

NEW SOUTH WALES ANIMAL HEALTH SURVEILLANCE

Information contributed by staff of the Rural Lands Protection Boards and the NSW Department of Primary Industries

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SPECIAL FEATURE

Progress in footrot control

The NSW Footrot Strategic Plan is progressing well. At the end of 2007 only one Board reported flock prevalence above 1% (Gundagai, with 1.19%; since reduced to 0.85%). The plan is to have the whole State achieve Protected Area status by the end of 2008, depending on seasonal conditions and the outcomes of eradication programs in summer.

The Hume Rural Lands Protection Board (RLPB) successfully applied for Protected Area status in March, and this gave Gundagai, Northern New England and Central Tablelands encouragement to give priority to meeting the requirements for Protected Area in the near future.

The Steering Committee noted that there is still good producer support for the eradication of footrot. More than 330 lameness investigations across 27 RLPBs showed that producers were actively seeking help to have problems investigated and resolved.

A total of 808 saleyard inspections were conducted in 2007, but only two cases of footrot were detected at saleyards. This brings into question the cost-benefit of saleyard inspections as a means of surveillance.

Reporting of tracing activity from one Board to another is of some concern to the Steering Committee. The Annual Returns indicated that between seven and 11 traces were notified; this is significantly down on the previous year, when 69 traces were sent.

Some form of publicity on footrot was undertaken in 21 RLPBs (down from 27 the previous year), but a number of Boards that cover regions with large numbers of sheep reported no publicity.

Breach investigations were reported in three RLPBs, resulting in a prosecution and a warning letter. The Steering Committee noted that no breach investigations had been conducted into a few failures by producers to notify of disease; the Committee emphasised that the footrot regulatory policy must be implemented on all occasions.

Annual Footrot Returns were received from 35 of the 47 RLPBs across the State. The majority of Boards not submitting Annual Returns are in coastal areas with few sheep or in the Western Division, where footrot is not considered a priority.

As of 31 December 2007 there were 43 RLPBs gazetted as Protected Areas and four with part Protected/part Control status. An updated map of the Footrot Zones can be found on the NSW DPI website.

As of 31 December 2007 there were 42 flocks in quarantine for footrot (out of 22 244 flocks in the State with more than 50 sheep). This is a reduction on the 90 flocks in quarantine at the start of the year. The highest number of quarantines was in the Central Tablelands Board area (10), followed by the Gundagai (seven), Hume and Armidale (six) and Wagga Wagga (four) Board areas. Another seven Boards had one or two properties in quarantine. Thirty-five RLPBs reported no footrot quarantines. The number of sheep in quarantine at the end of 2007 was 119 736, compared with 250 144 at the start of the year.

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Sheep in a footbath. Footrot causes major production losses and management difficulties. Photo: Col Somerset

In 2007 there were 333 lameness investigations undertaken across 27 Boards, compared with 273 investigations the previous year. Excluding the Hume Board, which reported 120 lameness investigations, the average number of investigations per Board was 10.

There were 808 saleyard inspections undertaken across 23 Boards (comparable with 880 inspections the previous year). It appears that all Boards with saleyards give priority to ensuring inspectors attend sheep sales.

Footrot surveys were undertaken by 12 Boards and involved visits to 535 farms (range: two to 187 per Board). The drought and the equine influenza outbreak were given as reasons for not conducting surveys.

Laboratory testing was undertaken by 13 RLPBs, with the highest number of submissions from the Central Tablelands (12 cases).

In flocks newly classified as infected, the source of infection was considered to be introduced sheep on six occasions, low-grade old endemic infections in two cases, stray sheep in one case, and uncertain on five occasions. Of the introductions, two were reported to have come from Victoria.

For further information contact John Seaman, NSW DPI, Executive Officer, Footrot Steering Committee, on (02) 6391 3248.

QUARTERLY HIGHLIGHTS

Abortion in sheep

A comparatively rare case of chlamyphilosis was diagnosed as the cause of late-term abortions in a flock of 90 Dorper sheep at Narrabri. The owner noticed eight foetuses aborted over 2 days. The ewes appeared normal.

Histological examination of a relatively fresh foetus and placenta revealed inflammation and necrosis of blood vessels in the placenta.

Laboratory culture of the tissues and a PCR test confirmed *Chlamydophila pecorum* as the cause. Overseas, a different species, *Chlamydophila abortus*, causes enzootic abortion of sheep, which is far more serious.

