NSW GOVERNMENT

Information contributed by staff of
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and Local Land Services

NEW SOUTH WALES

ANIMAL HEALTH SURVEILLANCE

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IN THIS ISSUE

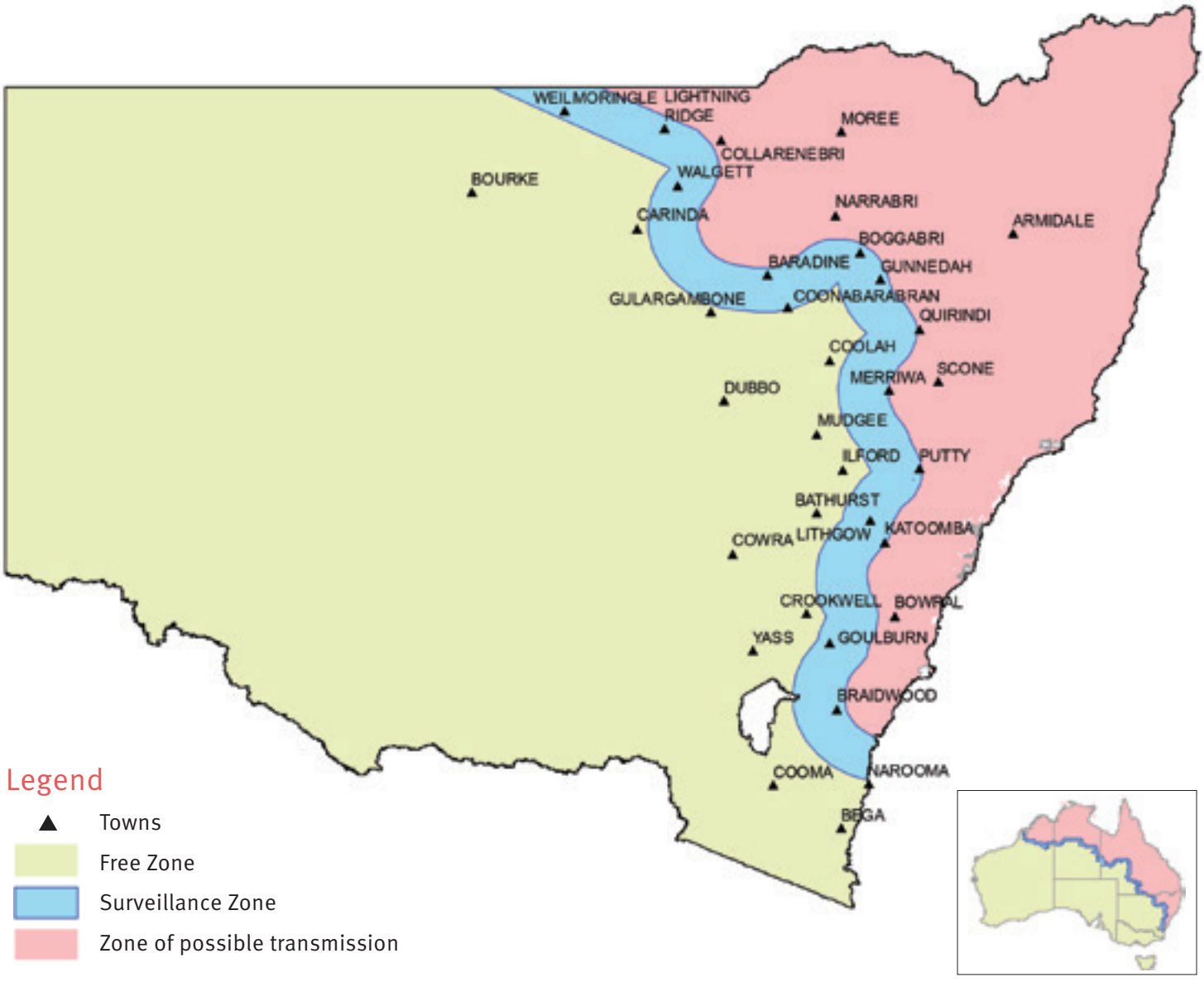
Unprecedented bluetongue virus transmission in 2014 affects trade

Although Australia is free of clinical bluetongue disease, there are serotypes present in Northern Australia that could cause disease in sheep. In contrast, the strains present in south-eastern Australia are not disease-causing. However, even the presence of non-virulent virus strains affects our ability to export ruminants, so we run a bluetongue monitoring and zoning system, the National Arbovirus Monitoring Program (NAMP), to help manage international trade. NAMP is also important in local animal health and disease control, should we ever detect bluetongue disease.

