ANIMAL HEALTH SURVEILLANCE

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MESSAGE FROM THE AUSTRALIAN CHIEF VETERINARY OFFICER

Welcome. This quarter, Hendra virus has been a focus — further cases have occurred in horses in New South Wales and Queensland since the previous issue of *Animal Health Surveillance Quarterly*. The number of cases decreased markedly during the quarter, from 13 in July to zero in September. No human cases were seen. This year, we have seen the southernmost incident of Hendra virus, the first incident west of the Great Dividing Range and the first natural infection of a dog with the virus. I congratulate the Queensland and New South Wales governments on their response efforts. I encourage veterinarians to remain aware of the latest biosecurity information, which can be found at www.outbreak.gov.au/pests_diseases/pests_diseases_animals/hendra/index.html.

In response to these incidents, the Minister for Agriculture, Fisheries and Forestry and the acting Minister for Health and Ageing jointly announced, on 29 July 2011, an additional Australian Government contribution of $6 million for Hendra virus research, its impact on human and animal health, and on environmental biodiversity. The funds will complement the $6 million in research funding over three years that was jointly announced on 27 July 2011 by the Queensland and New South Wales premiers. An Intergovernmental Hendra Virus Taskforce is currently identifying and prioritising research to be funded by these initiatives.

A new strain of avian paramyxovirus 1 (APMV-1) was first detected this quarter in several Victorian flocks of hobby and racing pigeons. In response to the detection, I convened a meeting of the Consultative Committee on Emergency Animal Disease to nationally coordinate communications and strategies. A detailed report from Victoria is included in this issue.

Australia continues to strengthen national surveillance. Currently, the highest priority is the post-border space. The aim is to optimise outcomes of surveillance by recognising the key role of producers and industry and the interconnections between regions, and improving the scope and timeliness of regional and national reporting and analysis. Work is ongoing.

As usual, we report on investigations of disease incidents, and monitoring and surveillance from the states and territories, and in Australian wildlife.

Mark Schipp, Australian Chief Veterinary Officer

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New Chief Veterinary Officer for Australia

On 5 September 2011, Dr Mark Schipp became the Chief Veterinary Officer (CVO) of Australia, replacing Dr Andy Carroll, who stepped down from the position in July 2011, pending retirement. Dr Schipp has also become Australia's delegate to the World Organisation for Animal Health (OIE).

The Australian CVO heads the Office of the Chief Veterinary Officer (OCVO) within the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF). The OCVO's mission is to mitigate threats to the Australian economy and the productivity of Australia's animal-dependent industries by supporting and enhancing trade and market access for animals and animal products. Consequently, Dr Schipp's work as CVO will include collaboration with Australian states and territories, Animal Health Australia and industry to maintain and improve Australia's animal health status. As CVO, Dr Schipp will provide definitive advice on this status, both domestically and internationally, including through official reports to the OIE and trading partners. He will lead national coordination of responses to emergency animal diseases, and collaborate with countries in the region — this includes assisting with capacity-building projects to manage animal diseases at their source. All this work is underpinned by intelligence gathering and analysis capability in the Animal Division of DAFF.

Dr Schipp is well equipped for the role of CVO, having worked in DAFF in a number of different roles. Most recently, he was General Manager for Food Exports. In this role, he was responsible for delivery of inspection, verification and certification for exports of meat, fish, dairy and organic products from Australia. From 2006 to 2010, Dr Schipp was General Manager for Export Standards, where he was responsible for negotiating market access and export certification requirements for Australian food products. During this period, he led the Australian delegation to the Codex Committee on Food Import and Export Inspection and Certification Systems. Dr Schipp served two terms overseas as Agriculture Counsellor: in Seoul, Republic of Korea (2000–03), and in Beijing, China (2003–06). Before this, he worked in the Australian Quarantine and Inspection Service in the export meat program at a number of levels — in abattoirs, in Canberra and in policy roles.

Dr Schipp began his career in Western Australia. After graduating in veterinary science from Murdoch University, he worked with the Western Australian Department of Agriculture, providing on-farm animal health advice to farmers.

Contributed by Jill Mortier, Office of the Chief Veterinary Officer, Australian Government Department of Agriculture, Fisheries and Forestry

Hendra virus vaccine provides immunity in horses

Hendra virus first appeared in Australia in 1994. Since then, it is known to have been associated with the death of more than 40 horses and four of the seven people who have been infected. The recent unprecedented number of outbreaks across Queensland and New South Wales, and the first detection of Hendra virus antibodies in a naturally infected dog, have prompted state governments and the Australian Government to increase funding for research to better understand Hendra virus infections.

A horse vaccine is crucial to breaking the cycle of Hendra virus transmission from flying foxes to horses and then to people, as it will prevent the horse both developing the disease and passing it on.

Trials have shown that a new experimental vaccine, developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), prevents horses from becoming infected with the deadly virus. The vaccine should be available for use as soon as the essential requirements for safety, efficacy and manufacturing quality are met. Field trials are expected to start as early as 2012.

Queensland Chief Veterinary Officer Dr Rick Symons said that the horse vaccine would be welcomed by both

vets and horse owners. However, he warned the community not to become complacent when dealing with Hendra virus. 'Personal protective equipment will still be an important part of personal safety when dealing with sick animals and should be worn if you suspect your horse is sick, or if any invasive work is being performed on the horse', Dr Symons said.

Recent work to evaluate the vaccine was jointly funded by CSIRO, the Australian Government and the Queensland Department of Employment, Economic Development and Innovation. Production of the vaccine was supported by funding from the United States National Institutes of Health.

The Australian Government Department of Agriculture, Fisheries and Forestry, and other regulatory bodies have indicated that they will give high priority to assessing the vaccine as soon as they receive information on its safety, efficacy and manufacturing quality.

Contributed by Emma Wilkins, Commonwealth Scientific and Industrial Research Organisation

Avian paramyxovirus in pigeons

A strain of avian paramyxovirus 1 (APMV-1) that had not previously been reported in Australia caused the deaths of a number of hobby and racing pigeons in the Shepparton region of Victoria and in Melbourne during the quarter. There have been no reports of infection in other states or territories of Australia or in any other avian species, including commercial poultry.

Investigations by the Victorian Department of Primary Industries (DPI) began in late August 2011 after a series of tests on a domestic pigeon from Shepparton showed that a flock was infected with an APMV-1. The index case presented largely as 'sick' pigeons, which led the investigating veterinarian to believe that they might have chlamydophilosis. However, some birds showed nervous signs, which led the veterinarian to request a test for APVM-1. The results showed that the index property was infected with both *Chlamydophila* and APMV-1.

During the course of these investigations, links were made to breeders of hobby pigeons in Melbourne, where most of the subsequent infected premises have been detected (Figure 1). At the centre of the outbreak was a pet shop in northern metropolitan Melbourne, which had unwittingly distributed infected birds to numerous locations around the city. Figure 2 shows the number of affected properties and the date of appearance of clinical signs on each. Forty infected properties have been found to the end of the quarter. A number of these have been resolved after quarantine with testing and disinfection.

Initial analysis has confirmed that the virus belongs to genotype VI of APMV-1. Gene sequencing has shown that the virus is related to virulent APMV-1 viruses. The Victorian isolate is related to similar viruses found in Europe and Asia.

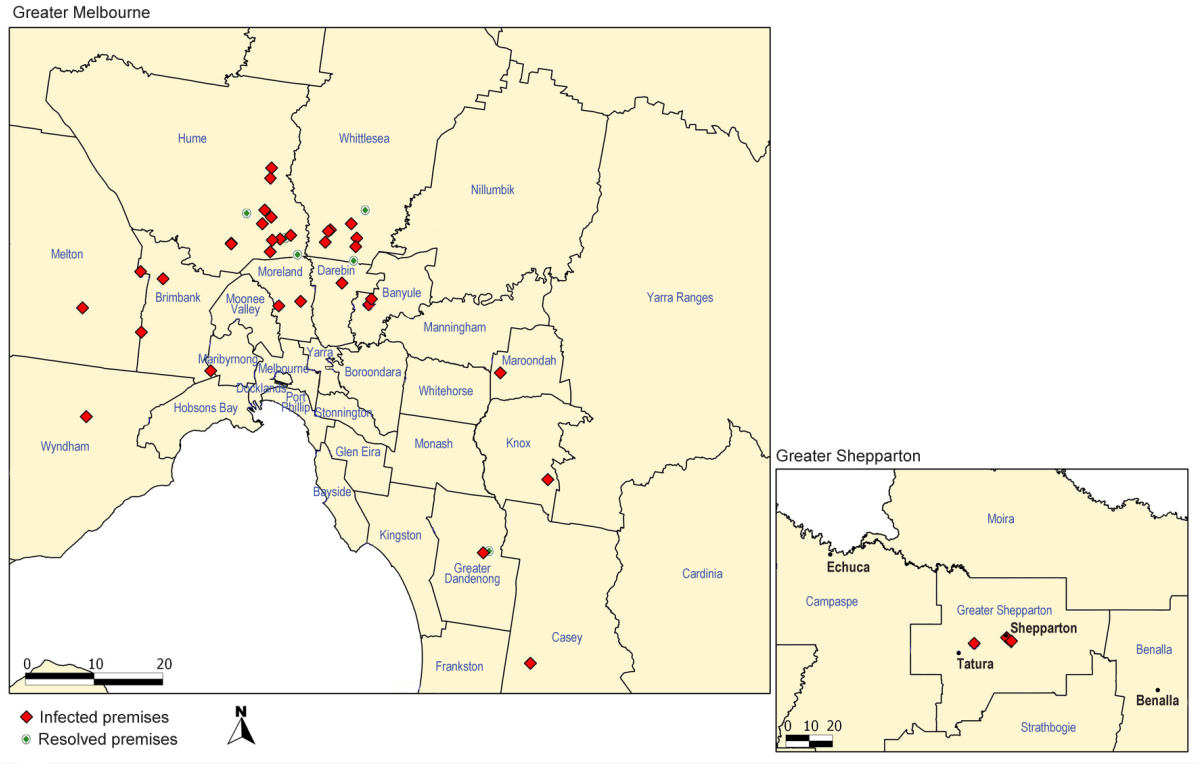
Mortality rates up to 100% have been seen in some pigeon flocks, with few reports of recovery from disease. Affected birds progress from a healthy state to death, sometimes as quickly as three days after the introduction of infected birds. Signs in sick birds include lethargy, diarrhoea, regurgitation and anorexia.

Data from DPI investigations of APMV-1 in pigeons indicate an incubation period of about three days.

The disease appears to be readily transmitted by direct contact between infected and susceptible pigeons. Most infected premises had brought pigeons onto their property only days or weeks before the disease occurred.

All evidence to date shows that APMV-1 is confined to pigeons; transmission to poultry has not occurred, despite exposure to the virus. On five properties shared by chickens and pigeons where pigeons were infected with APMV-1, large numbers of pigeons died while the chickens remained clinically healthy.

A few detections of APMV-1 in the feral pigeon population have been made, but no large-scale deaths have been reported. The racing pigeon industry has been largely unaffected — pigeon breeders and those who race pigeons are essentially two separate interests. On the rare occasion that someone has owned both 'hobby' pigeons and racing pigeons, both have been infected.



Source: State of Victoria, Department of Primary Industries, 2011

Figure 1 Victorian premises infected with avian paramyxovirus 1

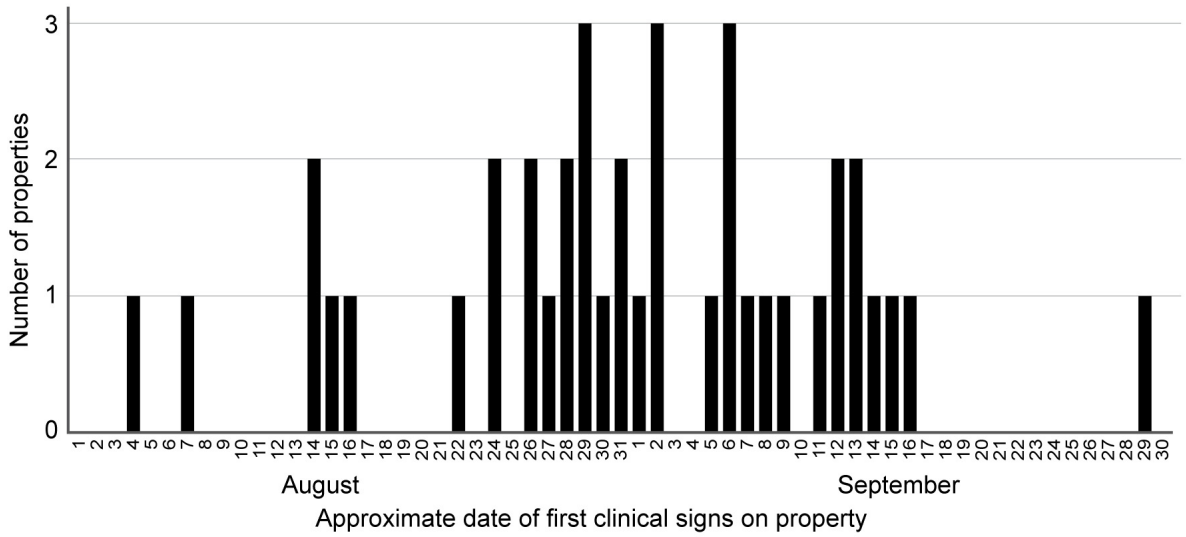


Figure 2 Victorian properties affected with avian paramyxovirus 1 during the quarter

As part of the response to the outbreak, the Victorian Government banned pigeon aggregations (such as racing events and shows) and quarantined infected premises. Within industry, all pigeon trading and movements ceased, and some owners began to vaccinate with Newcastle disease vaccine; however, this vaccine has not been widely used because of doubts about its efficacy against APMV-1 in pigeons.

The detection of this disease, by a private veterinary practitioner in Shepparton, clearly shows the value of the DPI's investment in the practitioner-based National Significant Disease Investigation Program. Under this scheme, practitioners are paid to investigate disease incidents on behalf of the DPI.

