

Disease Surveillance and Investigation Branch

DISEASE SURVEILLANCE REPORT

Northern Ireland Disease Surveillance Report, April to June 2015

- Cerebrocortical necrosis in calf
- Idiopathic necrotic enteritis in a calf
- Malignant catarrhal fever in a heifer
- Abomasal emptying defect in a ewe
- Eosinophilic interstitial pneumonia in a lamb
- Tick pyaemia in a lamb

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for April to June 2015

CATTLE:

Respiratory diseases

Respiratory disease was identified in 34 cattle post mortem submissions between April and June 2015. The most common pathogens identified included *Mycoplasma bovis* (seven cases), *Mannheimia haemolytica* (four cases), *Pasteurella multocida* (four cases) and *Trueperella pyogenes* (four cases).

Necrotic laryngeal chondritis was diagnosed on gross examination of a nine-month-old beef stirk, one of three out of a group of eighteen to show stertor and dyspnoea. Mixed growths including *T. pyogenes* and *Biberstenia trehalosi* were recovered from cultures. It was noted that whilst the aetiology of this condition is unknown, physical damage to the laryngeal cartilage is thought to be a predisposing factor.

Severe fungal pneumonia was diagnosed in a three-week-old calf. On gross examination there was massive pulmonary haemorrhage with sub-pleural haemorrhage and distension of the interlobular septae with blood, the lung parenchyma had a turgid feel and there was frank blood in the thoracic cavity. Histologically there was a massive sub-pleural and intra-septal haemorrhage, septal oedema, alveolar oedema, focal parenchymal necrosis with large numbers of branching, septate fungal hyphae present in the centre of the necrotic lesions. The necrotic zones were bordered by scant numbers of degenerating leucocytes. Interestingly in this case there were also gross changes and bone marrow histology lesions consistent with bovine neonatal pancytopenia.

It is possible that intercurrent immunosuppression allowed the development of such severe mycotic lesions.

Alimentary diseases

BVD / Mucosal disease

Of 2185 blood samples that were tested for bovine viral diarrhoea virus (BVDV) by virus isolation or antigen capture ELISA 262 (12.0 per cent) were positive. In addition, 1 of 190 (0.5 per cent) submitted tissues and nasal mucus samples were positive by immunofluorescence.

Three cases of mucosal disease were confirmed at post mortem examination during this period.
Idiopathic necrotic enteritis in calves

A three- month- old suckled calf presented following death after showing signs of pneumonia and diarrhoea for an indeterminate length of time. Gross post mortem findings were of a severe fibrino-purulent pleuritis and necrotising pneumonia with whole lobes consolidated and necrotic, there was fibrino-purulent peritonitis and enteritis with thick adhesions between bowel loops, and a necrotic pharyngitis. There were small circular haemorrhagic lesions visible on the serosal surface of multiple organs including the lungs, liver, kidneys, abomasum, rumen, throughout the intestinal tract and on the pleura. Histological examination identified a widespread vasculitis with fibrinoid endothelial necrosis and thrombosis. Special staining revealed the presence of fibrin within blood vessels of the brain (Figure 1) and liver (so-called 'shock bodies', indicative of severe blood vessel damage and disseminated intravascular coagulation) and a systemic mycosis. The differential diagnosis list included BVD/mucosal disease, salmonellosis, malignant catarrhal fever and coccidiosis, but none were detected. This suggests that idiopathic necrotising enteritis was the initiating condition and this enabled the secondary fungal invasion. No causative agent has been identified for this condition which has been diagnosed relatively frequently in Scotland since 1989.

A six- week- old suckled calf outdoors on grass presented having died after treatment for suspected meningitis. Gross findings were of a thick fibrinous peritonitis and serositis affecting the distal caecum and proximal colon and thick adhesions between bowel segments. The bowel in this region was thickened with congested serosa; proximal to this the ileum and jejunum were dilated with fluid contents and had thickened walls. The mucosa of the distal ileum, caecum and proximal colon was significantly thickened and showed necrotising enteritis. There were multiple pale necrotic foci throughout the cortex and medulla of the kidney, and there was caudo-dorsal lung consolidation. Histological examination of the affected gut showed full depth mucosa necrosis and evidence of crypt necrosis. There was lymphoid depletion of Peyer's patches and crypt herniation into lymphoid follicles with crypt necrosis and inflammation. PCR for BVD/Mucosal Disease was negative and again a diagnosis of idiopathic necrotising enteritis was made, based on the gross and histological findings in the absence of BVDV.

