

Quarterly review of diagnostic cases – April to June 1999

LABNET Invermay Ltd

Cattle

A 3-year-old Angus bull developed neurological signs when agitated, with staggering, jerky movements and occasionally falling. On histological examination of the brain there was loss of Purkinje cells in a cerebellar abiotrophy, a condition which has been reported in Angus cattle in the USA, with clinical onset from about 7 months of age.

In previous years, neosporosis has not been a major cause of cattle abortion in the southern half of the South Island, but this quarter there were at least seven big outbreaks. In two of these, about a third of the herd had aborted or were not pregnant at the time the samples were collected. Diagnosis was based on demonstration of high titres (>1/2000) in aborting cows or positive titres in aborted calves.

Facial eczema does not normally occur in the south half of the South Island. However the weather in autumn was unusually warm and several practitioners in the northern part of the region included the condition in their differential diagnosis of sunburn-like conditions. In one case, 25 of 150 unthrifty 18-month-old Friesians had sunburn-like lesions, but there was no biochemical indication of hepatic damage, and primary sunburn or primary photosensitisation was diagnosed. In another case, ragwort toxicity was diagnosed. In a few cases there was biochemical evidence of hepatic damage, but histological examination of the liver would have been necessary for confirmation of facial eczema, and this was not requested.

Nitrate poisoning occurred sporadically in cattle and sheep this quarter in the wake of the drought, but the problem did not appear to be as common as it was further north. Many farmers took the precaution of testing crop and new pasture before moving stock on. In one case, 11 cows died overnight after grazing lush new pasture for 4 hours. Necropsies showed classic signs of nitrate/nitrite poisoning, with brown membranes and brown blood, and the nitrate concentration in aqueous humour was high. Pasture nitrate concentrations were very high at 5.6 and 4.7 g/kg (>2.2 g/kg can be toxic).

Sheep

For each of the last 2 years, six to eight polled Dorset lambs on a farm had become dull and showed progressive weight loss in spite of treatment. The lambs had grown well for the first few months of life. Histology of the brain of one showed status spongiosis in the grey matter of the anterior basal nuclei of the thalamus. The affected lambs all had the same sire, suggesting a genetic aetiology. This encephalopathy in poll Dorsets represents a new syndrome.

Salmonella Brandenburg was isolated from the intestinal contents of

Each quarter, Surveillance publishes a review of selected diagnostic cases handled by New Zealand's regional animal health laboratories. These cases do not mirror our national disease profile but they do represent diseases of particular importance to the livestock industry.

a non-pregnant hogget, in association with acute fibrinosuppurative haemorrhagic abomasitis typical of salmonellosis. This is an unusual expression of S Brandenburg infection.

Salmonellosis was identified as the cause of severe diarrhoea and deaths in ewes in 21 cases. In 18 cases S Hindmarsh was isolated, and in three S Typhimurium. Up to 22 ewes had died in a week. S Brandenburg was not isolated from any of these cases although at least one outbreak occurred on a farm where S Brandenburg abortions were a problem last year.

As predicted, post-drought rainfalls brought some clinical gastroenteric parasitism. In one recent case, 13 of 20 faecal samples had >2,000 epg. In other cases there were up to 14,300 strongyle epg in faeces and up to 198,000 trichostrongyles in a worm count.

About 160 of 200 4-month-old Merinos in the central South Island developed skeletal abnormalities suggestive of bowie, and histology confirmed the presence of the cartilage abnormalities characteristic of this disease. The outbreak occurred on land which had not been topdressed for 8 years. Bowie is rare nowadays, but it was relatively common in Merino lambs before phosphate fertilisers became widely used.

In several cases, urinary zearalenone and creatinine assays were carried out to help assess any effect of the mycotoxin on ewe fertility. In five cases, Z:Cr ratios were over 14, indicating a likely adverse effect on fertility (>12.5 is significant).

Pigs

A pig farm in the south had an abortion problem. The owner had a leptospirosis vaccination programme for breeding pigs, and wanted to find out if it was worth vaccinating young pigs. In samples collected from 4-month-old pigs at the meat works, leptospire-like organisms were seen in fixed kidney sections, and titres in 10 pigs ranged from 1/50 in three to >1/1600 in seven. This indicated recent leptospiral infection, and suggested the need for a vaccination programme.