Contributed by Roger Paskin, Victorian Department of Primary Industries

Rabies control conference, Republic of Korea

Australia is free from rabies, but the disease is widespread globally and is considered to be an under-reported zoonosis. Reservoir species vary between regions. However, most human cases result from contact with infected domestic dogs or cats. Australia supports a number of programs in the region to control rabies.

In September, the World Organisation for Animal Health (OIE) held a Global Conference on Rabies Control in the Republic of Korea. Australia was a co-sponsor of the conference, which was attended by about 350 delegates from around the world who display a genuine passion for rabies control. The conference considered current and future tools for rabies control, management of animal reservoirs, economics of management and stakeholder roles in control.

Rabies in wildlife was also discussed. The meeting recognised that the disease in wild reservoirs endangers biodiversity and can pose a risk to humans and production animals. The OIE, the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations are developing a shared approach to global activities. This approach will address human health risks resulting from human–animal interfaces and recognise that ongoing assessment of the global burden of rabies will provide the best information to support advocacy worldwide for rabies control. Rabies OIE reference laboratories and WHO collaborating centres continue to contribute to the development of safer and more effective vaccines, control measures and diagnostic tests. The conference developed recommendations that will contribute to better collaboration to support the elimination of rabies worldwide.

The conference considered rabies control a high priority. It recommended that all governments, donors, foundations and nongovernment organisations should work towards the worldwide control of the disease, with its subsequent elimination, focusing on dog rabies. Key tools for rabies control include continuous improvement and sharing of surveillance information for rabies in humans, production animals and wildlife; harmonised laboratory methods for diagnosis; and combining rabies control programs with other interventions or disease control programs wherever possible. Other areas of further research that are needed to progress rabies elimination are dog population dynamics, immunocontraception, further development of oral rabies vaccine technologies and improving diagnostic capacity in developing countries.

Contributed by Lyndel Post and Peter Beers, Australian Government Department of Agriculture, Fisheries and Forestry

Australian Wildlife Health Network

The Australian Wildlife Health Network (AWHN)[1] is an Australian Government initiative that coordinates wildlife health surveillance information across Australia, with emphasis on supporting Australia's livestock health, livestock trade, human health and biodiversity. The AWHN collates information from a number of sources into a national database (eWHIS),[2] including submissions by AWHN subscribers, state and territory wildlife coordinators, researchers and zoo veterinarians. This report details some of the wildlife disease and mortality events recorded in eWHIS for the quarter. The AWHN would like to thank all those who submitted information for this report.

Wild bird mortality events — Newcastle disease and avian influenza exclusion

Forty-four wild bird mortality event investigations were reported to the AWHN from across Australia during July, August and September 2011. Samples from sick and dead birds include submissions from members of the public, private practitioners, universities, zoo wildlife clinics and wildlife sanctuaries.

Avian influenza (AI) was excluded (by PCR for influenza A) as the cause in 26 of the events as part of Australia's passive (sick and dead bird) AI surveillance program. AI exclusion testing was not warranted in the remaining 18 events based on clinical signs, history, prevailing environmental conditions or other diagnoses. Newcastle disease was also excluded (by PCR for Newcastle disease virus) in 20 events, including 6 events involving native columbid species, 4 involving wild domestic pigeons (*Columba livia*) and 1 involving an unspecified pigeon species.

With the avian paramyxovirus 1 outbreak in domesticated pigeons in Victoria, it may be of interest to note that Australia has 25 species of native pigeons and doves, in 13 genera, and 3 species in 2 introduced genera.[3-6] Among native species, only the white-headed pigeon (*C. leucomela*) is in the same genus as the common introduced (feral) species (rock dove, *C. livia*). Australian native columbids, which have Gondwanan and Asian faunal elements, show exceptional genetic, phenotypic and ecological diversity, and a high level of endemism. Three introduced species of columbids have established feral populations in Australia: the wild domestic pigeon, also known as the rock dove (*C. livia*), the spotted dove (*Streptopelia chinensis*) and the laughing dove (*S. senegalensis*). The latter occurs in Western Australia only. These species are known to mix with native species.[7]

Avian influenza surveillance

As part of Australia's AI surveillance program, a combination of live (healthy and sick) and dead (including hunter-killed) wild birds are targeted. Samples from sick or dead birds are discussed above. Sources for active wild bird surveillance data include state and territory government laboratories, universities, and samples collected through the Northern Australia Quarantine Strategy program.

Between July 2010 and June 2011, active wild bird surveillance occurred at sites in New South Wales, Queensland, Victoria, Tasmania, South Australia, the Northern Territory and Western Australia. Samples were taken from 7917 birds, with the majority collected from waterbirds (ducks and waders). No highly pathogenic AI viruses have been identified. However, surveillance activities continue to find evidence of a wide range of subtypes of low-pathogenic AI viruses, including low-pathogenic H5 and H7, as well as H1, H3, H4, H6, H8–H12 and H16. Poultry producers should therefore remain alert and review biosecurity arrangements at their premises to ensure that effective measures to reduce risk are in place.

During the quarter, targeted healthy, live wild bird surveillance occurred at sites in New South Wales and the Northern Territory, with faecal environmental swabs collected from 1137 waterbirds. No highly pathogenic AI viruses have been identified. A number of positive swabs to low-pathogenic AI are undergoing further testing.

The National Avian Influenza Wild Bird Surveillance Program continues to help inform policy for the prevention and management of AI outbreaks in Australian poultry flocks. Importantly, this program is a key source of samples positive for AI viruses. Positive samples are essential for developing current and specific primers and probes. This maintains

confidence that, should an outbreak in poultry of highly pathogenic AI (caused by H5 or H7 strains) occur, these strains will be detected. The program also ensures that laboratory capacity for high-throughput molecular testing is available for Australia. The multi-agency and cross-jurisdictional approach of this project has led to an improved relationship between the participating parties and has fostered development of a collaborative 'one health' approach; this will provide benefits to future collaborative efforts to manage national animal health issues.

Australian bat lyssavirus

Reports to the AWHN for the July–September quarter included 56 bats tested for Australian bat lyssavirus (ABLV) from New South Wales, Queensland, Victoria and South Australia. Bat submissions were made for a variety of reasons. Fifteen cases, of which two involved captive bats in a collection, were known or reasonably suspected to have had potentially dangerous contact with humans. In one of these, the bat presented with weakness and depression. Six cases were reported to display unusual, aggressive or agitated behaviour, one of which also showed evidence of trauma. Two further bats were submitted following trauma only. Another bat was found dead, one bat was presented with weakness and depression, and 29 bats presented based on contact with a dog or cat. For two bats, no history was reported to the AWHN.

One bat was confirmed positive for ABLV during the quarter. The bat was a grey-headed flying fox (*Pteropus poliocephalus*) from a suburb in Melbourne, Victoria, that presented with unusual vocalisation and apparent agitation and distress. The bat was reportedly difficult to catch. On examination, the bat was found to be extremely agitated, aggressive and sensitive to loud, sharp noises. No evidence of injury was found. Following euthanasia, the bat was confirmed positive for ABLV by fluorescent antibody test for lyssaviral antigen, immunohistochemistry, virus isolation and PCR for pteropid ABLV RNA. There was no potentially dangerous human contact in this case.

Investigation into skin lesions in wombats

Veterinary investigations of a population of the southern hairy-nosed wombat (*Lasiorhinus latifrons*) in the Murraylands region, South Australia, that began in the spring–summer of 2010–11 have continued. At the start of March 2011, approximately 60 animals presented with severe skin lesions; some had evidence of malnutrition. Wombats are commonly affected by sarcoptic mange; however, none of the clinical signs seen with sarcoptes (e.g. scabs, skin irritation, redness or dandruff) were evident in these wombats, and skin scrapings to date have been negative for mites. Five wombats have been necropsied as part of ongoing investigations. Pathology suggests that the symptoms might be related to toxicity — there is evidence of liver disease, alopecia, photosensitisation and severe dermal vasculitis of undetermined aetiology. The symptoms might be associated with an unknown toxin in plants being ingested by the wombats. This ongoing investigation has been a collaborative effort between Primary Industries and Regions South Australia, the South Australian Department of Environment and Natural Resources, the University of Adelaide and the Wombat Awareness Organisation.

Besnoitia in macropods

In early July 2011, six western grey kangaroos (*Macropus fuliginosus*) presented with a chronic history of epistaxis. All the kangaroos were located on the same property in South Australia. Two kangaroos were examined under general anaesthetic, during which nasal swabs were collected and saline flush was performed. The smear from the nasal passages contained hypertrophied host (presumptive epithelial) cells that were markedly expanded by intracytoplasmic protozoal zoites. There was a moderate mixed inflammatory exudate. These findings are consistent with protozoal rhinitis, probably caused by *Besnoitia* spp. Attempts at further characterisation of this parasite are under way.

There have been previous reports of *Besnoitia* sp. being identifed in western grey kangaroos in Western Australia.[8-9] Clinical signs included epistaxis and rhinitis, and further histological examination identified enlarged epithelial cells containing bradyzoites. Anecdotal reports suggest that this parasite might be widespread in kangaroo populations; however, further work is required.

Besnoitia spp. are cyst-forming coccidia with a two-host cycle, involving a definitive host (carnivore) and an intermediate host (herbivore). There are several known species of *Besnoitia*, including those that cause besnoitiosis in cattle (*B. besnoiti*), horses (*B. bennetti*) and goats (*B. caprae*). Besnoitiosis is not

present in livestock in Australia. However, *B. wallacei* has been reported in rats, with cats being definitive host species.[10] It is not known if this species or others exist within Australian native fauna. The *Besnoitia* species reported by Ladds (2009) and the Department of Agriculture and Food Western Australia (2010) were not speciated. Currently, no information is available for the treatment of *Besnoitia*. See the AWHN *Besnoitia* fact sheet for further information.[11]

[1] www.wildlifehealth.org.au

[2] www.wildlifehealth.org.au/AWHN/Subscribers/SubscribeLogin.aspx

[3] Birdlife International (2011). IUCN Red List for birds, accessed 21 November 2011, www.birdlife.org.

[4] Goodwin D (1970). *Pigeons and doves of the world*, 2nd edn, The British Museum (Natural History), London.

[5] Goodwin D (1967). Australian pigeons: their affinities and status. *Emu* 66(4):319–336.

[6] Frith HJ (1982). *Pigeons and doves of Australia*, Rigby Publishers, Sydney.

[7] Mulhall S, Lill A (2011). What facilitates urban colonisation by crested pigeons *Ocyphaps lophotes*? *Corella* 35(3):73–81.

[8] Department of Agriculture and Food Western Australia (2010). Animal diseases surveillance newsletter, July, p. 9, accessed 21 November 2011, www.agric.wa.gov.au/objtwr/imported_assets/content/pw/ah/animal%20health%20newsletterjuly%202010.pdf.

[9] Ladds P (2009). *Pathology of Australian native wildlife*, CSIRO Publishing, Melbourne.

[10] Manson RW (1980). The discovery of *Besnoitia wallacei* in Australia and the identification of a free-living intermediate host. *Parasitology Research* 61:173–178.

[11] www.wildlifehealth.org.au/AWHN_Admin/ManageWebsite/FactSheets/UploadedFiles/119/Besnoitia%2014%20Jul%202011%20(1.1).pdf

Contributed by Tiggy Grillo, Projects Coordinator, Australian Wildlife Health Network; and Lyndel Post, Animal Health Programs, Australian Government Department of Agriculture, Fisheries and Forestry

Aquatic animal health

Aquatic surveillance workshop

An aquatic surveillance workshop will be held in Adelaide on 12–16 December 2011. This is one of several activities under the Aquatic Animal Health Training Scheme, which is jointly funded by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) and the Fisheries Research and Development Corporation. The training scheme aims to improve knowledge and skills in aquatic animal health management, to support Australia's fishing and aquaculture industry, including the aquarium sector. It focuses on furthering skills, rather than basic training, and is open to practising aquatic animal health professionals in industry, research and government. Full details of the aquatic surveillance workshop are available at www.adelaide.edu.au/vetsci/research/pub_pop/aquaticwkshopinfo.html.

Placement with the Network of Aquaculture Centres in Asia–Pacific

An officer from Aquatic Animal Health Programs in DAFF recently completed a short-term placement with the Network of Aquaculture Centres in Asia–Pacific (NACA). NACA is an intergovernmental organisation that seeks to improve rural income, increase food production and foreign exchange earnings, and diversify farm production by improving aquaculture management in the region. One NACA program is about aquatic animal health management. This program facilitates regional cooperation to tackle priority issues relating to aquatic animal health. NACA manages quarterly aquatic animal disease reporting for the NACA-listed diseases (that is, diseases listed by the World Organisation for Animal Health and diseases of local significance), which assists in surveillance and sharing of information across the region. A project proposal to investigate

constraints to emergency aquatic animal disease response in the region was drafted during the DAFF officer's placement, for consideration by the NACA Regional Advisory Group at its annual meeting in November 2011. The placement also aimed to build on Australia's already strong relationship with NACA, particularly as it relates to aquatic animal health in the region.

National survey for ostreid herpesvirus 1µ variant (Pacific oyster mortality syndrome) completed

A syndrome of high mortalities in farmed Pacific oysters (*Crassostrea gigas*) was observed in parts of Botany Bay in late 2010, and in wild Pacific oysters in Port Jackson in early 2011. This disease did not affect Sydney rock oysters.

Laboratory testing found ostreid herpesvirus-1 microvariant (OsHV-1 µvar) genetic material in the affected Pacific oysters. The microvariant is considered to be a particularly virulent strain of oyster herpesvirus and has been associated with high mortalities of Pacific oysters. Before this event, OsHV-1 µvar had not been reported in Australia. Molecular testing for OsHV-1 detects virus genetic material; subsequent sequencing determines whether it is the variant.

The Aquatic Consultative Committee on Emergency Animal Disease (AqCCEAD) was convened to monitor developments and to assist New South Wales in managing the situation. The New South Wales Department of Primary Industries (NSW DPI) managed the incident locally and placed movement restrictions on the affected area of Botany Bay and the Georges River, to manage the risk of disease spread. The states with Pacific oyster industries (New South Wales, South Australia and Tasmania) participated in a national survey to determine the distribution of the virus in Pacific oyster production regions in Australia. The survey was a collaborative effort; funding for testing was provided by DAFF, the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL) and NSW DPI. Collection of samples and sample processing were coordinated by government officers from New South Wales, Tasmania and South Australia, in cooperation with the oyster industries in these states.

