

# Quarterly review of diagnostic cases – October to December 2007

## Gribbles Veterinary Pathology

### Cattle

On a Canterbury farm, 150 four-month-old calves all looked sick within 24 hours of receiving a copper EDTA injection; four died and a further four died within 48 hours. Against label instructions, the calves had been vaccinated and given a pour-on anthelmintic at the same time. Histological examination of the livers of two calves revealed massive acute coagulative necrosis typical of **acute copper poisoning**.

A 600-cow dairy farm in central Canterbury was run as two 300-cow herds; one was milked once a day and the other twice daily. Over about five days in mid December, 14 cows developed clinical signs consistent with polioencephalomalacia. One case on the first day was followed by eight on the next day and the other cases trickled in over the next few days. Thirteen cases were in the once-daily herd and one in the other herd. Some cows presented blind, some down, and some had severe nervous signs. Many had a concurrent acute onset diarrhoea and some had dysentery with clots of blood. **Polioencephalomalacia** was confirmed in one cow and most recovered after treatment with thiamine. The remainder of the once-a-day herd was given thiamine as a precaution. No further cases have occurred.

As calves are weaned and undergo changes in feed, neurological disease can occur. In one case in the Manawatu, four recently weaned Jersey calves from a mob of 15 died. They were either found dead or died after periods of recumbency, convulsions and blindness. Histopathology on brain from one calf confirmed **polioencephalomalacia**, typical of thiamine deficiency.

Three of 130 Angus yearlings on an Otago beef farm were found dull, incoordinated and head pressing. They also appeared blind and were salivating excessively. Another yearling was found dead nearby. A heparin blood sample from one affected animal had a lead concentration of 0.63 mg/l, high enough to confirm **lead poisoning**. The animals had been in a paddock in which an old house had recently been demolished.

In a separate Manawatu case, two yearling heifers from a mob of 20 developed head pressing, depression and blindness over the course of a week, before dying. Blood lead concentration in one was 3.2 mg/l, indicating **lead poisoning** (concentrations greater than 0.3 mg/l are considered toxic).

A Southland dairy farmer added a liquid product containing monensin (to prevent bloat) to a water trough used by his milking

Each quarter, Surveillance publishes a review of selected diagnostic cases handled by New Zealand's diagnostic laboratories. These cases do not necessarily reflect the national disease profile but they do represent diseases of interest to the livestock industries or of significance to wildlife or companion animals.

cows. Two days later several cows were dull, had a severe diarrhoea and were producing little milk. One severely affected cow in lateral recumbency was killed and necropsied. The only gross lesions were large areas of haemorrhage over the heart. Histological examination revealed a cardiomyopathy and possibly a secondary bacterial myocarditis and pericarditis. There were no significant lesions in other tissues examined histologically. The affected cows appeared to respond to an injectable antibiotic and there were no new cases. The aqueous suspension of 60 g/l monensin is designed for a metered in-line water dispensing system. The treated trough was in a part of the farm not connected to the water dispensing system so the farmer poured 1.5 litres of the product into the 400-litre trough. The affected cows were probably the first to drink the treated water and so suffered **monensin toxicity**.

Post-calving hypomagnesaemia can result in death if supplements are not provided quickly enough. In one spring case, 15 Angus cows from a mob of 35 in the Wairarapa had died despite magnesium bullet supplementation one month before. Serum magnesium concentrations were measured in eight survivors; two were within the normal range of 0.6–1.23 mmol/l and the remaining six were low, ranging from 0.3 to 0.49 mmol/l. In another case five dairy cows from a mob of 500 in Taranaki had died with evidence of struggling and aspiration pneumonia. Serum magnesium samples from 10 of the milking mob averaged 0.59 mmol/l (range 0.31–0.99), confirming **hypomagnesaemia**.

A four-week-old Blonde d'Acquaine-cross calf born on a Rangitikei dairy farm to a cow vaccinated against leptospirosis, was found dead in the paddock. Checked daily, the calves had been healthy up to this time. On postmortem examination the calf was markedly jaundiced and the bladder filled with red urine. Other pathological lesions included marked mid-zonal coagulative necrosis of hepatocytes with associated neutrophil infiltration, a suppurative splenitis and haemoglobinuria. Leptospire were visible on silver-stained sections of the kidney and on dark ground examination of the urine. A PCR test for leptospire on a urine sample was positive. Culture of kidney grew leptospire, identified as *Leptospira interrogans* serovar *ballum*, confirming **leptospirosis**.

