Volume 10 Issue 3

Animal Health Surveillance

1 July to 30 September 2005

QUARTERLY REPORT

ISSN 1445-9582

CONTENTS

Preface

In this issue of *Animal Health Surveillance Quarterly* (AHSQ), there is a strong focus on research and surveillance into zoonotic diseases. The lead article explores the potential to more closely integrate human and animal health within Australia, while a second special article reports on the development of a new diagnostic enzyme-linked immunosorbent assay (ELISA) that can detect antibodies to the SARS virus. The new ELISA has allowed the detection of antibodies in several species of bats in China and thus provides greater understanding of how the disease may be controlled in any future outbreak.

It is also noteworthy that the report from the Australian Wildlife Health Network and several of the State and Territory reports include investigations to exclude avian influenza virus and West Nile virus infections as the cause of death in several bird mortalities. Heightened awareness of the need to exclude these zoonotic diseases in Australian bird mortalities demonstrates the increased preparedness of Australian authorities to deal with such diseases, which have had major impacts in other regions of the world. The next edition of AHSQ will include a feature article on avian influenza.

Other topics include highlights of disease surveillance activities, items of interest from States and Territories, and summaries of disease monitoring and surveillance programs reported to Australia's National Animal Health Information System (NAHIS). Only summary information is recorded in NAHIS; detailed data are maintained by the source organisations.

The information in AHSQ is accurate at the time of publication but minor discrepancies may occur because of the short reporting and production time. AHSQ is also available on the Animal Health Australia website (at www.animalhealthaustralia.com.au/status/nahis.cfm).

Gardner Murray, Australian Chief Veterinary Officer

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Better integration of animal health and human health activities in zoonoses surveillance

Animals are thought to be the source of more than 70% of all emerging human infectious diseases. Recent outbreaks of bovine spongiform encephalopathy and SARS (severe acute respiratory syndrome), and the epidemic in poultry of H5N1 avian influenza in parts of Asia, highlight the need for a multidisciplinary approach to emerging and re-emerging zoonoses. A flurry of scientific publications, including many from international agencies, supports the integration of animal health and human health systems, and greater expertise in addressing zoonoses.

The Office of the Chief Veterinary Officer (OCVO), Australian Government Department of Agriculture, Fisheries and Forestry (DAFF), recently commissioned a study to improve zoonoses surveillance by integrating animal and human health activities. The report was completed in June 2005 by Mary Beers-Deeble and Scott Cameron, human health epidemiologists from the National Centre for Epidemiology and Population Health at the Australian National University.

The report was part of the zoonoses component of moves to improve national animal health surveillance in Australia. The terms of reference called for improving communication flow and shared learning between animal and human health for effective zoonoses surveillance.

The report made eight recommendations:

- *Consider creating a formal multidisciplinary committee for national human and animal health liaison on zoonotic disease* — This committee would have to be well supported and have clear objectives, to avoid the problems associated with a predecessor, the Animal Industries Public Health Committee.
- *Develop integrated national human and animal health surveillance for known and emerging zoonoses through enhanced data sharing and interpretation between the National Notifiable Diseases Surveillance System (NNDSS) and the National Animal Health Information System (NAHIS)* — Through this publication, NAHIS currently reports from the NNDSS on human cases of five zoonoses. A more sophisticated integration, perhaps involving two-way interpretative reporting, could be explored. Simon Firestone, a veterinary graduate and ANU Masters of Applied Epidemiology student currently working at the Australian Government Department of Health and Ageing (DoHA), will progress this work.
- *Enhance links with international surveillance and reporting networks relevant to zoonotic diseases of human and animal health importance* — Improved access to and sharing of information from the many international surveillance networks should improve global zoonoses surveillance within Australia.
- *Encourage and facilitate joint zoonotic disease investigations and response by both human and animal health authorities* — Improved integration at the jurisdictional level could be explored to achieve this goal.
- *Liaise in the development of technology, mechanisms and data analysis for surveillance* — DoHA and DAFF are members of the Australian Biosecurity Cooperative Research Centre for Emerging Infectious Diseases, which is therefore well placed to pursue new collaborative initiatives in zoonoses research, technology, data capture and data analysis.
- *Enhance surveillance and investigations of zoonoses suspected to be foodborne through collaboration between animal health agencies and OzFoodNet* — OzFoodNet is the national network of human health epidemiologists specifically tasked with investigating foodborne disease outbreaks. Network members are keen to engage more effectively with animal health colleagues to improve upstream and on-farm surveillance and investigations of foodborne zoonoses.
- *Consider facilitating temporary secondments or staff exchanges between human and animal health agencies for staff members involved in zoonoses, particularly for zoonoses surveillance* — This should contribute to a mutual understanding of the operating environment by the animal and human health sectors, reflected in a more detailed grasp of

the respective surveillance systems, drivers and capabilities, and possibilities for better integration to address zoonoses.

- *Enhance access to and use of interpreted animal and human health data available from the Australian Salmonella Reference Laboratory and the National Enteric Pathogens Surveillance System* — The databases of these organisations include sets of data on foodborne pathogens of animal, food and human origin. Epidemiological analysis of foodborne zoonoses using existing and ongoing data could be explored.

These recommendations are a small part of a range of contributions and inputs to be considered in formulating a National Animal Health Surveillance Strategy — the current project of a Primary Industries Health Committee High Level Working Group chaired by DAFF.

Contributed by: John Stratton, OCVO, DAFF

Australian Pig Health Monitoring Scheme

The Australian Pig Health Monitoring Scheme (PHMS) was developed by the South Australian Research and Development Institute with funding from the Pig Research and Development Corporation (now Australian Pork Limited). The scheme's slaughter monitoring approach was pioneered in Scandinavia, where lesions are recorded in all stock, but the approach has been modified to accommodate limited staff resources and local chain speeds.

Slaughter monitoring is particularly suited to pigs because many are reared in confinement and the proximity of large numbers of pigs facilitates the transmission of disease. Pig health status is a major determinant of herd profitability, which may be limited by subclinical disease. Producers are therefore encouraged to use the scheme, which also reveals the effects of any changes to disease control procedures.

PHMS monitors the incidence and point prevalence of 11 diseases in slaughter pigs at abattoirs and provides feedback to producers on the effectiveness of their control programs. Samples of carcases and offal are inspected on the kill chain, and lesions or signs of disease are recorded. The data are entered into the Pigmon3© database computer program, which generates detailed reports on disease prevalence and severity. The reports are sent to producers and their veterinary consultants to facilitate timely herd health management decisions. To aid interpretation, herd results are presented as figures and graphs covering the previous 24 months, along with average disease levels for herds of similar size and health status.

All data can be collated centrally and summarised by herd size, region and other herd management parameters to investigate epidemiological trends. State departments have previously used PHMS data for investigating specific conditions and establishing research priorities. Pharmaceutical companies have used the scheme to quantify potential markets for new products and to evaluate the efficacy of new products in development and field evaluation trials. Innovations could include the integration of lesion data with production data, incorporation of data into decision support models, and incorporation into farm quality assurance programs.

With approximately 50% of pig production receiving some level of PHMS servicing, Australian Pork Limited funded a project in 2002 to bring together the separate PHMS service providers into a national program. This included refresher training for PHMS inspectors, to ensure that they all used the same diagnosis and scoring systems and that they entered data so that herd confidentiality could be maintained during national analysis. Data included in the national database come from inspectors who participate in the national quality control process. The Australian Pork Limited project has been completed and Pfizer will fund the ongoing maintenance of the national PHMS for the next three years.

For further information, contact jackowiak.jan@saugov.sa.gov.au

Contributed by: Jan Jackowiak, South Australian Research and Development Institute

Invasive Animals Cooperative Research Centre: a new offensive against vertebrate pests

The Invasive Animals Cooperative Research Centre (IA CRC) was funded by the Australian Government in the 2004 CRC selection round and builds on the strong foundation provided by the previous Pest Animal Control CRC. For the first time, this allows research, industry, environmental, commercial and government agencies to work together to create and apply solutions for invasive animal threats. The centre was officially launched in August 2005 by Senator Ian Macdonald, Australian Government Minister for Fisheries, Forestry and Conservation.

For the purposes of the IA CRC, 'invasives' include terrestrial and freshwater vertebrates, including overabundant natives. The CRC's key objectives are to:

- develop new tools and strategies to control invasive animals (including birds and freshwater fish)
- develop new services and remove impediments to empower communities to take greater and more effective action against invasive animals
- advance understanding of the nature and behaviour of Australasia's invasive animals to maximise delivery from the above objectives
- provide partners with mechanisms for national and international business collaboration, to facilitate 'route to market' for products and services
- build greater capacity to anticipate, detect, prevent, limit or manage the impacts of existing or new invasive animals.

Forty-one organisations are participating in the IA CRC as core or supporting partners. Of these, 35 are Australian Government agencies, industry bodies and small–medium enterprises, and six are organisations from New Zealand, Britain and the United States. By combining national and international skills in science, management, commerce and industry, this unique partnership will combat existing high-profile invasive animal pests as well as those that have the potential to cause catastrophic impacts in the future.

The IA CRC is structured around six central programs (program leaders shown in parentheses):

- Terrestrial products and strategies (Glen Saunders)
- Freshwater products and strategies (Wayne Fulton)
- Detection and prevention (Elaine Murphy)
- Uptake of products and strategies (Steve Lapidge)
- Preparedness through education (Stephen Sarre)
- Business and client services (Chris Buller).

The CRC model provides a way to draw together the critical mass required to make a difference in vertebrate pest management. Program outcomes will help reduce or eliminate the prominent and costly impacts of invasive species on agricultural, environmental and social assets. The IA CRC will involve stakeholders in a continuum, from perception of a problem, through R&D, to marketing, distribution and on-ground application.

The centre headquarters has moved from CSIRO Sustainable Ecosystems in Canberra to the University of Canberra, with significant nodes at the New South Wales Department of Primary Industries in Orange, and in Adelaide.

Primary contacts are:
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Contributed by Keryn Lapidge, IA CRC

Link found between SARS and bats

Severe acute respiratory syndrome (SARS) emerged in the southern China province of Guangdong in 2002 and spread rapidly through China and South-East Asia and into North America and Europe. The syndrome is caused by a previously unrecorded coronavirus, SARS-CoV. By July 2003, SARS had spread worldwide, killing 774 people and infecting a further 8 000 before being contained.