The survey was designed in accordance with international standards to provide defensible evidence of freedom from OsHV-1.

Laboratory testing of Tasmanian and South Australian samples was conducted at CSIRO-AAHL. New South Wales samples were tested at the NSW DPI Elizabeth Macarthur Agricultural Institute (EMAI). At the beginning of the survey, CSIRO-AAHL and EMAI shared material to ensure consistency of testing results.

Through the survey, New South Wales, Tasmania and South Australia collected 4323 individual oyster samples from 23 growing regions. None of the individual oysters tested positive for OsHV-1. Based on these results, there is currently no evidence that OsHV-1 µvar is present outside the two known affected estuaries in New South Wales. The survey was designed to detect a 2% prevalence of OsHV-1 if it were present in at least one sampling location, with 95% confidence. Post-hoc analysis of the survey results shows that a 96% system sensitivity was achieved, with 96% combined probability of freedom from disease in estuaries outside the two known infected estuaries.

Because large populations of wild Pacific oysters are present, it is highly unlikely that OsHV-1 µvar could be eradicated from open systems such as the two affected estuaries in New South Wales. The current response objective is therefore to contain OsHV-1 µvar to these two estuaries.

NSW DPI continues to manage the disease locally. Movement controls for farmed Georges River oysters, and for oyster farming infrastructure and equipment are in place. There is a total ban on recreational fishers taking oysters from the Georges River, Botany Bay and Port Jackson.

OsHV-1 has no human health implications. NSW Health has confirmed that the virus only affects molluscs and cannot be transmitted to humans.

Contributed by Brett Herbert, Animal Health Programs, Australian Government Department of Agriculture, Fisheries and Forestry

State and territory reports

In Australia, the states and territories are responsible for animal disease control within their borders. National animal health programs are developed through consultation with the Animal Health Committee and are managed by Animal Health Australia.

New South Wales

Contributed by Rory Arthur, Department of Primary Industries

Cattle

Mouth lesions caused by rough fodder — foot-and mouth-disease and vesicular stomatitis excluded

Five out of 64 steers died with suspected pneumonia caused by *Pasteurella multocida* after arriving at a property near Wagga Wagga. They had been purchased one month earlier from a variety of owners and saleyards.

The cattle were fed in a grassy paddock and supplemented with a combination of hay and grain that was very dusty and contained rough stalks. Surprisingly, they were eating this dusty, spiky feed despite the availability of pasture.

When the herd was examined by the district veterinarian, a large number of steers were showing excess salivation, despite appearing very healthy. One steer was recumbent and reluctant to move. It had a fever, as well as many small, circular lesions in its mouth.

In a sample of the rest of the herd, two other steers had mouth lesions similar to those of the recumbent steer, and two were scouring. The emergency disease hotline was contacted and advised of the situation. Samples were taken for foot-and-mouth disease (FMD) exclusion, although the risk of FMD was not considered high.

The herd was prevented from gaining access to the feeder, and eight hours later the drooling of saliva had stopped. It was concluded that the dry, dusty, spiky feed had been the main cause of the drooling, rather than the mouth lesions.

The recumbent steer died, and necropsy revealed acute fibrinous pneumonia, as well as a swollen carpus on the left front leg, with excess yellow fluid in the joint and tendon sheath. The histopathologist reported a severe haemorrhagic pleuropneumonia consistent with infection with *Pasteurella* spp. Culture of the lungs and joint was unproductive; this was not unexpected, as the animal had been treated with antibiotics earlier.

Samples from mouth lesions in the salivating animals tested negative for FMD and vesicular stomatitis viruses. Histopathology of a tongue lesion showed epithelial degeneration, hyperplasia and intracytoplasmic inclusions strongly suggestive of bovine papular stomatitis virus infection.

The herd was given access to more palatable hay, and affected steers were treated with oxytetracycline. The deaths ceased.

Mother-of-millions toxicity in pregnant cattle

Five out of 100 Hereford cows died from mother-of-millions toxicity on a property east of Narrabri.

Clinical signs included dehydration, depression, profuse dark brown–black watery diarrhoea, sham drinking (playing with water but not drinking) and anorexia. One cow was reluctant to move with the herd, and when pressured became excited and dropped dead. There were numerous haemorrhages in her abomasum, and her lungs were mildly congested. There was about twice the normal amount of pericardial fluid around the heart, and haemorrhages were visible in the heart muscle.

The paddock from which the cows were moved consisted of dry, standing native grass pasture. A wooded area in a strip approximately 20 metres wide along the boundary fence contained a large number of mother-of-millions plants in early flower. Many of the plants had been chewed off, and a diagnosis of mother-of-millions plant toxicity was made.

The producer minimised any stress on the herd over the next three weeks to reduce deaths. The area infested with mother-of-millions plants was treated with a herbicide and permanently fenced off from the paddock.

Mother-of-millions (*Bryophyllum* spp.) is native to Madagascar. It is a popular garden plant in eastern Australia, especially in the drier inland areas. *Bryophyllum* species contain cardiac glycosides of the bufadienolide type. These toxins cause heart arrhythmias, leading to ventricular fibrillation and arrest. The flower heads contain five times as much toxin as the stems and leaves. Fatally affected animals die between five days and three weeks after they start ingesting the plant.

Salmonella *abortion in cattle — bovine brucellosis excluded*

Thirteen cows in a herd of 80 aborted in the Narrabri district in July 2011. They had been vaccinated against pestivirus, leptospirosis and clostridial disease some months earlier. The cows that had not aborted appeared normal. Eight cows that had aborted and two aborted calves were examined. The cows had retained foetal membranes and elevated temperatures. The aborted calves appeared normal, although one appeared to have an enlarged liver. Samples were taken for laboratory examination, and brucellosis (which has been eradicated from Australia) and trichomoniasis were excluded.

Histopathology on the liver of one calf showed a hepatopathy consistent with *Salmonella* or *Campylobacter* infection. No organisms were cultured from the fresh stomach contents of this calf. A range of fresh and preserved samples from the other calf were negative for leptospirosis, neosporosis and pestivirus, but culture of the fresh stomach contents was positive for *Salmonella* Chester.

Serology on the cows suggested that the herd had recently been exposed to pestivirus, as well as to *Salmonella* spp. The evidence suggested that exposure to *Salmonella* Chester was the most likely cause of the abortions. Unfortunately, a clear source could not be identified. The cattle were moved to another paddock, and calving proceeded normally.

Of the *Salmonella* organisms known to occur in cattle and cause disease, *Salmonella* Chester is relatively unknown.

Extra legs in Angus calves

New South Wales surveillance veterinarians have detected an increased prevalence of polymelia in Angus calves. Polymelia is the condition of being born with one or more extra limbs. If the limb or limbs are attached to the vertebral column, this is called notomelia.

The incidence of notomelia seems to be increasing in Angus calves in Australia above the sporadic background level, suggesting the possibility of an emerging heritable defect in this breed. At least 15 cases of notomelia in newborn Angus calves in New South Wales in the past two years have been reported to the New South Wales Department of Primary Industries.

In some cases, the extra limbs remain small after birth, and the affected calves appear to grow and breed normally, regardless of whether the extra limbs are surgically removed. In other cases, the extra limbs grow in proportion to the animal and become quite large, interfering with walking and normal life — a significant animal welfare issue.

DNA samples have been analysed in the United States with the aim of detecting the genetic cause and developing a test to detect genetic carriers.

Horses

Hendra virus case studies

In July–August 2011, Hendra virus infection was diagnosed in horses on seven properties on the north coast of New South Wales. The following examples emphasise the importance of careful investigation, personal protection and laboratory diagnosis.

A cattle producer near Lismore had a horse that had died with its head stuck through a wire fence. The horse had shown no signs of disease 12–18 hours earlier. It was in a paddock containing a fig tree. Flying foxes were suspected to visit the property but were not thought to be common. A private veterinarian indicated that the cause of death was unlikely to be Hendra virus but advised the producer to contact the government veterinarian in the Livestock Health and Pest Authority (LHPA). The only other horse in the paddock had no signs of disease.

The dead horse was examined by the district veterinarian. Using appropriate personal protective equipment, the veterinarian took oral and nasal swabs

from the horse; the nasal cavities contained a substantial amount of blood-stained froth. Swabs were placed in PBGS (phosphate-buffered gelatine saline containing antibiotics) viral transport medium.

Both the oral and the nasal swabs were positive for Hendra virus on an N gene TaqMan assay performed at the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL) and on a PCR test performed at the State Veterinary Diagnostic Laboratory at the Elizabeth Macarthur Agricultural Institute in New South Wales. Testing on the companion horse was negative.

Meanwhile, two dead horses were reported on a property near Ballina in the owner's absence. Wearing appropriate personal protective equipment, the district veterinarian attended the property. One dead horse was attached to a fence wire. A D-clip on its headstall had ensnared the wire.

The other horse was dead closer to the house, with decomposing tissue exuding from both rear orifices. The house paddock contained some native trees and an old orchard. Four other live horses on the property had no obvious signs of disease. The provisional field diagnosis by the district veterinarian was accidental death of the first horse and a reproductive incident of the other horse. However, as part of routine diagnostic support, swabs and jugular blood were collected from both dead horses.

All samples collected from the horses were positive for Hendra virus on testing done at both the New South Wales State Veterinary Diagnostic Laboratory and CSIRO-AAHL.

These case studies demonstrate the following:

- Some cases of Hendra virus, especially mortalities, will be investigated only if a government field service is available to attend.
- Hendra virus should be considered in horses where death appears to be accidental (such as the horse becoming entangled).
- The use of swabs to collect a range of fluids from a dead horse appears satisfactory to detect positive field cases of Hendra virus.

Horse owners should be advised that, if they find a horse stuck in a fence, they should not assume that this is the result of an accident. The neurological damage caused by Hendra virus may predispose horses to becoming caught in fences.

Poultry

Fowl cholera in turkeys

Fowl cholera was associated with the death of 40 out of 50 turkeys over a two-week period in a mixed free-range flock of 500 turkeys, ducks, guinea fowls and chickens. Limited numbers of ducks and chickens also died. There were no significant clinical signs beforehand.

At veterinary examination, only two older turkeys were showing signs of illness. The birds were 'fluffed up' and depressed and had swollen nose wattles. These two birds were necropsied; the findings were unremarkable, and the birds were in good body condition.

Avian influenza and Newcastle disease were both excluded by PCR testing at the laboratory.

Histopathology showed the liver to have multifocal loss of hepatocytes, with fibrin exudation and infiltrates of heterophils and mononuclear cells. A pure growth of *Pasteurella multocida* was grown from bacterial culture of a liver sample.

The affected turkeys were treated with antibiotics, and procedures were implemented for controlling rodents and burning dead birds.

Sheep

Sheep deaths in a central New South Wales feedlot — peste des petits ruminants ruled out

A sheep feedlot in the Forbes area had 10 deaths in a mob of 400 pregnant one-year-old ewes. Scouring preceded the early deaths, but treating the sheep (by drenching) for suspected worms did not control the diarrhoea. The ewes were feeding on a mix of lupins and barley and a small amount of stubble hay.

At necropsy of a recently deceased animal, there was severe inflammation of the mucosal surface of the abomasum and small intestine. The mesenteric lymph nodes were enlarged, and there was moderate colon inflammation. Although there were no characteristic 'tiger stripes' of inflammation in the intestine, samples were taken to exclude peste des petits ruminants, which does not occur in Australia. Culture of intestinal contents did not isolate an infectious cause. The small intestine contained a moderate burden of *Trichostrongylus* worms.

Histopathology showed marked mucosal and submucosal congestion in the abomasum and small

and large intestines. It was suspected that a low-grade grain poisoning was affecting the ewes. When the grain portion was reduced and antibiotics were given to individual animals, they improved and there were no more deaths.

Northern Territory

Contributed by Francois Human, Department of Resources

Cattle

Tetanus in weaners

Several 10-month old steers from a group of 580 weaners died on a property in the Darwin region. The animals were handled 11 days earlier, and two steers were recumbent on the day of investigation. They displayed signs of muscle spasm, rigid extended legs and third eyelid protrusion, and were very sensitive to sound and touch. A provisional diagnosis of tetanus was made based on the clinical signs. Both animals had infected scrotums after being castrated with rubber rings.

Laboratory results supported the initial diagnosis, with an increased total white blood cell count coming from neutrophils and lymphocytes. The only significant histopathological findings were changes in the spleen and liver, suggestive of concurrent bacterial septicaemia. Swab samples from the infection site were presented for bacterial culture and yielded a variegated bacterial growth. The identity of the isolated *Clostridium* species has not been pursued. The owner was advised on good management and hygiene practices during future calf marking.

Zamia palm poisoning

Ten Brahman steers out of a group of 56 died over a week on a small farm in Darwin. The two-year old animals had come from another property six weeks earlier. Affected animals displayed ataxia and tremors and appeared agitated. There were numerous zamia palms in the paddock that had been grazed.

A handful of stones were found in the reticulum, possibly resulting from pica associated with dietary deficiency. The histopathological findings in the examined tissues were mild, with limited clinical significance. Zamia palm poisoning was implicated as the most likely reason for the neurological signs. The animals were moved to a cleaner paddock.

Horses

Respiratory disease in horses — Hendra and equine influenza excluded

Several horses on a property near Alice Springs consecutively developed coughing and nasal discharge. Blood and nasal swab samples were collected from three horses by the private veterinary practitioner treating the animals. Hendra virus and equine influenza virus infection were ruled out at the CSIRO Australian Animal Health Laboratory.

PCR results from the submitted nasal swabs were all negative for equine herpesvirus (EHV) 1 and 4 genomes. Paired serum samples tested again three weeks later were all negative for EHV-1, but positive for EHV-4 antibodies, without any significant rise in antibody titres. Antibodies to EHV-4 are common in healthy (asymptomatic) Northern Territory horses. No final diagnosis was made, but the horses recovered completely.