Deer

A number of 3-year-old hinds had died, and others were losing weight over a period of a few months. They were on poor pasture but had been drenched regularly and given copper supplements. Necropsy showed abomasitis and haemorrhagic enteritis, and histology revealed chronic granulomatous enteritis and lymphadenitis suggestive of John's disease or avian tuberculosis

with concurrent parasitic abomasitis.

In a group of 500 newly weaned 3-month-old red deer, ten died over a period of 3 to 4 days. Some had been scouring, and necropsies indicated enteritis. *Yersinia pseudotuberculosis* was isolated from all intestinal samples cultured. This is typical of outbreaks of enteric yersiniosis in deer, which generally affect unvaccinated weaners from 3 to 6-months-old after periods of stress.

A valuable bull wapiti/elk was found dead in extensive hill country. The animal was in light body condition post-rut. Necropsy and histology showed an acute bacterial fibrinosuppurative haemorrhagic bronchopneumonia suggestive of pneumonic pasteurellosis, and malignant catarrhal fever was ruled out. The same diagnosis based on similar findings was made in a group of 700 weaner deer. Four were found dead 4 days after being put onto a crop of green oats. *Pasteurella haemolytica* was isolated from fresh lung tissue.

In a group of weaner deer which had been on the farm for 10 days, several developed severe foot and leg lesions, with swollen fetlocks and fistulae discharging pus near the hocks. Foot abscesses in deer are associated with trauma to the feet in the yards, for example from frozen mud or concrete edges or stones. The infection can spread up the tendon sheaths to burst out over the joints. In this case, *Actinomyces pyogenes* was isolated from abscess contents.

Severe lungworm burdens were recorded in several deer. High numbers of *Dictyocaulus* larvae were detected (from 2.8 to 1358.5 L1/g) in faeces from ten 4-month-old red deer. In a group of red hinds, two died, and histology of one showed verminous pneumonia.

Horses

In two incidents, fatal acute enteritis in foals was caused by *Salmonella* Typhimurium. In one case there was concurrent histological severe parasitic colitis. In the other case, five of 12 foals were unwell, and two died.

Dogs and cats

As usual at this time of year when rat poison is widely used, there were increased numbers of accidental anticoagulant poisonings in dogs. Nineteen cases were recorded during this quarter. Diagnosis was based on demonstration of a prolonged OSPT.

Anticoagulant poisoning is unusual in cats, but a cat presented recently in extremis had an OSPT of >100 seconds, and was anaemic.

Ducks

Paradise ducks found dead on a pond had small yellow abscesses in their lungs, and histology revealed fungal granulomata indicative of aspergillosis.

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Cattle

Cattle abortion diagnoses included *Neospora* abortions and mycotic abortion, with most of the latter being due to aspergillosis. In June, 17 of 70 cows aborted after access to prunings of Leyland cypress (*Cupressocyparis leylandii*). *Macrocarpa* (*Cupressocyparis macrocarpa*) is recognised as a cause of abortion, but Leyland cypress can also cause abortion. Focal malacia in foetal brain has been reported in *macrocarpa* abortions, but no brain lesions were found in the foetuses in this case.

A few cases of onion poisoning occurred in cattle and sheep. A group of 30 Friesian heifers developed haemolytic anaemia and haematuria, and three died. At necropsy, the liver was enlarged and jaundiced. *Leptospire*s were not detected in the urine. In the liver there was anoxic necrosis, and in the kidneys early tubular degeneration, and blood samples from surviving cohorts showed Heinz body anaemia. Sheep are less susceptible than cattle to onion poisoning.

Sheep

Two hundred of 1300 Borderdale/East Friesian cross ewe yearlings died during late April and early May, and gastrointestinal parasitism was a major factor. From an early submission from an autolysed carcass, a faecal egg count was only 200 epg, but later counts from fresher carcasses reached 5,800 epg, with worm counts of 68,000 - 79,000 trichostrongyles and 2000 - 3,600 *Ostertagia* species.

Deer

Two months after weaning, five deaths occurred in a group of 280 6-month-old deer, and post-mortems showed inflammation affecting the small intestine and caecum. The pathology was typical of yersinial enteritis, and *Yersinia pseudotuberculosis* and *Salmonella* Victoria were isolated. *Salmonella* Victoria is an unusual isolate, and may have been an incidental finding.