The Bluetongue Zone in NSW expanded in 2014, and this expansion is likely to have substantial impacts on those producers planning to supply animals or genetic material to bluetongue virus (BTV)-sensitive markets—particularly in the case of producers who are now inside the Zone when previously they were not.

BTV transmission in NSW during 2013–14 was widespread, resulting in five expansions of the 'zone of possible activity' during the monitoring season (to the west of Armidale, Tamworth and the Hunter Valley and to its most southerly limit near Milton). This is the farthest south BTV has been detected in NSW since 1989, when transmission was detected south to Bodalla.

BTV was detected along the entire North and Central coastal plains, on most of the South Coast, in the Hunter Valley and on the North West Slopes and Plains. The map shows BTV activity detected over the last 2 years. However, this map indicates only the current BTV zone;



Bluetongue Zones in NSW and Australia. Adapted from the Animal Health Australia (AHA) map dated 10.9.14. For the most up-to-date Bluetongue Zone map see the interactive map on the AHA website: *http://www.animalhealthaustralia.com.au/programs/disease-surveillance/national-arbovirus-monitoring-program/*

for the official interactive map see the Animal Health Australia website (http://www.animalhealthaustralia.com.au/programs/disease-surveillance/national-arbovirus-monitoring-program/). On this website you can apply to receive automated notifications of changes to the zone whenever they occur. The 'zone of possible transmission' and the 'surveillance zone' (a 50-km-wide buffer beyond the limit of the known detection of BTV) together form the BTV zone.

Any future retraction of the BTV zone will depend on no BTV activity being detected for the next two monitoring seasons.

What is NAMP and how does it operate?

The NSW Department of Primary Industries (DPI) is a major contributor to NAMP. Between October and June/July each year samples are collected at strategically sited locations across NSW to monitor the distribution of economically important arboviruses (insect-borne viruses) of livestock and their insect vectors. The objectives of NAMP are to:

- support market access for the export of live ruminants and their genetic material
- provide an early warning of the potential for the occurrence of bluetongue by detecting incursions of exotic strains of BTV and the insects (*Culicoides* midges) that transmit them
- help with risk management and disease control by detecting changes in the distribution of endemic BTV and akabane and bovine ephemeral fever (BEF) viruses.

In 2013–14 blood samples were collected from between 10 and 12 sentinel cattle at each of 36 sites across NSW. Insects were collected in green LED (light-emitting diode) traps at 33 sites. Collections are made monthly during summer and autumn in areas where *Culicoides* are endemic, quarterly at the margins of the arbovirus zone, and twice a year (at the start of summer and the end of autumn) in free areas.

Blood samples are tested for antibodies to akabane and BTV. Attempts are made to isolate viruses from samples from animals that have been infected with BTV to enable molecular characterisation and virulence studies. Globally, there are currently 26 recognised serotypes of BTV, 10 of which have been detected in Australia. At present, only two serotypes (1 and 21) have been detected in NSW.

Insect collections are sorted and the *Culicoides* species known to be arbovirus vectors identified and counted. In NSW, the main (and usually the only) midge vector is *Culicoides brevitarsis*, the major vector of BTV and akabane in Australia. BEF viruses have a wider distribution because they are spread by mosquitoes.

How are NAMP data used?

The data collected by NAMP are used to define the Bluetongue Zone and conversely the Bluetongue-free Zone, which is accepted by most countries that are concerned about BTV certification for importing ruminants and their genetic materials. Many countries, such as PR China, will accept only animals that were born in the Bluetongue Zone or have been resident there for a specified minimum time.

The BTV zone is dynamic and reflects the areas where BTV transmission has been detected at any time in the previous 2 years. The rest of the state is then recognised as the Bluetongue-free Zone. After an expansion of BTV activity, if a region remains free of BTV infection for 2 years it may revert to BTV-free status. To justify retraction of the BTV zone, it is just as important to have sentinel herds in free areas to show the absence of BTV transmission as it is to have these herds where BTV transmission has been detected. Although there is no formal akabane zone, it is similar to, but usually slightly bigger than, the Bluetongue Zone.

What are the risks for the disease occurring?

Normally BTV transmission in NSW is limited to coastal regions, where there are large cattle populations and few sheep. BTVs cause disease only in sheep. An exception was BTV serotype 8, which was found in Europe 8 years ago. This serotype did cause mild disease and foetal infections in some cattle.