Poultry

Hypothermia in week-old chickens — avian influenza ruled out

During July 2011, 25% of a group of week-old chickens died in a backyard chicken operation. Deaths started four days after the arrival of 100 day-old chicks and continued over a week.

No significant gross pathology was found, except for empty crops. Avian influenza, infectious laryngotracheitis, infectious coryza and *Pasteurella multocida* infection were ruled out by PCR testing. Parasites were not detected from any of the submitted chicks, and no significant bacteria were seen on bacterial culture.

The likely problem was lack of a heat source in the outdoor rearing cages, leading to cold stress and hypothermia in the chickens. The unaffected birds were eating well. The owner has been advised on management practices and different heating options, especially during the cool nights of the dry season.

Queensland

Contributed by Greg Williamson, Department of Employment, Economic Development and Innovation

Cattle

Tick fever

A return to drier conditions during the July–September quarter is reflected in the lower number of cases of tick fever reported throughout Queensland. Only nine occurrences of tick fever were reported during the quarter, six involving infection with *Babesia bovis* and three with *Anaplasma marginale*. Most of the cases of tick fever occurred in the coastal south-east corner of the state, and all were within the 'infected' tick zone. Queensland regulates the movement of stock to control cattle ticks through a system of zones.[1]

At a small beef cattle property in the Banana Shire Council area in July, six 10-year-old cattle died from an at-risk group of 50. The cattle initially showed signs of depression and anorexia, which rapidly progressed to sternal recumbency, then lateral recumbency and death. The affected animals also had haematuria, confirmed by dip-stick analysis of urine samples as 3+, the highest level on the scale. Histopathology revealed acute tubular necrosis in the kidney, and dark Giemsa-staining bodies consistent with *Babesia* were visible within red cells in tissue sections. A significant parasitaemia with *Babesia bovis* was detected in tissue smears taken from the sick cattle.

[1] www.dpi.qld.gov.au/4790_12780.htm

Lantana poisoning and hepatogenous photosensitivity

Lantana camara is an introduced perennial shrub that is widespread in coastal Queensland. There are many varieties of lantana, some of which are toxic. Poisoning of cattle commonly occurs when cattle with no prior exposure to the plant are introduced to pasture where lantana is growing. The primary effect of lantana poisoning is liver damage, which leads to clinical signs of jaundice and photosensitivity.

Plant poisoning consistent with *L. camara* poisoning was found to be responsible for the illness of two Friesian cows out of approximately 250 at risk on a property in the Toowoomba Regional Council area in late July 2011. Clinical signs of anorexia, drying off, and sloughing of skin on teats, muzzle and vulva were observed. Serum biochemistry revealed elevated levels of the liver enzymes gamma-glutamyltransferase (GGT) and glutamate dehydrogenase, supporting the clinical findings of photosensitisation most often seen as a result of lantana toxicity.

Lantana poisoning was also thought to be responsible for the sickness of 10 out of 20 beef cattle at risk on a property in the Lockyer Valley Regional Council area in early August. The group of 20 home-bred cattle were exposed to lantana after being moved to a new ungrazed paddock. Clinical signs of photosensitisation, jaundice, rapid weight loss, pyrexia, dullness and lethargy were observed in 10 animals. Elevation in liver enzymes and hyperfibrinogenaemia supported a diagnosis of lantana poisoning.

Hepatogenous photosensitisation caused the deaths of 8 cattle out of 250 at risk on a property in the Gympie Regional Council area in late September. The cattle had been introduced to the property two months earlier. On necropsy examination, tissues were very jaundiced and the spleen was contracted. Histopathology of the liver revealed bile duct hyperplasia and cholestasis. Elevated serum levels of the liver enzyme GGT and conjugated bilirubin further suggested exposure to a hepatotoxin.

Horses

Hendra virus

The occurrence of Hendra virus in Queensland this year has been unprecedented, with four notable aspects: the number of concurrent cases; the duration of the response effort; the wide geographic distribution, including the first detection west of the Great Dividing Range (in the Western Downs Regional Council area); and the confirmation for the first time of Hendra virus occurring naturally in a dog (manifested by serological changes but no disease).

Ten incidents were recorded in Queensland between late June and early October 2011. The incidents occurred in eight council areas: (from south to north) two in Scenic Rim, one in Gold Coast, one in Logan,

two in Brisbane, one in Moreton Bay, one in Western Downs, one in Fraser Coast and one in Tablelands. This compares with 13 incidents in Queensland between 1994 and 2010. The incidents so far this year have resulted in the death of 13 horses and 1 dog. Nineteen of 39 properties investigated were quarantined; 115 horses of interest were inspected daily, and sampled and tested three times; 21 dogs and 2 cats (as susceptible species) have been monitored and tested with negative results. The response, which began on 28 June 2011, continued throughout the quarter.

At the time of writing (late October 2011), one property is under quarantine for Hendra virus in Queensland, in the Moreton Bay Regional Council area.

A variety of clinical presentations were seen in association with this year's Hendra incidents. Prominent among these were neurological symptoms, ranging from lethargy and mild ataxia to profound incoordination and convulsions. Respiratory symptoms, which were prominent in outbreaks in previous years, have not occurred.

In addition to the strategies for control of the virus implemented by Biosecurity Queensland (including quarantine, testing and monitoring protocols), an extensive public awareness campaign was delivered to inform the community and horse owners about Hendra virus. The campaign involved the application of new communication tools, including Facebook and Twitter, an online registration system for Hendra virus information packs, and an online live-streamed forum to facilitate engagement across the Queensland community.

Pigs

Enzootic pneumonia

Enzootic pneumonia due to *Mycoplasma* sp. was found to be the cause of the deaths of five 22-week-old piglets out of 1200 at risk on a property in the Western Downs Regional Council area in mid-September 2011. About 10% of weaner pigs on the property had a productive cough for several weeks. No coughing was noted at grower or finisher stage. At abattoir inspection, 16% of pigs had small pneumonic lesions. Lung tissue tested by PCR was positive for *Mycoplasma* sp., but the organism could not be cultured.

Poultry

Infectious laryngotracheitis — avian influenza and Newcastle disease ruled out

Avian infectious laryngotracheitis (ILT) was responsible for 15 deaths out of 40 birds at risk in a backyard flock of poultry in the Gympie Regional Council area in mid-August 2011. The deaths occurred over the course of a week. Clinical signs before death included coughing, gasping, extended necks and crusting around the eyes. Necropsy revealed tracheitis and haemorrhagic lung lesions. Within the tracheal lumen, cellular debris and proteinaceous material were visible on histopatholgical examination of sections. There were mild infiltrates of lymphocytes and plasma cells within the tracheal lamina propria and submucosa, and multiple small foci of mucosal erosion with mild infiltrates of heterophils. PCR testing returned a positive result to ILT virus.

ILT infection resulted in respiratory disease that caused conjunctivitis and a wet cough in a broiler farm in the Redland City area in mid-September. The disease was confirmed by histological evidence of a necrotic laryngotracheitis and positive PCR test results. Approximately 33 000 birds that were unvaccinated for ILT were on-site, and 160 of these died. Broilers are not routinely vaccinated. The infection in this case was confined to one shed and all birds were culled. Investigations are ongoing as to the cause of the infection.

ILT was also found to be the cause of respiratory disease in a layer flock, with 80 deaths reported out of 17 000 birds on a property in the Toowoomba Regional Council area in late September. Sick birds had serous ocular and nasal discharges, and gasping. The disease was confirmed on histological examination, which showed marked laryngotracheitis with hyperplasia, necrosis of the mucosa and occasional syncytia formation. PCR testing for ILT virus was positive. Mechanical issues with uneven distribution of the live vaccine in drinking water are thought to have caused the breakdown. The disease incident was self-limiting.

In all of these ILT cases, Newcastle disease and avian influenza were excluded by routine PCR.

South Australia

Contributed by Celia Dickason, Department of Primary Industries and Resources

Cattle

Foot-and-mouth disease and vesicular stomatitis ruled out in a Hereford calf

In July 2011, a private veterinarian reported seeing mouth lesions in a two-month-old Hereford calf on a property in the Murray Bridge area. Biosecurity South Australia immediately undertook a thorough investigation of the property. A total of 67 cows and calves, and three resident bulls, were on the property. The calf was the only animal on the property that was affected with oral lesions; no other animals were showing signs of lameness or mouth lesions.

The calf and its mother were being held in yards apart from all other cattle. The calf was drooling about three days before the report. No lameness or foot tenderness was evident in either the calf or the cow, and the cow had no oral or udder lesions. The calf had multiple necro-ulcerative lesions on the nasal planum and chin and inside the mouth, with excess salivation. Further investigation revealed that no animals had entered or left the property over the previous few weeks, and there had been no contact with neighbouring cattle. Biosecurity advice was given to the owner and his family, while samples were sent to the CSIRO Australian Animal Health Laboratory for exotic disease exclusion testing.

All test results were negative for vesicular stomatitis and foot-and-mouth disease. The calf and its mother also tested negative for infectious bovine rhinotracheitis, but were both positive for pestivirus on antigen-capture ELISA and agar-gel immunodiffusion testing. The diagnosis was confirmed as mucosal disease caused by bovine diarrhoea virus type 1.

The property was released from quarantine, and the owner was informed of the results. The owner was also given advice about managing pestivirus in his herd, including managing persistently infected animals.

Horses

Pituitary abscess in a horse causing neurological signs — Hendra virus excluded

In early July 2011, a three-year-old warmblood horse from the Adelaide Hills presented with a sudden onset of profound depression and head tilt. The horse had been partially anorexic for 36 hours. There was no pyrexia and only a mildly elevated heart rate. Blood tests revealed mild anaemia and inflammation, as well as previous exposure to flavivirus (most likely to have been Murray Valley encephalitis virus), but no evidence of recent infection. Hendra virus testing was negative.

Despite supportive veterinary treatment and care, the neurological signs progressed, and the horse was euthanased in August 2011. To investigate the differential diagnosis of flavivirus infection (a recent flavivirus outbreak in horses in South Australia was reported in AHSQ Vol. 16 Issue 2), the brain of the horse was collected for further examination. Histopathology revealed a region of chronic abscessation, which primarily involved the hypothalamus and pituitary stalk, as well as the surrounding basilar meninges. There was focal extension of the abscess into the anterior lobe of the pituitary gland and concurrent osteomyelitis within the sphenoid bone surrounding the pituitary fossa, with a possible fracture in this area, indicating a likely previous head trauma. No significant bacteria were cultured from the affected brain tissue, and no flavivirus was detected by PCR or immunohistochemistry testing on the brain tissue.

In horses, focal brain abscesses may arise when infectious agents enter the central nervous system. The portal of entry can be via a direct penetrating injury or extension from an adjacent focus of suppurative inflammation (e.g. nasopharynx or tympanic bulla). Haematogenous spread or retrograde infection via peripheral nerves is also possible. Pituitary abscesses are reported to be rare in horses, due to their lack of defined rete mirabile vessels.

Sheep

Sudden deaths in mid-north weaner sheep

In early September 2001, about 50 deaths occurred in a group of 1000 five-month-old weaner lambs in the mid-north of South Australia. Routine earmarking, castration, tail docking and vaccination had occurred when the lambs were about three months old, and they

had also been treated for internal parasites with 10 mL of ivermectin at weaning age. The lambs were grazing good-quality pasture that had been rested for a couple of months. Deaths started after the lambs were fed oats and oaten hay.

Signs included lagging behind the group, diarrhoea and collapse. Affected animals were laterally recumbent, tachycardic and tachypnoeic, with pale mucous membranes. Investigations revealed panhypoproteinaemia with a protein-losing gastroenteropathy. There was also a subacute to chronic proliferative lymphocytic abomasitis and subacute lymphoplasmacytic/eosinophilic enteritis with villous erosion, blunting and fusion. High faecal worm egg counts were detected (up to 11 100 eggs per gram), with moderate to high numbers of coccidial oocysts. Faecal microculture was also positive for *Campylobacter* spp.

The final diagnosis of gastrointestinal parasitism, with possible concurrent coccidiosis, is consistent with the signs seen. The producer was given advice on internal parasite control and regular monitoring, and no further deaths were reported.

Unusually high rainfall in this area over the summer has seen a marked increase in worm larval survival on pastures, with pastures that were previously considered 'safe' for weaners now harbouring a significant parasite burden.

Introduced weaners primarily succumb to weed infestation

In early August 2011, a sheep producer in the mid-north of the state purchased three separate groups of five-month-old weaner lambs. On arrival, the lambs were all placed together in one paddock. Paddock feed comprised sown feed barley and barley grass. Broadleaf weeds had been sprayed with a herbicide mix 6–12 weeks earlier. A number of sheep died suddenly soon afterwards, and others appeared blind, recumbent, shaking or unable to rise.

Property investigation and blood testing revealed that lambs had a marked azotaemia and hyperphosphataemia, consistent with severe renal disease. Necropsy and histopathology revealed acute oxalate nephrosis, as well as early coccidial infection and rumenitis. Faecal egg counts were high (up to 2450 eggs per gram), with high to moderate levels of coccidial oocysts. The final cause of the deaths was considered to be acute oxalate toxicity, compounded by intestinal parasitism.

Paddock inspection revealed patches of soursob (*Oxalis pes-caprae*). Young lambs from areas where soursob is not prevalent may preferentially graze and ingest large quantities of this plant, causing death due to hypocalcaemia and/or renal failure. Sometimes weeds such as soursob are more palatable after having been sprayed, and this could have increased intake in this case. Early-stage coccidiosis was most likely precipitated by the stress of recent handling and movement, and high faecal egg counts indicated a substantial worm burden that would have contributed to the poor health of these lambs.

This case is an example of the challenges faced when bringing in new stock from other regions and introducing stock to a new property. It underlines the importance of sourcing well-managed stock and having property induction protocols, including appropriate animal health treatments.

The producer was advised to remove susceptible stock from soursob-infested pastures and was advised about internal parasite control and appropriate livestock introduction protocols. No further deaths were reported.

