NSW GOVERNMENT

Information contributed by staff of
NSW Department of Primary Industries
and Local Land Services

NEW SOUTH WALES

ANIMAL HEALTH SURVEILLANCE

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In this issue

Can foot-and-mouth disease be eradicated from the world?

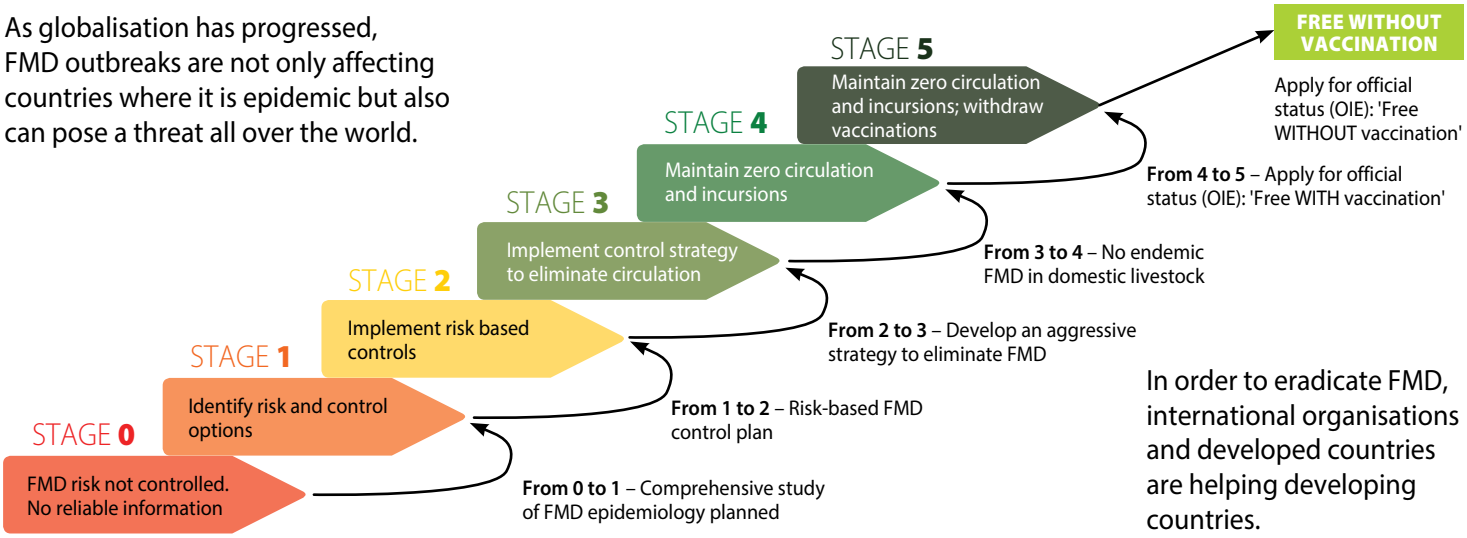
Foot-and-mouth disease (FMD) is highly contagious. It infects a wide variety of domestic and wildlife hosts and occurs as seven non-cross-protective virus serotypes (O, A, C, Asia1, South African Territories [SAT] 1, SAT 2 and SAT 3), which are further categorised into numerous variant 'topotypes'. Some areas of the world, including Central and North America and Australia–Oceania, have managed to become, or stay, free of FMD (see map below).

However, Australia remains at risk, and many of our active government veterinary surveillance programs are targeted at preventing the entry of FMD virus and at rapid detection if it does enter.

In 2012, the United Nations Food and Agriculture Organization (FAO) and the OIE (World Organisation for Animal Health) embarked on a Global FMD Control Strategy to improve the livelihoods of farmers in regions where the disease is still endemic and to protect the advanced animal disease-control status in other regions of the world, including Australia. The Strategy also improves government veterinary services in developing countries so that they can control other priority animal diseases. In effect, the Strategy, to which Australia contributes, is a 'Global Public Good'.