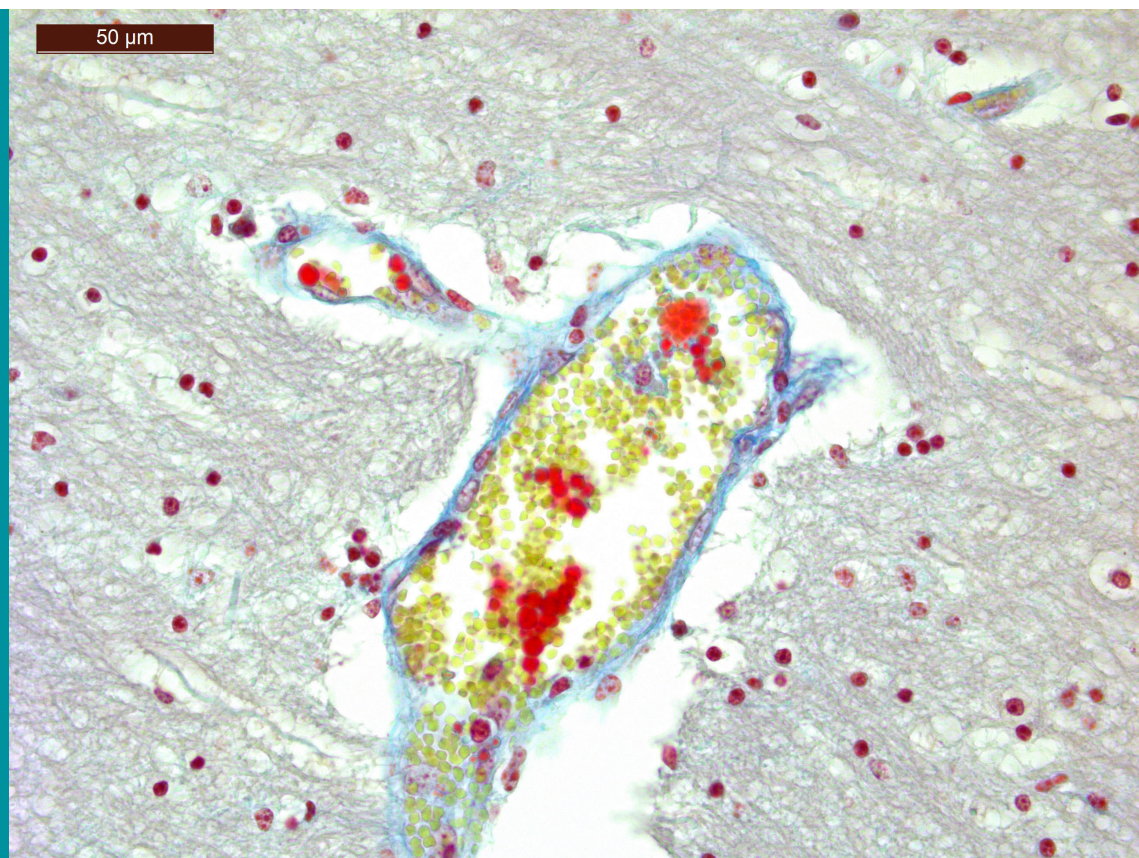


Figure 1

Martius Scarlet Blue stained section of a blood vessel clearly showing red coloured 'shock bodies' (Photo AFBI)

Neonatal enteritis

The pathogens identified in neonatal bovine faecal samples during the quarter are shown in Table 1. Overall, *Cryptosporidium* species and rotavirus were the most common pathogens identified.