In May, a 6-month-old red deer was found to be circling and ataxic. Histological examination of the brain revealed that within the cerebral cortex and extending into the midbrain on the left side there was a locally extensive focus of malacia with mycotic meningoencephalitis associated with vasculitis and thrombosis. The deer had been fed grain only, so the fungal organism may have gained entry to the blood as a consequence of mycotic rumenitis.

Twelve of 600 elk stags had a history of incoordination, and were repeatedly found in lateral recumbency over a 4-week period. A brain from a 2-year-old was submitted for diagnosis. There was no evidence of spongiform encephalopathy, and no vasculitis to suggest MCF. The significant changes were in the cerebellum, where there were many degenerate pyknotic Purkinje cells, swollen axons and spheroids consistent with perennial ryegrass staggers.

Dog

A 6-month-old border collie developed flaccid paralysis with no sign of recovery. The brain and spinal cord, and some representative muscle groups, were collected for histopathology. The most significant pathologic changes were in the spinal cord sections and ventral nerve rootlets, where there was demyelination. Sections of skeletal muscles of the hind limbs showed neurogenic atrophy. Lower motor neurone disease was diagnosed. The cause of this condition remains a mystery. Cases occur sporadically in the Canterbury region of the South Island, and there is a recent report of the disease in two 2-month-old pups in Italy.

Birds

Fungal infections, particularly aspergillosis, can cause problems in captive birds, particularly during winter. A number of cases have occurred in farmed ostriches. Also affected have been a number of captive native birds, including kakariki, Antipodean parakeets, and kea. Affected birds were usually in reasonable condition, and birds of all ages have been affected. Environmental sources of infection, and changes in immune status, may be important causative factor for this disease.

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Cattle

Adenoviral enteritis was diagnosed in a 6-month-old weaner which collapsed with dysentery. Necropsy showed severe acute haemorrhage in the distal intestine, and on histological examination the presence of intranuclear basophilic inclusions confirmed the diagnosis.

Twenty four percent of dairy herds tested for copper status during autumn were deficient in copper. This compared with 15% for the same period in 1998. The extensive use of prophylactic zinc this autumn to control facial eczema plus the low dry matter intakes over this period because of the drought are the probable reasons for the increase.

In the autumn of 1999, there were unusually severe outbreaks of sporidesmin toxicity (facial eczema). Affected animals had very high serum concentrations of gamma glutamyl transferase (GGT) and glutamate dehydrogenase (GDH). In many cases, concentrations of GGT were more than 1,000 u/l. Young cattle 6 to 18-months-old constituted many of the cases that died, and histological examinations revealed severe fibrosing cholangiohepatitis typical of sporidesmin toxicity, and in many animals there was also acute necrotising hepatitis indicative of secondary bacterial hepatitis.

During the height of the sporidesmin season, reports were received from practitioners of bovine ocular irritation and conjunctivitis. These cases were considered atypical of pink eye or other forms of known bovine keratoconjunctivitis, and no significant bacteria could be isolated. Anecdotal evidence suggested that the conjunctivitis was due to high spore counts in the environment causing direct irritation to the eyes. Histological assessment of one eyeball showed only a mild anterior lymphocytic plasmacytic uveitis and no significant corneal changes.

The nitrate concentrations of newly sown ryegrass and oat crops tended to be very high in June. Nitrate toxicity killed many cows over this period - up to 50 in some herds. This coincided with a period of unusually rapid pasture growth for the time of year because of warm rain after a prolonged dry spell. Nitrate fertiliser had been used on many of these crops to stimulate further pasture production, and consequently high concentrations of nitrate were translocated into the plant. The nitrate concentrations fell precipitously after a week of frosty dry weather. Multiple cases of abortions were frequently reported a few days following these outbreaks.

Acorn toxicity caused deaths in three of four 6-month-old calves which had had access to oak trees. The survivor had azotaemia, and the calves that died had typical histological changes of severe acute renal tubular necrosis.

Fourteen of 950 cows died of onion poisoning over an 8-day period after having been fed approximately 1.5kg of onions per cow for 4 months. Deaths occurred in some of the best cows, generally without prior illness, although in some cows there was haemoglobinuria before death. Some of the initial deaths were complicated by the recent additional feeding of potatoes, which resulted in rumen overload and metabolic acidosis. However, a consistent finding in all herd-mates sampled was a moderate to marked anaemia with Heinz bodies evident in up to 70% of erythrocytes.