A traceback investigation was undertaken when a Taranaki dairy farmer was confirmed with **leptospirosis**, confirmed serologically as the *ballum* serovar. She had been rearing calves at the time

symptoms developed. Eight weeks later, 20 serum samples and eight urine samples were collected from the herd of 60 calves. Microscopic agglutination titres (MAT) on the sera were negative to serovars *pomona* and *copenhageni*. Seven calves had low titres to serovar *ballum*, ranging from 1:50 to 1:100. Four urine samples had leptospira detected by PCR, and in two of these leptospire were visible on dark ground examination. Circumstantial evidence suggests the farmer had become infected from the calves.

## Sheep

Twelve four-month-old unweaned lambs died in the Rangitikei soon after a mob of 1,700 lambs and their mothers were yarded for drenching. Of six lambs necropsied, five had severe gross lesions of fibrinosuppurative and necrotising pleuritis and bronchopneumonia, confirmed on histopathology. The aetiology of the **pleuropneumonia** was not determined but was most likely a mix of viral, bacterial and environmental factors.

A three-week-old Merino lamb from a mob of 200 in the Wanganui district was noted pale and weak at docking. The next morning it was recumbent, and died shortly afterwards. At necropsy the lamb was jaundiced with blood-tinged fluid in the abdomen and thorax. Mild nephrosis was noted on histopathology of the kidney. A MAT to *L hardjo* was 1:100, and negative for *L pomona*. Five more lambs died, and four were clinically ill over the next few days. Sera from 20 ewes all had positive titres to *L hardjo*; 15 had a titre of 1:400 or greater. Only one sample had a low (1:50) titre to *L pomona*.

Five of 10 lambs and all 30 **rabbits** in a small 'petting zoo' in Paihia died after an illness of one or two days. Most developed diarrhoea before death. Culture of the rabbits' faeces grew *Salmonella* **Typhimurium** phage type RDNC – May 06. The riverside property is situated below the Haruru Falls and had been flooded when the Waitangi River overflowed its banks during a recent deluge, drowning all the animals there at the time. A layer of sedimentary silt, clay and debris from the flood was still visible. The present stock had been brought on to the property to repopulate it and re-start the small tourist enterprise.

## Goats

Approximately 15 of 150 adult goats pastured on a rough block in Otago developed respiratory difficulties over a six-week period. None died. The signs were present only when the animals moved; at rest they appeared to breathe normally and were otherwise in good condition and seemed normal. As the goats did not improve with conservative treatment, two animals were killed and necropsied. The only lesion seen was a lateral collapse of the trachea, which assumed a permanent V shape in cross section for about 400 mm of the mid-cervical region. There was no evidence of trauma or infection. The tracheal lesion was unlikely to be congenital or inherited as the affected goats had been brought onto the property from several different farms only a few months before and appeared normal at that time. **Tracheal collapse** has been reported mainly in dogs but

also in calves, foals and goats. A congenital structural defect has been proposed in most cases. However, unlike the condition seen in these goats, most reports are of single young animals and the tracheal collapse is almost always dorsoventral. A lateral collapse in dogs is rare and usually follows attempts at surgical correction of a dorsoventral collapse. The cause of the severe, probably acquired, tracheal collapse in the goats was not determined.

The intestine of a two-month-old goat kid that died suddenly in the Waikato had necrosis of the superficial mucosa then a band of congestion with scattered degenerate inflammatory cells in the mid-mucosa. The deep mucosa was well preserved. There were variable numbers of rod-shaped bacteria on the surface. This was consistent with acute necrotising enteritis caused by *Clostridium perfringens* Type C. *Clostridium perfringens* was isolated, confirming **clostridial enteritis**.