For further information contact Shaun Slattery, DV Narrabri RLPB, on (02) 6792 2533

Balanitis in Border Leicester rams

On a large property near Walgett, in western NSW, Border Leicester rams developed severe penile ulceration and inflammation that caused major disruption to the flock's breeding season. At least 31 out of 39 rams were affected, at significant cost to the owner in wasted rams and low lambing percentage.

The first mob of twenty-nine 18- to 30-month-old Border Leicester rams was purchased in late January and joined to 873 Merino ewes. Twelve days later, nine rams were removed because of 'bad pizzles' or foot abscess, and each was treated with two doses of long-acting penicillin.

Two weeks later, with the problem persisting, veterinary examination found the rams were all in good body condition and could urinate, although one at least was observed to dribble urine rather than excreting a controlled stream. Some had paraphimosis (inability to withdraw the penis), and all had ulceration, purulent exudate, abrasion and swelling of the glans penis.



Balanitis in a Border Leicester ram. Photo: Charlotte Cavanagh

Culture of preputial swabs and necrotic material was unhelpful because of bacterial overgrowth by contaminants. A diagnosis of ulcerative balanitis was made on clinical grounds and from histopathology.

Four ewes were examined with no obvious evidence of burrs attached to the wool in

the crutch region or of ulcerative lesions characteristic of vulvovaginitis. One had a creamy white vaginal discharge and one a serosanguinous discharge. Culture of vaginal swabs showed no significant growth.

The second mob of 10 rams was joined to 375 ewes. Twelve days after joining, one ram had an extruded and damaged penis and the remainder showed various levels of inflammation and ulceration of the penis. Each penis and prepuce was treated topically with disinfectant and corticosteroid, and all rams were given long-acting oxytetracycline by intramuscular injection.

The ewes were rested for a week and then joined to White Suffolk rams that were treated prophylactically with long-acting oxytetracycline. These were checked after 2 weeks and found to have no sign of disease.

At least one other producer who purchased rams from the same breeder had similar problems. Balanitis of young Border Leicester rams occurs sporadically. A variety of bacteria, many of which can also be isolated from normal cohorts, are isolated from the ulcerated lesions. Balanitis has been reproduced experimentally with some of these bacterial species. Presumably damage to the penile mucosa is a predisposing factor. Why Border Leicesters are more likely to develop the disease is unknown.

For further information contact Charlotte Cavanagh, RAHL, NSW DPI, on (02) 6872 2077.

Salmonellosis and haemonchosis

Feed deprivation and hot weather preceded sudden deaths in sheep due to salmonellosis.

During a week of very hot weather in mid March 2008, in the Riverina, 15 out of 450 lambs in a feedlot in Narrandera RLPB died and a further 10 were depressed and scouring after being taken off feed for 2 days for shearing. Necropsy revealed congested intestines, enlarged mesenteric lymph nodes and a thickened colon with blood-stained fibrinous tags. *Salmonella typhimurium* was isolated on tissue culture. Severe barber's pole worm (*Haemonchus contortus*) infestation was also diagnosed.

For further information contact Gabe Morrice, DV Narrandera RLPB, (02) 6959 2322.

Ill-thrift and hyperthermia in lambs

Ryegrass pastures and associated fungal or bacterial toxins cause ryegrass staggers, annual

ryegrass toxicity and facial eczema. They may also be associated with ill-thrift from the toxin ergotamine, produced by the fungus *Claviceps purpurea*, or by the related compound ergovaline, produced by the endophytic fungus *Neotyphodium lolii*.

The latter was suspected as the cause of an ill-thrift syndrome in lambs in southern NSW because of the pyrexia found in sheep without concurrent infection. In early autumn, 40 out of three hundred and fifty 8-month-old Merino lambs in the Hume RLPB area displayed ill-thrift, lethargy, lameness, a 'tucked-up' posture and posterior paralysis. In more chronic cases the lambs had lost weight. Affected lambs had elevated temperatures (40.5 to 41.0 °C).

Chlamydomphila infection was excluded by blood test and on the basis that the joints appeared normal. Because the sheep had recently grazed out the ryegrass component of the sward, ergovaline was suspected as having caused the elevated temperatures. Ergot alkaloids can cause ill-thrift, hyperthermia and variable amounts of scouring in sheep.

For further information contact Steve Whittaker, DV Hume RLPB, on (02) 6040 4210.