Sheep

In a Merino flock, there had been sporadic cases of a neurological disease in which affected sheep showed mild hind limb ataxia, some proprioception deficits, and slow progression to recumbency. There were usually two to three affected animals each year, and signs began at about 12 months of age. In two sheep examined this year, liver copper concentrations were normal. The brain and spinal cord were examined histologically. Both showed Wallerian degeneration and axonopathy extending from the midbrain to the lumbar cord, and more severe distally. The morphological diagnosis was multifocal neuronal necrosis and axonopathy. This could be an inherited condition, given the sporadic nature of the disease and the early age of onset. However, neighbouring farms reported a similar neurological complaint in young Merinos. This disease was compared with a range of described ovine neuropathies of inherited and toxic aetiology from Australian flocks, and ovine segmental axonopathy was considered the most likely possibility.

Deer

As with cattle, many deer experienced sporidesmin toxicity this autumn. Young deer were affected, and some showed signs of haemoglobinuria. In general, jaundice and sudden death were typical clinical features of the cervine disease. There was no histological or serological evidence of leptospirosis in these cases.

Goats

In an unusual case, a 6-year-old female Saanen developed white proliferative plaques on the lateral limbus of both eyes. Histology confirmed bilateral ocular squamous cell carcinoma.

Horses

Over a 3-week period, samples were received from four adult horses with severe skeletal myopathy diagnosed as probable severe exertional rhabdomyolysis. These horses were unrelated, physically quite separate and had been given food from different sources. All were acutely sick and had creatinine kinase concentrations up to 1,000,000 U/l. One horse died of the disease, and the others recovered. The selenium status of the two horses tested was normal, and monensin toxicity was unlikely given the different food sources.

Dogs

Salmonella Virchow was isolated from a recently imported dog. The animal was 3-months-old and it had been inappetent for one day before developing diarrhoea.

One working dog was found dead, and another had a 'sawhorse' stance and hyperaesthesia. Haematology and biochemistry were unrewarding, and tetanus was suspected. However, the dogs were found to have had access to strychnine. The surviving dog responded to supportive therapy and recovered uneventfully.

Birds

Nine of 26 young canary fledglings died and two were seen to be ill, with gaping beaks and swollen pale tongues. The birds frequently rubbed their beaks and showed difficulty eating and breathing. Necropsy findings confirmed that the lesions were limited to the tongue, and histology revealed large eosinophilic intracytoplasmic inclusions in the epithelium typical of avian poxvirus infection.

A 6-year-old domestic fowl was paretic and eventually became recumbent. At necropsy, fleshy pale masses of variable size were evident within the thoracic cavity, the parenchyma of the lungs, and subcutaneous tissues including the lateral aspect of the right hock joint. Histology of the masses revealed a relatively pleomorphic population of lymphoblastic cells with anaplastic features, and infiltrates of these cells were also present in the spleen, liver, brain, and kidney but not the bursa of Fabricius. These lesions are characteristic of Marek's disease.

Other species

In a zoo, a group of cotton-top tamarins of varying ages experienced an outbreak of yersiniosis. Two of seven animals died of septicaemia

and had typical necrotising lesions in the liver. In one, there was severe perforating ulcerative enteritis. The survivors showed some diarrhoea before recovering. *Yersinia pseudotuberculosis* was recovered in heavy growth from all affected animals. The source of the infection was not proven, but it occurred in conjunction with the seasonal roosting of large numbers of sparrows and starlings in the roof of the enclosure.

Three pet chinchillas died within a week after a brief period of anorexia and malaise, and listerial enteritis was diagnosed. The main finding at necropsy was impaction and distension of the distal jejunum. Faeces were scant, but well formed. Histology revealed a severe generalised neutrophilic enteritis, a less severe hepatitis, and a myocarditis associated with numerous rod-shaped bacteria, and *Listeria monocytogenes* was isolated from the liver.

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Cattle

Organisms morphologically consistent with *Theileria* were seen in five of 16 blood smears from cattle which were due to be exported. *T. orientalis* infection occasionally occurs in cattle in the North Island, and the most of infections are subclinical.

There were several cases of nitrate poisoning in cattle grazing new pasture. In one outbreak, cows were on new fescue pasture, and in another they were on new ryegrass. Diagnoses were made on the basis of history, clinical and post-mortem signs, and nitrate concentrations in animal tissues or food. Some cows were successfully treated with methylene blue.