In the aftermath of the outbreak, an increasing number of laboratories in North America, Europe and China began developing diagnostic reagents and vaccines for SARS-CoV, and studying the pathology, virus epidemiology and emergence of the disease. Most of these efforts focused on human rather than animal health issues. However, genome sequencing and epidemiological studies suggested that SARS-CoV came from an unidentified wild animal, infected another species such as the masked palm civet (*Paguma larvata*), and may have moved from there to infect humans. To identify the wild animal source and determine the distribution of the virus, there was an urgent need for a competitive enzyme-linked immunosorbent assay (ELISA) to detect SARS-CoV antibody in a wide range of animal species. The Australian Biosecurity Cooperative Research Centre for Emerging Infectious Diseases (AB CRC) saw this as an opportunity to make a significant contribution to the worldwide SARS research effort.

In August 2003, on a bus from Guangzhou to Shenzhen (Guangdong Province) during a World Health Organization-sponsored visit, Dr Linfa Wang (CSIRO Australian Animal Health Laboratory, AAHL) and Dr Hume Field (Queensland Department of Primary Industries and Fisheries) discussed the animal reservoir of the SARS virus, including:

- recent work, some of it funded by the AB CRC, on flying foxes as natural reservoirs of Hendra virus in Australia and Nipah viruses and South-East Asia
- the propensity of bats to be persistently infected by a range of viruses without showing clinical signs
- the use of bats and bat products as food and in traditional Chinese medicines.

This convinced them that a study should be done to look for evidence of SARS-CoV in Chinese bats.

The assay was developed by March 2005 and was transferred to a number of partner laboratories and collaborators in South-East Asia to test sera from target species. The study tested 408 bats (representing 9 species, 6 genera and 3 families) trapped over a large area in central China. Results from both the Wuhan Institute of Virology, Chinese Academy of Sciences and the AAHL showed that among the six genera of bats surveyed, three species from the genus *Rhinolophus* (horseshoe bats) showed high antibody prevalence. More than 70% of *R. macrotis* bats from Hubei had SARS-CoV antibodies in their blood. Virus genetic material was found in the faeces of some of the antibody-positive bats, and molecular analysis showed that the bats were infected with a family of viruses closely related to SARS-CoV.

These results were published on 29 September in Scien*cexpress*, the special online edition of *Science*. Another research team, including Professor Yeun Kwok-Yung, microbiologist at the University of Hong Kong, published similar findings in the *Proceedings of the National Academy of Sciences* on 27 September.

This discovery will have a major impact on determining how the SARS virus emerged and evolved. It also highlights the importance, once again, of bats as a source of infectious diseases — and how little we understand about the relationship between bats, viruses and disease emergence.

Contributed by: Corinna Lange, Communication Officer, AB CRC

AQUAPLAN 2005–2010: Australia's national strategic plan for aquatic animal health

AQUAPLAN 2005–2010: Australia's National Strategic Plan for Aquatic Animal Health was released on 28 July 2005 by the Australian Government Minister for Fisheries, Forestry and Conservation, Senator Ian Macdonald.

AQUAPLAN 2005–2010 is a broad, comprehensive strategy to build capacity for managing aquatic animal health in Australia. The plan has been jointly developed by governments and private industry under the management of the Aquatic Animal Health Committee. Where possible, it links to existing terrestrial animal health management arrangements of State and Territory governments and industries, to avoid duplication and make the most sensible use of resources.

There are seven main strategies within AQUAPLAN 2005–2010:

- enhanced integration and scope of aquatic animal health surveillance in Australia
- harmonised approaches to aquatic animal health in Australia
- enhanced aquatic animal emergency disease preparedness and response framework
- education and training in the aquatic animal health sector
- welfare standards for aquaculture
- appropriate use of therapeutics for aquatic animal health management
- aquatic animal health management as part of ecologically sustainable development.

The government and private sectors have identified priority projects under these seven strategies to achieve the plan's objectives.

For example, Strategy 1 outlines objectives and projects for enhancing the integration and scope of aquatic animal health surveillance in Australia. This strategy's objectives are to:

- identify the requirements for, and implement, cost-effective surveillance systems tailored to the needs of specific industry sectors (initially focusing on the salmon, tuna, prawn, pearl oyster and edible oyster sectors)
- have surveillance information and analyses readily accessible at a national level
- improve the investigation and reporting of major (wild) fish kills
- create a consistent system of aquatic animal disease diagnosis, surveillance and reporting across Australia.

Specific projects to achieve these objectives have either already started or will start in the coming years.

A six-monthly AQUAPLAN newsletter provides stakeholders with information on the implementation of AQUAPLAN projects, and details on how industry members can be involved. To be added to the mailing list, or to obtain a free copy of AQUAPLAN 2005Ð2010, contact aah@daff.gov.au

AQUAPLAN 2005–2010 and the AQUAPLAN newsletters can also be downloaded from www.daff.gov.au/aquaplan

Contributed by: Belinda Wright, OCVO, DAFF

Australian Wildlife Health Network

The Australian Wildlife Health Network (AWHN) receives reports of wildlife incidents and definitive diagnoses of causes of death among Australian wildlife. All contributions are recorded in the AWHN database (the Wildlife Health Information System, WHIS). Details of selected incidents are provided below.

The network appreciates and acknowledges contributions from organisations and individuals, and is always interested in receiving reports of incidents and definitive diagnoses. For copies of the network newsletter or digests, contact Amy Jones at ahwn@zoo.nsw.gov.au

In October, the network held its third annual general meeting. A number of goals were presented by the chairperson, including:

- short-term goals:
  - consolidate funding to allow employment of an additional technical person
  - concentrate on surveillance and emergency disease preparedness in the network program
  - encourage more ownership by the States (and demonstrate that enough safeguards have been built into WHIS to ensure confidentiality and control of data)
- medium-term goals:
  - encourage development of the network along the lines of the Canadian Cooperative Wildlife Health System (at wildlife1.usask.ca/ccwhc2003/CCWHC_home.php)
  - facilitate collaboration among the various agencies in all aspects of wildlife diseases
- long-term goal:
  - for wildlife health and welfare to be seen as part of the mainstream of the country's veterinary services.

SUSPECTED EXOTIC AND OIE LISTED DISEASES

In the past quarter, West Nile virus infection was excluded as a cause of death in four avian mortality events in Australia. All involved crow (*Corvus*) species, three of which were from Queensland (Georgetown, Normanton and Mackay) and one from Victoria (Mt Evelyn).

Avian influenza virus and Newcastle disease virus were excluded as the cause of death in six mortality events involving a variety of wild bird species, five in Queensland and one in Victoria. Species included pied currawong, crows (*Corvus* sp., in three events), friarbird (*Philemon* sp.) and a falcon (Accipitridae). Samples were received from Carmilla, Mackay, Atherton, Cairns and George Town in Queensland and Mt Evelyn in Victoria.

SUSPECTED HUMAN ZOONOTIC CONNECTION

In early September, two cases of *Mycobacterium ulcerans* were reported in mountain brushtail possums (*Trichosurus caninus*) from Orbost in Victoria. Both cases were found in an area in which a case in a long-footed potoroo (*Potorous longipes*) had previously been diagnosed. *M. ulcerans* is an environmental pathogen that causes the Buruli or Bairnsdale ulcer in humans. Previous cases have been reported in koalas, ringtail possums and an alpaca, but these have all been in the coastal areas in which human cases occur.

There is little information about this condition in wildlife and humans, and the transmission vectors are not known. Although the bacterium has been isolated from one species of mosquito in Victoria and from aquatic insects in Africa, these species have not been shown to transmit the disease to humans. Many more cases must occur in Australian native animals than are recorded, so there is a need to survey the riverine environment common to the affected animals and humans.

Contributed by: Chris Bunn, OCVO, DAFF, and Rupert Woods, Coordinator, Australian Wildlife Health Network

State and Territory reports

New South Wales

Contributed by:
Barbara Moloney
NSW DPI

ANTHRAX EXCLUSIONS

During the quarter, anthrax was excluded as the cause of death of beef cattle on five occasions. Urea intoxication was diagnosed in one case, and intestinal torsion suspected in another; in both cases, only one animal died. Hypocalcaemia was suspected on two of the other three occasions, in which mortalities ranged from 3% to 5%.

STRANGLES

A filly on the north coast undergoing treatment for a respiratory tract infection developed submandibular abscesses. *Streptococcus equi* subsp. *equi* was isolated from cultured swabs. The filly was isolated. Of the 11 other horses on the property, the five in contact with the filly were closely monitored for signs of infection. Four of those became symptomatic (not as severe as the index case) and were treated. A vaccination program was initiated on the property. The veterinarian has not seen any further cases of strangles in the area.

HENDRA VIRUS EXCLUSION

A horse from Casino district was found dead after being noticed unwell the night before. Gross post mortem findings included copious froth from the nostrils, blood-stained urine, jaundiced mucous membranes and fat, and oedematous lungs filled with froth. Samples were submitted to the AAHL for Hendra virus exclusion; TaqMan assay results on liver and spleen were negative. A diagnosis of acute streptococcal septicaemia (*Streptococcus zooepidemicus*) was determined on the results of bacterial culture and histopathology conducted at the NSW Agriculture Regional Veterinary Laboratory at Wollongbar.

AVIAN TUBERCULOSIS IN PIGS

Inspectors at an abattoir in northern NSW detected tuberculosis lesions in the mesenteric lymph nodes of 20-week-old pigs. Of the consignment of 200 pigs, 60–75% were affected. Up to four pigs had lesions in the lymph nodes of the head. Samples were collected and sent to RVLs Wollongbar and Menangle, with mycobacterial lymphadenitis confirmed. *Mycobacterium avium* was cultured from the first lymph node submission.

The pigs were traced to two contract growers for one company. Over the next 7 days, similarly affected pigs were identified at slaughter: 10–20% of 199 pigs were affected in one consignment, and 50% of 203 pigs in another. In a subsequent consignment, from a younger batch, only one out of 104 pigs was affected. The district veterinarian and ranger from the Armidale Rural Lands Protection Board inspected the contract grower sites and found no obvious problems, with all pigs in good health and adequately housed. Possible sources of infection include:

- grain contaminated with dead birds that had been processed into pig feed and used on the home farm and distributed to the contract grower sites
- the water supply on the home farm, which is drawn untreated from dams with significant populations of wild birds (mainly ducks).

SUPERPHOSPHATE POISONING IN SHEEP

In late September, on a property near Galong, superphosphate poisoning caused death in three animals and recumbency in one animal in a flock of 80 six-year-old merino ewes.

At the time, the flock was brought in for crutching and weaning and was held off food for 18–24 hours. Subsequently, three ewes became recumbent and did not respond to calcium borogluconate. Autopsy of one animal revealed swelling of the liver, kidneys and ureters, with increased amounts of clear abdominal and pleural fluid and large intestinal changes suggesting inflammation. Histopathological examination showed acute renal tubular necrosis and degeneration, suggesting a toxic cause. The liver showed localised areas of

periacinar to midzonal necrosis and diffuse degenerative changes. Further enquiries regarding possible exposure to nephrotoxic plants or chemicals revealed that the ewes had access to a superphosphate dump area while yarded. The superphosphate was spread out on the farm in March 2005, and rams had subsequently grazed in this same paddock with no ill effects. Initially, a presumptive diagnosis of hypocalcaemia was made. The histopathological changes excluded oxalate poisoning and indicated a need to investigate superphosphate exposure.