Table 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, April to June 2015

Pathogen	Number	
	Tested	Positive (per cent)
<i>Cryptosporidium</i> species	286	100 (35.0%)
Rotavirus	279	72 (25.8%)
Coronavirus	279	9 (3.2%)
<i>Escherichia coli</i> K99	116	0 (0.0%)

Other enteric conditions

Parasitic ova found in ruminant faeces samples submitted during the period are shown in Table 2.

Table 2: Endoparasitic infections in ruminants in Northern Ireland, April to June 2015

	Total	No of parasitic ova					% positive
		Negative	+	++	+++	++++	
Liver fluke							
Bovine	486	443	32	11	0	0	8.9%
Ovine	283	268	13	0	1	1	5.3%
Paramphistome							
Bovine	486	280	79	82	28	17	42.4%
Ovine	284	260	8	15	0	1	8.5%
Coccidia							
Bovine	588	490	77	5	8	8	16.7%
Ovine	337	108	166	28	17	18	68.1%
Strongyle worm egg count	Total	<500 epg	≥500 epg				% Positive
Bovine	561	536	25				4.5%
Ovine	325	274	51				15.7%

≥500 eggs per gram of faeces (epg) was considered of likely clinical significance
+ Low, ++ Moderate, +++ High, ++++ Very high

Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination, with Ziehl-Neelsen staining, on 140 bovine faecal samples. Four samples (2.7 per cent) contained acid-fast organisms typical of MAP. Of 3599 bovine blood samples that were tested for antibodies to MAP 471 (13.1 per cent) were positive.

Nutritional and metabolic disease

Copper poisoning in heifers

Copper toxicity was diagnosed in a Holstein Friesian heifer. The heifer was jaundiced, the liver bronzed and the kidneys black (Figure 2). The bladder was filled with bloody urine (haemoglobinuria).

Liver and kidney copper levels were 481 µg/g and 16 µg/g respectively (normal ranges: 25 to 100 µg/g in liver and 4 to 6 µg/g in kidney) and thus were within stated toxic ranges. A previous case of copper toxicity had been diagnosed in this herd several months earlier based on biochemistry findings in a moderately autolytic carcase in which there were no remarkable pathological findings.



Figure 2

Copper poisoning in a heifer, the yellow colouration of the omental fat and the bronze colouration of the liver can clearly be seen

Ragwort poisoning in a bullock

Hepatopathy due to pyrrolizidine alkaloid toxicity following ingestion of ragwort (*Senecio jacobaea*) was diagnosed in a one-year-old bullock. Histological examination of the liver showed generalised hepatoparenchymal necrosis and fibrosis with marked megalocytosis.

Reproductive and mammary diseases

Abortion

Specimens from 82 bovine abortions and stillbirths were examined during the 2nd quarter. Significant pathogens were detected in 37 cases (45.1 per cent). Of these, BVDV (8 cases, 9.8 per cent) was the most commonly identified pathogen. Other pathogens identified included *Bacillus licheniformis* (7 cases, 8.5 per cent), *T. pyogenes* (7 cases, 8.5 per cent), *E. coli* (7 cases, 8.5 per cent), *Neospora caninum* (5 cases, 6.1 per cent) and *Salmonella* Dublin (3 cases, 3.7 per cent).

Mastitis

A total of 354 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 43 (12.1 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 54 samples. *Streptococcus uberis* was the most frequently isolated organism and accounted for 20.1 per cent of isolates cultured.

Other frequently identified organisms included *E. coli* (18.9 per cent), *Staphylococcus aureus* (8.5 per cent), *Pseudomonas* species (5.6 per cent), *Streptococcus dysgalactiae* (5.1 per cent), *Bacillus cereus* (4.5 per cent) and *Streptococcus* species (4.0 per cent).

Neurological diseases

Clostridium botulinum type D toxicosis was diagnosed in 8 cases during the 2nd quarter of 2015. Association with silage feeding or grazing of pasture treated with broiler litter were common themes.

Cerebrocortical necrosis in a heifer

Cerebrocortical necrosis was diagnosed in ten-week-old heifer calf submitted in May on the basis of characteristic histological changes in the brain. There was marked vacuolation and malacia of the grey matter of the cerebral cortex, in a laminar pattern. Patchy malacia and vacuolation were also present in the cerebellar grey matter and white matter; these lesions were particularly marked at the boundary of the grey and white matter.