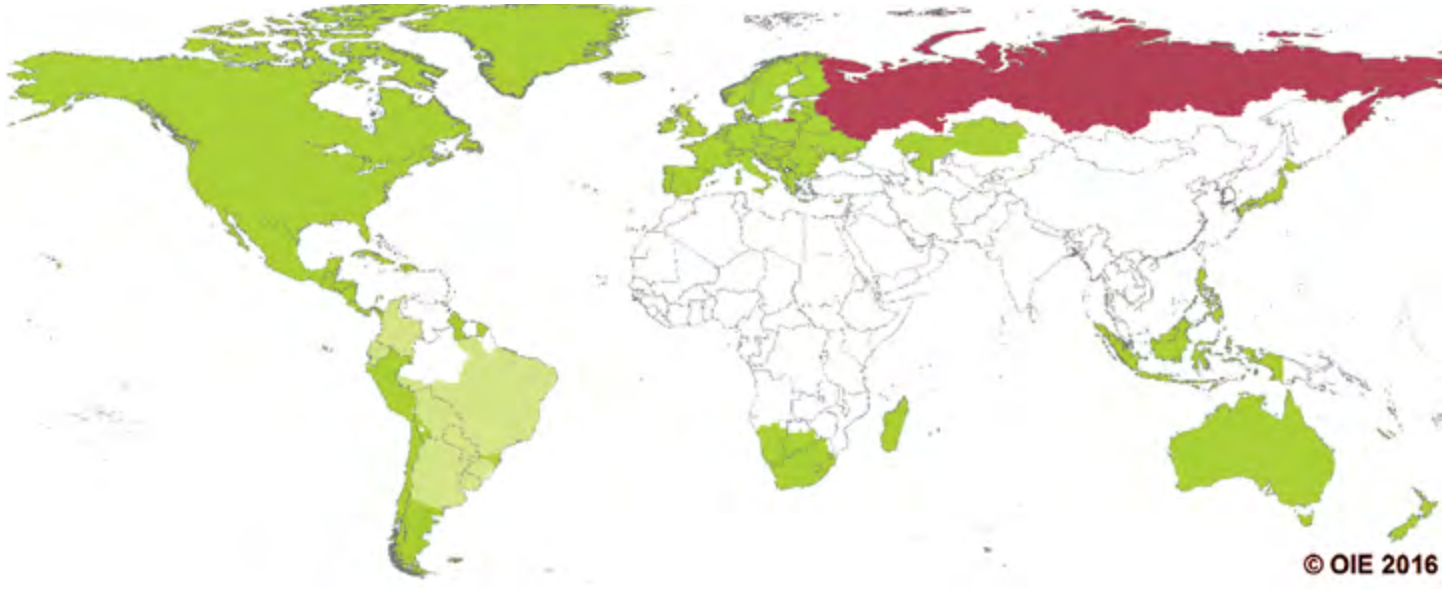
The Strategy is based on a 'Progressive Control Pathway' (PCP)(see figure below). Different countries are on different steps in the pathway, but it is important to complete each step before moving to the next. The overall goal is that, by 2027, countries that were in PCP stages 0 and 1 will have progressed at least two stages along the PCP. In practice, this could mean that all FMD-infected countries will be applying 'risk-based control' or 'aggressive FMD elimination programs' within the next 11 years.

As globalisation has progressed, FMD outbreaks are not only affecting countries where it is epidemic but also can pose a threat all over the world.