Internal parasites and drench resistance in sheep

From an economic viewpoint, internal parasites are the main health problem of sheep in Australia. The increasing prevalence and severity of drench resistance are therefore major issues and common causes of disease investigation by government veterinary services.

More than 90% of sheep farms in the State have barber's pole (*Haemonchus contortus*) and scour worms (*Trichostrongylus* spp.) that are resistant to benzimidazole drenches. Eighty per cent of farms have scour worms resistant to levamisole. In northern NSW, 70% of farms have macrocyclic lactone-resistant barber's pole worms and 80% of farms in the same region have closantel-resistant barber's pole worms.

During the quarter, with wetter conditions in many areas, district veterinarians visited properties to help with faecal egg-count reduction tests (DrenchTest), simple checks on worm egg counts shortly after routine drenching (DrenchCheck) and regular worm egg-count monitoring (WormTest) to provide objective information on worm control programs. Particular advice included:

- avoid unnecessary treatment of animals, especially adults
- avoid moving newly drenched animals to very clean pasture
- ensure brought-in animals receive an effective quarantine drench
- do not treat ewes pre-lambing with long-acting anthelmintics
- make sure you use an effective drench.

For further information contact Steve Love, State Worm Control Coordinator, NSW DPI, on (02) 6738 8519.

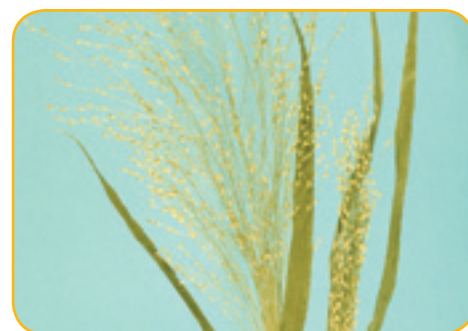
Photosensitisation in sheep

Plant toxicity disease is a frequent cause of property disease investigations by government veterinarians over much of the State; as part of these investigations infectious diseases need to be excluded.

Sporadic episodes of photosensitisation and death in sheep due to hairy panic (*Panicum coloratum*) toxicity were investigated by district veterinarians in southern and central NSW during February 2008. Affected lambs at West Wyalong were pyrexial and lame and had swollen faces and ears, as well as severe jaundice with very dark, discoloured livers and thickened granular bile. The hairy panic in the paddock was short and rapidly growing after recent rain. No further stock losses were reported after the flock was relocated to another paddock.

As well, a case of photosensitisation caused by caltrop (*Tribulus terrestris*) was investigated in Narrandera RLPB. In this case, 2.5% of lambs on a property were affected. Severe, diffuse crystal-associated cholangiohepatopathy with secondary photosensitisation, consistent with *Tribulus terrestris* toxicity, was observed on liver histopathology.

For further information contact Bert Luchjenbroers, DV Condobolin RLPB, on (02) 6895 2152.



Hairy panic grass. Photo: NSW DPI image library

Mastitis in sheep

Mannheimia haemolytica mastitis killed 30 and affected 400 of 600 lactating merino sheep on a grazing property near West Wyalong. The organism was cultured from a number of hard, consolidated mastitic udders from which thick pus was expressed instead of milk. The underbellies of affected ewes displayed a patchy purple skin discolouration over areas of the abdomen and udder.

The outbreak occurred 3 weeks after a significant rainfall event of 50 mm overnight. The ewes were all fat, with body scores of 4 to 5, and they had relatively large 3-month-old lambs at foot. The rain event may have suppressed appetite in the lactating ewe flock, resulting in a significant drop in milk production. The large lambs then caused bruising and tissue damage to the udders of the ewes while seeking milk, causing the udders to become infected.

Affected ewes were treated with oxytetracycline intramuscularly every second day for three treatments. The owner also implemented an early weaning strategy, with the larger lambs being sold at the saleyards.

For further information contact Bert Luchjenbroers, DV Condobolin RLPB, on (02) 6895 2152.

Bovine ephemeral fever virus

Widespread summer rain brought bovine ephemeral fever (BEF) to places in New South Wales where it had not been diagnosed for many years.

Typically, BEF seroconversions are observed annually on the North Coast, with regular spread inland and as far south as the Hunter Valley and Sydney. Extension of BEF seroconversion or clinical disease south of Sydney is uncommon. Clinical cases in northern NSW occur relatively frequently and are typically preceded by high rainfall in the previous month or two.

