NSW GOVERNMENT

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

NEW SOUTH WALES

ANIMAL HEALTH SURVEILLANCE

July–September 2016 » Issue 2016/3

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Anthrax in NSW: July–September 2016

There were no anthrax events during the quarter, but anthrax as the cause of death was excluded in 38 mortality events. Thirty-one of these involved cattle, in which the alternative diagnoses included clostridial infection, hypomagnesaemia, hypocalcaemia, bloat, *Cheilanthes sieberi* toxicity, *Mannheimia haemolytica* pneumonia and polioencephalomalacia. Six events involved sheep, in which the alternative diagnoses included intestinal parasitism with *Trichostrongylus* spp., polioencephalomalacia, red gut (intestinal torsion), hypocalcaemia and clostridial infection.

One event, in which there was no alternative diagnosis, involved a hippopotamus.

Laboratory testing with polychrome methylene blue or polymerase chain reaction, or both, was used in 19 of the investigations; 15 of these 19 were also negative on the immunochromatographic test (ICT). Negative ICT results, without laboratory investigation, were obtained in 11 of the investigations.

In the remaining eight investigations anthrax was ruled out on the clinical evidence, with an alternative diagnosis being found.

For further information contact Barbara Moloney, Technical Specialist Epidemiology, NSW DPI Orange, on (02) 6391 3687.

Anthrax is a notifiable disease that must be reported. Photo G Morrice

Tularaemia detected in Australian animals for the first time

In a retrospective study, wildlife experts at Taronga Zoo and the University of Sydney have used forensic DNA tests to detect the bacterium *Francisella tularensis* subspecies *holarctica* in tissue samples from common ringtail possums that died in eight separate events between 13 and 15 years ago. Westmead Hospital and the Australian Animal Health Laboratory confirmed the diagnosis.

Detection of the organism in Australian wildlife wasn't unexpected, because there were two separate human cases in Tasmania in 2011 associated with direct contact with a ringtail possum. A third human case was documented in the Northern Territory in 2003. All three people recovered uneventfully after treatment with antibiotics.

Worldwide, tularaemia has been shown to affect a wide range of mammals, including rabbits, rodents and wildlife. The virulence of tularaemia varies with the subspecies: subspecies *holarctica* requires close contact for transmission, unlike the more contagious overseas relative, subspecies *tularensis*.

For more information on clinical signs and submission of samples in suspected tularaemia visit http://www.dpi.nsw.gov.au/content/biosecurity/animal/humans/tularaemia and contact Kate Wingett, Veterinary Officer, NSW DPI Orange, on (02) 6391 3717.

Common ringtail possum. Image courtesy Ákos Lumnitzer, amatteroflight.com

Targeted surveillance project started in alpacas

Mycoplasma haemolamae adheres to the surfaces of the red blood cells of alpacas and llamas and can occasionally cause anaemia.

It was first diagnosed in South American camelids in the United States in 1990 and has since been detected in other countries worldwide. The organism has not been confirmed in Australia. Australia began importing alpacas in 1989, 1 year before the first identification of the organism and 11 years before a PCR (polymerase chain reaction) test was developed. Given that hundreds of live camelids have been imported from countries where the organism has been readily identified, such as Chile and Peru, it is possible that *M. haemolamae* is already present in Australia.

The current surveillance project aims to determine the presence of *M. haemolamae* in alpacas in south-eastern Australia by using a PCR test developed at NSW DPI's State Veterinary Diagnostic Laboratory. Equally importantly, the project will help establish notifiable disease surveillance networks and awareness among stakeholders in the alpaca industry. Producers participating in the study will complete a standardised questionnaire to identify potential risk factors for *M. haemolamae* infection, and samples will be collected from various sources (including an abattoir) and tested. Although detection of the organism is not usually associated with clinical disease or significant losses, confirming its presence in the Australian alpaca herd would be an important consideration for field vets investigating cases of wasting and anaemia.

For further information contact Amy Masters, District Veterinarian, Central Tablelands Local Land Services, Orange, on (02) 6391 3830.

Bluetongue-free zone expands

Map 1 shows how the bluetongue-virus (BTV)-free zone has been expanded following failure to detect the transmission of BTV in the green area of the map over the previous 2 years. In NSW, during 2016, only a single BTV seroconversion—of serotype BTV-21—was detected. This occurred in the Lismore sentinel herd on the Far North Coast. Consistent with this only occurrence of BTV, the biting midge *Culicoides brevitarsis*—the only vector detected in NSW this year—was restricted to the wetter coastal regions and the Hunter Valley. In the warmer conditions towards the end of the season, a few individual specimens were collected briefly at sites on the Great Dividing Range before the onset of cooler weather.