Outbreaks of superphosphate poisoning are not common, but occur more readily when sheep are hungry or nutritionally stressed (e.g. in sheep grazing short pasture recently top-dressed with superphosphate fertiliser).

LISTERIOSIS IN SHEEP

In July, listeriosis affected three sheep in each of two flocks of about 200 three-year-old merino wethers on a property near Orange.

The first cases occurred in a flock grazing on short green pasture containing cocksfoot and phalaris, and receiving supplementary feeds of wheat silage that showed evidence of mould and damage to plastic wrap. Three animals were sick: one recumbent and moribund, another circling, and a third walking with a high-stepping gait and raised head. A second flock had been moved to a new paddock containing phalaris 3 days earlier, and had three depressed animals: one leaning on a fence, one caught between a fence and trough, and another regurgitating. Two of these were recumbent the following day. Five sick animals were euthanised and autopsied, but showed no significant gross lesions. Histopathology of the brains revealed a nonsuppurative meningitis and pyogranulomatous encephalitis, with perivascular mononuclear cuffs, microabscesses and focal macrophage accumulations in the caudal brainstem, considered pathognomonic for listeriosis. Gram stain of one brainstem section showed gram-positive rods, consistent with listeria, associated with microabscesses.

This case highlights the potential risk of large plastic-wrapped silage bales causing listeriosis in sheep and, to a lesser extent, in cattle. The silage must be well made, and each bale completely sealed from air, or dormant listeria organisms may proliferate and result in an outbreak of listeriosis.

Northern Territory

Contributed by:
Dick Morton
DPIFM

COCCIDIOSIS IN WEANER CATTLE

Coccidiosis is a sporadic clinical disease in beef cattle weaners under the stress of weaning. Deaths from coccidiosis occurred in a group of 3–6-month-old cattle soon after weaning, with clinical signs of diarrhoea and depression. Eighteen weaners died suddenly during the first 3 days of the outbreak. A further 20 died over the next week, with emaciation and diarrhoea being the prominent signs. Post mortem examination revealed abomasal ulceration and watery, blood-tinged intestinal fluids. Coccidial oocyst counts from live and dead animals were very high. *Eimeria zuernii* was identified as the causative agent.

BABESIOSIS IN A COW

A four-year-old Friesian-cross cow showed progressive signs of depression, lethargy, inappetence, weight loss, fever, fetlock knuckling and tremor, before finally becoming recumbent and dying with convulsions. Haemorrhages were present on the vulva, mouth, bladder and heart. The spleen was enlarged, with a ‘raspberry jam consistency’. *Babesia bovis* parasites were identified on peripheral blood and brain smears. The cow had been kept alone on a rural block since a calf. However, a recently introduced steer probably exposed the cow to ticks.

RESPIRATORY DISEASE IN TURKEYS

Four of a batch of 15 eight-week-old turkeys showed clinical signs of upper respiratory tract infection. The most prominent sign was oedema of the cheeks and eyelids. They were also depressed and had a nasal discharge. Post mortem examination revealed sinusitis and tracheitis. *Bordetella avium*, the causative agent of turkey coryza, was isolated from nasal swabs. Samples were also tested to exclude avian influenza infection.

Queensland

Contributed by:
David Pitt
QDPI&F

CATTLE

Viral diseases

Bovine ephemeral fever (BEF) virus was diagnosed by PCR (polymerase chain reaction) in cattle in coastal Queensland from Townsville to Cooloola. In September, the virus was also detected in the Lockyer Valley in Gatton Shire, which is unusual for that time of year. The common clinical signs were recumbency with cough, fever, depression, weight loss and some sudden deaths. Some animals had signs of inhalation pneumonia on post mortem examination, a common complication of BEF virus infection secondary to ruminal atony and recumbency. Most affected animals were 18 months to 2 years old.

In late June, a group of 300 mixed-breed cattle aged 2–10 months were transported from Camerons Corner to Bundaberg, with a 2-week stopover in Roma due to rain. Many of the herd developed high fever, with some showing neurological signs. Mortality reached approximately 10%. Histology revealed non-suppurative meningoencephalitis, and bovine herpesvirus 5 was detected by virus isolation and PCR.

Bacterial diseases

Salmonella group E was diagnosed as the cause of four deaths from ten head of mixed sex/age cattle on a property in Fitzroy Shire. Affected cattle had fever and diarrhoea. Other common causes of diarrhoea in young cattle were ruled out.

Salmonella group B was associated with sickness in three dairy cattle out of 300 at risk in Beaudesert Shire. Clinical signs were diarrhoea, weight loss and one stillbirth. The cow that had the stillbirth had severe macrocytic anaemia.

Enterotoxaemia caused the deaths of two 18-month-old heifers out of 15 on grain in Biggenden Shire in late July. Small intestine contents were positive (by ELISA) for *Clostridium perfringens* epsilon toxin. The histological findings (pulmonary oedema and hepatocytic collagen depletion and some vascular damage) were consistent with the effect of epsilon toxin.

As part of a drought strategy, a drover walked a thousand head of cattle from Barcoo Shire to Barcaldine Shire over 13 weeks. In Barcaldine, the drover noticed a cow showing weakness, sitting down and heavy breathing; it died after a short time. The next day, he noticed two more animals showing similar signs. Clinical examination on a recumbent cow showed shrunken eyes with congested mucous membranes, drooling saliva, laboured breathing, diarrhoea with mucus, and body temperature of 39.5°C. This animal died soon after. All animals were in fair (score three) body condition. Post mortem examination on two cows showed flaccid right ventricles, and petechial and ecchymotic haemorrhages on the auricles. The thoracic cavity had free fibrinous fluid and fibrin attachments of the lung lobes to the thoracic walls. The middle lung lobe was consolidated. There was mucoid material in the bronchi. Laboratory examination showed bronchopneumonia due to *Pasteurella haemolytica*. Ten adult heifers and cows died, but calves and yearlings were not affected.

In late August, a dairy property lost six calves out of 24 at risk in Beaudesert Shire. The property, which previously had deaths due to *Salmonella* group D, had recently vaccinated for salmonella. The calves presented with respiratory dyspnoea and at post mortem examination had evidence of chronic pneumonia. Histology revealed severe subacute/chronic active purulent broncho-interstitial pneumonia, and *Pasteurella multocida* was cultured from swabs submitted. Pasteurellosis was also found to be responsible for the deaths of two 3-month-old dairy calves out of 40 at risk on a property in Maroochy Shire in late August. Histology revealed a severe acute/subacute suppurative necrotising bronchopneumonia.

Pasteurella multocida was also associated with purulent pneumonia and bronchopneumonia and death in Calliope Shire, where 20 out of 70 four-month-old dairy calves died and a further 15 were sick.

Babesiosis

Sickness and death due to *Babesia bovis* infection were reported on three properties in central Queensland and one in north Queensland.

A property in Fitzroy Shire lost six head, all of which had died suddenly, with one further animal affected. Post mortem examination findings suggested tick fever; smears confirmed death due to *B. bovis*. These animals were from a group of 600 cull cows recently introduced from the Gulf region of the State. The cows had not been vaccinated against tick fever and, despite coming from a tick-infested part of Queensland, had obviously had no previous exposure to tick fever.

Babesiosis due to *B. bovis* resulted in the deaths of 10 of 50 four-year-old cows in Livingstone Shire. The cows displayed ill-thrift and lethargy before they died. Despite obvious post mortem findings suggesting tick fever, anthrax was investigated and excluded as a cause of death because the property was one of the few in Queensland to have ever had diagnosed cases of anthrax.

A dairy farm in the Banana Shire lost one cow from a group of 60 cows, with a further three sick. Affected cows had decreased milk production, discoloured urine, fever, jaundice and lethargy. Smears from a sick cow indicated *Babesia bigemina* infection.

Copper deficiency

Marginal copper deficiency was diagnosed on an Ayr property that had suboptimal growth rates in steers. The property was a well-managed former cane farm with irrigated tropical pastures and leucaena (*Leucaena leucocephala*, a tropical tree legume). Ten livers were sampled at a local export abattoir. Biochemistry revealed three animals with deficient copper levels (1–20 mg Cu/kg dry matter), and seven with marginal copper levels (20–100 mg Cu/kg dry matter). Advice was given on methods to supplement the steers with copper.

Poisonings

From 1500 Brahman-cross heifers with access to a patch of 'mother of millions' (*Bryophyllum* sp.), 20 became sick and 40 died. Three post mortem examinations showed that all animals had epicardial and endocardial haemorrhages. Histological examination showed mild to marked, multifocal to locally extensive, acute myocardial necrosis and haemorrhage. Some blood vessels had fibrinoid necrosis of their walls. These lesions are consistent with *Bryophyllum* toxicity.

A property in Pioneer Shire lost 154 from 1200 head of recently introduced female cattle. The property had not been stocked for some time, and losses occurred within one week of the introduction of the cattle. Signs included jaundice, recumbency and tetanic spasms. Five head were autopsied, with the most significant finding in each case being severe acute periacinar to massive hepatic necrosis. Poison peach was the suspected cause. Losses ceased after the cattle were moved to another property.

Chemical poisoning — organophosphate

A property in the Duaringa Shire lost 16 head from a group of 140 replacement heifers being held in yards containing an old, unused cattle dip. The history of access to an old cattle dip, clinical signs of convulsions, salivation and weakness followed by death, coupled with lowered plasma cholinesterase levels, were consistent with organophosphate poisoning. The rumen and small intestines had significant levels of bromophos ethyl and ethion, common ingredients in cattle acaricides. The contaminated area was fenced off to prevent reoccurrences; organophosphates are present in cattle for a very short time.

HORSES

A 6-year-old gelding run with four other horses on buffel pasture was supplemented with a calcium and phosphorus mixture every second day. There was no history of lameness or illness except for weight loss. The horse was found recumbent in its paddock with no obvious abnormalities except for bilaterally enlarged facial bones and a tendency to fall to the right when trying to stand. After 24 hours, the horse was found recumbent with avulsion of the right elbow. On post mortem examination, extensive haemorrhages that were not consistent with recumbency were found in the joints and muscles. Blood and fresh and fixed tissues were submitted to the laboratory, and biochemistry revealed a marginal hypocalcaemia. Histological examination of the olecranon revealed extensive replacement of bone with loose, immature, fibrous tissue and marked osteoclast activity around widely spaced and poorly mineralised bone spicules. Similar changes were

present in the facial bone, except that the fibrous tissue was more mature. Sections of tendon had areas of severe haemorrhage and necrosis. This was consistent with secondary nutritional hyperparathyroidism or 'big head', which is common in central Queensland due to a predominance in regional pastures of buffel grass containing oxalate.