This year, extensive BEF virus transmission west of the Great Dividing Range occurred during January and February 2008. Cases were first reported in the central-northern regions of Bourke, Brewarrina, Walgett, Coonamble, Coonabarabran and Narrabri following highest-on-record rainfall in late 2007.

From late January till the end of early March 2008, cases were confirmed or suspected from the central-west regions around Dubbo down to the southern central regions of the Riverina,

bordering the Murray River. The last time BEF was reported in the Riverina was at Wagga Wagga in 1996, when cases were also confirmed on a number of properties in northern Victoria in the Strathbogie Ranges.

This year, cases were recorded at Yanco, Euroley and Nericon in the Narrandera region, and at Gundagai and Wagga Wagga. In these cases, only a few animals were affected, typically showing sudden onset of fever, inappetence, depression, profuse salivation, shifting lameness and reluctance to move, and then apparent recovery within 3 days. In one case, near Finley, high morbidity occurred, with 40 of 140 crossbred cattle showing lameness and reluctance to rise.

For further information contact Debbie Finlaison, Veterinary Virologist, NSW DPI, on (02) 4640 6335.

Nitrate poisoning

Nitrate poisoning caused the deaths of 60 out of 500 Angus cattle near Gundagai in late March 2008.

The cattle were fed millet hay for the first time and by the next morning 60 animals were found dead in lateral recumbency, with a bloody discharge from the anus and foam coming from the nostrils. One sick cow was observed to be ataxic and had a tremor of the lips. Nitrate poisoning was confirmed by the analysis of aqueous humour. A sample of the millet hay was found to contain 64 000 ppm nitrate.

A second property in the Gundagai RLPB lost 16 out of 38 shorthorn cattle after feeding millet silage. The animals were too decomposed for necropsy, but a sample of the silage taken from the outside of the bale contained 16 000 ppm nitrate.

When ruminal bacteria in cattle are not adapted to high levels of dietary nitrate, feed nitrate concentrations in excess of 6000 to 9000 ppm (dry weight basis) may be toxic.

For further information contact Joan Jordaan, DV Gundagai RLPB, on (02) 6944 1588.

Skin cancers in goats

Perineal squamous cell carcinoma was diagnosed as affecting at least six of 400 female Boer goats. The affected females were 5 to 8 years old, and this was the first time the owner had noticed the condition.



Squamous cell carcinoma around the perineum in a Boer goat.
Photo: Shaun Slattery

For further information contact Shaun Slattery, DV Narrabri RLPB, on (02) 6792 2533.

Sporadic bovine encephalomyelitis

Sporadic bovine encephalomyelitis (SBE) was diagnosed in one 14-month-old steer out of 16 in the Gundagai region. The affected animal had separated itself from the others and had swollen joints. Diagnosis was made on the basis of clinical signs and a positive complement fixation test for *Chlamydophila*.

Near Wagga, three Angus heifers displayed lethargy, reluctance to get up and a stiff gait. All three had positive chlamydomphila titres on serology.

For further information contact Joan Jordaan, DV Gundagai RLPB, on (02) 6944 1588, and Tony Morton, DV Wagga Wagga RLPB, on (02) 6923 0900.

Histophilus somni infection in cattle

Histophilus somni is a commensal of the respiratory and reproductive tracts, but it can cause respiratory diseases and septicaemia if predisposing factors (e.g. stress and viral infections) are present. In at least two cattle herds near Mudgee, *H. somni* infection caused laryngitis/tracheitis, fibrino-suppurative bronchopneumonia and fibrinous pleuritis, as well as septicaemia with preferential localisation of the organism in the brain, heart, muscles, joints or kidneys.

In one case, three calves out of a herd of 40 Angus calves died over a 1-week period—one with possible nervous signs and the other two with respiratory signs. One of the latter was necropsied and showed blue discolouration of mucous membranes and teats; blood discharging from the eyes; muscle haemorrhages; tracheal haemorrhages; fibrinous pleurisy and pericarditis with adhesions, oedema and emphysema of the lungs; and congestion and haemorrhage of the abomasal mucosa and ruminal lymph nodes.

