

# Quarterly review of diagnostic cases – April to June 2008

## Gribbles Veterinary Pathology

### Cattle

Drought conditions persisting into autumn characterised farming conditions for this quarter. Extended warm evening weather and heavy dews with occasional light rain were ideal conditions for *Pithomyces chartarum* to proliferate, leading to **sporidesmin toxicity** in ruminants. Many cases presented with photosensitisation. Veterinarians used gamma glutamyl transferase (GGT) concentrations to assess the severity of liver damage. A guide to the level of liver damage is: 100–300 IU/l, mild damage; 300–800 IU/l, moderate damage; and > 800 IU/l, severe. In Hawke's Bay, a line of two-year-old Angus bulls on good feed was losing condition. The average GGT concentration was 710 IU/l ranging up to 2,640. On another Hawke's Bay farm, 100 of 760 animals had skin lesions. From 30 animals blood tested, 29 had elevated GGT concentrations ranging from 100 to 2,700 IU/l. In Taranaki problems were widespread. On one farm of 330 cows, 15 were affected and two had died. Blood samples collected from two affected cows revealed GGT concentrations of 1,579 and 2,922 IU/l. There was also hepatocyte damage as glutamate dehydrogenase (GLDH) was elevated (5,450 and 1,289 IU/l; normal 8–41), and severe anaemia. High concentrations of sporidesmin can cause haemolysis. On another Taranaki property 13 Jersey heifers were in poor condition with peeling skin. All 13 were blood sampled and GGT concentrations ranged from 400 to 3,400 IU/l.

Four Friesian weaner heifers on a Rangitikei dairy farm run-off were found dying, 24 hours after injection with an appropriate dose of copper. Eight other animals of the 170 treated were ataxic and staggering. Liver samples examined histologically revealed massive hepatocellular necrosis, suggesting **copper toxicity** as the most likely diagnosis. Kidney copper concentrations measured 180 µmol/kg (toxic > 160 µmol/kg). The animals had been supplemented with oral copper bullets six months earlier, and until recently had also been fed palm kernel (known to have a copper concentration of 20 mg/kg). The farmer believed the animals' condition was poorer than it should be so he administered more copper, unfortunately with toxic effects.

Many bovine **abortions** occur during the mid-gestation period and can be investigated as the fetus can often be recovered. On a Rangitikei farm 15 autumn calving dairy cows had aborted and others were in poor health. Serum samples from two aborting cows were tested for bovine viral diarrhoea (BVD) antibodies and antigen, *Leptospira pomona* and *hardjo* antibody and *Neospora* antibody. The only significant finding was the *Neospora* immunofluorescent antibody titres (IFAT) of 1:1,000 and > 1:2,000. *Neospora* titres

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.

of this magnitude indicate recent infection or recrudescence of infection, and are the most likely cause of the abortion.

From a herd of 300 dairy cows in southern Hawke's Bay, four had aborted and one of these had severe diarrhoea. The farmer was concerned exposure to pine needles may have been a factor. *Neospora* IFATs on all four cows were negative. Three placentae examined histologically all revealed a necrohaemorrhagic placentitis associated with large numbers of bacteria. A culture from the faeces of one aborting cow isolated *Salmonella Typhimurium* and this probably played a role in the abortions.

Fungal infections of the placenta result in abortion in late gestation, and are usually associated with feeding of mouldy supplements. In a herd of 200 from southern Taranaki, five cows had aborted and one died. Fungal hyphae were visible in regions of necrosis and haemorrhage in the cotyledon from one abortion. In another case from Taranaki, 12 cows in a 400-cow dairy herd aborted. Examination of one fetus showed multiple 0.5–2 cm diameter raised grey plaques on the skin, typical of **fungal infection**.

Five cows aborted in a 300-cow dairy herd in the Wairarapa. *Mortierella wolffi* was cultured from the stomach content of one aborted fetus.