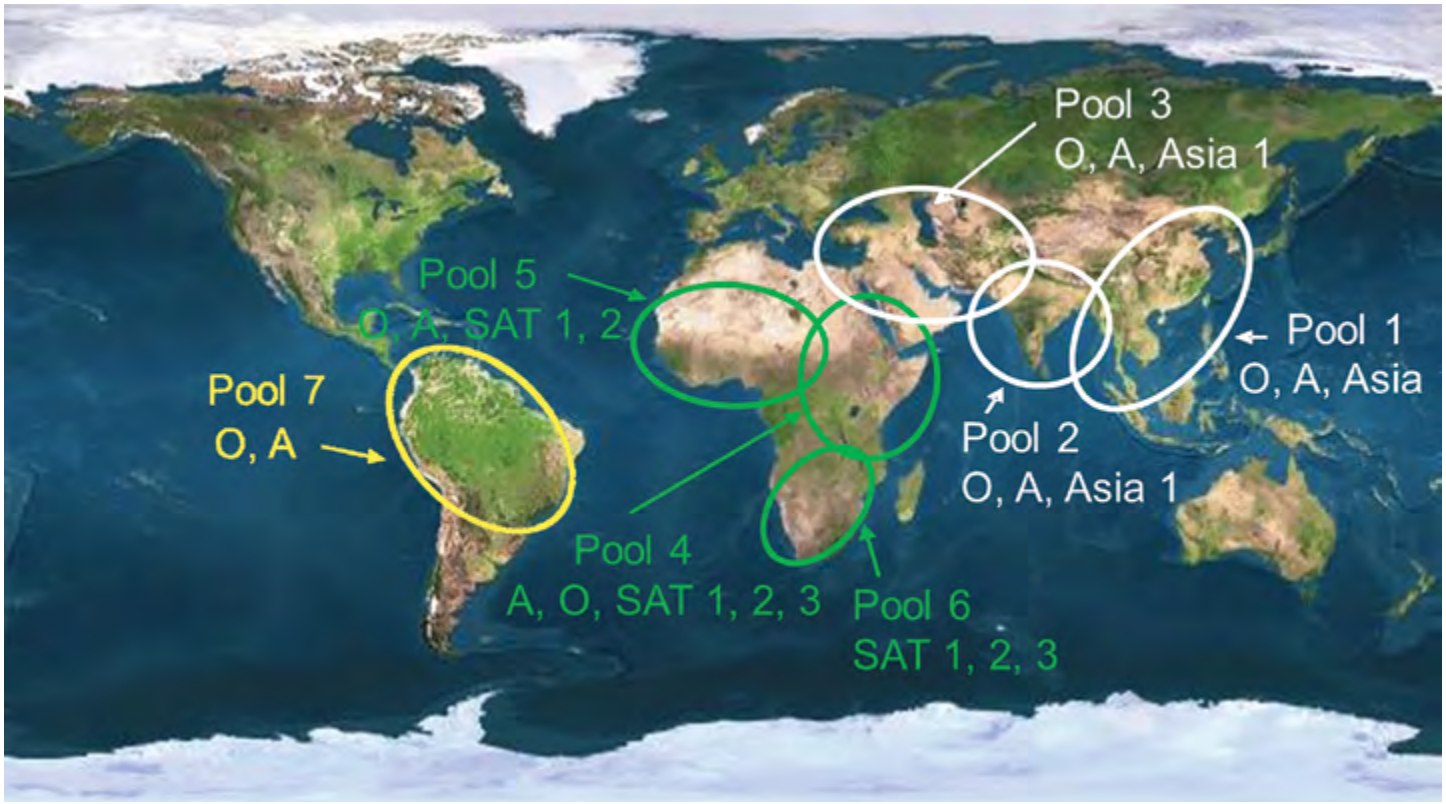


In order to eradicate FMD, international organisations and developed countries are helping developing countries.

The Progressive Control Pathway for FMD (from the website of the European Commission for the Control of Foot-and-Mouth Disease). OIE, World Organisation for Animal Health



Australia is free of foot and mouth disease, but many countries are not. Map from OIE (World Organisation for Animal Health) website, October 2016.



Nucleotide sequence analysis has demonstrated that FMD viruses are clustered into seven regional virus pools.

Some key positives so far are:

- OIE and FAO are conducting regional roadmap meetings based in seven different regional areas, each of which contains different FMD viruses (see map above). To date, 60 countries are engaged in the process and 42 of these countries, where there is evidence of the disease advancing, are being closely monitored.
- The uptake of FMD control is faster in west Eurasian countries (Pool 3) where there is clear political will and funding is provided. It is slower in other regions.
- Apart from there being a need for political will, the engagement of international and regional organisations and development partners (such as Australia) is crucial to the start-up and sustainability of FMD control plans.
- In places where the Strategy has been adopted, the ability of veterinary services to control other transboundary diseases has increased.

Some areas of concern are:

- Funding is needed to support the global Strategy—particularly in those countries at lower PCP stages.
- Mechanisms to improve surveillance and vaccine efficacy need to be developed and supported by regional government authorities and research communities.