A 12-year old thoroughbred mare aborted at 8 months gestation. No foetal or placental abnormalities were detected on post mortem examination, and sections of heart, lung, liver, kidney, thymus, placenta and umbilicus showed unremarkable histology. Aerobic culture of foetal lung and stomach was negative, but PCR and virus isolation identified equine herpesvirus.

SHEEP

The winter rain in western Queensland brought some relief, but also stimulated growth of many toxic plants. Of 750 sheep held for shearing over 48 hours without food or water, 60 died within several hours of being released into a paddock. A further 150 appeared 'sick' and were in lateral recumbency. Plant material and fixed tissues from four animals were submitted to the laboratory. Histological examination revealed that all four had oxalate crystals in their kidneys, and in one animal this was associated with mild tubular nephrosis. The blood calcium of one euthanised animal was 0.89 mmol/L. Plant material was forwarded to the Queensland Herbarium, and seedlings were identified as *Salsola kali.* This plant contains 2–10% soluble oxalates and causes toxicity through binding blood calcium. Articles were written for local newsletters to increase public awareness.

ALPACAS

Polioencephalomalacia syndrome resulted in the death of one 6-year-old alpaca out of 30 at risk on a property in Gin Gin. Clinical signs of blindness and staggers were observed over several weeks, with no response to treatment.

Selenium deficiency was diagnosed as the cause of weight loss, anaemia and abortion and three deaths in alpacas in Caboolture Shire. Blood glutathione peroxidase levels were down to 28.00 IU/g Hb.

GOATS

In August, enterotoxaemia caused the deaths of 12 milking goats out of 250 at risk on a property in Nanango Shire. Clinical signs of diarrhoea and sudden deaths were observed. Small intestine contents were positive on ELISA for *Clostridium perfringens* epsilon toxin.

MACROPODS

Ten wallabies from a property in Mackay Shire died with toxoplasmosis. There was histological evidence of protozoan cysts and a multifocal non-suppurative and necrotising encephalitis and non-suppurative and necrotising myocarditis, all consistent with *Toxoplasma gondii* infection.

WILD BIRDS

Samples analysed from 15 sick and a further 15 dead crows in Mackay Shire revealed detectable levels of fenthion in the liver and gut. Fenthion is an organophosphate chemical used in many registered agricultural and veterinary chemicals, and is commonly used to maliciously poison birds. Exotic bird viruses were ruled out as the cause of the deaths.

POULTRY

A clinical syndrome of reduced feed intake, decreased egg production, nasal discharge and weight loss affected all 2500 layers on a farm in south-east Queensland in August. Laboratory investigation found a chronic non-purulent laryngotracheitis, consistent with chronic respiratory disease. Ingluvitis (inflammation of the crop) of unidentified bacterial origin was also found in two of the three birds examined. *Mycoplasma pullorum* was isolated from the trachea. Liver vitamin E levels were also deficient.

South Australia

Contributed by:
Celia Dickason
PIRSA

CONGENITAL CUTANEOUS NEOPLASIA IN A CALF

A producer on the Eyre Peninsula presented a newborn Murray Grey calf for examination. It was unable to rise and had severely thickened, creased skin. There were bullous swellings in many places and notable thickenings in the inguinal region. The calf was deemed unlikely to survive and was euthanised. Gross changes seen at post mortem examination included diffuse bilateral pulmonary and splenic congestion.

Histopathology revealed congestion of many organs, with increased numbers of large lymphoid-type cells in the brain and liver, and accelerated involution of the thymic medulla. The dermis and upper hypodermis had diffuse infiltrations of rounded neoplastic cells with eccentric hyperchromic nuclei. Mitotic activity was low, and there were occasional scattered necrotic cells. The epidermis, which was unaffected, was separated from the neoplastic region by a thin layer of normal dermal tissue.

Cutaneous non-epitheliotrophic lymphoma was suspected, but immunohistochemistry was unable to confirm this (possibly due to the stains being human-derived). No further cases have been reported.

Congenital lymphomas are occasionally reported in calves (usually in the spleen, liver or lymph nodes), and are a different syndrome from enzootic bovine leucosis of adult cattle. They are not known to be hereditary.

CAMPYLOBACTER ABORTION IN SHEEP

In early August 2005, ovine campylobacteriosis was diagnosed as the cause of ten abortions in a flock of 180 aged merino ewes, and a similar number in a flock of 700 mixed-aged ewes on a farm near Koppio on the Eyre Peninsula.

The property was destroyed in the Eyre Peninsula bushfire in January 2005. The use of troughs for feeding grain was recommended, but the producer decided to feed his ewes on the ground. When the first abortions occurred, the ewes were moved out of the feedlot into a small paddock to avoid spread to the rest of the flock. PCR sequencing identified *Campylobacter jejuni* as the cause. The aborted carcases were collected and burned.

This outbreak highlights the importance of hand feeding pregnant ewes in troughs to avoid feed contamination and bacterial ingestion.

PIGLET ILL-THRIFT INVESTIGATION

A private veterinarian submitted samples to the State veterinary diagnostic laboratory from a group of post-weaner pigs that had poor growth. For the previous 6 months, the property had experienced increased post-weaner mortalities and a range of clinical syndromes. Bacteriology, histology and immunochemistry identified a range of disease processes and aetiologies. A differential diagnosis of post-weaning multisystemic wasting syndrome (PMWS) was included, as there was evidence of lymphoid depletion and porcine circovirus 2 (PCV2) infection, including botryoid inclusions. Further investigations were undertaken to refine the diagnosis.

As PMWS is exotic to Australia, a national technical working group was set up to develop a case definition for the syndrome in Australia. The case definition used basically required:

- non-responsive wasting with an elevated mortality
- lymphoid depletion
- PCV2 antigen associated with lymphoid depletion.

An intensive investigation at the affected property and other units within the production company looked for causes of the poor production over the preceding period. Investigators ran a cohort study to follow pigs through the production cycle, collecting samples from pigs that died and measuring growth rates. The company provided invaluable assistance with the investigation, supplying details on farm management and husbandry changes and assisting with ongoing monitoring.

The retrospective investigation identified causes of the increased mortality rates. These included outbreaks of Glasser's disease, *Actinobacillus pleuropneumonia*, haemolytic *Escherichia coli* and

salmonellosis, together with the development of some antibiotic resistance and some husbandry problems. The prospective study failed to demonstrate any non-responsive ill-thrift with elevated mortality; the post-weaner pigs exceeded industry benchmarks for growth rates.

The final diagnosis was of poor animal husbandry leading to endemic disease.

HENDRA VIRUS EXCLUSION

A private practitioner contacted PIRSA about two aged horses in poor condition, co-grazing on a property near Tintinara. They presented with acute signs of depression, low fever, inanition, dehydration, and dyspnoea with a copious foamy bilateral nasal discharge that was believed to indicate pulmonary oedema. Acute phase blood was submitted for haematology, biochemistry and serology. Samples submitted to AAHL for indirect ELISA and serum neutralisation tests were negative for Hendra virus. Both horses had marked neutropaenia, hyperglobulinaemia, electrolyte disturbances and marked azotaemia, suggesting antigenic stimulation and endotoxaemia inconsistent with Hendra.

Although there have been sporadic sightings of flying foxes (the known carrier of Hendra virus) in South Australia over the past ten years, it was considered unlikely that flying foxes were involved in this case. Hendra virus was excluded based on a review of clinical signs, progress of the disease and serology. No aetiology was confirmed, but the most likely cause was thought to be oesophageal obstruction ('choke') from excessively fibrous forage, with secondary aspiration pneumonia and septicaemia. The concomitant involvement of grasstree toxin or a mycotoxin could not be excluded. The animals continued to recover slowly.

EQUINE HERPESVIRUS ABORTION IN MARES

A property north of Adelaide had four abortions within 2 weeks. The mares were between 8 and 10 months gestation and had shown no signs of ill-health. Post mortem examination of one foetus produced histopathology that included a severe multifocal suppurative and necrotising bronchopneumonia, multifocal necrotising hepatitis, and a severe multifocal necrotising thymitis, all with eosinophilic intranuclear inclusions. These results strongly suggested equine herpesvirus (EHV) type 1, which was later confirmed by PCR. The abortions may have been due to reactivation of EHV in mares previously infected, or the introduction of virus from young horses that were kept with mares because of a shortage of feed resulting from drought.

Husbandry changes and a high level of biosecurity were implemented, and no further abortions have occurred. Breeders of horses were reminded that any mare which aborts should be segregated immediately from other pregnant mares, the foetus and membranes should be collected for veterinary examination, and the area in which the abortion occurred should be fenced off. Keeping pregnant mares in small groups and minimising stress can also help reduce the risk of abortion from EHV-1.

COLIBACILLOSIS IN TURKEYS

Infection by *Escherichia coli* resulting in pericarditis and air sacculitis was seen in a number of turkey flocks during the winter. Although the incidence increases in the cooler months (probably partly due to lower shed ventilation rates as growers attempt to keep shed temperatures up), the number of flocks affected was greater than usual, with problems in multiple sheds and flocks. The organisms cultured showed an unusually broad antibiotic sensitivity, and birds responded satisfactorily to treatment.

Tasmania

Contributed by:
Mary Lou Conway
DPIWE, Tasmania

LABORATORY ACCESSIONS

Source	Number of accessions
Aquaculture	82
Companion	102
Livestock	633
Other	10
Wildlife	145

ARTHROGRYPOSIS IN CALVES

Arboviruses are very rare in Tasmania, so suspect cases are of interest. Arthrogryposis occurred in calves in two cattle herds in the Circular Head area (north-west) during August and September. Both cases were negative for Akabane virus on virus neutralisation testing.

DIARRHOEA IN BEEF CALVES

A case of sudden death and severe diarrhoea in 2–3-week-old beef calves occurred in the Coal River Valley (southern Tasmania) in September. Of 70 calves born, 30 were affected, of which 12 died. Haemolytic *Escherichia coli* was isolated from faeces, which was also rotavirus positive (latex agglutination). *E. coli* had not previously been recorded on this property. The cows were managed as two separate groups in a cell grazing operation; only one group experienced calf deaths. The affected animals were in a group of first calf heifers in poor condition being supplemented with hay. They were part of a group of heifers introduced several months before calving from the north-east of the State.

POULTRY DEATHS ON FLINDERS ISLAND

On Flinders Island in late July, 50 of 60 birds in a backyard poultry flock died suddenly. The deaths were associated with the feeding of kitchen scraps from the local hotel. Acute ulcerative enteritis and azotaemia were diagnosed on laboratory examination. Considering the histology and recent dietary history, *Clostridium* spp. were suspected. Avian influenza and Newcastle disease were ruled out on haemagglutination test and virus isolation.