Sixteen of nineteen 2-year-old bulls died after being fed mouldy kumara. The deaths began about 11 days after introduction to the food. Pulmonary histopathology was consistent with 4-ipomeanol damage. This pulmonary toxin is produced by kumara in response to fungal infection.

Superphosphate toxicity was diagnosed in six cows which suddenly developed severe dehydration, recumbency, groaning, and reflux of rumen contents. Three cows died. Blood samples from four cows showed hypocalcaemia and severe azotemia, and histology of the kidney from one revealed a severe toxic nephropathy consistent with superphosphate poisoning. This was confirmed by demonstration of serum fluoride concentrations ranging from 0.58 to 0.92 mg/l (normal 0-0.19 mg/l).

Sheep

Each year on a farm, a number of 1-year-old Merinos developed hind limb ataxia suggestive of enzootic ataxia. In 1996, one ewe was affected, in 1997 there were six cases, and in 1998, 15 were affected. Histology revealed probable ventral horn demyelination in the lumbar spinal cord, suggestive of segmental axonopathy of Merinos.

There were a number of deaths in 1-year-old ewes on an eastern North Island farm. In one animal examined soon after death, there was marked subcutaneous oedema and fluid in the thorax. Histology of the liver was indicative of fascioliasis, with eosinophilic cholangiohepatitis and a moderate amount of brown pigment representing fluke excretory products.

Large and continuing numbers of sheep deaths occurred on a South Island farm. The small intestine of one sheep which died contained 4,000 *Nematodirus* species and 65,200 *Trichostrongylus* species, and in another there were 73,600 trichostrongyles together with significant numbers of worms in the abomasum. Intestinal worm burdens of this magnitude are extreme and would appear to have caused the deaths.

Twenty-five of 300 lambs grazing an orchard were found dead. At post-mortem, the lambs showed brown mucous membranes, haematuria, gun-metal coloured kidneys and swollen livers. There was marked haemolysis of blood samples, and hepatic and renal histopathology was revealed lesions consistent with the haemolysis of acute copper toxicity. This was confirmed by demonstration of a liver copper concentration of 9000 $\mu\text{mol/kg}$.

Pigs

An SPF herd had an outbreak of diarrhoea in 3-month-old pigs. Morbidity was high but mortality was low. Histology revealed a marked eosinophilic enteritis. Parasite control was excellent on this farm and parasitism was ruled out. Bacterial cultures isolated only coliforms and there appeared not to be a bacterial aetiology. The problem resolved after a change of diet, and dietary antigens were considered to have been the cause of the problem.

Camelids

A 10-month-old alpaca showed signs of weight loss, but it was bright and alert. It had been drenched with ivermectin, but was on limited feed. Blood biochemistry revealed a serum alkaline phosphatase of 32,000 U/L and a GGT of 861 U/L with no other significant alterations. It was Johne's serology negative. The marked cholestasis and increase in serum GGT concentrations led to a diagnosis of sporidesmin toxicity. Alpacas are very sensitive to this toxin.

Birds

A 1-year-old hen from a backyard operation was submitted for necropsy and histology. The sciatic nerves were 0.1 to 0.2 cm wide, and the cranial portion of the left kidney was tan-coloured. Histologically, neoplastic lymphocytes were proliferating in the connective tissue surrounding the sciatic nerve, within the optic nerve, and within the kidney and intestines. No lesions were present in the bursa. Virus isolation was not attempted, but the lesions were morphologically consistent with Marek's disease.

Fourteen of 1400 17-week-old pullets died with acute respiratory disease. One month earlier, and in the same shed, 100/1400 birds of the same age had died with similar clinical signs. The provisional diagnosis at that time had been avian infectious laryngotracheitis (ILT), and oral and intra-ocular vaccination, instituted for the first time on this property, had halted the progression of disease. The sick birds in the second incident had already been vaccinated against ILT and this, along with repeat vaccination in the face of disease, appeared to have attenuated the expression and halted the progression of disease. One dead bird submitted for necropsy from the second incident had a severe fibrinous and necrotising laryngotracheitis with amphophilic intranuclear inclusions. The morphological diagnosis was ILT.

Other species

Four pet rabbits died suddenly with bloody froth around the nose. Histopathology was consistent with rabbit haemorrhagic disease.

Several organs from a squirrel monkey found dead in a zoo had multifocal random necrosis with intralesional *Toxoplasma* organisms.

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