The Global FMD Strategy followed the successful eradication of rinderpest (cattle plague) from the world through a concerted effort of targeted testing and vaccination over more than 40 years. However, in the case of rinderpest there was one very good vaccine, one target species and no serotype variation in the virus, making control relatively easy.

FMD, on the other hand, is much more difficult to manage, as there are multiple serotypes and vaccination with one of these serotypes does not provide immunity to the others. There are also numerous variant topotypes within the serotypes, and these again do not provide immunity to the other variants. A number of vaccines are therefore required for each 'strain' of FMD circulating within the 'pools'; even so, the vaccines can vary in their effectiveness in different species. Also, FMD is hard to detect in some species and not all the diagnostic tests are equally effective, especially when laboratory facilities are poor.

On the plus side, there are opportunities for NSW DPI staff to build capabilities within developing countries by helping farmers to develop awareness programs, designing disease control programs, and helping develop essential supporting tools such as animal identification systems and laboratory diagnostic support. Further details can be found at the FAO website at **http://www.oie.int** and **http://www.fao.org/home/en/**.

For further information contact Dr Jeffrey Hammond, Director Science and Research, NSW DPI, Menangle, on (02) 4640 6573.

Dramatic increase in Australian bat lyssavirus exclusions

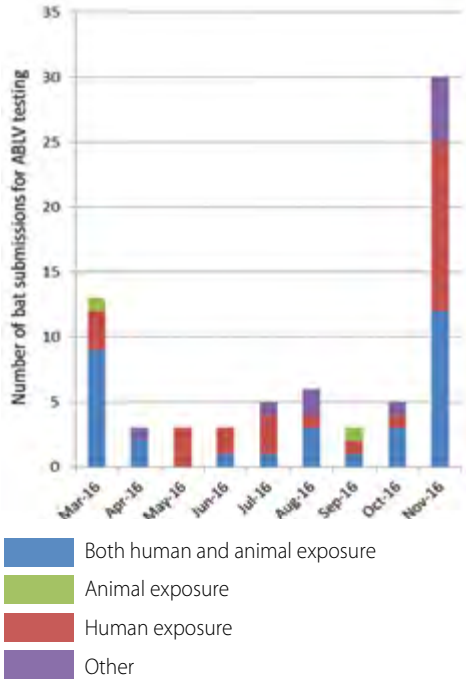
In November 2016, NSW DPI saw a dramatic increase in the number of bats submitted for Australian bat lyssavirus (ABLV) testing. Pup abandonment and misadventure of adults, likely because of a flying fox feed shortage on the east coast of Australia, has increased the numbers of both human and animal interactions with flying foxes.

Bats are sent to the State Veterinary Diagnostic Laboratory at the Elizabeth Macarthur Agricultural Institute for ABLV exclusion testing; this most commonly occurs following potentially high-risk interactions with domestic animals, humans, or both. All November submissions returned negative results for ABLV.

The results of the ABLV tests help NSW DPI to make recommendations on how to manage animals potentially exposed to lyssavirus, in line with the Australian Veterinary Emergency Plan (AUSVETPLAN). NSW Health is notified of ABLV-positive results in cases of animal exposure and all results from human exposure cases. NSW Public Health Units manage the human health aspects of these cases.

Private vets are integral to the management of ABLV infection and exposure cases, including the submission of bats to the laboratory. Private vets can obtain advice from the NSW DPI website at **http://www.dpi.nsw.gov.au/content/biosecurity/animal/humans/bat-health-risks** or from their local district vet; cases of potential ABLV infection or exposure should be reported to the Emergency Animal Disease Watch hotline (details below).

ABLV is a notifiable, endemic virus found in Australian bats. It has been found in both fruit bats (Megachiroptera) and insectivorous bats (Microchiroptera), and all bats in Australia are considered potentially infectious. A variety of other mammals have been infected with other lyssaviruses overseas, but so far, in Australia, horses and humans are the only other species known to have been infected with ABLV. Infection with lyssavirus is invariably fatal once clinical signs are present. If you are concerned about exposure call the Emergency Animal Disease Watch Hotline on 1800 675 888.



Reasons for ABLV testing at the State Veterinary Diagnostic Laboratory between March and November 2016

For further information contact Claire Harrison, Veterinary Officer, NSW DPI Orange, on (02) 6391 3490.