The widespread BTV transmission in NSW this year means that Australian BTVs are encroaching on sheep-producing areas, particularly in the North West Slopes and Plains regions and along the eastern fall of the Great Dividing Range north of the Hunter Valley. A few of the BTV serotypes detected in Australia are capable of causing disease in sheep. Serotypes 16 and 23 have been shown to cause severe disease and have high death rates, but these are confined to the far north of Australia.

Fortunately, in experimental studies, serotypes 1 and 21, which are the ones detected in NSW to date, have not caused disease in sheep. This is consistent with what has been observed in the field. Small surveys have identified antibodies in flocks that have not shown any signs of disease.

Although most of the serotypes that are likely to cause disease in sheep are still confined to northern Australia and don't seem to have moved very far south or eastward from their point of entry into the country, the epidemiological situation may no longer be stable. BTV serotype 2, which was first detected in Australia 5 years ago, has been detected intermittently in south-eastern Queensland over the last 4 years. This serotype can cause mild disease in sheep. Consequently, additional testing specifically directed towards BTV 2 is being done in herds along the Queensland border.

In addition to general NAMP activities in other states, there is also monitoring in the Northern Territory and Far North Queensland to detect the entry from South-East Asia of new serotypes or strains of BTV that enter in wind-blown *Culicoides* midges.

Because large vector populations of *Culicoides* are needed for efficient BTV transmission, infection of sheep—and the development of disease—is unlikely to occur before late summer or autumn. Currently there are no practical control measures available for immediate use in Australia.

For further information contact Dr Deborah Finlaison, Veterinary Virologist Elizabeth Macarthur Agricultural Institute, DPI Menangle on (02) 4640 6335.

Two cases of lead toxicity in the Narrabri district

District Vets diagnosed lead toxicity in cattle on two properties following investigations into sudden deaths around Narrabri.

Two Charolais cows died in a mob of 140 that had been moved into a new paddock the previous week. The owner noted that a third cow had abandoned her calf and didn't seem to be eating.

The two dead cows were too decomposed for post mortems to be useful. Anthrax ICT (immunochromatographic) tests performed on site were negative.

The third cow was examined in the paddock and found to be blind. She was wandering aimlessly and running into a fence, and she was not eating or drinking.

The paddock contained a large amount of turnip weed, and also shrubs such as boobialla bush, which is known to be toxic to livestock. There was evidence that the cattle had grazed these plants. Plant toxicity was high on the list of differential diagnoses, along with polioencephalomalacia (PEM) and lead poisoning.

The cow was treated with thiamine, but she didn't show the improvement that would have been expected with PEM induced by plant toxins. Blood was taken and sent to the State Veterinary Diagnostic Laboratory at the Elizabeth Macarthur Agricultural Institute (EMAI) for examination and lead testing.

The rest of the mob was moved into a different paddock until the cause of the deaths could be determined and to reduce the risk of more animals becoming affected.

The cow died 2 days later, and a local private vet did a post mortem. No gross abnormalities were noted, and samples were submitted to EMAI under the Transmissible Spongiform Encephalopathy Surveillance Program. By the following morning the original blood samples showed toxic levels of lead (4.16 µmol/L; normal is <0.24 µmol/L) and the post-mortem samples showed histological changes in the brain that were consistent with lead toxicity.

A thorough search of the paddock revealed a battery in the area where tall, rank dry grass had been slashed before the cows had been moved into the paddock. The chewed battery was nearly unrecognisable.

This old, damaged battery caused multiple cases of lead poisoning. Photo M Davies

The remaining cattle on the property were mustered and blood samples were taken from all of them to determine how many had been exposed to the lead. Of 144 cattle in total, six had detectable levels of lead in their blood, including two calves of the deceased cows. These cattle have been detained for a period of 12 months to prevent them from entering the food chain. They will then be tested further to see if their lead levels have dropped far enough to release them from detention.

In a second case, one steer was found dead and a further two were behaving abnormally in a mob of 77 that were grazing an oat and wheat crop. The cattle had recently been allowed access to a dam, as the water trough in the paddock had broken.

A brief post mortem examination was done on the decomposing dead steer and a kidney sample was taken for lead testing. The kidney lead levels were very high (1148 µmol/kg wet weight).

One of the sick steers was examined in the paddock and found to have severe depression; it had a fever (39.9 °C) and breathing difficulties, as well as engorged mucous membrane capillaries. It died within 24 hours and the owner observed it to be circling, bellowing and frothing at the mouth before it died.