Fifteen autumn-born calves being reared in a Wairarapa calf shed died and 10 more had diarrhoea. Salmonellosis had been a problem on this property the previous spring. Histological examination of small intestine revealed numerous deep microabscesses in the lamina propria associated with neutrophil infiltrates and large numbers of bacteria. Culture of intestinal contents yielded *Salmonella Typhimurium*. Three dairy cows from a herd of 200 in southern Hawke's Bay were ill with diarrhoea. Culture of faeces from two grew *Salmonella Typhimurium*.

Drought conditions in the summer and autumn compromised stock water sources. Three beef cattle died, and 20 were weak and staggering after drinking the last remaining water from a Hawke's Bay dam contaminated with a thick algal growth. Histological examination of the small intestine revealed diffuse necrosis of superficial enterocytes and multifocal erosions. Culture of the dam water isolated 13,000 *Anabaena* species per ml and 71,000 *Microcystis* per ml. **Cyanobacterial toxicity** was suspected as both

organisms are potentially toxic cyanobacteria. Deaths stopped once the cattle were shifted to another paddock with clean water.

Twenty-five cattle in a mob of 112 weaner heifers from southern Hawke's Bay had diarrhoea and ill thrift. *Yersinia pseudotuberculosis* was cultured from the faeces of two affected calves, confirming **yersiniosis**. Tests for BVD virus and parasites were negative, while serum concentrations of selenium and copper were adequate.

A Wairarapa farmer considered 40 of his mob of 60 weaner Jersey heifers were in poor condition with diarrhoea. The calves had been recently treated with anthelmintics. Serum pepsinogen values were within the normal range ruling out abomasal parasitism. Serum copper concentrations were sufficient but serum selenium concentrations averaged 115 nmol/l (adequate >140nmol/l). **Selenium deficiency** was the most likely cause of ill thrift. In another case in Hawke's Bay, five Jersey weaners had died and most of the remaining 75 calves were in poor condition. Tests for BVD virus, *Salmonella*, and *Yersinia* were all negative. Serum copper concentrations were adequate but serum selenium concentrations averaged only 122 nmol/l. A further case in the Rangitikei involved eight weaner Friesian heifers from a line of 100 with diarrhoea and ill thrift. Serum selenium concentrations averaged 87 nmol/l.

BVD virus infection is often suspected in an ill thrift problem. A group of three two-year-old Angus heifers from a mob of 100 were losing condition and had diarrhoea. All three had positive BVD antigen ELISA confirming viraemia and most likely **mucosal disease**.

Nine dairy bull calves from a mob of 100 died over one weekend in Taranaki. Many of the survivors had diarrhoea. Histological examination of the abomasum revealed a severe necrosuppurative and ulcerative abomasitis with numerous nematodes visible, consistent with **ostertagiasis**. In another case in Taranaki, two weaner Friesian steers were found dead, and two were in shock with severe diarrhoea. Postmortem examination showed severe thickening and oedema of the abomasal wall confirmed by histology as *Ostertagia* infestation. Suppurative and inflammatory changes in tissues and vessel walls confirmed widespread secondary septicaemia.

In a group of 19 six- to nine-month-old calves on a North Canterbury farm one was off-colour and losing condition. The calf died and necropsy showed perirenal and retro-peritoneal oedema. The calves had been eating acorns and histologically the kidney had acute tubular necrosis consistent with **acorn toxicity**. On a South Canterbury farm three in a mob of 120 calves died and 32 were depressed and anorexic and had eaten acorns. Histologically, the kidneys had acute tubular necrosis.