Listeriosis in sheep

Abortion, scouring, neurological signs and more than 30 deaths occurred in sheep when poorly made round-bale silage was fed to them on a Southern Tablelands property. Cattle were also fed the silage, but they remained unaffected. Some recovered sheep suffered marked fleece breaks, causing fleece shedding.

Crossbred and Merino sheep of all ages, and cattle, had been fed the purchased silage in August and September 2016 to supplement inadequate pasture. The silage was meant to have been made from red clover, but it contained mainly mature native grasses. The plastic wrapping around the bales was intact, but the moisture content of the silage appeared low, and the bales contained firmly compressed dry blocks of grass.

The silage was palatable, and no abnormalities were seen following feeding of the first bales. However, the alert owner then noticed scouring and abortions in late-pregnant ewes in several mobs. Some sheep lay down and died within 24 hours. Others were found dead in dams, suggesting that they had been feverish. Despite an attempt to gather and burn all of the remaining silage, animals were later often found dead or dying, with straws of silage protruding from their mouths. This corresponded to the observation of cranial nerve deficits in some sheep 2 to 3 weeks into the outbreak: sheep had drooping of one ear and one side of the mouth, as well as slobbering and an inability to control their tongue movements. Some sheep circled before lying down and dying. Cases continued to occur for 3 weeks after silage feeding had been stopped. Treatment of affected sheep with penicillin led to early improvement, and some of the treated sheep recovered. Severe multifocal subacute necro-suppurative encephalitis and non-suppurative meningitis were observed in samples submitted from a recumbent Merino weaner that had died less than 12 hours previously. The lesions were specifically characteristic of listeriosis.

For further information contact Bill Johnson, District Veterinarian, South East Local Land Services, Goulburn, on (02) 4824 1900.

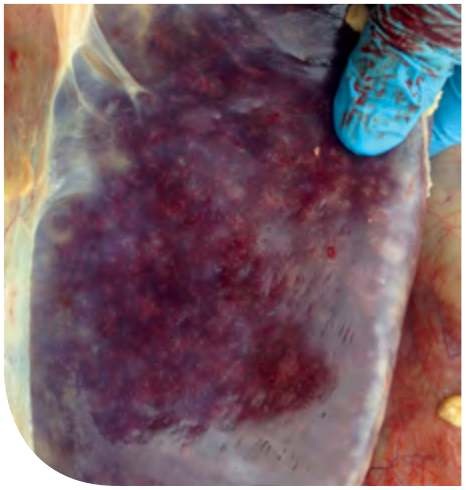
Lymphoma in a bull: enzootic bovine leucosis excluded

A private vet in the Riverina contacted Local Land Services to help investigate the death of a 3-year-old Shorthorn bull from an undiagnosed, chronic disease. Over several months before the bull's death it had lost weight and become increasingly lethargic. No other cattle were affected; all livestock were grazing improved pastures and had little or no access to poisonous plants. The owner had drenched the bull for intestinal parasites and liver fluke, to no effect. When the bull was examined by the private vet it had a fever; it was treated with oxytetracycline but died shortly afterwards.

A post-mortem examination by the district vet revealed multiple adhesions between the lungs and the chest wall, with fibrotic lung tissue containing pockets of pus. There was haemorrhage on the epicardium (part of the sac surrounding the heart). In the abdominal cavity, multiple adhesions were present between the liver and the diaphragm. The liver was enlarged and purplish, with extensive, multifocal white spots throughout the tissue. The gall bladder was grossly distended. A solid tissue mass measuring 8 x 6 cm was found in the intestine.

Histopathology of the liver, lungs and intestinal mass confirmed that the mass was a round cell tumour, most consistent with lymphoma. Lymphoma in cattle can be in the form of enzootic bovine leucosis (EBL), which is associated with bovine leukaemia virus or can be a sporadic form of cancer (i.e. not related to EBL). An EBL ELISA test was performed on arterial blood and ruled out the virus-associated (i.e. EBL) form of the disease.

Although EBL is uncommon in NSW, it occurs occasionally in beef cattle. The virus is transmitted horizontally through direct contact or through the shared use of contaminated instruments (e.g. needles or ear tag applicators) or rectal gloves between animals. Approximately 3% of



Multifocal white spots in the liver caused by a lymphoma. Photo K Stone

cattle infected with the virus will develop malignant disease. In dairy herds the disease was eradicated in 2012.

