

Batchelar Animal Health Laboratory case reports

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Abstract

A range of diseases are diagnosed in deer at the animal health laboratory. Many samples are "Optigrow" submissions assessing trace element status, or meat plant submissions for disease control and carcass deposition information. A number of interesting diseases seen over the past few years are summarised here. They include Johnes Disease, *Brucella ovis*, Leptospirosis, Yersiniosis, yearling deer deaths, jaundice possibly associated with *Theilaria*, Facsioliasis, Ill thrift, and sudden deaths of weaners.

Johne's disease

Multiple, cream, purulent, necrotic lesions in ileojejunal lymph nodes are frequently noticed at slaughter by meat plant veterinarians and submitted for investigation. The deer are often young and the incidence can range from 4-16% of the mob affected. Grading of lymph node lesions in deer at slaughter are done by the meat veterinarians as either typical or equivocal for tuberculosis. If 1, 2, or 3 animals in a line have lesions, they are all submitted for histological evaluation. If more than 3 animals have lesions only 3 need to be submitted, but the rest can be submitted at the discretion of the meat veterinarian. If only the ileocaecal nodes are affected and if the originating property has been confirmed as positive for Johnes in the past 12 months then these lesions need not be submitted and the lesions are considered negative for tuberculosis and consistent with Johnes.

Histological grading decides the disposition of the carcass as described in Table 1. If the histology suggests the diagnosis may be Johnes, the meat veterinarian may request culture or PCR testing (anon).

Table 1

H & E	ZN	Disposition
Negative	Negative	Export (not for TB reactors)
Suspicious	Negative	Local consumption/Condemn*
Typical	Negative	Local consumption /Condemn*
Typical	Positive	Local consumption /Condemn*

*Depending on the site(s) of the lesions

Examples of negative lesions are calcisphaerulosis (multiple mineralised circular concretions), actinobacillosis and pigment depositions.

When lesions in the ileocaecal nodes appear histologically as liquefactive necrosis surrounded by histiocytes and neutrophils, with huge numbers of short acid-fast organisms in the necrotic debris, these are graded as suspicious and suggest the most likely aetiology is Johnes disease.

In a typical case, 3 out of a line of 25 deer had lesions. *Mycobacterium paratuberculosis* was cultured. In another case liquefactive necrosis of the ileojejunal lymph node was found in 1 deer from a line of 25 suspicious for Johnes disease. However, *Mycobacterium avium* complex was cultured. Grossly and histologically, *M. paratuberculosis*, *M. bovis* and *M. avium* complex are identical so culture or PCR are essential to determine the exact aetiology of lesions (DeLisle and Collins, 1995).

Johnes disease is no longer a notifiable disease (effective September 2000)

Brucella ovis infection in stags

When lesions of epididymitis, or orchitis are found in stags at slaughter whole fresh testicles are submitted for culture for *B ovis* as part of a MAF-RA funded study. In typical cases bilateral epididymal thickening was detected in a 1-year-old and an aged red deer stag at slaughter. Samples were collected aseptically from both epididyma but were negative for *B ovis*. Further testing was not undertaken to determine the cause of epididymitis.

Leptospirosis

One month after weaning, sporadic deaths were ongoing in a herd of elk. About 25 weaners were dead from a mob of 176. On post mortem of an affected animal there was diarrhoea staining of the hind legs and the carcass was emaciated. Grossly the kidneys were pale, pitted, with multiple white spotted areas. Histologically there were multifocal lymphocyte infiltrates distributed throughout the renal cortex and small numbers of degenerate neutrophils in some renal tubules. In other tubules were aggregates of homogeneous eosinophilic material. In many tubules, epithelial cells were expanded by granular brown pigment within the cytoplasm. Bile canaliculi in the liver were expanded by bright granular pigment. The renal lesions are typical of leptospirosis in deer so Warthin-Starry silver stains were applied. Large numbers of silver positive slender leptospire were present in the renal tubules confirming a diagnosis of leptospirosis.

In other suspicious cases the presenting sign is often sudden death. For example, 4-month-old weaner deer were dying. The farmer delivered liver and kidney samples to a veterinarian. On histopathology there was severe haemoglobinuric nephrosis suspicious of leptospirosis. In another case, 7 weaner deer died from a mob of 500, recently introduced to a new property. Clinically there was haemoglobinuria confirmed as haemoglobinuric nephrosis on histopathology suspicious of leptospirosis. No leptospire were readily obvious on silver stains but paired acute and convalescent titres would be required to confirm infection.

Yersiniosis in deer

Eight fawns from a mob of 250 were found dead. The fawns had been vaccinated against Yersiniosis though the vaccination technique was suspected to be faulty. In another case deaths were noted in weaner deer vaccinated twice for Yersiniosis. *Yersinia pseudotuberculosis* was cultured from intestinal content in each case.

Listeriosis

Weaner deer were being fed poor quality silage in early winter. Ten had been found dead or *in extremis* over the previous month. Two stags were found circling with nystagmus and opisthotonus, before falling to recumbency. One was euthanased and one died.

Within the brain stem of both stags were multifocal microabscesses composed of dense infiltrates of neutrophils into the neuropil associated with degeneration of neuropil and neurone necrosis. There were dense infiltrates of neutrophils, macrophages and lymphocytes surrounding blood vessels adjacent to these foci. Within the meninges around the ventricles there was also a dense infiltrate of lymphocytes, macrophages and plasma cells into the Virchow-Robin space. Low numbers of gram-positive, short, bacteria were present within the lesions confirming a diagnosis of listeriosis.