NOTIFIABLE DISEASES

	Investigations	
Disease	**Positive**	**Total**
American foul brood	1	1
Anthrax	0	9
Avian psittacosis	0	6
Bluetongue virus	0	2
Brucella abortus	0	12
Brucella ovis	0	11
Clinical salmonellosis	34	172
Contagious agalactia	0	2
Hydatid disease	2	5
Johne's disease	7	20
Leptospira hardjo	5	19
Leptospira pomona	3	18
Listeria	2	15
Macrocyclic lactone	1	3
Marine aeromonad disease	3	10
Negative finfish bacteriology[a]	0	46
Pullorum disease (*Salmonella pullorum*)	0	4
Q fever	0	2
Salmonella abortus equi	0	3
Salmonella abortus ovis	0	13
Salmonella enteritidis	0	11
Taenia saginata cycticercosis	0	1
Transmissible spongiform encephalopathy	0	5
Verotoxic *Escherichia coli*	6	156

a *Aeromonas salmonicida* ssp. *salmonicida*, goldfish ulcer disease, streptococcosis of salmonids

Victoria

Contributed by:
Tristan Jubb
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HYPOCALCAEMIA IN FEEDLOT MERINO WETHER LAMBS

In a feedlot near Benalla, in north-east Victoria, severe hypocalcaemia was the only significant finding in laboratory examination of blood and tissue samples from two merino wether lambs that collapsed and died suddenly during loading for transport to the abattoir. Another 20 lambs died during transit from the saleyards to the abattoir. Blood samples taken at the abattoir from 10 of the approximately 100 surviving lambs were also hypocalcaemic.

Lambs held without feed or water for extended periods are predisposed to developing hypocalcaemia. In this incident, the lambs were not off feed for an extended period; other factors, such as a high-grain diet and a recent flush of green feed in the feedlot paddocks, may have contributed to this event. In the feedlot, lambs are given free access to a ground limestone lick, but it is well known that as few as 30% of animals in a flock will use licks. Ground limestone is recommended in feedlot diets at a rate of 1–2% of the ration. After addition of magnesium oxide and limestone to the feedlot diet, only one death occurred in the next consignment of lambs transported to the abattoir.

Another investigation by a private veterinary practitioner in the Benalla district also found hypocalcaemia to be the cause of death in merino lambs. Eight lambs in a flock of 100 held off feed in yards for 48 hours before shearing collapsed and died, with profound hypocalcaemia the significant laboratory finding.

UROLITHIASIS IN FEEDLOT LAMBS

Urolithiasis caused the deaths of 27 of 1 070 six-month-old merino wether lambs in a feedlot near Beulah in north-west Victoria. Two days after withdrawal of hay used to supplement their pelleted ration, 13 lambs died. Several more were kicking at their abdomens and were severely depressed; two had ‘water belly’. Autopsies on three animals found crystalline material blocking urethras, enlarged bladders, discolouration of bladder serosa and gritty sediment in urine. In one animal, histology showed aggregates of calcium in renal tubules and evidence of chronic cystitis.

No new cases occurred after ad libitum hay was reintroduced.

CHLAMYDIAL ARTHRITIS SUSPECTED IN CROSSBRED LAMBS

Chlamydophilia infection was suspected as the cause of lameness in crossbred lambs on a sheep–grain farm near Walpeup in north-west Victoria. Annually, the top 2% of the flock have been affected. Clinical signs include stiffness, lameness, unwillingness to move, recumbency and swollen joints. Histopathology on one lamb revealed a mild multifocal meningoencephalitis and mild to moderately severe cholangiohepatitis. Other findings included a mild, chronic, active purulent pyelitis in the kidneys, a mild, multifocal, interstitial myocarditis and a mild, diffuse, purulent interstitial pneumonia. *Chlamydophilia* infection was suspected because the autopsied lamb had a very high chlamydia complement fixation titre of 1:512. Diseases excluded included pestivirus, caprine arthritis encephalitis and mycoplasma infections. The liver copper and glutathione peroxidase concentrations were normal. Chlamydiosis has been confirmed previously in flocks in the area showing similar clinical histories.

YERSINIA PSEUDOTUBERCULOSIS IN MERINO EWES

Yersinia pseudotuberculosis was diagnosed as the cause of jaundice and death of 20 aged merino ewes in a flock of 380. The incident occurred in August on a property near Woomelang in north-west Victoria. Heliotrope poisoning was initially suspected because of the severe jaundice observed. Affected ewes would segregate themselves, become inappetant, incoordinated and recumbent, and die within 24 hours of being noticed. An autopsy revealed severe jaundice, mastitis, adhesion of the lung to the thoracic wall, and an orange liver with miliary abscessation throughout. *Yersinia pseudotuberculosis* was cultured from representative lesions. Other affected ewes responded to antibiotic treatment, and the condition of all sheep improved once they were moved to a different pasture and supplied with vitamin/mineral blocks.

RED GUT IN UNWEANED LAMBS

'Red gut' is the colloquial name for intestinal tympany and volvulus seen in lambs. The disease was diagnosed as the cause of sudden death in ten 11-week-old lambs over a 4-week period. The incident occurred in July and August on a property north of Bendigo in central Victoria. The lambs were part of a flock of 700 crossbred ewes and lambs recently introduced to irrigated and dryland lucerne. The owner was concerned because he suspected enterotoxaemia, despite having vaccinated the lambs and ewes twice with '5 in 1'. The main autopsy findings were severe gaseous distension and congestion of the small and large intestine, with bloody material in lumens. There were half (180°) twists at the root of the mesentery just posterior to the livers. Red gut was suspected on the basis of the autopsy findings and the recent dietary change to lucerne. Histology of gut samples showed congestion and haemorrhage typical of red gut, but also found multifocal crypt abscesses with neutrophils and eosinophils within crypt lumens. These were probably caused by subclinical infection with *Yersinia* sp., but this could not be confirmed by culture of intestinal contents and faeces.

RED GUT IN WEANER LAMBS

Tympany ('red gut') of the lower gut in lambs was diagnosed in August on a property near Rutherglen in north-east Victoria, after 15 out of 60 weaner lambs died suddenly in a 10-day period after being recently introduced to lucerne-rich pasture. Distended abdomens were the prominent feature in the dead lambs. At autopsy, entire small and large intestines were red-black and gas-filled, and their anatomic orientation suggested a twist at the root of the mesentery, but this was difficult to confirm. Mesenteric lymph nodes were enlarged and haemorrhagic. Histology showed intense congestion and haemorrhage in the gut, provisionally diagnosed as red gut. Deaths ceased when lambs were removed from the lucerne-rich pasture and fed hay. Laminitis caused lameness in some of the weaners, and it is suspected that the sudden rich dietary change that caused the red gut may also have caused the laminitis. Faecal cultures were positive for *Campylobacter* spp., but this was thought to be an incidental finding.

ORAL DISEASE IN DAIRY CALVES

In spring, oral disease with profuse salivation and respiratory distress affected 50% of a herd of 90 two-month-old dairy replacement heifers on a property in the Upper Murray district of north-east Victoria. Ten calves died, two of which were examined. Both had large caseous abscesses in the middle of the tongue, from which *Arcanobacterium* (*Actinomyces*) *pyogenes* was isolated. Alteration of a feeder had created a sharp protrusion that it was suspected had traumatised the calves' tongues. Furthermore, the calf yard was unhygienic, being poorly drained with a large buildup of spilt feed and faeces. Remodelling the feeder, treating affected calves with oxytetracycline and cleaning the yard saw the problem disappear.

RUMEN ACIDOSIS IN CATTLE ASSOCIATED WITH FEEDING CHOCOLATE

Rumen acidosis associated with feeding chocolate killed 26 cows in a beef herd of 600 near Ballarat in July. The extensively managed herd was fed seconds-quality chocolate as a supplement to a hay and grain ration. Cows had been fed chocolate from 15 kg buckets for 2 weeks with no ill-effects, but four cows immediately became sick after a change to one-tonne blocks of chocolate. Over the next 10 days, 26 cattle died after showing signs of weakness, recumbency, depression and failure to respond to calcium and magnesium injections. Autopsy found low rumen pH and thick chocolate in rumen contents, and microscopy showed rumenitis and acute cortical nephrosis, confirming the clinical suspicion of rumen acidosis. Deaths continued for another 5 days after the chocolate was removed and a hay-only diet was provided.

This case highlights the risks of feeding stock with atypical feeds. Chocolate, with its high energy (22 MJ digestible energy) and zero fibre content, is particularly dangerous for ruminants.

SUSPECTED INHERITED MYOCLONUS OF POLL HEREFORD CATTLE

On a Poll Hereford stud property in northern Victoria, two of 100 calves were born with severe neurological signs. From birth, both calves had intermittent convulsions, tremors and opisthotonus. The calves had severe tetanic spasms when handled or in response to sound. One of the two calves was autopsied, and no significant gross or

histological findings were identified. Bacterial septicaemia/meningitis or known congenital conditions in this breed, including maple syrup urine disease, cerebellar abiotrophy/malformation and hypomyelinogenesis were excluded. A presumptive diagnosis of inherited myoclonus was made. Inherited myoclonus is an autosomal recessive condition first identified in Australian Poll Hereford cattle in 1986. Further tests on hair samples from the calf are continuing, in an attempt to confirm the diagnosis by DNA molecular analysis.

TOXIC HEPATOPATHY IN GROWER PIGS

Toxic hepatopathy was diagnosed as the cause of death in two 20-week-old grower pigs in a group of 20 that were unthrifty. Autopsies found excessive yellow fluid in thoracic and peritoneal cavities and haemorrhages around the major heart vessels. There were ulcers in the stomach and blood in the intestines. The liver was brown, with bloody and black areas; histology of the liver revealed severe submassive hepatic necrosis, bridging fibrosis, cholestasis, biliary proliferation and megalocytosis of hepatocytes, consistent with pyrrolizidine alkaloid toxicity. In this case, the farmer home-mixed his feed, which was a barley-based diet. Follow-up with the grower of the barley revealed it had been harvested late in the season when full of weed, particularly heliotrope (*Heliotropium europaeum*). By 6 weeks after the initial investigation, 50 out of approximately 250 pigs had died and the remainder were growing poorly. The circumstances of this incident are typical for the occurrence of pyrrolizidine alkaloid toxicity in pigs.