## Alpacas

Alpacas from Taranaki, Manawatu and Hastings regions all had pruritic areas of crusting, lichenification and alopecia extending from the distal limbs of all four legs to the groin and axilla. In the Taranaki and Manawatu herds, a mixture of males and females, crias, yearlings, and adults were affected but the small Hastings herd had only two full siblings affected. The main histopathological change was a diffuse orthokeratosis with mildly thickened and spongiotic epidermis. Keratin plugs distended the follicular infundibula. This change was particularly prominent in the animal from Hastings. Eosinophils and lymphocytes surrounded blood vessels in the oedematous superficial dermis. These findings are typical of **ectoparasite infection** and chorioptic mites were identified in skin scrapings from the animals from Hastings and Taranaki. Confirmation of infection requires repeated skin scrapings, especially from between the toes. Some of the alpacas had been regularly treated for parasitism with injectable macrocyclic lactones but without improvement, probably because these products have no effect on surface-feeding mites. In the Taranaki case, application of topical cypermethrin resulted in clinical improvement within seven days.

Of a group of 15 recently shorn alpacas in the Hawke's Bay, two had non-pruritic areas of alopecia and hyperkeratotic crusts on the groin, over the bridge of the nose, the axilla, and the medial aspects of both hind legs. Skin scrapings did not reveal mites but histological examination of skin biopsies from the legs of a yearling male revealed intrafollicular *Demodex* mites associated with necrotic debris and hyperkeratosis, and allowing a diagnosis of **demodectic mange**. *Demodex* are host-specific normal inhabitants of the hair follicles and sebaceous glands, not previously reported in New Zealand alpacas.

The eye of a 10-year-old alpaca was enucleated because of intraocular neoplasia. Diffuse iris **melanoma** was confirmed on histology, and was associated with osseous metaplasia.

## Pigs

A number of five-week-old piglets on a small Southland piggery developed ataxia over a short period. The piglets had been normal up until that age, and were in a combined litter of 15 housed outside with a single sow. One piglet rapidly became tetraplegic and was killed. The other affected piglets grew normally and the clinical signs did not appear to worsen. One piglet killed for necropsy had no postmortem or radiological lesions. Histological examination of a range of tissues, including brain, the entire spinal cord and associated ganglia, peripheral nerves and skeletal muscle, revealed no lesions except for changes in the cerebellum consistent with a **cerebellar abiotrophy**. These findings are almost identical to those of an abiotrophy reported in a litter of Yorkshire pigs (De Lahunta A. Veterinary Neuroanatomy and Clinical Neurology, second edition. Pp 270-1, 1983).

In a herd of 12 pigs in the Hawke's Bay, one died and one developed a high-stepping gait progressing to hindlimb paralysis, hypothermia, respiratory distress and recumbency, and death two days later. Postmortem examination showed multifocal ecchymotic haemorrhages of the skin, fluid containing fibrin clots in the thorax and pericardium, congested lungs, and numerous white foci on the liver. Histopathology of the liver was characteristic of stage III hepatic **porcine multisystemic wasting syndrome** (PMWS). There was also mild chronic passive congestion in the lungs, and a mild chronic meningitis was probably responsible for the neurological signs.

## Horses

Three properties in the Waikato region experienced abortions and/or perinatal deaths in foals caused by **equine herpesvirus** (EHV) infection. On the first property, a foal found dead had a ruptured liver and a large amount of clotted blood in the abdomen. The liver had multifocal necrosis typical of herpesvirus infection but no definitive intranuclear inclusions were detected. Four foal deaths on the second property all had lesions typical of EHV, and definitive intranuclear inclusions were detected. The third property had one neonatal death with typical EHV lesions and intranuclear inclusions in a section of lung.

A foal from South Auckland developed diarrhoea 24 hours after birth then became severely ill with colic at 36 hours. After euthanasia, postmortem examination showed severe haemorrhagic enteritis. Histology of the small intestine revealed generalised necrosis of the villi with the denuded surface covered with large rod-shaped bacteria. The necrosis extended down many of the glands and left only small nests of epithelial cells at their base. The submucosa was congested and oedematous. The large intestine had a thin mucosa with a flattened surface and extensive loss of epithelium and again numerous rod-shaped bacteria were present on the surface. The submucosa was congested and oedematous. This severe necrotising enteritis is consistent with a **clostridial enteritis** caused by *Clostridium perfringens* Type C.