Facial lesions on ewes on the Eyre Peninsula

In late September 2011, a sheep producer on the Eyre Peninsula reported ill-thrift in 80 out of 500 merino ewes. Signs also included exudative crusting and ulcerative facial, lip and oral mucosae. Further investigation revealed histopathological lesions typical of ovine parapoxvirus infection (contagious ecthyma or 'orf'), with a secondary *Staphylococcus aureus* infection.

It is unclear how the ewes contracted parapoxvirus — there had been no recent introductions of infected sheep, and the property had not experienced infections previously. It is suspected that sheep straying onto the property may have been the source of virus infection. The producer was advised to consider implementing a parapoxvirus vaccination program in future, and antibiotic therapy was prescribed for the secondary bacterial infection. No further cases were reported.

Tasmania

Contributed by Mary Lou Conway, Department of Primary Industries, Parks, Water and Environment

Cattle

Calf deaths associated with neurological signs

A beef producer reported two 6–8-week-old calves with hindquarter paresis within 24 hours of their group being moved to a new paddock. Two stillborn calves had been found in this group within the previous week. Two similar cases were observed but not investigated in the herd during the 2010 calving season.

The group of cattle comprised 84 Angus and Hereford cows, 55 calves at foot and 3 Angus bulls, and was located in the Huon Valley, southern Tasmania. Both paretic calves died within 24 hours of detection, and one of them was necropsied. Only fixed tissues were submitted for histopathology.

The major pathological changes were noted in the kidneys, with multifocal cortical tubule–interstitial suppurolymphoid nephritis. The kidney lesions were consistent with a bloodborne infection with renal localisation. In calves, *Escherichia coli* is capable of this; in nonfatal cases, the outcome is white spotted kidneys. The neurological signs reported by the owner may have been due to general weakness associated with the infection.

The owner was advised to move the herd to less contaminated ground, and deaths have ceased.

Weight loss and death in young dairy cattle

Two members of a group of 10-month-old Friesian cattle died over a two-week period in July 2011. The herd of 10 had been introduced to the northern Tasmanian property in November 2010. The cattle had all been vaccinated against clostridial disease ('5 in 1' vaccine) the week before the first death and had access to mineral blocks (to prevent grass tetany associated with trace element deficiency).

The first death occurred suddenly — a steer was found convulsing and frothing at the mouth just before death. A veterinary examination did not occur. During disposal of the carcass, which required dismembering, it was noted that the blood had not clotted and the musculature appeared to be oedematous and pale. The second animal, a heifer, lost weight over a two-week period, had reduced exercise tolerance, had no appetite for hay and tended to isolate herself. She was found dead, and necropsied within 12 hours.

Gross pathology was indicative of clostridial myositis, with pale, oedematous musculature noted over the caudal neck area. There was also subcutaneous oedema either side of the dorsal spinous processes from the mid-thoracic to lumbar area, with petechial haemorrhages in the adjacent muscles, and in connective and udder tissues. Fibrin tags on the pleural surfaces and anterior pulmonary congestion were also noted and confirmed on histopathology. Muscle necrosis was not apparent microscopically. Although there was a weak positive result for *Clostridium* epsilon toxin, and low numbers of *C. sordellii* and *C. septicum* were found on smears from the small intestine, these findings were most likely to be artefacts of the necropsy. Muscle smears were subjected to direct fluorescent antibody testing for *C. septicum*, but this was also negative.

Although clostridial disease could not be confirmed with laboratory testing, it could not be excluded. The gross changes in the muscles were strongly suggestive of necrotising myositis due to pathogens such as *C. septicum* or *C. chauvoei*. The fastidious nature of these organisms might have prevented their culture from the necropsy samples presented.

No further deaths occurred, and the herd was revaccinated.

Victoria

Contributed by Cameron Bell, Department of Primary Industries

General surveillance

A total of 894 clinical disease events were recorded during the reporting period by the surveillance data management system of the Victorian Department of Primary Industries (DPI). Approximately 84% of these related to either cattle (459) or sheep (292), with the remainder relating to various domestic avian species, including pigeons, camelids, goats, horses, pigs, deer and rabbits. Investigations occurred over much of the state (Figure 3), and their location closely reflected the distribution of livestock in Victoria. They included DPI-subsidised investigations by private veterinary practitioners, notifications received by private veterinary practitioners and investigations by DPI field staff.

Of the 459 cattle investigations, the most common diagnoses recorded were salmonellosis (135), cryptosporidiosis (25), yersiniosis (17), internal parasitism (15), hypocalcaemia (13), paratuberculosis (12), benign theileriosis (10), hypomagnesaemia (10), pestivirus infection (10), calving paralysis (8) and mastitis (8).

Of the 292 sheep investigations, the most common diagnoses recorded were internal parasitism (75), dystocia (13), paratuberculosis (10), pregnancy toxaemia (9), phalaris toxicity (9), hypocalcaemia (6), navel ill (5) and footrot (5).

Of the other 143 investigations of various other species, the most noteworthy final diagnosis was paramyxovirus 1 in pigeons (see page 3).

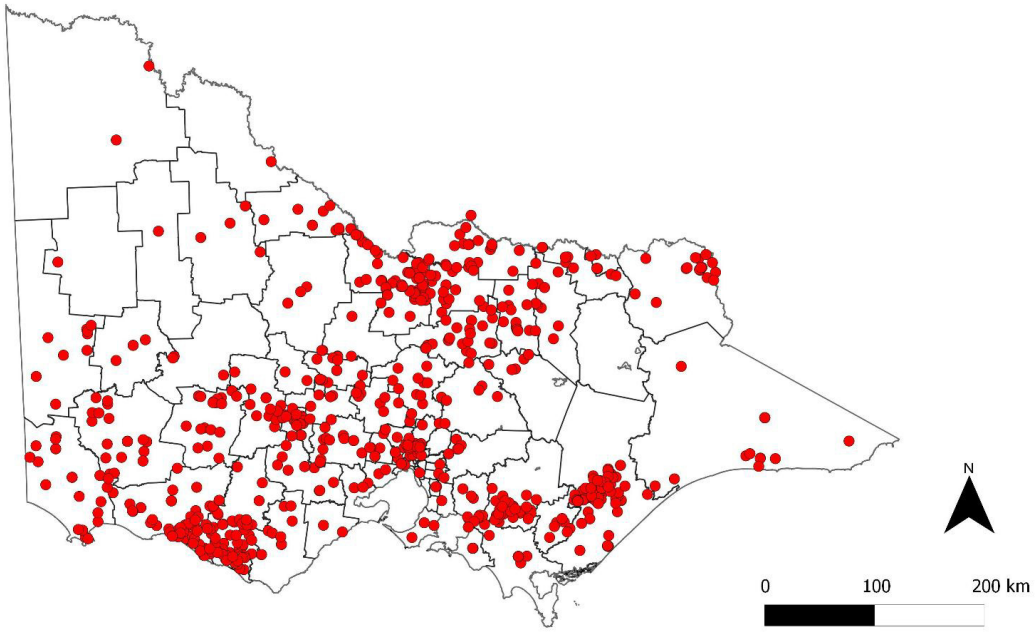


Figure 3 Locations in Victoria of 894 clinical disease events recorded in livestock and domestic avian species between 1 July and 30 September 2011. Large areas where no investigations were recorded are public land or areas with a low density of livestock populations. Municipal boundaries are shown.

Cattle

Benign theileriosis caused by the Theileria orientalis *group*

During the reporting period, benign theileriosis caused by the *Theileria orientalis* group was confirmed by laboratory testing in 10 cattle herds located in south-west Gippsland (5), east Gippsland (2) and north-east Victoria (3). Both beef and dairy breeds were affected. A range of clinical signs were observed, with anaemia, listlessness/depression and jaundice being the most common. In affected herds, mortality and morbidity rates of up to 10% and 30%, respectively, were recorded. A total of 16 deaths and 33 sick cattle were recorded across the 10 affected herds. Diagnosis was made on examination of blood smears that showed the presence of piroplasms within erythrocytes. Further testing by PCR will be undertaken to confirm the variant of *T. orientalis* that is present. For some cases, symptomatic treatment was provided where practical, but this was generally unrewarding.

Benign theileriosis is believed to be transmitted by the bush tick *Haemophysalis longicornis*. This tick is common and widespread in Victoria, particularly in wetter areas. Other vectors may exist. Although bush ticks can infest a variety of animal species, including horses, birds, sheep, goats and native wildlife, they are only able to transmit benign theileriosis to cattle.

Although theileriosis caused by the *T. orientalis* group has been present in Australia since the early 1900s, it has seldom caused any illness and was considered a benign infection. In recent years, there has been an increase in clinical disease, particularly in New South Wales and, more recently, Victoria. DNA typing has revealed that most cases of clinical disease are due to the Ikeda variant of *T. orientalis*. Emergence of a more serious disease may be associated with the movement of cattle from interstate endemic regions and environmental conditions favouring the proliferation of the bush tick.

The epidemiology of benign theileriosis means that reducing the risk of future infections is difficult. Exposed cattle should develop immunity, but owners are advised to monitor cattle closely for the development of clinical signs. Since there is still much to be learnt about the disease, and the role that bush ticks and other possible vectors play, it is unknown if benign theileriosis will persist or spread within Victoria.

Australia is free from the World Organisation for Animal Health (OIE)-listed *Theileria* species *T. parva* and *T. annulata*.

Pigs

Swine dysentery in pigs

An outbreak of diarrhoea and reduced appetite affecting most age groups of pigs (commercial Large White × Landrace) on a farrow-to-finish farm in south-west Victoria was reported to the DPI in early September 2011. Approximately 80% of finisher pigs (over 20 weeks of age) had diarrhoea containing fresh flecks of blood. Five pigs (2% of the finisher population) had died over a four-day period. Grower pigs (10–20 weeks of age), dry sows and gilts were reported to have concurrent reduced feed intakes. Four newly farrowed (four days earlier) sows were off their feed, with hypogalactia and vulval discharges. Two sows had a fever, and another lactating sow had died. Weaners were apparently unaffected.

A variety of fixed and fresh tissues from a dead finisher and a sacrificed sow were presented to the DPI Pig Health and Research Unit in Bendigo, along with two faecal samples from diarrhoeic finishers and a feed sample from the affected finishers' pen. Examination of the faecal samples revealed spirochaetes. The bacterium was subsequently identified on culture as *Brachyspira hyodysenteriae*, the aetiological agent of swine dysentery. *Salmonella*, later confirmed as *Salmonella* Livingston, was isolated from finisher faeces and from finisher feed. *Klebsiella pneumoniae* was isolated from the uterus of the sow. *Klebsiella* spp. are commonly reported from urogenital infections of pigs; however, in the sows, this bacterium was considered incidental to the diarrhoea and reduced feed intake in other age groups of pigs.

The onset of the disease outbreak coincided with the arrival of a fresh batch of ice-cream on the farm, which formed part of the liquid feed provided to all pigs other than the weaners. *Salmonella* Livingston is not a known pathogen of pigs, usually being isolated from poultry. The herd was not previously known to have *B. hyodysenteriae*, but infection must have been subclinical because no biosecurity breaches had occurred and there had been no recent introductions of pigs preceding this disease event. Pigs recovered after tilmicosin medication was added to the feed. Since infection results in significant growth penalties,

requiring ongoing medication, eradication of *B. hyodysenteriae* may be considered in the future.

Sheep

Ill-thrift and diarrhoea in weaner lambs

Nearly all of 3000 crossbred weaner lambs were affected by ill-thrift and diarrhoea on a property near Springhurst in north-east Victoria in early spring 2011. The lambs had been affected to varying degrees for more than two months without any mortalities. Little clinical improvement was seen following anthelmintic treatment with ivermectin, in spite of an initial average faecal egg count of more than 800 eggs per gram, which decreased to 20 eggs per gram following treatment. Necropsy of two clinically affected lambs showed enlarged mesenteric lymph nodes and a thickened jejunum. Culture of intestinal contents was positive for *Campylobacter* spp. Histology revealed blunting of the intestinal villi, large numbers of coccidia in the jejunum and ileum, coccidial schizonts in the mesenteric lymph nodes, and moderate numbers of nematodes in the abomasum and intestinal tract. The owner was advised that, although clinical signs had improved following administration of sulfadimidine and ivermectin, a portion of the flock could continue to suffer from ill-thrift as a result of residual intestinal damage. To prevent future similar outbreaks following high faecal egg counts, the owner was advised to treat lambs appropriately and put them onto clean paddocks.

Selenium deficiency in lambs

Selenium deficiency led to the death of 6 lambs out of 70, with another 8 showing similar symptoms, on a property near Seymour in north-east Victoria in August 2011. The age of affected lambs ranged from one to three weeks. The lambs were born to maiden crossbred ewes run on a predominantly clover (*Trifolium* spp.) pasture. The available level of pasture was more than required. A typical history of the affected animals was a progressive hindlimb ataxia, with a bunny-hop gait and eventual recumbency and death. Two lambs were presented for necropsy at the DPI Biosciences Research Division laboratory. On gross examination, there was cream-coloured streaking and chalky mottling to the muscle groups on all limbs. In one lamb, there was also patchy white mottling on the endocardium of the right ventricle. These gross findings are typical of a severe nutritional myopathy associated with low selenium levels.

Biochemical analysis of liver and blood samples demonstrated the severity of the selenium deficiency, with the liver levels of glutathione peroxidase being 0.5 and 0.3 U/g wet weight, respectively, in the two lambs. (The normal range is 2.0–25.0 U/g wet weight.)

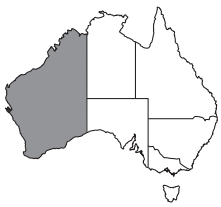
The property has a history of selenium deficiency. The usual management practice is to provide the ewes and lambs with selenium via a drench. In this case, however, because of increased worm burdens, the ewes were given a long-acting anthelmintic capsule in June that did not contain selenium. Coupled with the dominant clover pasture, this probably contributed to the deficiency occurring in the lambs. The remaining lambs and ewes were given a vaccine that included selenium or an additional selium-containing drench at marking.