For the latest and definitive information on the National Arbovirus Monitoring Program visit the Animal Health Australia website at https://www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/national-arbovirus-monitoring-program/

Map 1: Boundaries of the zone of transmission of bluetongue, 2015 and 2016. NAMP, National Arbovirus Monitoring Program

Wild-bird surveillance for avian influenza in NSW

Australia-wide wild-bird avian influenza (AI) surveillance involves targeted testing of waterbirds and investigation of deaths. Established in 2005, the surveillance program has tested more than 90,000 wild birds and has not identified any highly pathogenic AI viruses, although it has found evidence of infection with low-pathogenic AI viruses.

Samples for AI testing were available in four wild-bird mortality events in NSW in the last quarter; all samples returned negative results. In one example, a mass mortality of Australian magpies (*Cracticus tibicen*) occurred at a shopping centre on the Central Coast of NSW. More than 100 birds died suddenly over 2 weeks without other obvious clinical signs. Greater Sydney Local Land Services investigated and collected samples. Tests for avian influenza, Newcastle disease and *Chlamydia psittaci* were negative. However, an organophosphate pesticide was detected and NSW Environment Protection Authority staff are investigating potentially deliberate poisoning of the birds.

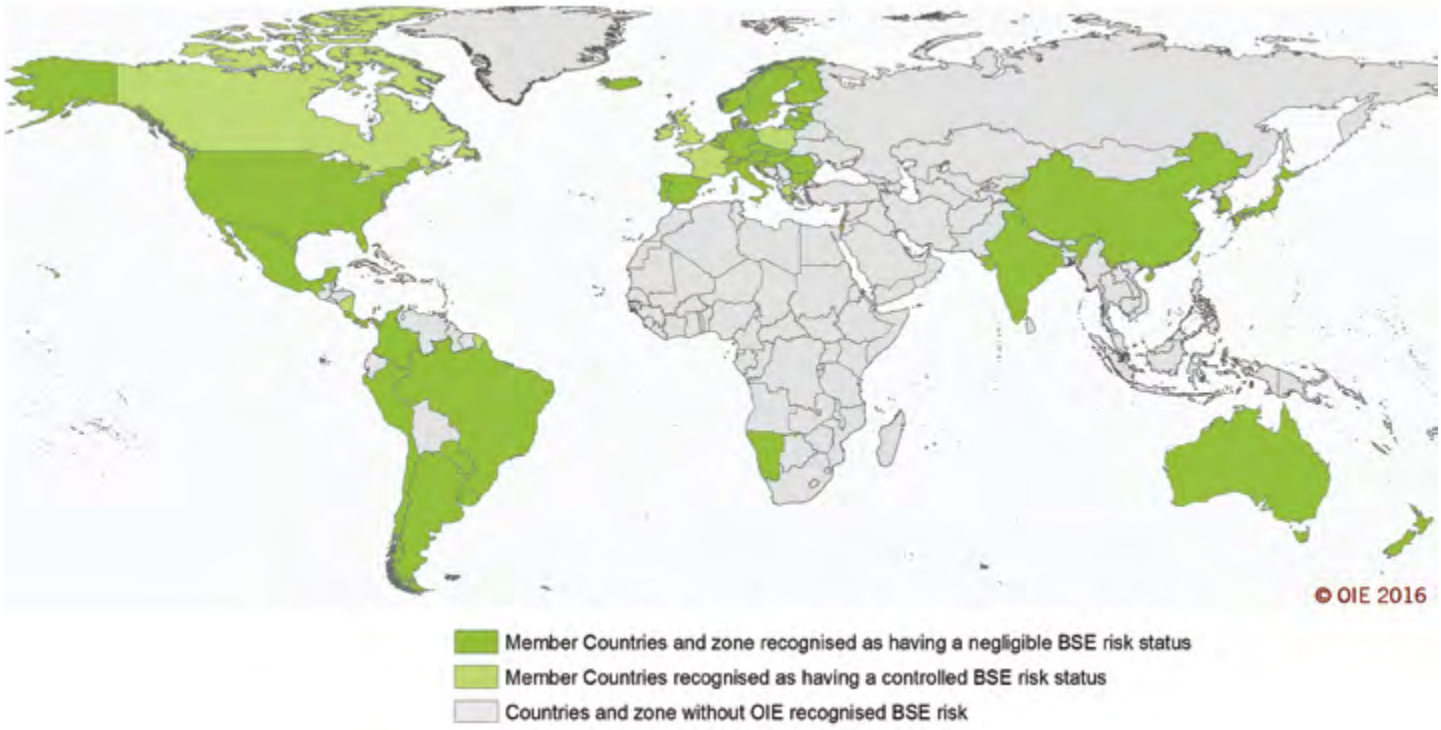
For further information contact Claire Harrison, Veterinary Officer, NSW DPI Orange, on (02) 6391 3490.