Post mortem examination revealed signs of acute disease of the liver, kidneys and heart. A toxin was considered the most likely cause. At the laboratory, various tissues were histologically normal, but lead levels in the blood were found to be 4.4 µmol/L.

The other sick steer was observed standing in a yard with its head pressed into the corner; it looked blind and depressed. It was treated with thiamine intravenously by a private vet but there was no immediate improvement.

Eight days later the steer was alert, with a tendency toward aggression but moving freely around the yard. This steer's blood lead level was 4.38 µmol/L.

The whole mob was yarded and blood samples were taken, revealing that a

further six steers had high levels of lead in their blood. These cattle have been detained for 12 months, after which further testing will be done.

A search of the paddock found a partially consumed bulldozer battery hidden in tall dry grass near the dam. The owners were unaware of its presence and suspected it may have been there for some years.

This case was further complicated by the fact that, during the course of the investigation, cattle had been sold through a saleyard to two different buyers in NSW and Queensland. These cattle were traced through the National Livestock Identification System and blood tested; three returned high lead levels. One was destroyed and two were returned to the property of origin to be detained with the other affected steers.

This is a timely reminder to all livestock owners to always be on the lookout for foreign material in the paddock. In both cases, the stock owners were unaware of the presence of the batteries, as high feed levels in the past had obscured them from sight. Batteries need to be collected from paddocks and stored in areas that are not accessible by animals until they can be moved off farm and recycled if possible.

For further information contact Megan Davies, District Veterinarian, North West LLS, Narrabri, on (02) 6792 2533.

Urinary tract stones in feedlot lambs

In a 600-lamb feedlot, animals in a group of 200 newly introduced crossbred lambs aged 4 to 7 months and from at least three separate sources started dying sporadically after 5 or 6 weeks. They had been grazing pasture on the farm for a month before they were introduced into the feedlot.

The District Vet found that six of the animals showed signs of ill-thrift; they looked 'tucked up' and were standing off on their own in the lot. On closer inspection, swelling of the lower abdomen was noted and in a few of the lambs there was a necrotic draining wound below the body of the sheath.

Necropsy revealed extensive swelling under the skin on the undersides of the animal as well as a thickened, red bladder, obvious ureters in most cases and enlarged, soft kidneys. When the bladder was opened, a large volume of granular sand-like material could be felt and seen. When the penis was cut along its length, areas of necrosis and haemorrhage were found, along with more of the sand-like material in the urethra.

Analysis of the sand-like stones revealed that they were 48% calcium oxalate and 52% ammonium phosphate.

Grain diets can have a number of effects on the urine. Because high-grain rations are rich in phosphorus, urinary phosphorus levels increase and thus increase the levels of phosphorus solutes in the urine. Rapid introduction to grain rations has the potential to reduce overall urine volume and thus concentrate the urine (and its solutes) even further.

This is particularly the case when grain is fed in a few large, high-concentrate low-roughage (pelleted) meals, which may allow crystals to form. A heavy grain ration will also increase the mucopolysaccharide fraction of the urine, which acts as a cement for the crystals, forming stones or 'uroliths' and causing urolithiasis.

The affected lambs were probably stressed and in store condition on arrival at the property and had to adjust to the new groups in the introductory paddock before being introduced to the feedlot ration. This may have led them to drink less water. They were given free access to grain feeders with lucerne hay once they entered the feedlot.

Following this increase in the number of urolithiasis cases the ration was reformulated to contain a more precise 2:1 calcium to phosphorus ratio with added 0.5% ammonium chloride and 1% sodium chloride to increase water intake. Also, for a few weeks after diagnosis, until the ration could be reformulated, free salt licks were provided to the pens.

The change in diet was partially successful for a few months, but the problem began to appear again and continued to be a problem on the property. Subsequent evaluations of the uroliths showed that the calcium carbonate components had disappeared but 100% ammonium phosphate stones continued to be a problem. The salt content of the diet was increased to 4% to try to increase fluid intake and provide a flushing action in the urine, despite the risk of reduced feed intake with such a high salt component.

Granular precipitates or 'uroliths' in the bladder of a sheep. Photo E Braddon

The producer subsequently sold the property without satisfactorily controlling the losses from urolithiasis.

For further information contact Eliz Braddon, Team Leader Riverina LLS, Young, on (02) 6382 1255.

Serious pneumonia in cattle

Suspected *Histophilus somni* infection killed 10 mixed-aged beef cattle from a mob of 300 breeders during August–September in Central West NSW.

