfowl. To date, no influenza A has been found in birds migrating to New Zealand, and only non-pathogenic strains have been found in waterfowl. This work is expected to continue until at least 2008. Passive surveillance, involving testing samples from dead birds notified via MAF's 0800 telephone number, is ongoing.

In addition to surveillance, laboratory staff have been working on improving capability for diagnosis of influenza by developing and validating new rapid tests for avian influenza. Through collaboration with ESR and AgResearch, they are also evaluating risk pathways for influenza transmission in non-commercial birds.

#### PMWS and PCV-2

Porcine circovirus type 2 (PCV-2) is considered to be an important aetiological factor in the development of post-weaning multisystemic wasting syndrome (PMWS). Following the diagnosis of PMWS in New Zealand in 2003, several viral isolates were recovered by the AHL. These are being compared with other PCV-2 isolates from non-diseased pigs using whole genome sequencing. Results will help understanding of the role of PCV-2 in PMWS.

#### Ultrastructure of Bonamia

This is an international study, in association with the OIE, to develop molecular and morphological tools to distinguish members of this group of emerging pathogens of shellfish. To date, results of the ultrastructural work (based on transmission electron microscopy) have allowed the construction of phylogenic trees. Parallel work involving the construction of genome-based phylogenies has shown that the two methods have produced corresponding groupings of organisms.

#### Characterisation of Brucella

In 2002, a *Brucella* isolate from a human was forwarded to IDC for identification. The patient had been involved in home-killing of pigs, and there was concern that the isolate was a biovar of the exotic species *Brucella suis*. Field investigation found no evidence of *Brucella* infection in animals. Detailed molecular characterisation of the *omp 25*, *omp 31*, *omp 28*, *omp 2a* and *omp2b* genes from the isolate allowed IDC staff to determine that the agent is most closely related to *Brucella* isolates from marine mammals.

#### **IBR PCR validation**

During 2005, collaborative work was conducted with several European laboratories to develop and validate a rapid molecular test for infectious bovine rhinotracheitis in bovine semen. This study has been led by IDC and jointly funded by MAF and industry. It is aimed at developing an internationally accepted test to improve trade conditions for New Zealand's exporters of bovine genetic material. After several months of development, an international ring trial was carried out involving five laboratories (including OIE reference laboratories in the UK and Sweden). Results showed that the assay was highly reproducible and had markedly better sensitivity and specificity than that of the current gold standard, virus isolation. A detailed dossier has been submitted to the OIE seeking acceptance for the method as a prescribed test for international trade.

#### Klebsiella in marine mammals

In 2002 and 2003, two epidemics of *Klebsiella pneumoniae* infection occurred in seals from the Auckland Islands. To determine the prevalence of the infection in the population, IDC has been working with staff from Massey University to develop a serological assay that can be used on archival seal sera. This will indicate whether this pathogen has recently entered the population, or whether it is a widespread commensal organism that only causes disease under unusual circumstances.

## Staff publications in scientific and technical journals

Bingham P. Exercise Taurus – exercising FMD readiness. Proceedings of the Epidemiology and Animal Health Management Branch of NZVA meeting, 30 May – 1 June 2005, at 82nd NZVA conference, Wellington, NZ.

Bingham P. Foot and Mouth Simulation Field Exercise. Biosecurity Magazine, Issue 59, March 2005.

Geale D, Rawdon T. Response planning for avian influenza in New Zealand. Proceedings of the Food Safety and Biosecurity, and Epidemiology and Animal Health Management Branches of the NZVA. FCE Publication No. 245, 113-22, 2005.

Loth L. Review of exotic tick interceptions in New Zealand since 1980. Surveillance 32(3), 7-9, 2005.

Loth L, Stone M. Weaner pig mortality rates on New Zealand farms affected by PMWS. Surveillance 32(1), 3-6, 2005.

McFadden AM, Van Halderen A. Operation Waiheke the week New Zealand held its breath, Primary Industry Management 8(3), 11-3, 2005.