Surveillance of cattle imported from BSE-infected countries

For very many years, all cattle imported from countries that have subsequently been found to have a case of BSE (bovine spongiform encephalopathy, i.e. mad cow disease) have been traced and placed into lifetime quarantine by the Australian Government Department of Agriculture and Water Resources.

Surveillance of these cattle shows that, after the deaths of four animals in the last year, there are now only 27 remaining alive. There remain two cattle from the EU and Japan in Victoria, one Canadian animal in Western Australia, and 24 cattle from the USA in the Northern Territory (4), Queensland (7), NSW (1), Victoria (3) and South Australia (9).

For further information contact Dermot McNerney, Senior Veterinary Officer (Residues), NSW DPI Dareton, on (03) 5019 8411.



Bovine spongiform encephalopathy (BSE) risk status map for countries that are members of the OIE (World Organisation for Animal Health), as at May 2016. Australia has a negligible BSE risk status.

Grass tetany in cattle on the Northern Tablelands

A beef producer east of Armidale contacted the district vet in early August when she found four 3-year-old Angus cows dead in a paddock. The cows had calved 4 weeks beforehand and had been grazing a barley crop.

The district vet investigated, ruled out anthrax on various grounds, and conducted a post mortem of the most recently dead cow. No abnormalities were detected grossly, and samples, including from the aqueous humour of the eye, were taken to test for calcium and magnesium levels.

The district vet noted that the barley that was being grazed was green and very short. In addition, the weather during that week had been cold and wet. Because of concerns over potential grass tetany, he advised the beef producer to remove the cows from the barley paddock. The cows were moved immediately, but one of the cows collapsed in the process, showing an altered state of consciousness, tetanic spasms and eventual death.

The time since calving, the grazing history, the weather and the clinical signs were strongly suggestive of hypomagnesaemia. Low levels of magnesium in the submitted samples of aqueous humour were confirmed by the laboratory.

Advice was given on managing grass tetany and on magnesium supplementation, and no more deaths were observed.

For further information, contact Steve Eastwood, Team Leader, Northern Tablelands Local Land Services, Armidale, on 0427 007 186.

Cycad neurotoxicosis ('zamia staggers') in cattle on the Far South Coast

In early August, a private vet was called out to a 90-hectare property near Moruya to look at a young beef cow staggering on her hindlimbs. The cow was part of a self-replacing herd of around 75 cows ranging in age from 18 months to 15 years, mostly of the Angus breed. The calves had been weaned between 1 and 2 months earlier, and most of the cows were 7 or 8 months in calf. The staggering cow was treated for infection, trauma and metabolic disturbances and then isolated and put onto hay. The vet was called out about 3 weeks later to see a few more cattle affected in the same way, with knuckling on the hindlimbs but otherwise strong, bright and alert, with no evidence of sight impairment and eating well. Physical examination and blood testing of two of the affected cows did not reveal any significant findings apart from knuckling of the hindlimbs and mildly elevated muscle enzyme levels. The condition of the cow the vet had examined and treated 3 weeks beforehand had not changed at all. He contacted the Local Land Services district vet for help.

The owner told the district vet that he had put all the cattle through the yards that day and had isolated seven cattle (aged 18 months to 14 years) showing definite hindlimb weakness and knuckling. All cattle were removed from their 'winter' paddock. One of the two examined and blood sampled had gone down in the yards; she was lying on her sternum but continuing to eat and drink. The owner was comfortable to have a post mortem done on that individual the following day.

When the district vet arrived at the property, two more of the seven affected cows were down in sternal recumbency. The remaining five (two heifers and three heavy in calf) were displaying varying degrees of hindlimb ataxia and knuckling, but were otherwise strong, very mobile and alert. No others from the mob were identified as being affected. The cow identified for the post mortem was now lying on her side. She was euthanased.

Post mortem showed multiple plum-coloured depressions of various shapes in the surface of the liver; these were later confirmed to be telangiectasis (a spidery-looking dilation of the capillaries). Otherwise there were no significant findings. The brain was removed and the liver and the cervical and thoracolumbar spinal cord were sampled.

The cattle had been in their 'winter' paddock for a number of weeks. The pasture consisted of very short (about 600 kg of dry matter/hectare), predominantly native grass. The cattle had access to about 4 hectares of more elevated dry eucalypt forest, with a low to moderate scattering of burrawangs (the cycad *Macrozamia communis*) throughout. A drive through the forest revealed that the majority of the burrawangs had fresh new growth and that a significant number of the young leaves had been eaten.