Histopathology showed a severe diffuse acute fibrinous pleuritis with bacterial colonies, interstitial oedema and emphysema in the lungs, and haemorrhages in the trachea, skeletal muscle and lymph nodes. There were no notable findings in brain sections. *Histophilus somni* was isolated from the lung. Pestivirus antigen-capture ELISA testing of lung fluid was negative. A complement fixation test of pericardial fluid for *Chlamydophila* gave a low titre of 16. The aqueous humour was negative for nitrate and nitrite.

Two more animals died after the investigation. One showed neurological signs, with floccules of purulent material in the cerebrospinal fluid and in the joint synovial fluid.

In the second case, two heifers from a herd of seventy 9-month-old Angus heifers on a property near Gulgong died and thromboembolic meningoencephalitis was diagnosed in a third heifer that was found recumbent. The animal was paralysed, with opisthotonos and a prolapsed tongue. It had some oral ulcers caused by grass seeds and an oedematous skin swelling in the flank area. *Histophilus somni* was isolated from cerebrospinal and pericardial fluid.

In both cases, the remaining animals showing respiratory or nervous signs responded to oxytetracycline injections.

For further information contact Dave Gardiner, DV Mudgee-Merriwa RLPB, on (02) 6372 1866.

NOTIFIABLE DISEASES

Anthrax

An outbreak of anthrax on 10 properties was reported in the Hunter district in December 2007. In early January 2008, one further property in this cluster was affected, and an additional six cattle in the district died, bringing the total deaths to 53. It transpired that these holdings were part of a larger property that was subdivided into smaller properties many years ago and on which no anthrax has been reported for many years. Anthrax may have existed on what was then a single property in 1945, with spores exposed following heavy rain in January. Each of the small holdings was quarantined, and the carcasses were burnt according to policy. No stock had recently left the property, and movement restrictions were audited by using the national livestock identification system at abattoirs.

In a similarly rare case, anthrax was diagnosed on a property in the Narrandera RLPB. Anthrax spores may have been disturbed when old fencing material was buried on a sandhill in the paddock 2 years ago. Anthrax had occurred on this property in 1946. Fifty-nine out of 420 Angus yearlings grazing wheat stubble in the paddock died. The property was quarantined and the affected mob vaccinated. Losses were severe despite early diagnosis and prompt vaccination.

Anthrax was excluded as the cause of other sudden deaths in the Narrandera and Murray RLPBs.

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

Tick fever

A case of tick fever caused by *Babesia bovis* was confirmed on two North Coast properties in March 2008. The properties were infected from a third property, which adjoined one of the affected properties. This third property had recently destocked cattle; however, ticks remained in the paddocks. The property had been stocked with cattle imported from Queensland. It seems likely that these cattle arrived with the ticks and with *Babesia bovis* infection. Twelve cattle died on one of the properties and two died on the second property.

The second infected property had on-sold cattle to other North Coast properties, and these were traced to determine the likelihood of spread of cattle tick or tick fever and to implement control procedures.

Tick eradication programs have commenced on the properties where cattle ticks have been detected, as NSW has a policy of tick eradication when outbreaks are detected.



Tick surveillance is critical to the prevention of tick fever. Photo: DPI Image Library.

For further information contact Paul Freeman, NSW DPI, on 02 6626 1214.

Equine influenza

The last case of equine influenza (EI) in the State was confirmed on 22 December 2007, but the horse is believed to have been infected on about 9 or 10 December 2007. Surveillance for proof of freedom and movement restrictions continued until 28 February, when the National Management Group endorsed the Consultative Committee on Emergency Animal Disease recommendation that NSW be considered provisionally free from EI at 14 March and that EI was once again an exotic disease.

Since 28 February 2008, when widespread surveillance testing had ceased, 31 properties with clinical cases resembling the case definition of EI have been thoroughly investigated, with negative results.

In all, approximately 6600 properties and more than 40 000 horses were considered to have been infected during the course of the outbreak.



Stephen Ottaway accepts the award for RLPBs for their work on horse flu. Photo: Trudy Glasgow.

For further information contact Therese Wright, NSW DPI, on 02 6391 3351.

Johne's disease

The number of cattle herds in NSW infected with Bovine Johne's disease (BJD) as at 31 March 2008 is shown in Table 1.

The number of flocks or herds enrolled in Johne's Disease Market Assurance Programs (JD MAPs) as at 31 March 2008 is shown in Table 2.

Transmissible spongiform encephalopathy (TSE) surveillance

Continuing submissions to the National Transmissible Spongiform Encephalopathy Surveillance Program are encouraged. Cattle over 30 months and less than 9 years and sheep over 18 months that exhibit neurological symptoms are eligible for sampling under the program. All samples were TSE negative in the first quarter of 2008 (Table 3).