On a property in the Bay of Plenty each year several calves became ill thrifty and some died. Postmortem of a euthanased calf showed it was emaciated but no other gross abnormalities were noted. Histology revealed a reaction to parasites in the abomasum and small intestine. The pancreas was not examined. The liver had

228 mg/kg of zinc (reference range 40–60), confirming **zinc toxicity**. A second property in the Waikato had calves doing poorly, scouring, with dirty tails and drooling saliva. Some were anaemic. One calf euthanased had shallow erosions behind incisor teeth and a green watery scour. The caecum was distended with watery contents. The pancreas was grey and firm. Histology revealed the pancreas had severe generalised interstitial fibrosis with scattered degeneration and necrosis of individual exocrine cells. The pancreatic islets were spared. The exocrine cells had enlarged nuclei and very little granulation in their cytoplasm. The serum zinc levels in 11 calves ranged from 33–160 µmol/l (normal 9–20).

Two nine-month-old dairy calves on the West Coast died. Postmortem of one showed severe enteritis. Histology revealed the abomasum and small intestine had a moderately severe diffuse infiltrate of lymphoid cells and eosinophils throughout the mucosa extending to the submucosa. Occasional mucosal capillaries had endothelial cells with marginated chromatin and large amphophilic intranuclear inclusions. Small arteries in the submucosa occasionally had endothelial cells with enlarged nuclei with marginated chromatin and large amphophilic intranuclear inclusions. Acute **adenoviral abomasitis** and enteritis was diagnosed.

A two-year-old Charolais cow from the Nelson region had **ataxia** at six months that progressed over two years. Gluteal muscles were wasted. The property had had other cases. Longitudinal slice of the fixed cerebellum showed a marked atrophy of the rostral and caudoventral folia. Histology revealed marked atrophy with only a few normal folia in the dorsocaudal area. Large areas lacked Purkinje cells and the outer molecular layer was thin and pale staining. The granular layer was less cellular and the white matter was pale. Some areas had pale rounded eosinophilic plaques in both the granular layer and the white matter. Some plaques appeared slightly granular and others vacuolated. There were occasional small foci where the axons appeared demyelinated. 'Normal' folia had variable loss of Purkinje cells. The cerebral cortex had moderate numbers of Alzheimer type II astrocytes in the grey matter. Occasional degenerate neurons and pale eosinophilic plaques were seen in the corpus callosum, cerebellar peduncles and in the spinal cord. Between fibres of the heart were frequent mild infiltrates of mononuclear cells, some of which were quite large and had granular cytoplasm (possibly basophils). The muscle nuclei were enlarged and elongated. Scattered Anichov cells were present. Severe chronic cerebellar abiotrophy and chronic myocarditis was diagnosed. The brain changes appear to be a mixture of a cerebellar abiotrophy with features of Charolais progressive ataxia. Tissues have been sent to Massey University for further investigation.

Four of 63 dairy cows aborted over three weeks. Previous serology and fresh fetal spleen were negative for *Neospora* and BVD antigen and antibody. Histopathology on multiple fixed tissues from an aborted fetus revealed a severe acute necrosuppurative placentitis and vasculitis with intralésional fungi (presumed to be *Mortierella* spp), indicative

of **fungal abortion**. The likely source of the fungi was silage, hay or haylage. Fungal culture of the placenta had mixed growth of *Aspergillus* and *Mucor* spp and yeast, suggesting environmental contamination. *Mortierella* spp are slower growing and may have been overgrown by the contaminating fungi. Further diagnosis would require the ELISA IgG serology test for *Mortierella*.

## Sheep

Soon after being allowed to graze a driveway beneath oak trees in Hawke's Bay, four of a mob of 700 ewes were found dead and four others were weak. At necropsy the livers were hard, pale, shrunken, and difficult to cut. Histology revealed this was characterised by biliary hyperplasia and fibrosis, hepatic cord atrophy and more recent hepatocyte necrosis. The lesions were chronic but active and indicated **hepatobiliary toxicity** resulting from access to a toxin, most likely sporidesmin, over the previous few months.