Deaths in yearling deer

A mob of 400 yearling stags was being fed meal over the winter. In the previous 3 weeks, 40 deer had died. The deer had been vaccinated twice, (at the recommended interval), for yersinia and treated with anthelmintics. Two field post-mortems revealed necrotising enteritis and abomasitis with rupture of the omasum and small intestine. Grain overload and acidosis with secondary infection was suspected. Culture of mesenteric lymph node and small intestine revealed a heavy growth of

Clostridium perfringens, suggesting this organism was proliferating in the high carbohydrate intestinal content and contributing to deaths through either, a toxin, or a necrotising effect

Jaundice in prime stags

Over the past 6 months, three separate cases of jaundice noticed first at slaughter have been partially, or fully investigated. In the first case, half a mob of prime red deer stags was killed with no problems. Two weeks later the remainder of the mob were submitted for slaughter. The stags had been grazing ryegrass and white clover pastures and no changes to the paddocks, nor treatment had been given to the stags in the intervening period. The first six stags killed were jaundiced and the entire carcass was condemned. Slaughter of the line was halted and the balance of the mob returned to the farm. The next day the returned animals were examined by a veterinarian and samples collected from two stags. Serum copper concentrations were low at 2.2 and 3.6 $\mu\text{mol/l}$ (normal concentration 8 – 18.5 $\mu\text{mol/l}$). Bilirubin concentration was increased at 49 and 16.6 $\mu\text{mol/l}$ (normal concentration 2-10 $\mu\text{mol/l}$), while gamma glutamyl transferase (GGT) was normal. Complete blood counts were within the normal range for deer.

Hyperbilirubinaemia was the cause of the jaundice. However, the values were only moderately elevated. Normal GGT values did not support obstructive jaundice and if haemolysis was present it was not severe enough to lead to anaemia. The role of hypocupraemia is unclear in the process. Serology for *Leptospira copenhageni*, *hardjo* and *pomona* was negative.

In the second case a mob of 30 stags were sent for slaughter. Fifteen were condemned at slaughter because of generalized jaundice. Killing was halted and the remaining 15 returned home. Those 15 have since been killed with no problem detected. Fixed samples were collected from 2 animals. In both kidneys there were accumulations of eosinophilic homogenous material within tubules and tubule epithelial cells, especially in the cortex. Silver stains for leptospire were applied but were negative.

In the third case a mob of yearling hinds were transported for slaughter. While being held in the yards overnight, 3 hinds died. Post-mortem examinations revealed extensive bruising and haemorrhage of the thorax and rump suggesting trampling and trauma might have contributed to death. In two of the animals' post-mortem the kidneys were dark and friable. Liver and kidney samples were collected from those animals. The next day the line was slaughtered and another hind was condemned for jaundice. The rest of the line appeared normal. On histological examination of the liver from the hinds dying in the yards, there was moderate haemosiderosis and a granular eosinophilic change to hepatocyte cytoplasm. The liver was generally congested. On high-power oil-immersion examination of erythrocytes in liver blood vessels, occasional dark 0.5 μm refractile bodies were present within erythrocytes. In the kidney there was marked haemosiderosis of tubule epithelial cells in the renal cortex. Kidney copper concentrations on the fresh kidney samples from the two dead deer were 77 and 82 $\mu\text{mol/kg}$ (within the normal range) indicating copper toxicity was not a factor.

Finding an intracellular parasite and haemosiderosis suggested the problem might have been due to *Theileria*, although the liver changes did not support acute anoxic damage, as would be expected, had a haemolytic anaemic process been occurring.

Theileria is a notifiable disease and because it was included in the differential diagnosis the MAF hotline was called. The National Centre for Disease Investigation visited the property and collected blood samples from 119 in contact mixed age hinds. Blood borne parasites resembling *Theileria* were present in 25 samples.

The presence of *Theileria*-like organisms in the blood of the deer may be an incidental finding unrelated to the jaundice found at slaughter, however it is tempting to speculate the parasite is playing a role in all the cases. *Theileria orientalis* has been implicated in disease in cattle in New Zealand (Thompson 1991). Clinical signs recorded in cattle cases varied, but included icterus. More recently, *Theileria* like organisms were seen in erythrocytes of deer with haemolytic anaemia (Wilson et al, 2000). All the cases described here occurred in the Wairarapa and Hawkes Bay regions. *Theileria* is

a tick borne disease and would only be expected where *Haemophysalis longicornis* was found. Veterinarians in these areas report ticks are present and widespread.

Fascioliasis and fibrosing cholangitis

Liver sections from 4 adult red deer hinds collected at the slaughter plant were submitted for histology. One of the animals had severe bridging fibrosis and biliary hyperplasia consistent with previous severe sporodesmin exposure. In addition the same animal had numerous eosinophils aggregating around damaged bile ducts. Within the bile ducts were fluke excretory pigments consistent with liver fluke infection.

Ill thrift in stags

A group of three-year-old, red deer stags were in poor condition with diarrhoea. Serum copper concentrations were low at 1.5 µmol/l (normal range 8-18.5 µmol/l) and pepsinogen concentrations increased. The primary condition may have been abomasal parasitism leading to poor copper absorption and copper deficiency. Both conditions could contribute to illthrift.

Rapid weight loss and death was noted in a two-year-old red deer stag. Histopathological examination of the abomasum revealed numerous nematodes throughout the mucosa consistent with a diagnosis of verminous abomasitis, most likely *Ostertagia*.

Sudden death in weaners

Four weaner deer died suddenly. At necropsy the lungs appeared markedly congested and oedematous. Histopathological examination revealed a severe interstitial pneumonia with oedema and fibrin precipitates plus eosinophil infiltration. These findings suggest an allergic reaction to migrating lungworm larvae.

References

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