For further information on TSE or BJD contact Sally Spence, NSW DPI, on (02) 6391 3630.

Enzootic bovine leucosis (EBL)

Table 4 shows the EBL status of NSW dairy herds as at the end of March 2008.

For further information contact Richard Zelski, NSW DPI, on (02) 4939 8959.

Emergency disease exclusions

Laboratory investigations for which laboratory samples were collected and reported on in the quarter are shown in Table 5.

Table 1: Bovine Johne's disease (BJD)-infected herds in NSW as at 31 March 2008

RLPB	Dairy	Beef	Total
Casino	18	13	32
Grafton	1	0	1
Gundagai	0	1	1
Hume	3	2	5
Kempsey	4	0	4
Maitland	2	1	3
Molong	0	1	1
Moss Vale	2	0	2
Murray	13	1	14
Riverina	7	1	8
South Coast	13	2	15
Tweed Lismore	16	9	25
Total	79	31	111

Table 2: Flocks and herds enrolled in JD MAPs as at 31 March 2008

	Herd type	Results of status testing at each stage (number of herds)						TOTAL
		MN1	MN1-V	MN2	MN2-V	MN3	MN3-V	
AlpacaMAP	Stud	4		23		85		112
	Other	1		2		3		6
	Total	5		25		88		118
CattleMAP	Stud	46		116		186		348
	Other	42		36		31		109
	Total	88		152		217		457
GoatMAP	Stud	7		17		5		29
	Other	0		3		0		3
	Total	7		20		5		32
SheepMAP	Stud	7	24	23	27	143	32	256
	Other	5	7	14	4	22	1	53
	Total	12	31	37	31	165	33	309

MNn = Monitored negative (n = minimum number times sample tested with negative result)

MNn-V = Flocks being vaccinated against OJD (sheep only)

Table 3: TSE surveillance notifications by RLPB 1.1.2008 to 31.3.2008

RLPB	DV sheep	DV cattle	Abattoir sheep	Abattoir Cattle	Private vet sheep	Private vet cattle	Total sheep	Total cattle
Bourke	1						1	
Central Tablelands						1		1
Cooma	1	1					1	1
Gundagai		1						1
Hume					4	1	4	1
Kempsey		2						2
Molong	1				1		2	
Moss Vale						2		2
Mudgee-Merriwa		1						1
Narrabri		1						1
Northern Slopes		2						2
Tamworth		1						1
Wagga Wagga						1		1
Total	3	9	0	0	5	5	8	14

Table 4: EBL status of NSW dairy herds at March 2008

Status	Number herds	%
Monitored free	821	91.7
BMT negative	39	3.3
Not assessed	35	4.0
Total	895	100.0

BMT: bulk milk test

Table 5: Emergency disease exclusions

Disease excluded	Species	Diagnosis
Foot-and-mouth disease	Ovine	Scabby mouth
Hendra virus	Equine	Crofton weed or mist flower poisoning
Foot-and-mouth disease	Ovine	Scabby mouth
Tuberculosis in any mammal	Bovine	Pneumonia
Menangle virus	Porcine	Negative
Equine herpesvirus 1 abortigenic and neurological strains	Equine	Metritis
Contagious equine metritis	Equine	Metritis
Hendra virus	Equine	Negative

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. If you would like more specific information about diseases occurring in your part of the State, contact your local Rural Lands Protection Board District Veterinarian, Departmental Senior Regional Animal Health Manager, Regional Health Leader, or Regional Veterinary Laboratory.

For Statewide information, contact NSW DPI's Animal and Plant Biosecurity Branch in Orange on (02) 6391 3237 or fax (02) 6361 9976.

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

**Report under the Animal Disease Surveillance Operational Plan, Project 3.1
'Reporting for Animal Disease Status in NSW'**

Prepared by Rory Arthur, Animal and Plant Biosecurity Branch, Orange Agricultural Institute, Orange NSW 2800

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**Copies of NSW Animal Health Surveillance reports are available on the internet at:
<http://www.dpi.nsw.gov.au/reader/ah-surveillance>**

Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing (April 2008). 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 New South Wales Department of Primary Industries or the user's independent adviser.



**NSW DEPARTMENT OF
PRIMARY INDUSTRIES**