A mob of 200 well conditioned pregnant ewes on a Waimarino farm was being supplemented with parsnips. Ewes were noted staggering and became recumbent with their legs stretched out behind them. Six died and three others responded to subcutaneous calcium treatment. The serum calcium concentration of one affected ewe was 1.69 mmol/l (normal 1.95–2.65). Creatine phosphokinase and aspartate aminotransferase were also elevated, consistent with muscle damage from recumbency. Histological examination of tissues did not reveal any pathology so **hypocalcaemia** was diagnosed. The role of the parsnips is unclear. Adequate grass was available. Perhaps the bulk of the parsnips in the rumen was compromising absorption of calcium.

A mob of 387 ram hoggets in Poverty Bay was examined as part of a fertility check. Eleven animals had **epididymitis**, identifiable by palpable thickening of the epididymis. Nine of them were positive to a *Brucella ovis* complement fixation test. Previous blood tests on older rams had also indicated a high infection rate, confirming a brucellosis problem.

Four of a mob of 800 ewes died in April in northern Hawke's Bay. Histology of the intestine revealed erosion and suppuration of the intestinal mucosa with inflammation extending into the submucosa. Fibrin thrombi clogged blood vessels in the liver, consistent with a septicemic process. *Salmonella* Hindmarsh was isolated from intestinal content, confirming **salmonellosis**.

Twenty ewe hoggets from a mob of 600 in Hawke's Bay died with evidence of diarrhoea. At necropsy the intestinal tract was diffusely reddened and liquid. Histology revealed a severe necrotising hepatitis and abomasitis. *Yersinia pseudotuberculosis* cultured from the gut contents confirmed **yersiniosis**.

Twenty-five lambs died overnight on a property in Gisborne. Postmortem of four showed bronzed livers and brown kidneys. One had red urine. Histology on tissues from two lambs showed irregular shaped areas of degeneration and necrosis associated with the central veins in the livers. The kidneys had occasional

proteinaceous or granular casts in tubules. The epithelial cells in the cortex contained small amounts of brown granular pigment in their cytoplasm. Acute hepatopathy consistent with hypoxia and acute haemoglobinuric nephrosis was diagnosed. One kidney was PCR positive for leptospira, indicating **leptospirosis**.

Four of a flock of 100 two-tooth ewes in Marlborough aborted. The flock had been vaccinated for *Toxoplasma* and *Campylobacter*. Histology of the fetus revealed marginating neutrophilia in brain blood vessels, bronchopneumonia and necrotising placentitis, suggesting fetal septicaemia. Culture yielded a heavy growth of *Listeria ivanovii*, confirming the diagnosis of **listerial abortion**. This is an uncommon cause of ovine abortion.

## Goats

A six-week-old Angora kid, one of a group of 15 on a lifestyle block, was sacrificed because of chronic congenital nervous disease. The animal had been removed from a South Auckland property as part of an SPCA investigation of possible animal neglect. It was reported to have nystagmus, occasional fitting, ataxia, and at necropsy had hypotropia. Other kids in the group were unaffected. Serum copper concentration of the affected animal was 18.4 µmol/l (normal 11–25) and caprine arthritis-encephalitis ELISA was negative. Histology revealed malacia of one of the ventral funicular tracts in the medulla, focal demyelination of white matter tracts in the mid-brain, a non-suppurative meningitis, loss of cells in the granular layer and to a lesser extent the Purkinje cell layer of the cerebellum, and demyelination of dorsolateral tracts and axonal swelling in ventrolateral tracts in the spinal cord. The findings are consistent with **enzootic ataxia**. It is likely the kid was copper deficient at some stage of gestation, although the copper status at death was adequate.

## Deer

Seven of a mob of 700 deer in Hawke's Bay died. One animal examined by the veterinarian was autolysed and tissues could not be examined histologically. Microbiology confirmed a moderate growth of *Yersinia pseudotuberculosis*. **Yersiniosis** was also diagnosed in a case from the Manawatu, when four deer from a mob of 200 died and 20 had diarrhoea. *Yersinia pseudotuberculosis* was cultured from the intestinal content, and typical foci of necrosuppurative enteritis surrounding dense clusters of bacteria were seen in the small intestine lamina propria. In central Canterbury, cases of yersiniosis occurred in April and May and animals presented with typical acute dysentery and death. On one farm, 15 of a mob of 400 died, and on another six of a mob of 150 died. In both cases the intestine had typical lesions of *Yersinia* infection and *Yersinia pseudotuberculosis* was recovered from the intestine in the one case in which culture was attempted.