For further information contact Kristy Stone, District Veterinarian, Riverina Local Land Services, Gundagai, on (02) 6940 6900.

Hair loss and deaths in Angus cows

In mid-November the district vet at Inverell was called to investigate the death of a 5-year-old Angus cow, following a similar case the week before. The cattle had been grazing improved grass pasture with some medic. The cows had received 5-in-1 boosters a month beforehand, at which time they had also received a pour-on treatment for worms.

Possible diagnoses included metabolic disorders such as hypomagnesaemia, the ingestion of pasture plants containing nitrates or cyanide, and enterotoxaemia.

The cow showed no evidence of struggling before death or bleeding from any orifice, so anthrax was excluded and a post-mortem conducted. Post-mortem changes included jaundice of the renal fat and omentum. The liver had rounded edges, and there were some paintbrush haemorrhages on the omentum. The mucosal surface of the abomasum was reddened.

Close examination of the skin around the head and neck of the cow showed patches of hair loss and trauma likely to be associated with rubbing. The skin was thickened. Tissues were submitted to the State Veterinary Diagnostic Laboratory for laboratory testing.

Pathologists identified multifocal areas of necrosis and tubular degeneration in the kidneys, with fibrosis, and accumulations of lymphocytes, plasma cells, macrophages and giant cells. The interstitial granulomatous fibrosing nephritis that was found was consistent with the effects of hairy vetch toxicity.

The paddock where the cow died had no vetch. Further investigation revealed that the cows had been moved to this paddock only a few days previously following the death of the first cow. This paddock had substantial amounts of vetch. Vetch is a common naturalized legume in grass pastures in the Inverell area in spring; although vetch is common, vetch poisoning is not. The hypersensitivity resulting from an unknown toxin is seen predominantly in Angus or Murray Grey cattle over 3 years of age.

The owner was advised to customize their management and induction protocols to take into account age and breed differences in sensitivity to vetch toxicity.

Hairy vetch can occasionally cause toxicity. Photo A Biddle

Hair loss associated with rubbing due to a hypersensitivity to hairy vetch. Photo A Biddle

For further information contact Andrew Biddle, District Veterinarian, Northern Tablelands Local Land Services, on (02) 6720 8300.

Hendra virus ruled out in south-west NSW

Hendra virus infection of horses in NSW is infrequent and, so far, has been confined to the northern, coastal regions. However, active surveillance is conducted all over the state when the cause of illness in horses is unknown, and particularly when signs progress quickly, with rapid deterioration.

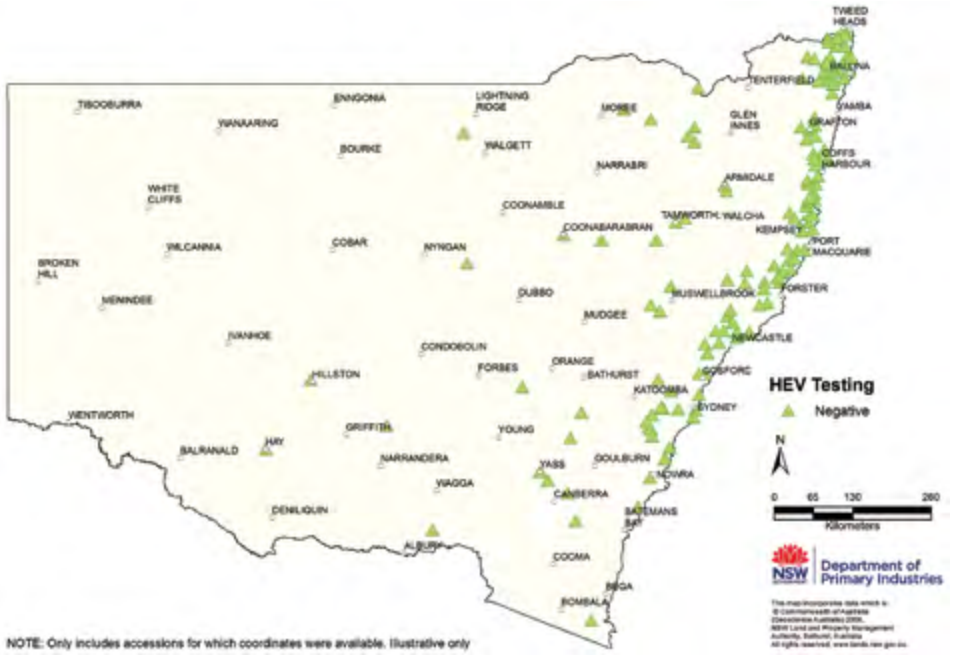
In the town of Hillston in south-western NSW, two horses died within 36 hours of each other. One of the horses, a mare, developed lethargy and discomfort, which quickly progressed to strong twitching of the shoulder and neck muscles when the mare was standing and labored breathing when she was lying down on her side. She died overnight. A gelding in the same paddock developed the same signs that morning and died late the following afternoon. The district vet was called and noted that there was little grass left in the horses' paddock and the horses had had potential access to a number of toxic plants, including oleander, heliotrope, and Paterson's curse.