The burrawang is the most commonly occurring and widespread cycad in NSW and the most southerly occurring cycad species in the world. It is endemic to eastern NSW, from the coast to the nearby slopes and ridges of the Great Dividing Range, extending from the Taree region in the north to near Bega on the Far South Coast.

Cycads are known to be poisonous to cattle, sheep, dogs and humans. Cattle are the usual victims of the neurological form of cycad poisoning: they ingest an unidentified neurotoxin in the leaves (particularly young leaves) when other feed is dry or scarce. Cycads also contain MAM (methylazoxymethanol) glycosides in their leaves and nuts, the latter being the most toxic. It is these compounds that are responsible for the liver and intestinal damage more commonly seen in sheep, dogs and humans with cycad poisoning.

The presumptive diagnosis, based on the history, access and clinical signs, was cycad neurotoxicosis, a condition that is not progressive once exposure to the toxin stops. However, there is no treatment and cattle do not recover. The toxin causes irreversible damage to the nerve fibres in the spinal cord, resulting in proprioceptive disturbance of the hindlimbs and causing knuckling over at the fetlocks, posterior weakness, and posterior paralysis in more severely affected animals.

Although histopathology of the liver identified areas of telangiectasis, this is a common lesion in cattle and was not functionally significant. There was no evidence of the toxic liver disease that characterises the hepatic type of cycad poisoning. Mild, non-specific lesions were identified in the spinal cord and were considered consistent with cycad neurotoxicosis.

Cow knuckling over in the hindlimbs. Photo H Schaefer

The burrawang *(Macrozamia communis)* cycad; the young leaves have been eaten. Photo H Schaefer

The most effective way of preventing cycad poisoning is to prevent access of livestock to cycad plants with young leaves or nuts.

An interesting postscript is that, of the five remaining affected cattle, the three pregnant cows all calved with no help within 48 hours of each other about 4 weeks after the property visit. All the calves are strong, healthy and feeding well from their dams; they have no signs of neurotoxicosis. The owner is engaged in a project with Local Land Services to fence off the forest.

For further information contact Helen Schaefer, District Veterinarian, South East Local Land Services, Bega, on 6491 7800.

Strawberry footrot in the Central West

A private vet near Nyngan asked the district vet to investigate severe, multi-limb lameness in a first-cross Merino flock in August 2016. The sheep had been in an oats paddock, without supplementation, and they had been eating the burr around the outside of the paddock rather than the oats. They had received one 5-in-1 vaccination at marking and had been drenched in mid-June.

About 60% of the mob of 360 weaner lambs, aged 10 months, were affected, with severe, acute, multifocal, black, crusty, raised scabs around the distal limb between the coronet and the carpus or tarsus; in most of the sheep multiple feet were affected. A small proportion also had foot abscesses. A severe, acute, multifocal dermatitis was observed when the scab was removed. A large percentage of the mob had facial lesions similar to scabby mouth, and a few animals had mild inflammation and exudate, causing clumping of the wool, along their backs. This was believed to be mild mycotic dermatitis ('lumpy wool'). Examination of the interdigital space showed generally healthy skin, although some sheep had abscesses and a couple had very mild scald (interdigital dermatitis), although this didn't appear to be causing the lameness. The severely affected animals were not bearing weight, and the mildly to moderately affected animals showed obvious lameness when walking.

Scabs from affected feet were examined by impression-smear Gram staining of cells at the State Veterinary Laboratory; *Dermatophilus congolensis* was identified on examination of these smears. A definitive diagnosis of severe acute proliferative dermatitis caused by *D. congolensis* was made on the basis of these results.

Dermatophilus congolensis can infect many species of domestic and wild animals and causes both lumpy wool and 'strawberry footrot' in sheep. It is transmitted from infected or carrier animals to naïve animals by direct contact or through fomites and vectors such as flies. Factors that erode the dermal protective barrier increase the incidence of disease; examples include prolonged moisture on the feet, high humidity and mild temperatures. *Dermatophilus congolensis* more commonly causes lumpy wool; young animals are the most severely affected.

The sheep in this case were all treated with high-dose long-acting oxytetracycline. Sheep that were severely affected were treated concurrently with tolfenamic acid (an anti-inflammatory) to provide some degree of pain relief.

Strawberry footrot on the front leg of a lamb. Photo E Kennedy

For further information contact Erica Kennedy, District Veterinarian, Central West Local Land Services, on (02) 6831 1506.

