Additional submission to the Biosecurity and Quarantine Review Panel 2008

Animal and Plant Biosecurity Branch, NSW DPI

Orange, NSW 2800

MAY 2008

NSW DEPARTMENT OF
PRIMARY INDUSTRIES

Title: Additional submission to the Biosecurity and Quarantine Review Panel 2008

Prepared by:
Animal and Plant Biosecurity Branch
New South Wales Department of Primary Industries
Orange, NSW 2800

File reference: INT08/41237

CONTENTS

Biosecurity Expenditure in NSW by NSW DPI and Rural Lands Protection Board _ 1

Development and Adoption of New Technology _____ 1

Case Study 1: Equine Influenza response by NSW DPI 1

Case Study 2: Use of Frontgate during the EI campaign 2

Case Study 3: High throughput genotyping in fruit fly research 3

Marine Case Studies _____ 3

Case Study 1: Marine biofouling 3

Case Study 2: Import control measures in ornamental fish 4

BIOSECURITY EXPENDITURE IN NSW BY NSW DPI AND RURAL LANDS PROTECTION BOARD

International markets are increasingly requiring additional amounts of surveillance to provide evidence of pest and disease freedom, rather than relying on a lack of reporting and passive surveillance.

NSW DPI supports AusBIOSEC and considers that Biosecurity agreements should be supported at the highest state and national levels.

DEVELOPMENT AND ADOPTION OF NEW TECHNOLOGY

NSW DPI is at the forefront in the development and adoption of new technologies relevant to biosecurity. The success of NSW DPI in this regard is attributable to:

- an innovative approach based on a close working relationship between research and diagnostic functions which makes the latest technology available;
- a willingness to invest in new technology as it becomes available;
- investment in training of staff;
- a whole of DPI response to emergency disease events including surveillance, field operations, laboratories, extension and research;
- integration with emerging national strategies, such as participation in the National Animal Health Laboratory Strategy, Sub Committee on Animal Health Standards and support for the proposed national training strategy for veterinary pathology.

CASE STUDY 1: EQUINE INFLUENZA RESPONSE BY NSW DPI

NSW DPI maintains a highly capable veterinary laboratory service. The key site at the Elizabeth MacArthur Agricultural Institute (EMAI) includes a Regional Veterinary Laboratory. Both laboratories offer commercial testing services as well as conducting research and training, and maintain a rapid scale-up capability to support emergency animal disease response.

The Leader of the Virology Laboratory at EMAI, Dr Peter Kirkland, had identified an opportunity to deploy real-time PCR technology for the detection of viral diseases. This technology is particularly suitable for use in a State veterinary laboratory as it obviates the need to culture live virus, enables rapid testing with automated equipment and is applicable to many different viruses. Two staff were sent for training in the techniques of testing for avian influenza to the US. Real-time PCR machines capable of high throughput were acquired and installed and a Kingfisher magnetic particle purification system was bought.

This pre-placement of technology, trained staff and validated test methods enabled rapid identification of the Equine Influenza (EI) when a suspect case presented. The samples were sent to the Australian Animal Health Laboratory (AAHL) in Geelong for confirmation and the NSW CVO was able to initiate rapid action to limit the spread of the disease and ultimately eradicate the disease within 6 months, saving the Australian community hundreds of millions of dollars.

This successful campaign has also initiated a review by National Animal Health Committee of the current model of management of exotic disease laboratory support in Australia. The value of regional capability and the close alignment of surveillance, field operations, laboratories, extension and research should be considered by this review.

During the EI campaign, 131,000 tests were conducted, around half using the real-time PCR technology. In most cases, results were available within 24 hours and in some urgent cases as little as three hours. The Virology laboratory daily workload peaked at over 2500 PCR tests.

CASE STUDY 2: USE OF FRONTGATE DURING THE EI CAMPAIGN

Front Gate is an interactive web mapping system that allows inquiry on Land and Ownership, providing a static copy of the Department of Lands data sets. The system was developed by DPI specifically for spatial analysis and mapping to support planning, response and recovery from emergencies and natural disasters, though it s also a valuable tool for other activities within the department such as compliance.

Front Gate proved a highly versatile tool during the EI control and eradication program. Users were able to rapidly locate and map a property of interest by a number of means: zooming down on areas of interest, by direct searches, or using available property information such as address and owner details. Properties were also able to be located using Geodetic DD Co-ordinates (Latitude & Longitude) in conjunction with Google Maps and Department of Lands Spatial Information exchange.

Once a property had been identified the user was able to screen property information held by the Department of Lands, allowing for verification of information obtained from other sources.

A series of relevant general geospatial information, such as roads, localities, land lots, horse holdings, and RLPB boundaries, associated with a given area were overlayed with layers of EI specific information including properties of interest, protection plan areas and vaccination buffer areas.