MULBERRY HEART DISEASE IN PIGS

Mulberry heart disease was diagnosed as the cause of sudden death in 4-week-old piglets in a small piggery near Bendigo in central Victoria. Autopsy revealed excessive accumulation of abdominal, pleural and pericardial fluid. Large numbers of fine fibrin strands coated pleural surfaces. Histology showed severe, acute, centrilobar coagulative necrosis of hepatocytes and severe acute, multifocal to locally-extensive myonecrosis with haemorrhage in the myocardium. An incidental finding of numerous foci of purulent enteritis with microabscessation in some crypts of the ileum may be attributed to subclinical infection with *Salmonella* sp. or other such infectious agents. Mulberry heart disease can be resolved by appropriate vitamin E/selenium supplementation.

SUDDEN DEATHS IN A SMALL FLOCK OF GEESE

Over a period of 12 hours in August, on a periurban property to the east of Melbourne, nine of 11 one-year-old geese died. Signs included depression, weakness, vomiting or regurgitation, seizures, and sudden death. Resident chickens and ducks showed no abnormal clinical signs. Autopsy findings included severe muscle haemorrhage and contusions, with one bird having penetrating bite wounds to the breast. These findings fitted with physical exhaustion and trauma that may have been induced by the farm's new collie dog, which was known to herd the geese, or possibly attack by foxes. Laboratory testing excluded avian influenza and botulism.

Western Australia

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During the quarter, significant disease outbreaks were investigated in 64 ovine and 84 bovine submissions. Three cases precipitated category 1 exotic disease alerts (low index of suspicion), involving the exclusion of avian influenza and Newcastle disease in avian species. One case was attributed to infectious laryngotracheitis, another to a primary toxic insult and the third to *Mycoplasma gallisepticum* and avian encephalomyelitis.

METABOLIC BONE DISEASE IN CALVES

A metabolic bone disease was thought to be responsible for a number of downer calves on two properties at Brunswick. Severe axonopathy was detected in one calf submitted for post mortem examination, and bone fractures were found in the other calves examined on the farm. Axonopathy was probably due to a fracture of the spinal vertebra. Bone analysis and further investigations are pending, but phosphorus deficiency is a likely diagnosis.

ENCEPHALODYSPLASIA IN CALVES

Encephalodysplasia was diagnosed in three calves that presented with opisthotonus and limb hyperextension. All calves were the progeny of a cross between Shorthorn/Santa Gertrudis and Red Angus/Simmental cattle. No macroscopic lesions were found at autopsy, but histopathological examination of the brain of one calf revealed dysplastic lesions in the cerebellum. Cerebellar lesions were present in the other calves, but more severe lesions were found in the rostral colliculi. The aetiology of the defects has not been determined, but mucosal disease, maple syrup urine disease, and Akabane and bovine pestiviral infections were all excluded as the cause.

COPPER TOXICITY IN CALVES AND RAMS

Several copper toxicity problems occurred during the quarter, with two cases involving Coppernate (copper glycinate 60 mg/mL). In one, four of 90 Shorthorn bull calves died after receiving Coppernate, possibly at an excessive dose rate. Several other animals suffered anaphylactic shock, and another three calves died over the following 5 days. The Coppernate label warns of local tissue damage and the chances of anaphylactic shock in young bovines.

In another instance, eight of forty 2–4-month-old Angus steers at Pinjarra died after being marked, drenched, vaccinated and treated with Coppernate. A few other young steers looked affected and wobbly, but none of the adult cattle showed any signs. Histological examination of tissues from one of the calves revealed universal massive liver necrosis with widespread periacinar haemorrhage. Liver copper concentration was 893 mg/kg, and the kidney concentration was 118 mg/kg. These calves were given 120 mg of Coppernate (twice the recommended rate). Treatment with copper had been part of the farm's management procedures for several years, apparently without ill effects.

A third case of copper toxicity occurred at Busselton when four out of 30 calves (5–6 weeks old) died and 10 became very ill. Toxic liver copper levels of 1302 and 1046 mg/kg were detected in two of the calves, and the kidney copper level of one of the calves was estimated at 60 mg/kg. In this case, the source of the copper was not determined.

Copper toxicity is also associated with water delivered through copper pipes. Shedded rams at Narrogin were diagnosed with copper toxicity and, in this instance, there was 15 ppm copper in the water ration (compared to 10 ppm recommended at AAHL). The diagnosis prompted testing of liver function of the rams before they entered the shed. The result was surprising, with plasma GLDH values of all 14 animals tested ranging from 44 to 223 U/L (normal is less than 20) and most GGT values hovering around the upper end of the normal range. Investigations are continuing, as it has been established that many rams entering the shed already had high liver copper values.

UNUSUAL LISTERIAL ABORTION IN EWES

Abortion caused by *Listeria ivanovii* was diagnosed in a flock of 470 merinos at Quairading, with losses of up to 30 lambs due to stillbirths and premature births. The flock was fed silage and oats until shearing. Bacterial culture from lung, liver and abomasal fluid from two lambs yielded pure growths of *L. ivanovii*, as did culture of samples of brain, liver, abomasal content and placenta from two other lambs from the property. This is an unusual isolate, but has on several occasions been associated with abortion rather than encephalitis.

SALMONELLOSIS IN CALVES AND SHEEP

Salmonellosis was diagnosed as the cause of ill-thrift in adult merinos put into a Moora feedlot in early June. Later in the month, the animals began to lose weight and within a 5-day period stopped eating the grain ration on offer. Lupinosis was suspected, but histopathological examination of the liver revealed a focally extensive area that contained many small but random foci containing necrotic hepatocytes and infiltrating neutrophils, lesions consistent with bacterial hepatitis and confirmed by the recovery of *Salmonella* sp. from primary culture of intestine.

Necrotising abomasitis and enteritis was diagnosed in two of 45 neonatal calves at Capel. Four of these calves had died within 7 days and another two were described as sick. The problem was attributed to salmonellosis.

OVINE RUMENITIS

Weaners at Kalannie had been in a feedlot for about 6 weeks. They were on lupin hay but had recently been changed to oats and lupin hay.

Eleven sheep died over a 5-day period without clinical signs. At autopsy, small abscesses were found on the liver, and the abomasal and rumen wall was inflamed. Microscopically, there was focal mucosal ulceration of the rumen with necrosis of the epithelium and loss of the keratin layer. In another case at Cranbrook, four out of 60 mature rams died after accessing remnant grain from a silo that had recently been cleaned out. Histopathological examination of the rumen wall identified lesions consistent with rumenitis.

PERICARDITIS AND RHINITIS IN PIGLETS

Pericarditis and rhinitis in piglets was diagnosed as a cause of mortalities in 30 out of 300 piglets (2–3 weeks old) at Kulin. Deaths occurred across all litters, and some were preceded by clinical signs of dyspnoea and wheezing. Two piglets were presented for autopsy and subsequent histopathological examination. Lesions in one consisted of acute severe fibrinous pericarditis accompanied by marked pleural oedema, acute pericarditis and hepatic necrosis, the last consistent with hypoxia. The second piglet had multifocal areas of alveolar collapse and subacute to chronic rhinitis. The lesions in the upper respiratory tract were sufficient to explain the clinical signs, but it was not certain whether the piglet was suffering from an early or a mild form of atrophic rhinitis.

MYCOPLASMA PNEUMONIA IN WEANER PIGS

Mycoplasma pneumonia was diagnosed in weaner and grower pigs with mortalities, coughing and other respiratory signs in a unit at Gnowangerup. Affected pigs were treated with antibiotics in water for a week — deaths subsided but coughing persisted. The herd had been vaccinated for *M. hyopneumoniae*. Coughing started in shelters but spread to the farrowing shed. Post mortem examination of a grower pig and a weaner revealed grey/pink consolidation in the ventral portions of the cranial, middle and caudal lobes of both animals. Bacterial culture yielded only *M. hyorhinis* from the weaner lung. Although the lesions were highly suggestive of *Mycoplasma* pneumonia, *M. hyorhinus* is not recognised as a cause of pneumonia in commercial pigs.

Respiratory lesions suggesting *Mycoplasma* infection were detected during a routine Pig Health Monitoring Scheme inspection in 5% of a line of porkers from a 12 000-pig unit at Mogumber. The herd was considered free from *Mycoplasma*, but histopathological examination revealed interstitial pneumonia with copious infiltrates of alveolar macrophages. The dominant feature was widespread lymphocytic peribronchiolar cuffing. The latter is highly suggestive but not pathognomonic for *Mycoplasma* infection. Culture of lung material failed to grow *Mycoplasma* sp., but *M. hyorhinus* was identified by PCR.

PORCINE SALMONELLOSIS

A contract growing herd at Cuballing, exposed to water with high salt content, lost approximately 50 weaners two weeks after weaning. *Salmonella* sp. was isolated from the colon of one and from the ileum of the other. The histological picture was surprising. The jejunum of one pig was essentially normal. The colon of the other was also normal except for the presence of two venous thrombi in the submucosa. Its ileum contained a lesion characterised by widespread subacute phlebitis and arteritis in the submucosa. Both polymorph and mononuclear leucocytes, but mainly the latter, infiltrated and thickened the walls of affected vessels. In some, the vascular lumen was almost obliterated.

Quarterly disease statistics

Control activities

OVINE BRUCELLOSIS

Contagious epididymitis, caused by *Brucella ovis*, is present in commercial flocks at a low level that varies around the country. Voluntary accreditation programs (usually in stud flocks) for ovine brucellosis freedom are operating in all States. Table 1 shows the number of accredited flocks at the end of the quarter.

Table 1: Ovine brucellosis accredited free flocks at 30 September 2005

NSW	492
NT	0
QLD	60
SA	492
TAS	92
VIC	606
WA	147
AUST	1889

ENZOOTIC BOVINE LEUCOSIS

Enzootic bovine leucosis accreditation programs have been operating in the dairy industries in Queensland and New South Wales for several years. Victoria, South Australia, Western Australia and Tasmania are undertaking a program of bulk milk testing of all dairy herds. Table 2 shows the number of dairy herds tested free of enzootic bovine leucosis at the end of the quarter.

Table 2: Dairy herds tested free of enzootic bovine leucosis at 30 September 2005

	Free	Herds
NSW	1026	1047
NT	0	0
QLD	898	903
SA	410	411
TAS	525	525
VIC	6152	6214
WA	360	360
AUS	9371	9460

JOHNE'S DISEASE

In Australia, Johne's disease occurs primarily in dairy cattle and sheep and to a lesser extent in beef cattle, goats, deer and camelids. Infection with sheep strains occurs to varying extents across the sheep-producing regions of southern Australia but has not been detected in Queensland. Cattle strains are endemic in south-eastern Australia, but surveillance programs have not identified endemic infection in Queensland, Western Australia or the Northern Territory, and active measures are taken to stamp out any incursions. Table 3 shows the number of herds and flocks known to be infected.