A 10-year-old mare in the Waikato had yellow membranes and some behavioural changes, apparently the result of acute liver failure. Haematology showed haemoconcentration, neutrophilia and monocytosis. Biochemistry showed elevated AST, GDH GGT, bilirubin and bile acids. The mare died the next day and a limited postmortem examination was conducted. Histology of the liver revealed a generalised hepatopathy consistent with **equine serum hepatitis** or **Theiler's disease**. This can occur in horses injected with equine serum, or equine tissue derived vaccines, 42–60 days previously. Significant numbers also occur without a history of vaccination and their cause is not known.

A 26-year-old gelding of unknown breed had a two-year history of mild haemorrhagic nasal discharge. Endoscopy showed only some mild scarring. The horse was lethargic, inappetent and had ventral oedema, not midline and possibly a result of muscle rupture. The animal was extremely anaemic and had a marked thrombocytopenia. Fibrinogen was mildly increased and blood leucocytes appeared normal. Biochemical examination showed a hypoalbuminaemia. A Coombs test was not carried out to confirm it but the horse probably had an **immune mediated haemolytic anaemia** (IMHA). The hypoalbuminaemia is probably a result of oedema and vasculitis. In a horse of this age the likely trigger is a tumour such as lymphoma. The thrombocytopenia may also have been triggered by a tumour, or may result from disseminated intravascular coagulation (DIC), also triggered by tumours and by IMHA.

## Dogs

Salmonellosis was diagnosed in three unrelated pets in Auckland: a three-month-old Siamese cat from the North Shore, a two-year-old Hungarian Vizsla from West Harbour, and a five-month-old Shih Tzu from Mt Wellington. All were presented at veterinary clinics within two days with acute diarrhoea. **Salmonella Typhimurium phage type 29** was recovered from the faeces of each. This phage type is uncommon in New Zealand and it is not known how these animals from different areas of Auckland city all contracted the unusual infection.

## Cats

A 10-year-old Siamese cat from Taranaki had some pharyngeal inflammation or infection and had difficulty eating but was not especially ill. Most neutrophils in a blood sample contained azurophilic granules ranging in number from a few to many, and the cytoplasm was slightly bluer than normal. Morphologically the granules resembled the 'toxic granules' from cases of severe inflammation and/or the azurophilic granules seen in some normal Birman cats. After antibiotic treatment the cat recovered uneventfully within several days. In a blood sample taken when he was clinically normal, the azurophilic granules were still present in most neutrophils and there was also a mild eosinophilia, which was probably coincidental. The **abnormal intracytoplasmic granules**

have been reported in three Siamese cats and a Himalayan cat.

**Tritrichomonas** was diagnosed after *Tritrichomonas foetus* was identified by real-time PCR in faeces from several cats with chronic mucoid diarrhoea that lived in a multi-cat household in Auckland. All those clinically affected were in close contact. The clinician observed a close correlation between positive results and clinical disease. The diarrhoea ceased after the affected cats were treated.

An 11-year-old spayed female Burmese cat from Auckland city was presented to a clinic with a history of lethargy and anorexia. A CBC revealed a moderate non-regenerative anaemia (haematocrit 14%). No organisms were observed in or on erythrocytes in a peripheral blood smear. PCR was negative for *Mycoplasma haemofelis* but positive for DNA of another *Mycoplasma* species (probably *Mycoplasma haemominutum*). Serology was negative for FIV and FeLV.

## Birds

Illthrift and slowly increasing mortality was seen in an extensive free range egg farm on the southern outskirts of Auckland city. Many birds had loose mucoid droppings and were moribund. Histology of the gastrointestinal tract revealed large numbers of histomonads in the crypts of the large intestine, associated with attenuation of crypt epithelium and cystic dilation, indicating **histomoniasis**. No liver lesions were seen.

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# New Zealand Veterinary Pathology

## Cattle

Two three-month-old calves in the Manawatu were blind and showed opisthotonus. One had been seen circling the night before. One calf died and was presented for postmortem examination, which showed a marked suppurative meningoencephalitis with vasculitis, accompanied by cortical laminar necrosis. A **bacterial meningitis** was diagnosed. The remaining calf was treated with high doses of penicillin and vitamin B1.