Acute keratoconjunctivitis and pregnancy toxaemia in ewes

An outbreak of acute keratoconjunctivitis (pink eye) occurred in approximately 45% of a mob of 110 heavily pregnant Merino ewes, on a property near Omeo in eastern Victoria, in mid-August 2011. A mob of 200 wethers and 260 crossbred ewes, and the rams on the farm remained unaffected. The clinical signs in affected sheep included unilateral or bilateral inflammation of the conjunctivae and corneae, with corneal opacity and erosion, marked vascularisation of the cornea in many cases and hypopyon in a few. The worst-affected ewes were blind. Several ewes developed signs consistent with pregnancy toxaemia. Twelve ewes were treated with intramuscular penicillin and oxytetracycline eye spray. Four severely affected ewes were euthanased. Necropsy of one of these ewes showed diffuse fatty changes to the liver consistent with pregnancy toxaemia (twin lamb disease). Affected ewes recovered slowly over a period of about two weeks.

This outbreak was assumed to be the result of a microbial pathogen (e.g. *Mycoplasma* spp. or *Chlamydia* spp.), but no pathogen was isolated or identified from conjunctival swabs subjected to chlamydial immunofluorescence and to examination of Gimenez-stained smears. Failure to identify a pathogen may have been because affected ewes had been treated with ocular and intramuscular antibiotics. Mycoplasmal culture was not conducted because there was no culture medium available at short notice.

The outbreak was unusual because it occurred in mature ewes in mid-winter and in the near absence of bush flies (*Musca vetustissima*). There was no explanation of why the wether and crossbred ewe mobs were unaffected. In the event of a future outbreak of keratoconjunctivitis in sheep, the owner was advised to seek early veterinary advice.



Western Australia

Contributed by Jenny Cotter, Department of Agriculture and Food

Laboratory testing occurred in 347 investigations of animal disease during the quarter.

After a late break to the 2011 season, the July–September quarter has seen good falls of rain over most of the agricultural regions, with exceptions for a couple of areas where crops have failed and water is continuing to be carted for stock. In most regions, pasture growth has been excellent, with stock recovered from the preceding dry period and now in good condition.

Pigs

Human influenza virus in sows and growers

Respiratory signs (including coughing and increased respiratory effort), anorexia, lethargy and pyrexia occurred in a 1000-sow piggery to the south of Perth.

The herd was under the care of the farm's private veterinarian, who suspected an environmental cause for the signs and prescribed an antibiotic, which was included in the ration, and an anti-inflammatory for use in pyrexic pigs. Morbidity increased rapidly over the ensuing days, and the Department of Agriculture and Food Western Australia (DAFWA) was alerted to a severe outbreak of respiratory disease. DAFWA subsequently visited the farm and calculated that 10–15% of 360 sows in the dry shed were affected at that time. The sows were coughing and had increased respiratory effort, and anorexia, lethargy and pyrexia were noted in a small number of sows. The cough was typically nonproductive. Many pigs appeared to be mildly affected, with improvement after several days, while a small number of pigs developed chronic respiratory signs and later died. One sow was necropsied following several days of worsening respiratory signs, lethargy, anorexia and pyrexia, with no response to anti-inflammatory and antibiotic medications.

Several days after clinical signs had arisen in the sow herd, similar signs were noted in a grower shed, with 10% of growers of varying age coughing and mildly lethargic. Nasal swabs were collected in viral transport media from affected sows and from randomly selected growers.

Recent history revealed that the piggery had been closed in 2007 and, within the past 12 months, had been restocked with pigs of high health status. An employee had recently sought medical advice following upper respiratory disease.

All sows and several growers tested positive for influenza type A on PCR of nasal swabs. This is consistent with the clinical signs and possibly the respiratory signs affecting the employee. A diagnosis of influenza with secondary bacterial bronchopneumonia was made on the basis of the PCR results and histology.

Influenza typing identified the isolate as pandemic (H1N1) 2009 strain, and this was confirmed at the CSIRO Australian Animal Health Laboratory. Identification of this strain is a very strong indication that the original source was an infected human. Pigs examined histologically exhibited various degrees of necrosuppurative bronchopneumonia, with fine bacterial bacilli present in bronchial exudate. This is indicative of an aerogenous bacterial infection. Given the presence of an influenza virus in the herd, it is highly likely that the bacterial infection was secondary to initial viral damage. One of the necropsied sows exhibited several other significant lesions. A severe, multifocal subacute myocarditis was present. Myocarditis has been recorded as a result of influenza viraemia in humans, and this may be the cause of the lesion in the pig. Hypoxia due to respiratory disease or pre-existing myocardial damage cannot be totally excluded. Severe hepatic necrosis was also present. This was most likely the result of terminal hypoxia due to either respiratory or cardiac compromise. The large

volumes of ascites and pleural effusion are likely to be due to a combination of cardiac and hepatic failure.

It is important that good biosecurity practices are used at all piggeries. Piggeries should employ staff who have been vaccinated against pandemic (H1N1) influenza 2009. Employees with influenza symptoms should refrain from working with pigs.

Poultry

High Salmonella *mortalities in chicks — avian influenza and Newcastle disease ruled out*

Nine-day-old chickens were submitted for necropsy from a broiler farm in the Great Southern region that had received 25 000 birds at one day of age. The chickens did well until day 4, when the first deaths occurred. Mortality increased daily until it reached 6.5% on day 9. DAFWA received a submission of material from the farm's consulting veterinarian. From the mortality rate, it was immediately evident that Newcastle disease, although initially considered only a possiblity, needed to be ruled out. A field veterinarian was despatched to visit the farms and collect more affected birds for further necropsies. Examination of birds in the barn and discussion with the farm manager confirmed that there were two syndromes occurring: a severe neurological condition, with birds displaying depression and torticollis, and death within a few hours; and a condition involving weakness, staining of the vent and ill-thrift. Examination of the farm's management practices confirmed that the farm had excellent biosecurity, temperatures were within the accepted range for chickens of this age, feed and water were continuously supplied, and litter was clean.

The farm was quarantined, along with a related farm that had also received 25 000 birds of the same age from the same consignor and was experiencing a similar outbreak of illness and a mortality of 7%. The second farm was also visited, and birds were necropsied. The results from both farms revealed acute multifocal but mild omphalitis, hepatitis and colitis in birds exhibiting ill-thrift, and diffuse suppurative and severe meningoencephalitis in birds with neurological signs. Pure strains of *Salmonella* Typhimurium were grown. The *Salmonella* Typhimurium isolates were typed by PathWest using pulsed-field gel electrophoresis and identified as the same strain. This is a strong indication of a common source. Testing for avian influenza and Newcastle disease was negative from all birds. Meningoencephalitis is a rare presentation of salmonellosis. The farm's consulting veterinarian provided advice to the manager and administered antibiotics. The disease has self-limited in both of the affected flocks, and investigations are continuing into identifying the point source of the infection.

Sheep

Photosensitivation

A cluster of photosensitisation cases have occurred in sheep grazing new pastures across an extensive area of the agricultural region. Sheep in the areas north and east of Brookton appear to have suffered secondary photosensitisation with liver disease, which may have been due to the presence of caltrop (*Tribulus terrestris*) in paddocks. In the southern cases, the photosensitisation was primary, with no evidence of liver disease; sheep were grazing clean, normal pasture plants, with no particular weed involvement. Cases have resolved with the provision of shade, a change in pasture or the passage of time.

Quarterly statistics

Endemic disease monitoring

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 infection to be endemic in Queensland, Western Australia or the Northern Territory, and active measures are taken to stamp out any incursions. Table 1 shows the number of herds and flocks known to be infected.

Table 1 Herds or flocks infected with Johne's disease, at 30 September 2011

State	Cattle	Deer	Goat	Sheep	Total
NSW	115	1	2	1286	1404
Qld	2	0	0	0	2
SA	60	0	1	41[a]	102
Tas	14	0	3	64	81
Vic	911[b]	4	6	685	1606
WA	0	0	0	41	41
Aus	1102	5	12	2117	3236

a Two of these flocks are infected with 'cattle' strain.
b Includes herds participating in state test and control programs.

New approaches based on risk assessment and management have been developed to control Johne's disease. Market assurance programs (MAPs) are in operation for cattle, sheep, goats and alpacas; the numbers of herds or flocks that have reached a status of Monitored Negative 1or higher are shown in Table 2. For status definition, see the current species MAP manual, available at the website given below. Herd or flock testing is undertaken by a MAP-approved veterinarian.

Table 2 Herds or flocks[a] with a market assurance program status of at least Monitored Negative 1

	Alpaca	Cattle	Goat	Sheep	Total
Apr–Jun 2011	98	700	42	436	1276
Jul–Sep 2011					
NSW	74	253	22	204	553
Qld	0	0	0	1	1
SA	11	188	9	153	361
Tas	2	54	6	18	80
Vic	7	163	3	63	236
WA	0	0	0	5	5
Aus	94	658	40	444	1236

a There are no herds or flocks in Western Australia or the Northern Territory in the MAPs. Herds or flocks in Free or Protected zones have a status of Monitored Negative 1 or better because of the zone status.

Lists of cattle, goat and alpaca herds, and sheep flocks assessed in the MAPs are available at www.animalhealthaustralia.com.au/programs/johnes-disease/market-assurance-programs-maps.

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 technical adviser, David Kennedy (02 6365 6016).

Enzootic bovine leucosis

In March 2010, in accordance with the National Dairy Enzootic Bovine Leucosis (EBL) Eradication Program standard definitions and rules, Australia declared provisional freedom from EBL in Australian dairy herds. Provisional freedom requires at least 99.8% of dairy herds to test negative for EBL.

EBL testing and accreditation programs have been operating in the dairy industries of Queensland and New South Wales for several years. Victoria, South Australia, Tasmania and Western Australia are bulk milk testing all dairy herds. There are no commercial dairy herds in the Northern Territory. Table 3 shows the number of dairy herds by EBL testing status at the end of the quarter.

Table 3 Enzootic bovine leucosis testing status[a] of dairy herds, at 30 September 2011

State	Infected	Non-assessed	BMT negative	Provisionally clear	Monitored free	Total
NSW	0	0	0	0	867	867
Qld	0	0	0	0	564	564
SA	0	0	0	0	292	292
Tas	0	0	0	0	429	429
Vic	0	0	0	1	4150	4151
WA	0	0	0	0	190	190
Aus	0	0	0	1	6492	6493

BMT = bulk milk testing
a See www.daff.gov.au/__data/assets/pdf_file/0005/1029371/bovine-leucrosis-dairy-def-rules.pdf for information about testing for enzootic bovine leucosis in dairy cattle.

Ovine contagious epididymitis

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 contagious epididymitis freedom operate in all states. Table 4 shows the number of accredited flocks.

Table 4 Ovine contagious epididymitis accredited-free flocks, at the end of each quarter

State	July–Sep 2010	Oct–Dec 2010	Jan–Mar 2011	Apr–Jun 2011	**Jul–Sep 2011**
ACT	1	1	1	1	**1**
NSW	920	886	875	876	**874**
Qld	72	74	75	76	**69**
SA	546	546	541	541	**541**
Tas	76	76	79	78	**81**
Vic	449	510	486	493	**456**
WA	197	196	211	186	**220**
Aus	2261	2289	2268	2251	**2242**

Laboratory testing

Serological testing

Table 5 summarises the results of serological testing for two equine viruses on samples submitted to state and territory animal health laboratories during the quarter. Positive serological test results are not an indication of the presence of clinical disease.

Table 5 Results of serological testing for two equine viruses

	Equine infectious anaemia		Equine viral arteritis	
	Tests	+ve	Tests	+ve
Jul–Sep 2010	673	3	568	6
Oct–Dec 2010	959	0	413	1
Jan–Mar 2011	328	0	277	6
Apr–Jun 2011	700	2	415	1
Jul–Sep 2011				
NSW	313	0	452	8
NT	0	0	0	0
Qld	20	0	0	0
SA	0	0	0	0
Vic	294	0	263	15
WA	18	0	19	0
Aus	645	0	734	23

Table 6 summarises the results of laboratory investigations for equine herpesvirus 1 on samples submitted to state and territory animal health laboratories during the quarter.

Table 6 Results of testing for equine herpesvirus 1

Syndrome	Suspect	Negative	Positive	Tests
Abortion	2	82	6	90
Neurological	0	3	0	3
Other	0	3	0	3
Total	2	88	6	96

Table 7 summarises the results of serological testing for enzootic bovine leucosis in beef cattle on samples submitted to state and territory animal health laboratories during the quarter.

Table 7 Results of serological testing for enzootic bovine leucosis in beef cattle

	Tests	Positive
Jul–Sep 2010	2899	0
Oct–Dec 2009	6400	4
Jan–Mar 2011	711	0
Apr–Jun 2011	2505	1
Jul–Sep 2011		
NSW	80	0
NT	1206	92
Qld	142	0
Vic	441	0
WA	7216	1
Aus	9085	93

Table 8 summarises the results of serological testing for three arboviruses on samples submitted to state and territory animal health laboratories during the quarter. Positive serological test results are not an indication of the presence of clinical disease. The distribution of these viruses is monitored by the National Arbovirus Monitoring Program (NAMP); further information can be found at namp.animalhealthaustralia.com.au.

Table 8 Results of serological testing for three arboviruses

	Akabane		Bluetongue		Bovine ephemeral fever	
	Tests	+ve	Tests	+ve	Tests	+ve
Jul–Sep 2010	1 843	295	6 024	376	1 560	386
Oct–Dec 2010	6 944	591	7 763	388	2 129	529
Jan–Mar 2011	9 313	294	12 772	296	1 578	416
Apr–Jun 2011	2 661	500	12 117	756	2 210	609
Jul–Sep 2011	**2 592**	**358**	**9 915**	**271**	**1 170**	**163**

National Residue Survey

There were 3340 meat samples collected and analysed in the National Residue Survey (NRS) Random Monitoring Program for the quarter. Five samples were found with residues above the relevant standard in the Australia New Zealand Food Standards Code (Table 9).[1]

A liver sample from a beef (bobby calf) was found to contain lasalocid at 0.84 mg/kg, which is above the Australian standard of 0.7 mg/kg. The traceback investigation determined that the residue most likely resulted from the use of a milk replacement product containing lasalocid although product misuse was not suspected.