The EI specific layers, identified all properties in a district according to the Animal Emergency Management Information System status. This was recorded for both the geographic locality and point in time. Thus by mapping properties of interest, a complete geospatial record was formed, relating to disease information for the entire state.

Important information provided by *Front Gate* during the course of the campaign included:

- locating properties targeted for visits;
- identifying property status (disease or zoning) at any given date;
- providing maps of properties of interest that included disease or state zoning information for a given date;
- correcting misinformation recorded on forms;
- recording disease and vaccination status;
- identifying neighbours to properties of interest;
- identifying local disease spread;
- assisting in decisions regarding targeted vaccination;

- allowing the Local Vaccination Centres to identify when all vaccinations in a buffer were completed;
- provided information on the nearest active infection or other disease information relevant to risk assessments for movement applications.

A large proportion of staff engaged in the EI operation were able to utilise this technology. The user friendly interface meant staff required minimal training. The system was used in all emergency centres to manage infected properties and provided real time reports on many aspects of the disease eradication program in addition to general mapping. As a web delivered application, it was available to all staff working on the campaign.

CASE STUDY 3: HIGH THROUGHPUT GENOTYPING IN FRUIT FLY RESEARCH

A NSW DPI research team at EMAI have adapted an existing method to genotype fruit flies into a high throughput diagnostic protocol that uses robotic systems to set up and analyse vast numbers of molecular reactions.

The original genotyping method was established by colleagues at Sydney University and provided an essential tool in differentiating between wild and factory-bred strains of the Queensland fruit fly (Qfly), a major pest of Australia's horticultural industries. Whilst the factory-bred strain of Qfly is part of the solution to the fruit fly problem, having been sterilised and released as part of the national management strategy, the wild-type Qfly is part of the problem. Differentiation between the two strains requires analysis of each fly at more than 15 genetic loci.

To maintain market access when flies are trapped within the grid, rapid differentiation between strains is essential. However, the original method was time consuming and labour intensive, which also made it very expensive. Development of the testing process into a largely-automated system underpins the biosecurity of horticultural productions zones by improving the turnaround time and the reducing the cost of generating and analysing the complex DNA fingerprints that make up the diagnostic assay.

High throughput will also facilitate the adoption of similar technologies to determine the geographic origin of wild Qflies that may have been trapped within the horticultural production areas, allowing for more informed decision making about risk management practises and sources of incursion into these quarantine zones.

Real time and conventional molecular analyses also underpin the national standards for the diagnosis of citrus canker and huanglongbing (aka citrus greening). The team at EMAI is also seeking to develop high throughput capacity for these exotic diseases, in the near future.

AQUATIC CASE STUDIES

CASE STUDY 1: MARINE BIOFOULING

Biofouling of international vessels by exotic marine organisms poses a serious quarantine risk to Australia's marine environment and industries. Agreed protocols need to be resolved as a matter of urgency. The quarantine risk should be addressed at the first point of entry into Australia by AQIS.

Clarification is also needed regarding AQIS's implementation of voluntary biofouling management requirements for vessels less than 25 metres in length and also on international yachts. Advice on how similar threats are being addressed for other classes of

vessels, such as slow-moving tugs and barges which are susceptible to heavy fouling is also needed.

NSW DPI is aware of incidents involving the introduction of vessels into Australia where biofouling concerns where raised.

CASE STUDY 2: IMPORT CONTROL MEASURES IN ORNAMENTAL FISH

The importation of large numbers of live ornamental fish into Australia poses a significant aquatic biosecurity risk to Australian aquaculture, as well as Australia's native fish populations. The volume of legitimately imported fish (over 10 million comprising over 450 species) in association with the short quarantine detention periods (7 days for the majority of species) could result in a very high risk of introducing exotic pests or diseases into Australia.

It is essential that satisfactory monitoring and surveillance within private ornamental quarantine is undertaken by competent investigators. Arrangements also need to be in place to allow causative agents to be identified where significant mortalities are occurring.

Two recent detections of exotic disease agents highlight the need for urgent consideration of this area. These detections were:

Goldfish herpesvirus in imported goldfish, which has been reportedly associated with deaths of Australian bred goldfish, and

Megalocytivirus in imported ornamental gouramis, the first report of this group of viruses in an aquaculture species in Australia. This pathogen has been demonstrated to be almost identical to a virus isolated from a mass mortality event in Murray cod in an aquaculture establishment in Victoria.

Further, many ornamental fish originate from regions where antibiotic use restrictions differ from those in Australia. Prohibited antibiotics may be widely used leading to the development of antibiotic resistant microbial populations with those fish. There is the potential for such microbes to be imported along with their fish hosts. This issue also needs to be carefully considered as part of importation procedures for ornamental fish.