Table 3: Number of herds/flocks infected with Johne's disease at 30 September 2005

	Cattle	Sheep	Goat	Deer	Alp-aca	Total
NSW	124	1286	11	1	0	1422
NT	0	0	0	0	0	0
QLD	1	0	1	0	0	2
SA	46	64[a]	2	2	0	114
TAS	19	58	0	0	0	77
VIC	1002	394	9	7	0	1412
WA	0	18	0	0	0	18
AUS	1192	1820	23	10	0	3045

a Seven of these sheep flocks are infected with 'c' strain.

New approaches based on risk assessment and management have been developed to control Johne's disease. Market Assurance Programs are in operation for cattle, sheep, goats and alpacas; the numbers of herds or flocks that have reached a status of Monitored Negative 1 or higher are shown in Table 4.

Table 4: Flocks with a Market Assurance Program status of at least Monitored Negative 1 at 30 September 2005

	Cattle	Sheep	Goat	Alpaca	Total
NSW	712	470	54	95	1331
NT[a]	0	0	0	0	0
QLD[a]	nil return				
SA	275	226	16	42	559
TAS	106	31	1	1	139
VIC	325	98	2	24	413
WA[a]	0	0	0	0	0
AUS	1418	825	73	162	2478

a Herds/flocks in Free or Protected zones have a status of Monitored Negative 1 or better because of the zone status.

Lists of beef, dairy and alpaca herds and sheep flocks assessed in the Market Assurance Programs are available at www.animalhealthaustralia.com.au/programs/jd/maps.cfm

Information about components of the National Johne's Disease Control Program can be obtained from State coordinators and Animal Health Australia's Johne's disease coordinator, David Kennedy (02 6365 6016).

Laboratory testing

Table 5 shows the results of serological testing for a range of viral diseases from routine laboratory submissions for the quarter.

Table 5: Serological testing from routine submissions to State laboratories

	Akabane		Bluetongue		Bovine ephemeral fever		Enzootic bovine leucosis		Equine infectious anaemia		Equine viral arteritis	
	Tests	+ve	Tests	+ve	Tests	+ve	Tests	+ve	Tests	+ve	Tests	+ve
Jul–Sep 04	18 309	1 093	26 082	359	1 282	252	8684	12	719	5	246	14
Oct–Dec 04	8 337	540	11 469	97	1 872	362	10 754	3	531	8	160	3
Jan–Mar 05	5 251	536	5 764	194	1 610	278	6 562	0	481	5	278	12
Apr–Jun 05	2 984	583	4 354	288	1 458	356	3 233	8	570	3	253	8
Jul–Sep 05	1 872	476	3 409	343	1 239	257	2 874	0	577	21	188	13
NSW	142	64	1 099	10	141	12	561	0	118	0	85	0
NT	727	218	839	232	394	79	418	0	76	0	0	0
QLD	419	168	390	61	424	153	28	0	231	21	21	0
SA	0	0	102	0	0	0	1 538	0	4	0	3	0
TAS	22	0	20	0	20	0	2	0	2	0	0	0
VIC	18	0	355	0	4	0	45	0	131	0	66	13
WA	544	26	604	40	256	13	282	0	15	0	13	0

Surveillance activities

SALMONELLA SURVEILLANCE

The National Enteric Pathogen Surveillance Scheme (NEPSS) is operated and maintained on behalf of the Commonwealth and States/Territories by the Microbiological Diagnostic Unit at the University of Melbourne. Data on isolates of salmonellae and other pathogens are submitted to NEPSS from participating laboratories around Australia. Quarterly newsletters and annual reports of both human and non-human isolates are published, and detailed data searches are provided on request to NEPSS. Table 6 summarises salmonella isolations from animals notified to NEPSS for the quarter.

Contact: National Enteric Pathogen Surveillance Scheme, Microbiological Diagnostic Unit, University of Melbourne

Table 6: Salmonella notifications, 1 July to 30 September 2005

Serovars	Avian	Bovine	Canine	Equine	Feline	Ovine	Porcine	Other	Total
S. bovismorbificans	0	52	0	1	0	8	0	0	61
S. dublin	0	61	0	0	0	0	0	0	61
S. infantis	0	2	2	1	1	0	0	0	6
S. typhimurium	12	155	3	5	1	19	7	3	205
Other	13	49	18	7	3	6	7	26	129
Total	25	319	23	14	5	33	14	29	462

ZOONOSES

The National Notifiable Diseases Surveillance System (NNDSS) of the Communicable Diseases Network Australia collects statistics about many human diseases. A summary of information about five important zoonoses is submitted to NAHIS each quarter (see Table 7).

Contact: Communicable Diseases Intelligence, Australian Government Department of Health and Ageing
www9.health.gov.au/cda/Source/CDA-index.cfm

Table 7: Notifications of zoonotic diseases in humans

Disease	Q3 2004	Q4 2004	Q1 2005	Q2 2005	Q3 2005	Current quarter						
	AUST	AUST	AUST	AUST	AUST	NSW	NT	QLD	SA	TAS	VIC	WA
Brucellosis[a]	12	17	13	5	9	3	0	6	0	0	0	0
Leptospirosis	36	25	41	69	25	3	2	15	0	0	1	4
Listeriosis	16	14	15	25	11	7	1	1	0	1	0	1
Ornithosis	53	54	42	98	41	31	6	2	0	1	0	1
Q fever	109	120	88	217	80	34	13	27	0	3	0	3

a *Brucella melitensis* and *Brucella abortus* are exotic to Australia.

NATIONAL TSE SURVEILLANCE PROGRAM

The National Transmissible Spongiform Encephalopathies Surveillance Program (NTSESP) is an integrated national program jointly funded by industry and governments to demonstrate Australia's ongoing freedom from bovine spongiform encephalopathy and scrapie, and to provide early detection of these diseases should they occur. Table 8 summarises the activity of the program over the past five quarters. All specimens tested were negative for TSEs. Information about the NTSESP is available on the internet (at www.animalhealthaustralia.com.au/aahc/programs/adsp/tsefap/ntsesp.cfm).

Contact: Duncan Rowland, Animal Health Australia's NTSESP National Coordinator

Table 8: TSE surveillance

	Jul–Sep 04		Oct–Dec 04		Jan–Mar 05		Apr–Jun 05		Jul–Sep 05	
	Cattle	Sheep	Cattle	Sheep	Cattle	Sheep	Cattle	Sheep	Cattle	Sheep
NSW	50	49	23	30	12	19	27	30	28	31
NT	11	0	4	0	0	0	14	0	6	0
QLD	38	9	29	5	29	0	31	7	39	6
SA	6	11	3	6	3	7	6	18	3	9
TAS	5	1	2	10	4	6	3	0	3	1
VIC	26	37	23	24	15	10	31	36	41	59
WA	13	22	8	77	5	62	8	17	8	9
AUS	149	129	92	152	68	104	120	108	128	115

NORTHERN AUSTRALIA QUARANTINE STRATEGY

In recognition of the special quarantine risks associated with Australia's sparsely populated northern coastline, the Australian Quarantine and Inspection Service conducts an animal disease surveillance program as an integral component of the Northern Australia Quarantine Strategy (NAQS). The NAQS surveillance program provides early warning of disease threats to livestock industries and, in some cases, to human health. NAQS surveillance activities include both offshore and onshore components. Table 9 summarises NAQS activity in Australia over the past five quarters.

Contact: Jonathan Lee, Australian Quarantine and Inspection Service, DAFF

Table 9: Summary of recent NAQS activity in Australia

	Jul–Sep 04		Oct–Dec 04		Jan–Mar 05		Apr–Jun 05		Jul–Sep 05	
Disease	**Tested**	**+ve**	**Tested**	**+ve**	**Tested**	**+ve**	**Tested**	**+ve**	**Tested**	**+ve**
Aujeszky's disease	90	0	157	0	73	0	72	0	65	0
Classical swine fever	90	0	157	0	73	0	72	0	65	0
Japanese encephalitis[a]	97	0	201	5	110	24	37	0	0	0
Nipah virus	90	0	158	0	79	0	0	0	0	0
Porcine reproductive and respiratory syndrome	90	0	158	0	73	0	0	0	0	0
Surra	49	0	69	0	117	0	76	0	65	0
Hendra	0	0	2	0	2	0	0	0	0	0
Avian influenza	0	0	107	0	122	0	186	0	58	0
Newcastle disease	0	0	107	0	16	0	66	0	0	0

a In 1995–97, animals at sentinel sites on islands in the Torres Strait, but not the Australian mainland, seroconverted to Japanese encephalitis (JE) during the latter part of the wet season (March–April). In March 1998, seroconversions occurred at a number of sites on islands in the Torres Strait, and for the first time on the mainland at the tip of Cape York Peninsula. Since 1999, sentinel pigs at Badu Island have seroconverted each wet season, and seroconversions have been detected on other central Torres Strait islands in surveys. In early 2004, sentinel pigs in the northern peninsula area on the mainland seroconverted, and JE virus was isolated. This was the first detection of JE on the mainland since 1998. Subsequently, feral pigs from south of Mapoon showed a pattern of serology consistent with exposure to JE virus, but the time of exposure is undetermined. The sentinel pigs in the northern peninsula area did not seroconvert in early 2005, and there has been no evidence of transmission of JE virus on the mainland in 2005. It remains unclear whether JE is established in central Torres Strait islands or is reintroduced from the island of New Guinea in monsoonal weather.

BOVINE BRUCELLOSIS

Although bovine brucellosis is now exotic to Australia, surveillance is maintained through abortion investigations and miscellaneous testing of cattle for export or other reasons. As shown in Table 10, a total of 343 abortion investigations were performed during the reporting period, all with negative results for bovine brucellosis.

Table 10: Surveillance for bovine brucellosis

	Abortion investigations		Tests for other reasons	
	Tests	+ve	Tests	+ve
Jul–Sep 04	187	0	795	0
Oct–Dec 04	247	0	3502	0
Jan–Mar 05	358	0	796	0
Apr–Jun 05	253	0	1748	0
Jul–Sep 05	343	0	1430	0
NSW	7	0	58	0
NT	0	0	607	0
QLD	242	0	339	0
SA	3	0	18	0
TAS	17	0	12	0
VIC	5	0	19	0
WA	69	0	377	0

TUBERCULOSIS

Australia was declared free from bovine tuberculosis (TB) on 31 December 1997, exceeding the OIE requirements for declaration of country freedom. The last cases of TB were detected in buffalo in January 2002 and in cattle in August 2000, and trace-forward and trace-back slaughter were carried out according to the Tuberculosis Freedom Assurance Program (TFAP2). The National Granuloma Submission Program has been the major surveillance tool for TB since 1992. All Australian laboratories supporting TFAP2 are accredited for veterinary testing by the National Association of Testing Authorities under ISO/IEC 17025.