Two lead residues were detected in sheep liver samples at levels of 0.59 mg/kg and 0.7 mg/kg, which are above the Australian maximum level (ML) of 0.5 mg/kg. The traceback investigation for the first residue did not find an obvious cause for the contamination. The second lead residue is currently under investigation.

A further sheep liver sample was found to contain a cadmium residue of 1.40 mg/kg, which is above the Australian ML of 1.25 mg/kg. Cadmium residues above the ML are a common finding in older sheep across southern Australia. Although this detection is above the Australian standard for sheep liver, it is below the action level of 2.5 mg/kg required to initiate a traceback investigation.

A pig fat sample was detected to contain 0.22 mg/kg of aroclor 1254, exceeding the Australian standard of 0.2 mg/kg. A traceback investigation is under way.

Contributed by Jim Derrick, National Residue Survey, Australian Government Department of Agriculture, Fisheries and Forestry

[1] www.foodstandards.gov.au/foodstandards/foodstandardscode.cfm

[2] The maximum level (ML) is the maximum concentration of a contaminant (e.g. a metal, natural toxicant, or agricultural or veterinary chemical that is no longer used in agriculture, but can persist in the environment) in or on a food, agricultural commodity or feed. The concentration is expressed in milligrams per kilogram (mg/kg) or parts per million of a commodity.

Table 9 Number of samples tested (column A) and samples with test results above the relevant standard[a] (column B) during the quarter

		ACT		NSW		NT		Qld		SA		Tas		Vic		WA		**Aus**	
Chemical	Source	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	**A**	**B**
Anthelmintics	Cattle	0	0	54	1	0	0	63	0	14	0	4	0	16	0	5	0	**156**	**1**
	Pigs	0	0	22	0	0	0	10	0	13	0	0	0	5	0	1	0	**51**	**0**
	Poultry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
	Sheep	0	0	86	0	0	0	3	0	41	0	1	0	35	0	62	0	**228**	**0**
	Other	0	0	11	0	0	0	14	0	1	0	0	0	5	0	2	0	**33**	**0**
	Total	0	0	173	1	0	0	90	0	69	0	5	0	61	0	70	0	**468**	**1**
Antimicrobials	Cattle	1	0	83	0	0	0	127	0	17	0	10	0	47	0	9	0	**294**	**0**
	Pigs	0	0	28	0	0	0	22	0	30	0	0	0	21	0	2	0	**103**	**0**
	Poultry	2	0	30	0	0	0	5	0	11	0	0	0	17	0	3	0	**68**	**0**
	Sheep	0	0	57	0	0	0	0	0	24	0	1	0	28	0	36	0	**146**	**0**
	Other	0	0	2	0	0	0	9	0	0	0	0	0	9	0	2	0	**22**	**0**
	Total	3	0	200	0	0	0	163	0	82	0	11	0	122	0	52	0	**633**	**0**
Growth promotants	Cattle	0	0	77	0	0	0	123	0	31	0	4	0	32	0	13	0	**280**	**0**
	Pigs	0	0	22	0	0	0	20	0	29	0	0	0	29	0	3	0	**103**	**0**
	Poultry	0	0	6	0	0	0	1	0	2	0	1	0	1	0	1	0	**12**	**0**
	Sheep	0	0	63	0	0	0	6	0	37	0	0	0	39	0	45	0	**190**	**0**
	Other	0	0	0	0	0	0	4	0	0	0	0	0	5	0	1	0	**10**	**0**
	Total	0	0	168	0	0	0	154	0	99	0	5	0	106	0	63	0	**595**	**0**
Insecticides	Cattle	0	0	104	0	1	0	109	0	28	0	19	0	49	0	12	0	**322**	**0**
	Pigs	0	0	15	0	0	0	5	0	15	0	0	0	11	1	2	0	**48**	**1**
	Poultry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
	Sheep	0	0	130	0	0	0	9	0	71	0	2	0	36	0	83	0	**331**	**0**
	Other	3	0	14	0	0	0	19	0	2	0	0	0	2	0	5	0	**45**	**0**
	Total	3	0	263	0	1	0	142	0	116	0	21	0	98	1	102	0	**746**	**1**
Metals	Cattle	0	0	21	0	0	0	24	0	22	0	1	0	14	0	3	0	**85**	**0**
	Pigs	0	0	12	0	0	0	7	0	15	0	0	0	8	0	1	0	**43**	**0**
	Poultry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
	Sheep	0	0	36	0	0	0	0	0	6	1	0	0	7	0	32	2	**81**	**3**
	Other	2	0	6	0	0	0	16	0	0	0	0	0	6	0	2	0	**32**	**0**
	Total	2	0	75	0	0	0	47	0	43	1	1	0	35	0	38	2	**241**	**3**
Miscellaneous	Cattle	1	0	81	0	2	0	102	0	7	0	7	0	20	0	3	0	**223**	**0**
	Pigs	0	0	48	0	0	0	29	0	78	0	5	0	42	0	2	0	**204**	**0**
	Poultry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
	Sheep	2	0	97	0	0	0	9	0	37	0	1	0	24	0	50	0	**220**	**0**
	Other	0	0	1	0	0	0	3	0	0	0	0	0	3	0	3	0	**10**	**0**
	Total	3	0	227	0	2	0	143	0	122	0	13	0	89	0	58	0	**657**	**0**

Table 9 *continued*

		ACT		NSW		NT		Qld		SA		Tas		Vic		WA		**Aus**	
Chemical	Source	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	**A**	**B**
Total	Cattle	2	0	420	1	3	0	548	0	119	0	45	0	178	0	45	0	**1360**	**1**
	Pigs	0	0	147	0	0	0	93	0	180	0	5	0	116	1	11	0	**552**	**1**
	Poultry	2	0	36	0	0	0	6	0	13	0	1	0	18	0	4	0	**80**	**0**
	Sheep	2	0	469	0	0	0	27	0	216	1	5	0	169	0	308	2	**1196**	**3**
	Other	5	0	34	0	0	0	65	0	3	0	0	0	30	0	15	0	**152**	**0**
	Total	11	0	1106	1	3	0	739	0	531	1	56	0	511	1	383	2	**3340**	**5**

a Maximum residue limit or maximum level

Surveillance activities

Bovine brucellosis

Australia declared freedom from bovine brucellosis in 1989. Surveillance is maintained through abortion investigations and additional testing of cattle for export or other reasons. Table 10 shows that 297 bovine abortion investigations and 1517 investigations for other reasons took place during the quarter; all were negative for bovine brucellosis.

Table 10 Bovine brucellosis testing

	Abortion		Other reasons	
	Tests	Positive	Tests[a]	Positive
Jul–Sep 2010	168	0	648	0
Oct–Dec 2010	728	0	1159	0
Jan–Mar 2011	340	0	541	0
Apr–Jun 2011	116	0	1206	0
Jul–Sep 2011				
NSW	0	0	532	0
Qld	265	0	940	0
SA	5	0	20	0
Tas	6	0	0	0
Vic	0	0	21	0
WA	21	0	4	0
Aus	297	0	1517	0

a A proportion of this testing information is derived from pre-export testing of cattle destined for live export markets where the importing country requires testing. The total number of tests each quarter may therefore vary depending on total cattle exports to particular markets.

Bovine tuberculosis

Australia was declared free from bovine tuberculosis (TB) on 31 December 1997, exceeding the World Organisation for Animal Health's requirements for declaration of country freedom. The last cases of TB were detected in buffalo in January 2002 and in cattle in December 2000. Traceforward and traceback slaughter were carried out according to the Tuberculosis Freedom Assurance Program.

Meat inspection for granulomas (by the Australian Quarantine and Inspection Service) has been the primary surveillance activity for bovine TB since 1992. This activity involves the submission of granulomas, found in the head and thorax of slaughtered cattle, for laboratory examination. Table 11 shows the number of granulomas submitted and test results.

All Australian laboratories examining granulomas are accredited for veterinary testing by the National Association of Testing Authorities under ISO/IEC 17025. In addition, laboratories approved for culture of *Mycobacterium bovis* must pass an annual external quality assurance program, run by the Australian Reference Laboratory for TB.

Table 11 Granulomas submitted for bovine tuberculosis (TB) testing

	Jul–Sep 2010	Oct–Dec 2010	Jan–Mar 2011	Apr–Jun 2011	**Jul–Sep 2011**
Submitted	63	84	50	67	**88**
TB positive	0	0	0	0	**0**

National Transmissible Spongiform Encephalopathies Surveillance Program

The National Transmissible Spongiform Encephalopathies Surveillance Program (NTSESP) is an integrated national program jointly funded by industry and government to demonstrate Australia's ongoing freedom from bovine spongiform encephalopathy (BSE) and scrapie, and to provide early detection of these diseases should they occur. The program, based on the World Organisation for Animal Health Terrestrial Code,[1] involves testing of samples from cattle and sheep with clinical signs consistent with BSE or scrapie, respectively, as well as from *fallen* and *casualty slaughter* cattle. Points are assigned to cattle samples according to the animal's age and subpopulation category (i.e. the likelihood of detecting BSE). Australia's target is to achieve a minimum of 150 000 points over a rolling seven-year period. Table 12 shows the number of animals sampled for BSE and scrapie, and the points tally for cattle, in the NTSESP over the past 12 months. All samples tested were negative.

Additional information about the NTSESP is available at www.animalhealthaustralia.com.au/programs/biosecurity/tse-freedom-assurance-program/national-tse-surveillance-program.

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

[1] Bovine spongiform encephalopathy, Chapter 11.5, *Terrestrial Animal Health Code*, OIE (2010). www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.11.5.htm

Table 12 Samples tested for bovine spongiform encephalopathy and scrapie from 1 October 2010 to 30 September 2011

	Cattle			Sheep	
State	No. examined	No. points	No. positive	No. examined	No. positive
NSW	167	48 930.2	0	163	0
NT	21	10 770	0	0	0
Qld	233	70 188.1	0	18	0
SA	33	9 613.7	0	71	0
Tas	14	4 676.8	0	5	0
Vic	191	84 719.9	0	131	0
WA	41	16 121	0	121	0
Aus	700	245 019.7	0	509	0

Area prevalence estimates for ovine Johne's disease in 2010

This report summarises prevalence estimates for ovine Johne's disease (OJD) prevalence areas based on abattoir monitoring data for the 2010 calendar year.

All analyses used a nationally standardised Bayesian simulation method to estimate prevalence. This approach combines prior estimates of prevalence with estimates of flock-level sensitivity and specificity of abattoir monitoring, and the observed results provide revised estimates for the current year. Data are aggregated by property identification code before analysis. Flock-level sensitivity estimates for each area are based on the average numbers of animals inspected per flock for each area.

Abattoir monitoring results and corresponding prevalence estimates are summarised by prevalence area and state in Table 13.

In 2010, only 3500 lines were screened, 50% of the national target. This reduction was due to the lower numbers of adult stock killed in Australia during the year and problems with access to some abattoirs following reforms to the export certification process introduced during the year.

Table 13 Summary of abattoir surveillance and corresponding prevalence estimates grouped by prevalence area. 95% values in bold exceed the cutoff for the respective area

Prevalence area	Region[a]	2010 abattoir monitoring (numbers of PICs)				Prevalence estimates	
		Negative	Positive	Total	% positive	Median	95th percentile
High prevalence	NSW	193	113	306	36.9	46.8	81.4
Medium prevalence	NSW	39	10	49	20.4	25.9	49.2
	SA	116	2	118	1.7	2.6	6.1
	Tas	296	15	311	4.8	4.9	8
	Vict	97	44	141	31.2	30.7	36
Low prevalence	NSW	363	2	365	0.5	0.9	1.6
	Qld	168	0	168	0	0.4	0.9
	SA	701	3	704	0.4	0.3	0.7
	Vic	69	4	73	5.5	4.6	7.3
	WA	335	16	351	4.6	2.7	4
	Eastern Australia LPA	1301	9	1310	0.69	0.8	2.6

LPA = low prevalence area; PIC = property identification code
a There are currently no known infected flocks in Queensland.

Avian influenza

Australia is currently free from highly pathogenic avian influenza. A number of low pathogenic subtypes of avian influenza have been found in wild birds. Please consult the Australian Wildlife Health Network (AWHN) report in this publication for information on avian influenza in wild birds.

During the quarter, 638 birds from 180 laboratory submissions were tested for avian influenza (excluding surveillance reported in the AWHN and Northern Australia Quarantine Strategy reports); there were no positive results (Table 14). Tests include competitive ELISA, haemagglutination inhibition, agar gel immunodiffusion, reverse-transcriptase PCR and virus isolation.

Table 14 Avian influenza testing, 1 July to 30 September 2011[a]

H5 positive	H7 positive	Positive for a non-H5, non-H7 strain
0	0	0

a Excludes testing for import purposes

Newcastle disease

Australia is currently free from virulent Newcastle disease or exotic Newcastle disease, even though precursor viruses are present in Australia. Vaccination against virulent Newcastle disease using a combination of live lentogenic virus (V4) and a killed vaccine is required in commercial chicken flocks in all Australian jurisdictions (except broilers in Tasmania and Western Australia). During the quarter, 558 birds from 164 laboratory submissions were tested for Newcastle disease; one result was positive for a lentogenic V4 or V4-like Newcastle disease virus, confirmed by PCR as being consistent with vaccine V4 virus, and 54 were positive for other paramyxovirus (APMV-1) (Table 15).

Table 15 Newcastle disease (ND) testing, 1 July to 30 September 2011[a]

Virulent strain of ND virus	Peats Ridge strain of ND virus	Lentogenic V4 or V4-like ND virus	Other paramyxovirus
0	0	1	54

a Excludes testing for import purposes

Salmonella surveillance

The National Enteric Pathogens Surveillance Scheme (NEPSS) is operated and maintained on behalf of the Australian Government, and state and territory governments by the Microbiological Diagnostic Unit at the University of Melbourne. Data on isolates of salmonellas and other pathogens are submitted to NEPSS from participating laboratories around Australia. Annual reports of both human and nonhuman isolates are available on request, and detailed data searches are also provided on request to NEPSS. Table 16 summarises *Salmonella* isolations from animals notified to NEPSS for the quarter.