A yearling dairy heifer in the Waikato was presented with illthrift and severe skin lesions. She was covered in thick scabs with a creamy exudate, and had severe swelling around the mouth and nose. A Gram stain revealed large numbers of organisms consistent with *Dermatophilus congolensis*. BVD antigen ELISA was negative.

Several cases of hepatopathy consistent with 'spring eczema' were identified this quarter. In one case, a property had several unexplained deaths over one week. Some animals appeared bloated before death. One cow was presented trembling, salivating, and grinding her teeth with a temperature of 38°C. Serum biochemistry

revealed a marked increase in AST (1140 IU/l, reference range 0–179), GGT (320 IU/l, reference range 0–36), and GLDH (2300 IU/l, reference range 8–41).

Four cows from the Waikato had decreased production and feed intake. Biochemistry on blood revealed marked hypomagnesaemia (0.13 mmol/l, reference range 0.49–1.15 mmol/l) in two, with a milder hypocalcaemia. These two animals also had a moderate anaemia, consistent with **chronic hypomagnesaemia** (Taranaki anaemia). Fibrinogen levels in the other two animals were markedly elevated consistent with inflammation, which was probably bacterial in origin.

Nine heifers in the Waikato were found dead five days after being moved to a new property for grazing. The remaining four heifers in the group were severely dehydrated and had lost a lot of weight since their move. All the dead animals had dark or bloody faeces visible at the anus, although some were moderately to markedly autolysed. Postmortem specimens from one dead animal showed no significant abnormalities although autolysis was moderate. Faecal cultures were negative for *Salmonella* and faecal examination revealed no evidence of coccidia. ELISA for malignant catarrhal fever was negative. The paddock the animals were grazing had the water trough at the top of the hill, not visible from the lower part of the paddock. The surviving animals had broken through the fence at the bottom of the paddock to reach a stream on adjacent land. Severe **water deprivation** appeared to have caused the death of animals that had evidently not found the water provided at the other end of the paddock.

Ten dairy cows in the Bay of Plenty presented on a Saturday morning with marked diarrhoea, depression and weakness. At least two animals became recumbent, and by the next day three animals had died, and the rest were recovering. Histology on tissues from one dead animal revealed marked rumenal parakeratosis with mild suppurative rumenitis. Biochemistry on blood from two affected surviving animals revealed a markedly low bicarbonate of 4 and 5 mmol/l (reference range 26–34 mmol/l), consistent with metabolic acidosis. **Carbohydrate overload** was diagnosed. Enquiry revealed that the animals were fed liquid waste from icecream manufacture as a supplement. On the Friday, the water supply on the farm had broken down and it appears likely that the animals over-indulged on the liquid icecream instead, causing a sudden increase in carbohydrate intake.

Up to 100 of a group of three-month-old calves in the Rangitikei exhibited marked respiratory distress. Histology on lung from one animal revealed a marked chronic active locally extensive suppurative pneumonia. *Pasteurella multocida* was isolated, and the lesions were considered consistent with **bovine enzootic pneumonia**.

Three cows of a herd of 50 died after a period of illthrift. Necropsy showed evidence of intestinal parasitism, and numerous parasites in the rumen were identified as *Calicophoron calicophorum*. These

paramphistomes are commonly known as **rumen flukes**. The flukes can cause severe gastroenteritis as large numbers of metacercariae migrate from the small intestine through the abomasum to the rumen. Adults in the rumen are considered clinically insignificant.

A two-year-old heifer in the Waikato died after a period of condition loss and diarrhoea. On necropsy, the animal had severe oedema in the mesentery and abomasal wall and submucosa. The liver appeared abnormal, and histology revealed evidence of diffuse sinusoidal fibrosis with megalocytosis and oval cell proliferation. The pattern of the histologic change was consistent with chronic pyrrolizidine alkaloid toxicity, probably caused by **ragwort poisoning**.