Laboratories approved for culture of *Mycobacterium bovis* must pass an external quality assurance program run by the Australian reference laboratory for bovine tuberculosis on an annual basis. Table 11 summarises results from the program.

Table 11: Results of the National Granuloma Submission Program

Granulomas	Jul–Sep 04	Oct–Dec 04	Jan–Mar 05	Apr–Jun 05	Jul–Sep 05
Submitted	10	11	65	76	54
	75	84	0	0	0
TB +ve	0	0	0	0	0

PORTS SURVEILLANCE PROGRAM

Biosecurity Australia conducts the Ports Surveillance Program for *Culicoides*, screw-worm fly, exotic bees and bee mites. Seaports, particularly those servicing returning livestock vessels and those dealing with high-risk deck cargo such as timber, mining equipment and containers, are considered to be high-risk locations for incursions of such pests. The program increases the capacity to detect incursions at an early stage, and this in turn increases the probability of a successful eradication program. The *Culicoides* surveillance also supports the livestock export trade by confirming the continuous or seasonal absence of *Culicoides* vectors at ports from which livestock are loaded. Table 12 shows the number of times that insect trap sites were inspected for the Port Surveillance Program; no exotic insects or mites were detected.

Contact: Howe Heng, Biosecurity Australia, DAFF

Table 12: Ports Surveillance Program: number of inspections of insect traps

	Jul–Sep 04	Oct–Dec 04	Jan–Mar 05	Apr–Jun 05	Jul–Sep 05
Port surveillance					
Asian bees	18	12	14	21	18
Varroa mites	24	31	23	30	24
Asian mites	24	31	23	30	24
Tracheal mites	26	20	22	28	26
Culicoides	30	31	28	29	27
Screw-worm fly	21	23	28	29	29
NAQS					
Screw-worm fly	24	45	45	45	not available

NATIONAL RESIDUE SURVEY

Of 3344 samples tested during the quarter for residues of agricultural and veterinary chemicals and environmental contaminants, one detection of an antimicrobial in cattle and one of a metal in a sheep were above the relevant Australian standards. The results are summarised in Table 13, in which each pair of figures gives the number of samples above the maximum residue limit (MRL) or the maximum permitted concentration, and the number of samples tested.

Table 13: National Residue Survey, 1 July to 30 September 2005

	NSW		NT		QLD		SA		TAS		VIC		WA		AUS	
Anthelmintics																
cattle	0	47	0	2	0	118	0	11	0	7	0	34	0	5	0	224
pigs	0	22	0	0	0	14	0	15	0	2	0	19	0	12	0	84
sheep	0	45	0	0	0	16	0	19	0	3	0	27	0	50	0	160
Total	0	114	0	2	0	148	0	45	0	12	0	80	0	67	0	468
Antimicrobials																
cattle	0	90	0	1	0	165	1	10	0	17	0	121	0	12	1	416
pigs	0	49	0	2	0	56	0	35	0	4	0	53	0	37	0	236
sheep	0	106	0	1	0	21	0	26	0	0	0	34	0	66	0	254
Total	0	245	0	4	0	242	1	71	0	21	0	208	0	115	1	906
Growth promotants																
cattle	0	66	0	1	0	135	0	9	0	4	0	38	0	15	0	268
pigs	0	43	0	1	0	35	0	28	0	1	0	39	0	16	0	163
sheep	0	70	0	0	0	6	0	18	0	1	0	23	0	48	0	166
Total	0	179	0	2	0	176	0	55	0	6	0	100	0	79	0	597
Insecticides																
cattle	0	91	0	0	0	198	0	12	0	13	0	74	0	27	0	415
pigs	0	26	0	0	0	16	0	7	0	0	0	22	0	12	0	83
sheep	0	98	0	0	0	14	0	24	0	2	0	33	0	55	0	226
Total	0	215	0	0	0	228	0	43	0	15	0	129	0	94	0	724
Metals																
cattle	0	15	0	1	0	48	0	1	0	2	0	19	0	8	0	94
pigs	0	25	0	0	0	17	0	14	0	3	0	14	0	10	0	83
sheep	0	20	0	0	0	2	0	9	0	0	0	16	1	16	1	63
Total	0	60	0	1	0	67	0	24	0	5	0	49	1	34	1	240
Miscellaneous																
cattle	0	44	0	0	0	80	0	5	0	7	0	30	0	9	0	175
pigs	0	44	0	0	0	35	0	27	0	0	0	44	0	23	0	173
sheep	0	28	0	0	0	7	0	3	0	2	0	7	0	14	0	61
Total	0	116	0	0	0	122	0	35	0	9	0	81	0	46	0	409

The antimicrobial detection was of sulfadimidine (0.12 mg/kg; MRL 0.10 mg/kg) in a bobby calf. The cause of the violation could not conclusively be determined at trace-back. The metal detection in sheep was of cadmium (1.6 mg/kg; maximum permitted level 1.25 mg/kg). A trace-back investigation was not instigated for the detection as it was below the residue action level of 2.5 mg/kg.

Further results, reports and information on NRS can be found on the internet (at www.daff.gov.au/nrs).

Contributed by: Jason Lutze, National Residue Survey, DAFF

SUSPECT EXOTIC OR EMERGENCY DISEASE INVESTIGATIONS

Thirty-one investigations of diseases suspected to be either exotic or a possible emergency were reported during the quarter, as shown in Table 14. More details about some of these investigations can be found in the State and Territory reports.

Table 14: Exotic or emergency disease investigations reported from 1 July to 30 September 2005

Disease	Species	State	Month	Response	Finding
Anthrax	bovine	VIC	Jul	1	negative
Anthrax	bovine	VIC	Aug	2	negative; 2 investigations
Anthrax	bovine	VIC	Sep	1	negative
Avian influenza	avian	NT	Sep	3	negative; 2 investigations
Avian influenza	avian	NSW	Aug	3	negative
Avian influenza	avian	VIC	Aug	2	trauma
Avian influenza	avian	QLD	Aug	3	poisoning
Avian influenza	avian	QLD	Aug	2	negative; 2 investigations
Avian influenza	avian	TAS	Jul	3	negative; 2 investigations
Bluetongue	ovine	VIC	Aug	2	negative
Bovine brucellosis	bovine	NT	Sep	3	negative
Bovine brucellosis	bovine	QLD	Sep	3	*Brucella suis*
Bovine malignant catarrh	bovine	TAS	Jul	3	negative
Classical swine fever	porcine	NT	Sep	3	negative
Contagious bovine pleuropneumonia	bovine	QLD	Aug	1	*Mannheimia*
Epizootic ulcerative syndrome	piscean	VIC	Aug	2	negative
Foot-and-mouth disease	bovine	VIC	Sep	2	infectious bovine rhinotracheitis
Foot-and-mouth disease	camelid	QLD	Jul	1	dermatitis
Hendra virus	equine	SA	Aug	3	oesophageal obstruction
Hendra virus	equine	NSW	Aug	3	*S. zooepidemicus* septicaemia
Japanese encephalitis	equine	QLD	Sep	3	Kunjin virus
Newcastle disease	avian	TAS	Jul	3	negative
Pacheco's disease	avian	NSW	Jul	2	nephrosis
Rabies	canine	SA	Sep	3	negative
West Nile virus	avian	QLD	Sep	3	negative
West Nile virus	avian	VIC	Aug	2	negative
West Nile virus	equine	WA	Jul	3	negative

KEY to highest level of response:
1 Field investigation by government officer
2 Investigation by State or Territory government veterinary laboratory
3 Specimens sent to the Australian Animal Health Laboratory (or CSIRO Division of Entomology)
4 Specimens sent to reference laboratories overseas
5 Regulatory action taken (quarantine or police)
6 Alert or standby
7 Eradication

NAHIS contacts

The National Animal Health Information System (NAHIS) collects summaries of animal health information from many sources. NAHIS is on the internet (at www.animalhealthaustralia.com.au/status/nahis.cfm). Because NAHIS does not duplicate the data in the other systems, the relevant person below should be contacted if further details are required.

Name	Role	Phone	Fax	email
Rod Andrewartha	Tasmanian State Coordinator	03 6233 6836	03 6278 1875	rod.andrewartha@dpiwe.tas.gov.au
Chris Bunn	Emergency Disease Preparedness, AFFA	02 6272 5540	02 6272 3372	chris.bunn@daff.gov.au
John Cronin	Queensland State Coordinator	07 4688 1220	074688 1199	john.cronin@dpi.qld.gov.au
Celia Dickason	SA State Coordinator	08 8207 7803	08 8207 7852	dickason.celia@saugov.sa.gov.au
Iain East	Australian Government NAHIS Coordinator	02 6272 3106	02 6272 3150	Iain.east@daff.gov.au
Ian Haynes	Australian Milk Residue Analysis Survey	03 9810 5901	03 9819 4299	ihaynes@dairysafe.vic.gov.au
Jenny Hutchison	National Surveillance Coordinator	02 6287 4483	02 6287 4468	jenny@ausvet.com.au
Tristan Jubb	Victorian State Coordinator	03 5430 4545	03 5430 4520	tristan.jubb@dpi.vic.gov.au
David Kennedy	Johne's Disease Coordinator	02 6365 6016	02 6365 6088	david@ausvet.com.au
Jonathan Lee	Northern Australia Quarantine Strategy	07 4030 7853		Jonathan.lee@daff.gov.au
Diane Lightfoot	National Enteric Pathogen Surveillance Scheme	03 8344 5701	03 8344 7833	dligh@unimelb.edu.au
Peter Miller	National Residue Survey	02 6272 3762	02 6272 4023	peter.miller@daff.gov.au
Barbara Moloney	NSW State Coordinator	02 6391 3687	02 6361 9976	barbara.moloney@dpi.nsw.gov.au
Richard Norris	WA State Coordinator	08 9368 3637	08 9367 6248	rnorris@agric.wa.gov.au
Brian Radunz	NT Coordinator	08 8999 2130	08 8999 2089	brian.radunz@nt.gov.au
Jenean Spencer	Communicable Diseases Intelligence	02 6289 1555	02 6289 7791	www.health.gov.au
Neville Spencer	National Granuloma Submission Program	02 6271 6650	02 6272 5442	neville.spencer@aqis.gov.au
Simon Winter	Animal Health Australia Program Manager	02 6203 3988	02 6232 5511	simon.winter@aahc.com.au
Rupert Woods	Australian Wildlife Health Network	02 9978 4749	02 9978 4516	rwoods@zoo.nsw.gov.au

Disease Watch Hotline — 1800 675 888

The Disease Watch Hotline is a toll-free telephone number that connects callers to the relevant State or Territory officer to report concerns about any potential disease situation. Anyone suspecting an exotic disease outbreak should use this number to get immediate advice and assistance.

For information about the Disease Watch Hotline, contact Jane McBride, Animal Health Australia