## Alpacas

On a Canterbury property, five mixed age adult female alpacas in a group of 20 developed acute colic and diarrhoea within two days of being put in a paddock containing a pile of old plant clippings. The

animals also had arrhythmic hearts. Treatment had no effect and all died. Examination of the plant material revealed most of it to be macrocarpa but it also contained leaves identified as oleander. The owner had trimmed an oleander bush and deposited the trimmings in this paddock, resulting in the probable **oleander poisoning** of the alpacas.

## Pigs

On a 30-sow piggery in Taranaki, a pen of weaners was performing poorly. Three had died and 10 were not eating and had lost weight. Postmortem of one showed a pale carcass with evidence of gastric rupture. A 5 cm diameter area of necrosis in the pars oesophagea had two full thickness ulcers associated with it. Blood was present in the stomach, and the remainder of the gastric lining was oedematous. No weaner feed had been available at the time, so the farmer had substituted finely ground piglet meal while awaiting arrival of the weaner feed. This was the cause of the **gastric ulceration**.

## Horses

A liver biopsy was received from a horse with a history of liver disease and which had elevated liver enzymes. There was a mild diffuse infiltrate of eosinophils with slightly higher numbers in portal areas. There were bands of pale amorphous eosinophilic material in the spaces of Disse. In many areas this material had merged together and was accompanied by moderate fibrosis, which had replaced hepatocytes and distorted the normal architecture. There was moderate accumulation of bile within hepatocytes in the worst affected areas. Chronic eosinophilic hepatitis and **amyloidosis** was diagnosed and special stains confirmed the presence of amyloid.

## Dogs

One well grown pup of a litter of eight Great Dane cross pups in the Waikato was suspected of having an intussusception. It had fed well at about 11 pm, was crying and unsettled at 4 am and progressed to screaming at 5.30 am. The pup had increased respiratory effort and appeared to have abdominal pain. Nothing was found at surgery. It recovered well but then developed respiratory problems and was euthanased. At postmortem there was white foam present in the trachea and bronchi and the thoracic cavity contained 15 ml of straw-coloured fluid. The lungs were oedematous and did not collapse completely. The liver was slightly swollen and had miliary white foci (approx 1 mm diameter) often with a red centre. The kidneys had multiple small haemorrhages. Histologically the liver had multiple small foci of necrosis with replacement pooling of blood. Many of the surrounding hepatocytes were degenerate and in some the nuclei had marginated chromatin and large intranuclear inclusions. The kidney had multiple foci of necrosis and haemorrhage in the cortex. Acute multifocal hepatic and renal necrosis typical of **canine herpesvirus** infection was diagnosed.

## Rabbits

An owner of 11 rabbits in an urban area of Christchurch city lost 10 over about three weeks. The rabbits were between six months and two years of age and were found dead without being noticed ill. One rabbit sent for necropsy had appeared normal in the morning but was dead in the early afternoon. The liver had lesions typical of **rabbit haemorrhagic disease**.