A necropsy revealed congestion of the conjunctivae and mucous membranes, increased fluid in the pericardial sac (the sac around the heart) and petechial haemorrhages in the heart. The lungs were congested and had a dark red/purple discoloration.

Although a provisional diagnosis was made of plant poisoning, samples were also taken to exclude Hendra virus infection, as there were reports that little red flying foxes were in the area. However, none of their favoured eucalyptus trees were flowering and there was no evidence of flying fox activity over the horses' paddock. Samples were negative for Hendra virus, and the pathologists at the State Veterinary Diagnostic Laboratory diagnosed myocarditis, potentially from a cardiac glycoside found in oleanders.

The map shows the approximate locations where samples were taken from horses in 2016 to exclude Hendra virus infection. There were no positive cases in NSW in 2016.

For further information contact Courtney Simkin, District Veterinarian, Riverina Local Land Services, Hay, on (02) 6990 1300.



Locations of sampling in 2016 for Hendra virus (HEV) exclusion in horses

Two cases of lead poisoning

Case 1: A producer in the Narrabri district of the North West Local Land Services region lost three cows and three calves out of 200 cows and calves over a period of 1 month during August–September 2016. The owners noticed a sick calf in the mob at calf marking. The calf was depressed and lying on its side in the yards. After marking, the calf was observed to appear unaware; it started convulsing immediately before it died. The owners also had a second calf that behaved strangely while they were mustering the cattle. It separated from the mob and refused to walk.

A post mortem was performed on the first calf soon after death. The rumen contained an approximately 60-cm length of plastic sheeting and tangled baling twine. There was no evidence of lead particles in the rumen and reticulum, but lead toxicity was considered likely on the basis of the clinical presentation of the two calves.

The affected calves had all been older ones in a group that had started being born in late June.

The cows and calves had had access to three adjoining paddocks during the calving period from late June to calf marking in early September. One paddock contained a silage pit; it appeared that the plastic sheet that was eaten by the calf had come from this pit. The owner and the district vet searched the paddocks for evidence of a battery that had been broken apart by the cattle, but they failed to find one.

Calves licked the paint on this old van and suffered lead poisoning. Photo J Ellem

The cattle had had access to an area of sheds, machinery, old vehicles, old caravans and a shack. As this area was on high ground with plenty of tree cover, the cattle had spent some time there during cold wet weather in the previous month. Potential sources of lead in this region included sump oil containers that were well sealed, flaking paint on the old shack and remains of a wooden van, and old vehicles in the vicinity. However, there was evidence of greater cattle activity around a standing metal caravan. The paint on this van was powdery and easily rubbed off and had been rubbed at a consistent height, possibly by calf tongues at calf height. Samples taken of this paint residue tested positive for lead.

Testing of the calf that died confirmed a lead level in the kidney of 425 µmol/kg wet weight. Testing of the whole herd revealed that 19 calves had blood lead levels above 0.24 µmol/L. No cows tested positive for lead residues. The calf that had shown signs at marking showed no signs at sampling 1 month later, but its blood lead level was still elevated at 6.2 µmol/L. All the calves with elevated blood lead levels have been detained for 12 months, after which time they will be retested for lead residues. They remain ineligible for slaughter until the lead concentration in the blood is below 0.24 µmol/L.