Adult cows, yearlings and calves were affected. Deaths started in 3- to 4-year-old cows that had recently calved. They showed respiratory signs with laboured breathing and white foam exuding from the nostrils. A post-mortem by the District Vet on a cow that died overnight revealed a moderately self-digested carcass with large amounts of pale, straw-coloured fluid and exudates of fibrin in the chest cavity. Some of the lung lobes appeared mottled and dark red.

Subsequently, a yearling heifer in an adjoining paddock died while being mustered. This time the post mortem revealed erosion of the lining of the oesophagus. The wall of the left ventricle of the heart was four or five times thicker than the wall of the right ventricle, and there were some pinpoint haemorrhages covering the left ventricle. The abomasum, caecum and intestine were haemorrhagic and their linings were sloughing off.

Histological examination showed that there was severe multifocal subacute necrotising myocarditis (an extreme form of inflammation of the heart muscle), as well as mild localized erosion of the oesophagus and moderate multifocal chronic inflammation of the abomasum from parasitic infection. Death was likely due to heart failure, and the findings pointed to an infectious cause. The bacterium *Histophilus somni* was suggested to be a potential cause.

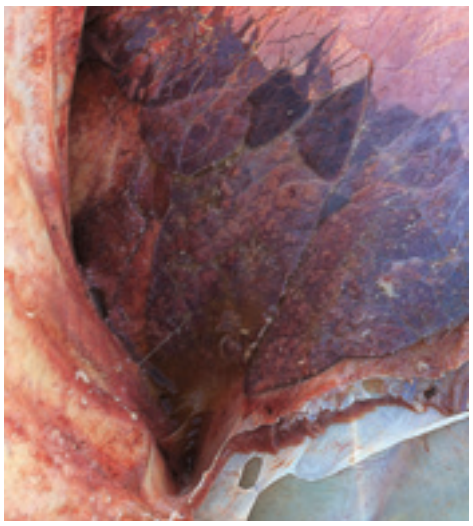
A yearling bull, a yearling steer, two 3-month-old calves and a cow were also found dead, but their tissues had begun to self-digest, making it very hard to do worthwhile post mortems. The owner reported that copious amounts of white foam had leaked from the steer's nostrils after it had died.

A 3-month-old calf then died while it was being mustered. A post mortem revealed marked gastrointestinal and cardiac changes similar to those found in the yearling heifer.

Histological examination revealed myocardial degeneration with focal mineralization and fibrosis. *Histophilus* was not cultured in this animal.

Although a diagnosis of histophilosis (i.e. disease from *Histophilus somni* infection) was not reached, the findings strongly suggested that this bacterium had caused the deaths. The herd was placed under closer observation with the aim of treating any clinical cases, but no further illnesses or deaths were reported.

Foam from the pneumonic lungs at death. Photo H Thomas



Typical pneumonia from *Histophilus somni* infection. Photo H Thomas

Abortion in sheep

Four hundred mixed-age Merino × Border Leicester cross ewes scanned as bearing twins were fed field peas from the bottom of a silo. The peas had quite a bit of contamination and appeared to be water damaged. Two weeks later eight of the ewes aborted.

The aborted lambs measured about 250 mm from crown to rump and were not fully formed. There was some inflammation of the placenta, between the cotyledons (the lobules in the placenta where exchange occurs between the maternal and foetal blood).

The only abnormality noticed at post mortem was a relatively small number (about 20) of small (1 mm) white areas in the liver. Under the microscope there were multifocal areas of neutrophils (while blood cells) in the placenta, liver and lung.

A pure growth of *Listeria ivanovii* was cultured from the foetal tissues. No other pathogens were identified.

Listeria bacteria are partial anaerobes, and listerial abortion is often reported to be associated with the feeding of silage or juice by-products (e.g. grape marc or orange peel). In this case the feed was spoiled, suggesting that there had been some growth of anaerobic bacteria.

Aborted twin lamb foetuses. Photo D Salmon

For further information contact Dan Salmon, Team Leader Murray LLS, Deniliquin, on 03 5881 1055.

Leptospirosis survey in the western regions

Leptospirosis is an infectious bacterial disease that can cause reproductive losses in cows and abortions and illness in calves. It can also be contracted by humans. No serological survey for this disease has been done in beef cattle in NSW since the 1960s, so farmers and District Vets in the Central West were wondering if leptospirosis was present and if vaccination was a worthwhile investment. Feral pig populations have also increased dramatically in this area over the past 20 years, and producers and Local Land Services (LLS) biosecurity staff were interested to know if they posed a leptospirosis risk to livestock and humans.