## Birds

About 100 birds died from a flock of 20,000 nine-week-old layers reared at a high density on a Manawatu poultry farm. When disturbed, birds began gasping and collapsed. Three that were necropsied each had a blood clot extending the length of the trachea associated with abundant mucus. In some areas a clot of fibrin and necrotic debris adhered to the tracheal mucosa. Histology revealed erosion and ulceration of the mucosa. Clusters of syncytial epithelial cells had sloughed into the lumen of the trachea and many cells contained intranuclear eosinophilic inclusion bodies, characteristic of **infectious laryngotracheitis** (ILT) herpesvirus infection. There was also a mild pneumonia, hepatitis and nephritis. The deaths eventually stopped, and six weeks later the birds were vaccinated against ILT. About 10 days after vaccination there were another 120 deaths. Liver samples revealed severe necrotising hepatitis suggestive of a bacterial infection. Deaths stopped once antibiotics were added to the feed but no microbes could be cultured from previously collected fresh liver. It is unclear whether the later deaths were related to the vaccination or another infectious event.

Blood and faeces from 19 mixed age and breed **kakariki** (*Cyanoramphus n. novaezelandiae*) were examined during a routine disease surveillance screen. Blood smears of two contained small numbers of intra-erythrocytic protozoa (haemoparasites). MAF Biosecurity New Zealand was notified. PCR for avian haemoparasites (nonspecific for *Plasmodium*, *Leukocytozoon* or *Haemoproteus*) was positive in nine birds. Rosemary Barraclough, Massey University Auckland, who viewed a blood smear, and Mike Peirce, at MP International UK, who viewed photographs, both agreed the parasite was 'certainly a strain of *Plasmodium relictum* or one of the subspecies'.

## Other

A three-year-old male snake-necked **turtle** (*Chelodina longicollis*) was presented with a history of anorexia and depression. The in-house haematocrit was reported as 31%. The leucocyte count on a blood slide was estimated at  $8 \times 10^9/l$ , with some atypical mononuclear cells with visible nucleoli or nucleoli remnants. The cytoplasm of these cells was intensely basophilic and had a few azurophilic granules. Many of the erythrocytes contained **haemoparasites** morphologically resembling *Rickettsia* spp.

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## New Zealand Veterinary Pathology

### Cattle

Six of 70 yearling heifers in the Manawatu presented in May with severe bloody scour. Only small numbers of coccidia were present on faecal egg count. Biochemistry on three animals revealed severe uraemia, with urea levels of between 21.0–56.8 mmol/l (normal 2.7–12.3). Hyperproteinaemia was not present, ruling out dehydration as a cause of the uraemia. Acute renal failure resulting from **acorn toxicity** was considered the most likely diagnosis. In another similar case, a six-month-old calf in the Northern Waikato died after a one-week illness. Postmortem showed moderate diffuse petechial haemorrhages and oedema. Histology revealed a severe tubular nephropathy consistent with acorn toxicity.

**Cyanide toxicity** was suspected when four cows of a mob of 500 died suddenly while grazing a predominantly white clover pasture in a coastal area of the Bay of Plenty. The cows had recently been walked along the coast from an area where they had been grazing grass and were fed maize silage. Cyanide testing of the new pasture was negative but rumen content from a dead animal was cyanide-positive, suggesting the animals had ingested cyanide while they were being moved. However, examination of the route for cyanide-containing plants has not revealed an obvious source of cyanide.

Bovine **abortions** were a common reason for submission of tissues to veterinary diagnostic laboratories during this quarter. *Neospora* infection was a common diagnosis in mid gestation (at 120–180 days), with bacterial and fungal placentitis more common in later gestation (after about 180 days). Abortion from BVD infection of the fetus was diagnosed throughout gestation.

In one typical case of bacterial abortion from the Waikato, four cows aborted over two weeks. Histologic examination of the fetus and placenta from one animal revealed a multifocal suppurative placentitis accompanied by a moderate fetal bronchopneumonia. A pure growth of *Arcanobacterium* (formerly *Actinomyces*) *pyogenes* was cultured from the stomach content. Abortion caused by *Arcanobacterium pyogenes* was diagnosed.

In another less typical case, a fetus was submitted from a herd in the Northern Waikato with a recent history of diarrhoea and abortions. Histologic examination of the fetus and placental membranes revealed a multifocal suppurative placentitis. Culture of the stomach content revealed a pure culture of *Listeria monocytogenes*, suggesting this was the likely cause of abortion. Whether *Listeria monocytogenes* also had a role in the diarrhoea observed clinically is unknown.