Contact: Joan Powling, National Enteric Pathogens Surveillance Scheme, Microbiological Diagnostic Unit, University of Melbourne

Table 16 *Salmonella* notifications, 1 July to 30 September 2011

Salmonella serovar	Birds[a]	Cats	Cattle	Dogs	Horses	Pigs	Sheep	Other	Total
Bovismorbificans	1	1	46	0	0	1	1	0	50
Dublin	0	0	44	0	0	0	0	0	44
Infantis	0	0	2	1	0	0	1	1	5
Typhimurium	0	3	65	5	8	14	11	2	108
Other	4	2	88	12	6	14	2	15	143
Total	5	6	245	18	14	29	15	18	350

a Includes both poultry and wild birds

Northern Australia Quarantine Strategy

In recognition of the unique quarantine risks associated with Australia's sparsely populated northern coastline, the Australian Government Department of Agriculture, Fisheries and Forestry conducts an animal disease surveillance program as an integral component of the Northern Australia Quarantine Strategy (NAQS). Surveillance activities by NAQS aim to provide improved detection in a defined region for targeted pests and diseases, including those that threaten livestock industries and, in some cases, human health. Information is obtained through the use of sentinel animals, structured surveys, opportunistic sampling, community reporting and insect-trapping activities. Table 17 summarises NAQS animal testing in Australia over the past five quarters.

Further information about the NAQS program, including the target list for animal pests and diseases, can be found at www.daff.gov.au/aqis/quarantine/naqs.

Contact: Beth Cookson, Northern Australia Quarantine Strategy, Australian Government Department of Agriculture, Fisheries and Forestry

Table 17 Disease testing and pest surveillance under the Northern Australia Quarantine Strategy

	Jul–Sep 2010		Oct–Dec 2010		Jan–Mar 2011		Apr–Jun 2011		**Jul–Sep 2011**	
Disease or pest	Tested	+ve	Tested	+ve	Tested	+ve	Tested	+ve	**Tested**	**+ve**
Avian influenza — highly pathogenic	0	0	0	0	0	0	28	0	**0**	**0**
Classical swine fever	0	0	310	0	0	0	193	0	**139**	**0**
Japanese encephalitis	0	0	0	0	60	0	32	0	**0**	**0**
Surra — *Trypanosoma evansi*	22	0	25	0	17	0	158	0	**139**	**0**

Screw-worm fly freedom assurance program

The screw-worm fly freedom assurance program is managed by Animal Health Australia. This program brings together relevant national surveillance data from surveillance undertaken at ports, Northern Australia Quarantine Strategy operations in the Torres Strait, myiasis reporting (including data from meat inspections by the Australian Quarantine and Inspection Service and activities of Australia's livestock industries) and negative surveillance data. Screw-worm fly surveillance increases the capacity for early detection of screw-worm fly incursions, which increases the probability of a successful eradication program. Table 18 summarises adult fly-trapping efforts over the last five quarters.

Contact Duncan Rowland, Animal Health Australia

Table 18 Summary of adult fly trapping

Program	Jul–Sep 2010		Oct–Dec 2010		Jan–Mar 2011		Apr–Jun 2011		**Jul–Sep 2011**	
	Traps examined	Positive	Traps examined	Positive	Traps examined	Positive	Traps examined	Positive	**Traps examined**	**Positive**
NAQS	39	0	27	0	26	0	21	0	**24**	**0**
Port surveillance	42	0	45	0	34	0	24	0	**19**	**0**

Note: Excludes traps with identification results pending.

Surveillance at sea ports — trapping for *Culicoides* midges and the National Sentinel Hive Program

Surveillance is conducted at sea ports for *Culicoides* midges (the insect vector for bluetongue and Akabane viruses in Australia) and exotic pests of honeybees, as seaports that service returning livestock vessels are considered to be high-risk locations for incursions of these vectors and pests. *Culicoides* midge surveillance at sea ports supports the livestock export trade by confirming the continuous or seasonal absence of *Culicoides* vectors at ports from which livestock are loaded. Table 19 shows the number of times that insect-trap sites at seaports were inspected for specific insects or mites in the Ports Surveillance Program and the National Sentinel Hive Program during the quarter; no detections were recorded. Suspect emergency and exotic disease investigations are reported in Table 21.

Contact: Howe Heng, Biosecurity Australia (Ports Surveillance Program), or Glynn Maynard, Australian Government, Department of Agriculture, Fisheries and Forestry (National Sentinel Hive Program)

Table 19 Negative insect-trap inspections under the Ports Surveillance and National Sentinel Hive programs

Species	Jul–Sep 2010	Oct–Dec 2010	Jan–Mar 2011	Apr–Jun 2011	**Jul–Sep 2011**
Asian bees	50	20	28	21	**24**
Culicoides spp.	27	28	26	27	**26**
Tracheal mites	22	36	36	31	**16**
Tropilaelaps mites	27	33	36	31	**16**
Varroa mites	27	33	36	31	**16**

Public health

The National Notifiable Diseases Surveillance System (NNDSS) coordinates the national surveillance of more than 50 communicable diseases or disease groups. Unit records of disease notifications made to the state or territory health authority, under the provisions of the public health legislation in their jurisdiction, are supplied daily to the Office of Health Protection, Australian Government Department of Health and Ageing. The data are published weekly on the NNDSS website and quarterly in the journal *Communicable Diseases Intelligence,* and are replicated in Table 20 for five important zoonoses.

Contact: epi@health.gov.au or visit NNDSS at www9.health.gov.au/cda/Source/CDA-index.cfm

Table 20 National notifications of five zoonotic infections in humans

Disease	Jul–Sep 2010	Oct–Dec 2010	Jan–Mar 2011	Apr–Jun 2011	**Jul–Sep 2011**	Current quarter (Jul–Sep 2011)						
						ACT	NSW	Qld	SA	Tas	Vic	WA
Brucellosis[a]	7	5	9	11	**7**	0	0	7	0	0	0	0
Chlamydophilosis[b]	6	27	23	19	**12**	0	3	0	0	1	8	0
Leptospirosis	27	29	111	60	**19**	1	4	11	1	0	2	0
Listeriosis	8	16	16	22	**9**	1	3	1	1	0	1	2
Q fever	87	67	79	80	**62**	0	21	31	3	0	6	1

a Bovine brucellosis (*Brucella abortus*) was eradicated from the Australian cattle herd in 1989 and is currently considered an exotic animal disease in Australia. Caprine and ovine brucellosis (caused by *B. melitensis*) has never been reported in Australian sheep or goats. Swine brucellosis (caused by *B. suis*) is confined to small areas of northern Australia, where it occurs in feral pigs, with human cases predominantly seen in recreational feral pig hunters. It is rare in domestic pigs, cattle and horses.
b Also known as psittacosis or ornithosis

Suspect exotic or emergency disease investigations

There were 796 investigations of diseases reported during the quarter (Table 21) that were suspected to be either exotic or possible emergency diseases. More details about the investigations can be found in the state and territory reports, or from the relevant state or territory coordinator; contact details are provided on the back cover. Further information regarding Australia's emergency animal disease preparedness and management can be found at www.daff.gov.au/animal-plant-health/animal/emergency.

Table 21 Exotic or emergency disease investigations reported, 1 July to 30 September 2011

Disease	Species	State	Month	Response code	Finding
American foulbrood *Paenibacillus larvae*	Honeybee	NSW	Sep	2	Positive
Bluetongue — clinical disease	Bovine	NSW	Jul	2	Negative
	Ovine	NSW	Jul	2	Negative
Bovine virus diarrhoea type 2	Bovine	WA	Aug	3	Negative
Brucellosis (*B.abortus*, *B suis*, *B canis* and *B. melitensis*)	Caprine	SA	Aug	2	Negative
	Porcine	SA	Aug	2	Negative
Enzootic bovine leucosis	Bovine	SA	Jul	2	Negative
	Bovine	SA	Aug	2	Negative
Equine encephalosis	Equine	WA	Aug	3	Negative
Equine influenza	Equine	NT	Jul	3	Negative
	Equine	SA	Aug	3	Negative
Foot-and-mouth disease	Banteng	Vic	Sep	3	Negative
	Bovine	NSW	Jul	3	Negative
	Bovine	NSW	Aug	3	Negative
	Bovine	SA	Jul	3	Negative
	Bovine	Vic	Sep	3	Negative

Table 21 *continued*

Disease	Species	State	Month	Response code	Finding
Hendra virus infection	Canine	NSW	Jul	2	Negative (3 unrelated investigations)
	Canine	NSW	Sep	2	Negative (2 unrelated investigations)
	Canine	Qld	Jul	3	Negative
	Canine	Qld	Jul	5	Negative (12 related investigations)
	Canine	Qld	Jul	5	Positive (2 related investigations)
	Canine	Qld	Jul	5	Negative
	Canine	Qld	Aug	2	Negative
	Canine	Qld	Aug	5	Negative (7 related investigations)
	Canine	Qld	Sep	5	Negative (2 related investigations)
	Equine	ACT	Aug	3	Negative
	Equine	NSW	Jul	2	Negative (83 investigations)
	Equine	NSW	Jul	3	Negative (8 unrelated investigations)
	Equine	NSW	Jul	3	Positive (4 unrelated investigations)
	Equine	NSW	Aug	2	Negative (67 investigations)
	Equine	NSW	Aug	3	Positive
	Equine	NSW	Aug	3	Negative (12 unrelated investigations)
	Equine	NSW	Aug	3	Positive (3 unrelated investigations)
	Equine	NSW	Sep	2	Negative (39 investigations)
	Equine	NSW	Sep	3	Negative (5 unrelated investigations)
	Equine	NT	Jul	3	Negative
	Equine	Qld	Jul	2	Negative (8 related investigations)
	Equine	Qld	Jul	2	Negative (185 investigations)
	Equine	Qld	Jul	3	Negative (2 related investigations)
	Equine	Qld	Jul	3	Negative (10 unrelated investigations)
	Equine	Qld	Jul	5	Negative (23 related investigations)
	Equine	Qld	Jul	5	Positive (9 related investigations)
	Equine	Qld	Jul	5	Negative
	Equine	Qld	Jul	5	Positive
	Equine	Qld	Aug	2	Negative (130 investigations)
	Equine	Qld	Aug	3	Negative (2 related investigations)
	Equine	Qld	Aug	5	Negative (14 related investigations)
	Equine	Qld	Aug	5	Positive (2 related investigations)
	Equine	Qld	Aug	5	Negative
	Equine	Qld	Sep	2	Negative (66 investigations)
	Equine	Qld	Sep	5	Negative (2 related investigations)
	Equine	SA	Jul	3	Negative (5 unrelated investigations)
	Equine	SA	Aug	3	Negative (7 unrelated investigations)
	Equine	SA	Sep	3	Negative

Table 21 *continued*

Disease	Species	State	Month	Response code	Finding
Hendra virus infection *continued*	Equine	Vic	Jul	3	Negative (5 unrelated investigations)
	Equine	Vic	Aug	3	Negative (4 unrelated investigations)
	Equine	WA	Jul	3	Negative (3 unrelated investigations)
	Equine	WA	Aug	3	Negative (8 unrelated investigations)
	Equine	WA	Sep	3	Negative
	Feline	NSW	Jul	2	Negative
	Feline	NSW	Aug	2	Negative (2 unrelated investigations)
	Feline	Qld	Jul	5	Negative (4 related investigations)
Swine influenza	Porcine	WA	Jul	2	Positive
Varroasis — *Varroa destructor*	Honeybee	Vic	Sep	2	Negative
West Nile virus infection — clinical	Avian	SA	Jul	3	Negative (2 unrelated investigations)
	Avian	SA	Sep	3	Negative
	Bovine	NSW	Sep	2	Negative
	Chicken	SA	Sep	3	Negative (3 unrelated investigations)
	Emu	SA	Sep	3	Negative
	Equine	NSW	Jul	2	Negative (17 unrelated investigations)
	Equine	WA	Aug	3	Negative

Key to response codes
1: Field investigation by government officer
2: Investigation by state or territory government veterinary laboratory
3: Specimens sent to the CSIRO Australian Animal Health Laboratory (or CSIRO 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; detailed data are maintained by the source organisations. Please contact the relevant person below if further details are required. NAHIS is on the internet (nahis.animalhealthaustralia.com.au).

Name	Role	Phone	email
Ian Langstaff	NAHIS Program Manager	02 6203 3909	ilangstaff@animalhealthaustralia.com.au
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Winnie Wong	Australian Milk Residue Analysis Survey	03 9810 5930	wwong@dairysafe.vic.gov.au
Rupert Woods	Australian Wildlife Health Network	02 9978 4579	rwoods@zoo.nsw.gov.au
Joan Powling	National Enteric Pathogens Surveillance Scheme	03 8344 5701	joanp@unimelb.edu.au
Ron Southgate	National Granuloma Submission Program	02 6272 3101	ron.southgate@aqis.gov.au
Mark Trungove	National Notifiable Diseases Surveillance System	02 6289 8315	mark.trungove@health.gov.au
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Beth Cookson	Northern Australia Quarantine Strategy	07 4030 7853	beth.cookson@aqis.gov.au
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Cameron Bell	Vic Coordinator	03 5430 4545	cameron.bell@dpi.vic.gov.au
Jennifer Cotter	WA Coordinator	08 9892 8421	jennifer.cotter@agric.wa.gov.au

EMERGENCY ANIMAL DISEASE WATCH HOTLINE — 1800 675 888

The Emergency Animal 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.

There were 1513 calls to the Emergency Animal Disease Watch Hotline during the quarter.

For information about the Emergency Animal Disease Watch Hotline, contact Animal Health Australia.

Animal Health Australia is a not-for-profit public company established by the Australian Government, state and territory governments, and major national livestock industry organisations. The company manages national animal programs on behalf of its members.

ANIMAL HEALTH SURVEILLANCE

This report was published by Animal Health Australia from information supplied by the many organisations that contribute to the National Animal Health Information System.

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