The North West, Central West, Central North and Darling Livestock Health and Pest Authorities (now LLS), in conjunction with the animal health company Zoetis, conducted a serological survey to determine antibody levels, and therefore exposure of sheep, cattle and feral pigs to *Leptospira borgpetersenii* serovar Hardjo and *Leptospira interrogans* serovar Pomona.

Overall, 282 blood samples were taken from cattle on 29 properties; 693 blood samples were taken from sheep on 67 farms; and 146 blood samples were taken from feral pigs on 33 properties.

A positive result was considered to be a microscopic agglutination test (MAT) titre of >1:80.

The study showed that 38% of individual feral pigs tested had exposure to *Leptospira interrogans* serovar Pomona, and 61% of farms on which feral pigs were tested returned at least one positive result for *Leptospira interrogans* serovar Pomona. Sixteen percent of pigs had an MAT of >1:640.

Eighteen percent of all cattle tested had a positive test for *Leptospira borgpetersenii* serovar Hardjo, and 59% of cattle properties participating in the survey had at least one *Leptospira borgpetersenii* serovar Hardjo-positive animal at the time of testing.

An extensive study into leptospirosis in sheep has never been conducted in Australia before. Our study found that 15.9% of individual sheep on 59.7% of properties had a positive antibody titre to *Leptospira borgpetersenii* serovar Hardjo. Almost 20% of individual sheep on 73% of farms had a positive test to *Leptospira interrogans* serovar Pomona.

As part of the serological work, a questionnaire was completed by farmers participating in the trial. Interestingly (and contrary to historical studies), there was no association between rainfall and the incidence of leptospirosis on a property. There was a positive relationship, however, between flooding events and the likelihood of finding leptospirosis on the property.

Forty-five per cent of farmers surveyed said that the feral pig burdens on their farms were high. There was an increasing trend of cattle and sheep testing positive to *Leptospira interrogans* serovar Pomona as a farm's feral pig burden increased.

This study has shown that leptospirosis is actively present in beef cattle, sheep and feral pig populations across the interior of NSW and is not linked to rainfall. All producers should instigate cattle vaccination programs for leptospirosis to protect the reproductive potential of their herds and their own health, as well as that of workers and their families. Feral pigs should be controlled on farms, and when feral pigs are handled the appropriate personal protective equipment (gloves, protective clothing and a mask) should be worn. More research needs to be done into the effects of leptospirosis on sheep reproduction before any recommendations can be made in sheep flocks.

For further information contact Jillian Kelly, Team Leader Central West Local Lands Services, Coonamble, on (02) 6822 1588.

Congenital hypotrichosis in White Suffolk sheep

Recently, a sheep producer near Coonamble noticed that about 3% of lambs born into his flock had very little hair and very pink faces. The mob consisted of 188 Merino × White Suffolk ewes, with three newly purchased White Suffolk rams as the sires.

Affected animals had very little wool and were especially bald on the head and legs. There were sparse long hairs in these areas, and the skin was very pink and very oily. The skin was very thickened, and there were mild abrasions and sunburn in some areas. All four hooves were overgrown. The lambs were in good body condition and were bright and active.

Histopathological examination of the skin showed a non-suppurative perivascular dermatitis (skin inflammation in which inflammatory cells are clustered around the blood vessels), with keratin cysts. The pathologist said that the histopathology was interesting and supported a diagnosis of hypotrichosis (sparse hair growth).

Genetic testing of an affected lamb through SARDI (the South Australian Research and Development Institute) showed that it was double-positive (i.e. homozygous) for the *hairless* (*hr*) gene mutation.

The diagnosis in this case was congenital hypotrichosis, which is a genetic fault resulting in an absence of fibre follicles. It is an autosomal recessive trait. The farmer was advised that he should genetically test his rams to identify and cull carriers of the genetic mutation.

Hypotrichosis in a sheep. Photo J Kelly

For further information contact Jillian Kelly, Team Leader Central West Local Lands Services, Coonamble, on (02) 6822 1588.

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*

Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing (November 2014). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check the currency of the information with the appropriate officer of Department of Primary Industries or the user's independent adviser.

The product trade names in this publication are supplied on the understanding that no preference between equivalent products is intended and that the inclusion of a product name does not imply endorsement by the Department of Primary Industries over any equivalent product from another manufacturer.

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

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