Twenty-one calves in the Waikato died within one to two hours of being dosed with 47 ml of a product containing 75 g/l of levamisole. The calves exhibited seizures before death. The calves ranged in weight from 120–180 kg, and thus received a dose ranging from 29 mg/kg (in the smaller animals) to 19 mg/kg (larger animals). The toxic oral dose is considered to be about 24 mg/kg. Histologic

examination of tissues from three dead animals revealed moderate pulmonary congestion and oedema. Given the dosages and signs reported, **levamisole toxicity** was considered the most likely cause of death.

Yersiniosis caused primarily by *Yersinia pseudotuberculosis* has been an important cause of enteritis and wasting in growing calves this autumn throughout the Waikato. In a typical case, five of a group of 20 animals exhibited severe scour and lethargy with a mild fever of about 39°C. Culture of one of two samples of faeces yielded a heavy growth of *Yersinia pseudotuberculosis*.

Salmonellosis caused by *Salmonella Typhimurium* continued to be a common cause of bacterial enteritis in both calves and older animals. In general salmonellosis cases appeared sporadic with no major outbreaks reported this season. In a typical case, an adult cow exhibited marked diarrhoea with dysentery. Faecal egg and coccidial oocyst counts were not significantly elevated. *Salmonella Typhimurium* was isolated from faeces.

An eight-month-old calf in the Waikato presented with a large mass (approximately 20 x 30 cm) at the thoracic inlet. The calf had severe dyspnoea that was unresponsive to treatment. Peripheral lymph nodes were not enlarged. Histology revealed the mass was composed of sheets of neoplastic round cells. Sporadic **thymic lymphoma** was diagnosed.

Some cows in the south Waikato were let on to a fresh paddock for grazing. The next day, one cow had died with one other down and at least six animals appearing lethargic. The paddock had fertiliser applied two weeks earlier but because of lack of rain it had not washed in. Blood chemistry on three affected animals revealed markedly elevated urea and creatinine levels. Acute renal failure from **fluoride toxicity** was diagnosed. Fluoride is considered the major toxic component of superphosphate.

**Copper toxicity** has been relatively common over the autumn months. Contributing causes include accidental intramuscular injection of copper, accidental overdose with copper supplements or, in some cases, feeding palm kernel, a feed supplement that was used widely during the drought and which tends to have relatively high levels of copper, often greater than 20 ppm on a dry matter basis. In one typical case, five calves of a mob of 17 in the Waikato died suddenly, two days after being injected with copper glycinate. The calves had a slightly swollen liver with pale kidneys. Blood from a live calf revealed marked elevations in AST and GLDH, suggestive of severe hepatocellular damage. Histology on tissues from one animal revealed severe acute periacinar necrosis in the liver with a haemoglobinuric nephropathy affecting the kidneys. Analysis of kidney revealed copper levels of 220 µmol/kg (normal range up to 157), confirming copper toxicity.

Eleven of a herd of 160 cows aborted over a two-week period. Fetuses ranged in age from 18 to 24 weeks of gestation. All the aborting animals were from one group of 80 grazed near a line

of trees of a macrocarpa hybrid, and **macrocarpa toxicity** was considered the most likely cause of abortion.

## Sheep

A property in the Manawatu had lost three two-tooth ewes over two weeks. Over the next two days, two ewes and two ewe lambs presented with a constellation of central nervous system signs, including ataxia, seizures, collapse and opisthotonos. Head tilts and circling were not seen. Histologic examination of four brains revealed a moderate to marked suppurative meningitis with extension into the adjacent white matter and some evidence of degenerative change affecting the white matter. A suppurative meningoencephalitis was diagnosed in all animals. Listeriosis was considered the most likely aetiology. The losses stopped temporarily but five weeks later several more animals died, exhibiting more classic signs of listeriosis including head tilt and circling. Examination of the brain from one revealed a marked subacute lymphoplasmacytic meningoencephalitis with microabscesses, affecting the brainstem most severely. The findings were typical of **listeriosis**. Interestingly, these animals had not been fed fermented feedstuffs such as silage or baleage.