Case 2: At Hay in south-western NSW a large mob of steers from two separate properties were being grazed on several travelling stock routes (TSRs). One steer suddenly became blind and was euthanased. Post-mortem blood sampling revealed very high levels of lead (4.72 µmol/L).

The cattle were evacuated from the stock route because of rising floodwaters and returned to their home properties, where they were tested for lead residues. Blood lead levels above background were found in another five cattle, which were detained. Once all the floodwaters had subsided the search continued for the source of the lead. A chewed battery was found on one of the TSRs that had been used.

The battery that had caused lead poisoning in a mob of steers at Hay was found on a travelling stock route. Photo C Simkin

For further information contact Judy Ellem, District Veterinarian, North West Local Land Services, Narrabri/Gunnedah, on 02 6790 7600.

Bovine anaemia due to *Theileria orientalis* in homebred beef calves

Cases of bovine anaemia due to *Theileria orientalis* in naïve adult cattle introduced into the Kempsey region of North Coast Local Land Services were first diagnosed in 2006. The disease occurs in adult cattle introduced to the area from tick-free areas and also in homebred calves at 6 to 12 weeks of age.

Most of the cases have been caused by the Ikeda variant of *Theileria*. The more pathogenic types, namely *Theileria parva* (east coast fever) and *Theileria annulata* (tropical theileriosis), are exotic to Australia. This report describes a case of bovine theileriosis in homebred beef calves and some of the difficulties experienced in preventing it and treating it.

Two 8-week old Speckle Park calves in a mob of 40 cows and calves grazing improved pasture became ill. They were lethargic and reluctant to move with the mob when changing paddocks.

One calf became recumbent before reaching the yards. It had a rectal temperature of 37.2°C, dry pellet-like faeces covered in mucus, and very pale mucous membranes. The second calf had pale mucous membranes, a rectal temperature of 40.1°C, and an increased respiratory rate.

The first calf died shortly after the clinical examination. At post-mortem examination its carcase was pale and slightly jaundiced and the spleen was about double its normal size. The liver was enlarged and ochre coloured.

Laboratory testing supported a diagnosis of bovine anaemia due to *T. orientalis*. There was evidence of a regenerative anaemia in both calves and the presence of organisms consistent with *Theileria* sp.

Anaemia due to *T. orientalis* remains a frustrating disease for both producers and vets in the North Coast Local Land Services region. Treatment options are limited. We need further research to give us a better understanding of why there has been an increase in the disease and to develop improved treatment and prevention strategies. Treatments used most commonly include oxtetracyclines and imidocarb. Some vets are using Baycox (toltrazuril, Bayer) as a prophylactic. Further trials of the efficacy of some of these treatments are required. Blood transfusions may be an option and are used widely in New Zealand. Minimising stress on affected animals remains an important part of management. Handling should be minimised, but if it is necessary it should be done quietly and slowly.

Paleness of the membranes of the eye associated with anaemia. Photo I Poe

Spleen enlargement associated with *Theileria orientalis* infection. Photo I Poe

For further information contact Ian Poe, District Veterinarian, North Coast Local Land Services, Kempsey, on (02) 6623 3900.

Getting information on animal diseases

This surveillance report can convey only a very limited amount of information about the occurrence and distribution of livestock diseases in New South Wales.

For statewide information, contact the Department of Primary Industries Animal and Plant Biosecurity Branch in Orange on (02) 6391 3237 or fax (02) 6361 9976.

If you would like more specific information about diseases occurring in your part of the state, contact your Local Land Services District Veterinarian or the Department of Primary Industries Senior Veterinary Officer for your region, or go to: *www.lls.nsw.gov.au*

For more information on national disease status, check the National Animal Health Information System (NAHIS) via the internet at: *www.animalhealthaustralia.com.au/status/nahis.cfm*

This is a report under the Animal Disease Surveillance Operational Plan, Project 8, 'Reporting for Animal Disease Status in NSW'.

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Copies of NSW Animal Health Surveillance reports are available on the internet at:

www.dpi.nsw.gov.au/newsletters/animal-health-surveillance

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