Fireweed, sheep, PAs and the food chain in the Bega Valley

Local Land Services and NSW DPI recently collaborated with the 2015 NSW Young Scientist of the Year, Jade Moxey, in her 2016 Year 11 school project on fireweed.

Fireweed *(Senecio madagascariensis)*, an opportunistic weed, is a native of South Africa. It was first recorded in Australia in the Hunter Valley in 1918 and is now established along the entire NSW coast, extending into Victoria to the south and as far north as central Queensland. It has been declared a Weed of National Significance because of its invasiveness, potential for spread, and economic and environmental impacts.

Fireweed is one of about 30 *Senecio* species reported to be responsible for livestock and human toxicity around the world. The toxic potential of *Senecio* species is due to the presence of pyrrolizidine alkaloids (PAs) in all of the above-ground parts of the plant, at all stages of growth. PAs primarily cause liver damage. Poisoning may not be evident for weeks to months after the plants are eaten. The liver damage caused by fireweed is irreversible and untreatable.

Particularly in the Bega Valley, sheep are often promoted as a method of fireweed control, as they are more inclined than other livestock species to eat fireweed and are up to 20 times more resistant to its toxic effects. Jade posed the following three questions in her 2016 research project.

Sheep being used for fireweed control; or are they spreading it? Photo H Schaefer

Do sheep spread fireweed?

The trial definitively showed that sheep are capable of spreading fireweed through their manure. Of all of the plants that germinated from the sheep manure, over 28% were fireweed, close to 60% were pasture grasses or clovers, and 12% were broadleaf weeds. These results are in contrast to the pasture content of over 95% desirable plant species. Given that the property on which this trial was done had an average of 6.5 fireweed plants per square metre (considered low to moderate density), this result suggests that sheep may not be as effective a control of fireweed as generally accepted, and may in fact aid the spread of the weed. Further research is required to compare the quantity of seeds consumed with the number of viable seeds excreted.

Do the PAs in fireweed affect sheep health?

Fifty homebred sheep over five different age groups and two breeds were blood tested and liver biochemistry performed. On the basis of the results, 12 sheep were slaughtered, with liver samples being assessed for evidence of hepatic damage due to PA toxicity. The results revealed no clear evidence that fireweed consumption had a negative impact on the health of sheep grazing fireweed plants for up to 6 years. These results don't guarantee that sheep used to graze high densities of fireweed under different management practices will not be negatively affected. Further research is required to identify the relationship between fireweed density, years of grazing fireweed, sheep age and liver damage so that we can develop informed best-practice guidelines for sheep grazing of fireweed in different situations.

Are PAs entering the human food chain via consumption of lamb, mutton and sheep offal?

Specimens of the fireweed plants on this property were sent to Dr Mary Fletcher at the University of Queensland for identification of the PAs. Five major alkaloids were identified. Samples of liver and muscle were taken from each carcase at the time of slaughter of the 12 sheep and qualitatively analysed to see whether the same PAs were present in those tissues as were in the plant material. No other PA-containing plants were identified on the property.

Very low levels of one PA (florosenine, the major fireweed alkaloid) were detected in three of the meat samples. Although the levels were below the limits of quantitation, they were best estimated to be between 0.1 and 0.5 micrograms/kilogram. No PAs were present in any of the liver samples or in the other nine meat samples. There was no correlation between detection of PA in muscle samples and the sheep's age, breed or liver enzyme results.

The average Australian male consuming meat contaminated with PA at the levels detected in the three of the 12 samples would be consuming 0.0005% of the Food Standards Australia and New Zealand (FSANZ) safe daily intake.

Although these results indicate that sheep are capable of accumulating PAs in their muscle tissues, the identified levels are well below the safe intake levels as recommended by the FSANZ, even if all the red meat consumed were to contain PAs. There was no evidence of accumulation of PAs in the liver in this trial.

Conclusion

This project highlights both the need to educate farmers using sheep to help control fireweed and the need for further research. Further areas of research include investigating the connections among the various paddock densities of fireweed, the levels and duration of consumption by sheep, and liver damage and PA contamination of muscle and liver tissues. Such research would enable the informed development of best practice guidelines for producers and industry. In this way, grazing of fireweed by sheep could be managed to benefit all stakeholders, including the sheep farmer and the consumer.

Fireweed. Photo J Moxey

For further information contact Helen Schaefer, District Veterinarian, South East Local Land Services, Bega, on 6491 7800.

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

Published by NSW Department of Primary Industries, a part of NSW Department of Industry, Skills and Regional Development

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

www.dpi.nsw.gov.au
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JN 14112 08/16