## Goats

A mob of dairy goats in the Waikato experienced a series of deaths, with eight animals dying after one to three months of wasting. The animals had been regularly drenched and were fed maize silage as a supplement. Of the six ill animals presented to the veterinarian, three had mild to marked hypoalbuminaemia. Histology on one that had died recently revealed a moderate histiocytic enteritis and lymphadenitis, consistent with **Johne's disease**. Five of the six animals sampled were positive on Johne's ELISA.

## Deer

Four adult Rusa deer in the Bay of Plenty area died over four days, followed by another two animals over two days two weeks later. Postmortem of one animal showed marked perirenal haemorrhage, accompanied by patchy mesenteric haemorrhage and pulmonary congestion. Histologic examination of tissues, especially the kidney, revealed a marked large vessel lymphocytic vasculitis. **Malignant catarrhal fever** was diagnosed.

## Horses

Several cases of equine **strangles** were reported during this quarter from the Auckland region and the Manawatu. Affected horses were thoroughbreds and standardbreds from a variety of breeding and racing establishments. Presentation appeared typical, with suppurative nasal discharge an important presenting sign. One horse also had submandibular abscessation.

Several cases of larval **cyathostomiasis** were noted in horses during late autumn and early winter, in the Manawatu and the Waikato. The age of affected horses varied but most were yearling or two-year-olds, with one described as a mare. Presenting syndromes

also varied; some animals were found dead and others presented with a more chronic, severe, protein-losing enteropathy. All horses had been wormed regularly and faecal egg counts were negative. Cyathostome preparations of faeces revealed larval cyathostomes were present. Two animals that died acutely had an ulcerative and suppurative colitis with numerous cyathostome larvae embedded in the colonic mucosa. Another animal that died after a longer period of protein-losing enteropathy had a less severe colitis but numerous larvae were embedded in the colon mucosa.

A case of equine **abortion** was submitted from the Waikato. The placenta had a large grossly visible region of cystic degeneration affecting the cervical star of the allantochorion. Cystic spaces were lined by allantoic epithelium and contained moderate numbers of degenerate neutrophils. Histologically there was cystic allantoic dysplasia, a lesion that has been associated with placentitis. This fits in this case, as the lesion was detected in the region of the cervical star, consistent with an ascending infection.

## Dogs

An eight-month-old dog in Wellington had diarrhoea for nine days, which persisted despite metronidazole therapy. Faecal egg counts and tests for *Giardia* and *Cryptosporidium* were negative. A heavy growth of *Yersinia pseudotuberculosis* was cultured from the faeces. **Yersiniosis** was considered the likely cause of the enteritis.

An eight-week-old puppy in the Bay of Plenty developed acute severe icterus soon after arriving from Northland at its new owner's premises. The pup had markedly elevated ALP and ALT levels, as well as severe uraemia. When it developed clinical signs of disseminated intravascular coagulation (DIC) it was euthanased. Histology revealed moderate dissociation of hepatocellular cords, with an acute, suppurative, tubular nephritis. PCR on EDTA blood for *Leptospira* spp was positive, confirming **leptospirosis**.

## Other

Five water **buffalo** (*Bubalus bubalis*) of a group of 80 in the south Auckland area developed severe fetid watery diarrhoea and two died. Culture of faeces from four affected animals yielded heavy growths of *Yersinia pseudotuberculosis* but was negative for *Salmonella*. Histologic examination of tissues revealed numerous colonies of bacteria present in the superficial mucosa of the small intestine, accompanied by a suppurative enteritis, consistent with **yersiniosis**.

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