In the King Country, four or five Angus calves from a group of 250 had open sores on the legs and in the mouth that had been visible from birth. The calves had also lost skin around the coronet, carpus and fetlock, with open sores present down the insides of the legs, on the ventral abdomen and in the mouth. There was separation of the hooves, which appeared about to fall off. Histology revealed lesions consistent with mechanobullous disease of Angus calves (**familial acantholysis of Angus calves**). All the affected calves had the same sire. This syndrome was first described in New Zealand in 1975 and is believed to be transmitted by an autosomal recessive gene.

## Sheep

Several lambs in the Rotorua area had proliferative lesions over the nasal planum and at the commissures of the mouth. Histologic sections revealed a marked proliferative and papilliform dermatitis with overlying suppurative inflammation, consistent with orf virus infection (**scabby mouth**).

Ten ewes in the Auckland area died over one week in December. They were in good condition but had a slightly oedematous gall bladder. **Salmonella Hindmarsh** was isolated from a mesenteric lymph node of one animal, indicating salmonellosis. This group of animals was diagnosed with salmonellosis in June and was vaccinated once at that time but received no booster vaccination.

## Goats

Two two-month-old goat kids of a group of 10 in the Waikato had intermittent hindlimb paralysis. The goats were being fed a diet of milk and kelp. Serum copper levels were 2.9 µmol/l (normal range 11.0–25.0), consistent with enzootic ataxia caused by **copper deficiency**.

## Pigs

Two grower pigs from the Waikato region died suddenly after a period of wasting. Histology on both animals revealed a moderate to marked hepatopathy with widespread single cell necrosis and multifocal suppurative inflammation. Both also had marked lymphoid depletion affecting the Peyer's patches and lymph nodes. One animal had circoviral inclusion bodies in the lymph nodes. Both animals also had a moderate to marked interstitial pneumonia. **Porcine circoviral infection** was diagnosed.

## Horses

A foal from the Auckland region presented with a submandibular abscess. Haematology revealed a marked neutrophilia with elevated fibrinogen levels. Culture of the abscess grew **Rhodococcus equi**.

Another foal from the Auckland region died after a period of respiratory distress. Necropsy showed marked pulmonary congestion and consolidation. Histology on the lung confirmed a marked suppurative and fibrinous **bronchopneumonia**. A pure growth of *Staphylococcus aureus* was isolated from the lung.

A three-year-old horse in Northland had a history of increased respiratory effort. Tracheal wash revealed a moderate suppurative and septic tracheobronchitis. Culture of the wash yielded a heavy growth of *Streptococcus equi* subsp *equi* (the causative agent of **strangles**) and *Streptococcus equi* subsp *zooepidemicus*.

A Standardbred foal in Canterbury had a two-day history of diarrhoea and depression, with a temperature of 39.5°C. Biochemistry indicated protein and electrolyte losses. Testing for cryptosporidia and rotavirus was negative but **Salmonella Typhimurium** was isolated from the faeces.

## Dogs

A four-month-old sheepdog pup appeared slightly dull one evening and was found dead the next day. Necropsy showed a markedly enlarged and mottled liver with an enhanced lobular pattern. Histology revealed an acute necrotising hepatitis with intranuclear inclusion bodies consistent with **infectious canine hepatitis**. Serology for *Leptospira copenhagenii* was negative.

An 11-year-old Labrador retriever was being treated with chlorambucil for chronic lymphoid leukaemia, and appeared lethargic. Two weeks earlier, the dog had a splenectomy and a blood transfusion because of splenomegaly caused by its condition. The dog was markedly anaemic, with a haematocrit of 0.21 (normal 0.37–0.55). Blood smears revealed several structures on the red cells consistent with **Mycoplasma haemocanis** (formerly *Haemobartonella canis*). The blood donor dog was also screened for *Mycoplasma haemocanis*, but no organisms were seen.

## Bird

A two-year-old galah that appeared depressed and was not talking had a history of chewing on his painted cage. X-rays revealed numerous radiodense particles in his gizzard. Blood samples revealed serum zinc levels of 214 µmol/l, a toxic level for this species (normal range for psittacine serum is 28–52). Flakes of painted metal from the cage had <4 mg/kg of lead present, but 2,150 mg/kg of zinc. **Zinc toxicity** was diagnosed.

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