McFadden AM, Heuer C, Jackson R, West DM, Parkinson TJ. Reproductive performance of beef cow herds in New Zealand. New Zealand Veterinary Journal 53, 39-44, 2005

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Mackereth GF, Webb KM, O'Keefe J, Duignan PJ, Kittelberger R. Serological survey of pre-weaned New Zealand fur seals (*Arctocephalus forsteri*) for brucellosis and leptospirosis. New Zealand Veterinary Journal 53, 428-32, 2005.

McDonald WL, O'Riley KJ, Schroen CJ, Condron RJ. Heat inactivation of *Mycobacterium avium* subsp. *paratuberculosis* in milk. Applied Environmental Microbiology 71, 1785-9, 2005.

McDonald WL, Fry BN, Deighton MA. Identification of *Streptococcus* spp. causing bovine mastitis by PCR-RFLP of 16S-23S ribosomal DNA. Veterinary Microbiology 111, 241-6, 2005.

Rawdon T, Johnstone A, Jillings E. Heinz body anaemia in yearling red deer: a case report. Proceedings of the Deer Branch of the New Zealand Veterinary Association 22, 37-41, 2005.

Stone M, McDonald W. Investigation of the *Coxiella burnetii* status of a Northland farm. Surveillance 32(4), 3-6, 2005.

Wang J, Horner GW, O'Keefe JS. Detection and molecular characterisation of bovine polyomavirus in bovine sera in New Zealand. New Zealand Veterinary Journal 53, 26-30, 2005.

#### International conference presentations

Bingham P. Report on an Aircurtain Incineration (ACI) trial in New Zealand – a disposal option for exotic disease incursions. Quadrilateral (USA, Canada, Australia, New Zealand) Group workshop – Noosa, Australia, March 2005.

Bingham P. Exercise Taurus, New Zealand's National FMD simulation exercise.

Australian College of Veterinary Scientists Science Week, Gold Coast, Australia, 27-30 June 2005.

Bingham P. Investigation of IBD seropositivity on two free-range layer properties in New Zealand. Australian College of Veterinary Scientists Science Week, Gold Coast, Australia, 27-30 June 2005.

Duignan PJ, McDonald W, Mackereth G, Kittelberger R, Jamaludin R, Bando M, Roe W, Geschke K, Jones GW, Hutt A, Stone G. First report of *Brucella* sp. in Hector's dolphins *(Cephalorhynchus hectori hectori)* in New Zealand. 16th Biennial Conference on the Biology of Marine Mammals, 12-16 December 2005, San Diego, USA.

Duignan PJ, Mackereth G, McDonald W, Jamaludin R, Kittelberger R, Geschke K, Hutt A, Stone G. First report of *Brucella* sp. from Hector's dolphin *(Cephalorhynchus hectori hectori)* in New Zealand. Poster MD-14. 19th Annual Conference of the European Cetacean Society, La Rochelle, France, 2-7 April 2005.

Grinberg A, Castinel A, Duignan P, Pattison R, Kittelberger R, McDonald W, Chilvers L, Wilkinson I. Characterization of epidemic *Klebsiella pneumoniae* isolated from New Zealand sea lions in 2002 and 2003 and its serological prevalence in the population. 16th Biennial Conference on the Biology of Marine Mammals, 12-16 December, 2005, San Diego, USA.

Mackereth, GF. Decision making in an FMD response. FMD Modelling Workshop. Canberra, March 2005.

Mackereth GF, Webb KM, O'Keefe J, Duignan PJ, Kittelberger R. Serological survey of pre-weaned New Zealand fur seals *(Arctocephalus forsteri)* for brucellosis and leptospirosis. 16th Biennial Conference on the Biology of Marine Mammals, 12-16

December, 2005, San Diego, USA.

Rawdon T. APEC (Asia-Pacific Economic Cooperation) Conference on Avian Influenza, 22-23 June 2005, Taichung, Taiwan.

Rawdon T. 8th Biennial Conference on Tropical Veterinary Medicine: Impacts of Emerging and Zoonotic diseases on Animal Health, 26 June - 1 July 2005, Hanoi, Vietnam.

Stone MAB, Tham KM, Kittelberger R. PMWS in New Zealand: Surveillance, epidemiology and research. International Conference on Animal Circoviruses and Associated Diseases, Queens University, Belfast, Northern Ireland, 11 - 13 September 2005.

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