Malignant catarrhal fever (MCF) in a heifer

MCF was diagnosed in a fifteen-month-old heifer submitted with a history of diarrhoea and nervous signs including blindness. The animal was sero-positive for MCF, histologically there was a mild meningoencephalitis centred on blood vessels and the blood vessel walls of the optic nerve contained a lymphocyte infiltration, with cell debris and fibrin accumulation.

Meningitis in a calf

A six-week-old calf was found dull and died shortly afterwards. The carcass was jaundiced and there were subcutaneous haemorrhages. The liver was enlarged with generalised hepatocyte swelling and scattered foci of acute necrosis. There was low grade purulent meningitis. There was also a chronic active nephritis. Glomerular spaces were distended and some contained beaded protein droplets. Occasional glomeruli had early membranous change. There was tubular loss with interstitial fibrosis along with acute tubular cell necrosis. There was eosinophilic material in a number of tubular lumina and occasional tubules were filled with neutrophils. *Leptospira* were detected in both liver and kidney.

Other diseases of cattle

Neonatal septicaemia in calves

Four instances of neonatal omphalitis, enteritis and septicaemia were listed as noteworthy during the reporting period. Pathogens detected included *S. Dublin*, *E. coli*, *B. trehalosi*, *T. pyogenes* and rotavirus. However it was considered to be very important that in all these cases zinc sulphate turbidity test results showed inadequate uptake of maternally derived antibody.

Multi-centric lymphoma in a heifer

Multi-centric sporadic bovine lymphoma and secondary fibrino-necrotic pneumonia due to *P. multocida* infection were diagnosed in a two-year-old heifer. The animal was serologically negative for enzootic bovine leucosis virus (EBLV) by ELISA. The so-called sporadic types of bovine lymphoma are not associated with retrovirus (bovine leukaemia virus / EBLV) infection. Sporadic bovine lymphomas are associated with a T-cell lineage and this is in contrast to B-cell line tumours resulting from EBLV infection.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 15 ovine post mortem submissions during this quarter. *M. haemolytica* (6 cases), jaagsiekte (3 cases) and parasitic pneumonia (1 case) were the most common diagnoses.

Eosinophilic interstitial pneumonia in a lamb

Eosinophilic interstitial pneumonia was diagnosed in a one-month-old lamb on the basis of full post-mortem examination. Histological examination of the lung showed the presence of diffuse alveolar wall congestion and infiltration by eosinophils. Immunohistochemistry was positive for the presence of *Toxoplasma gondii*.

Alimentary diseases

Abomasal emptying disorder in a ewe

Abomasal emptying disorder was diagnosed in an adult Suffolk ewe which presented with a greatly distended abomasum which contained 22 kg of ingesta. No lesions consistent with scrapie were detected on histological examination of the brain. Abomasal emptying disorder is an uncommon condition and is seen mainly in the Suffolk breed. The cause is not known but it is likely that there is a hereditary component to the condition, however similar signs have been reported in cases of scrapie and the brain of all suspected cases should be examined histologically.

Parasitic disease in early season lambs

Instances of deaths in lambs due to nematodiosis were recorded in May and June, concurrent coccidiosis was seen in some cases and in one case there was a secondary nephrosis in a two-month-old lamb. This was considered to be secondary to the nematodiosis although D-lactate acidosis (or 'drunken lamb syndrome') could not be ruled out.

Johne's disease

Three ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. No samples contained acid-fast organisms typical of MAP. Of 31 ovine blood samples that were tested for antibodies to MAP 2 (6.5 per cent) were positive.

Reproductive diseases

Abortion

Specimens from 24 ovine abortions and stillbirths were examined during the 2nd quarter of 2015. Significant pathogens were detected in 14 cases (58.3 per cent). Causes identified included toxoplasmosis (4 cases, 16.7 per cent), ovine enzootic abortion (4 cases, 16.7 per cent), listerial abortion (2 cases, 8.3 per cent), and leptospiral abortion (1 case, 4.2 per cent).

Hyperplastic goitre was diagnosed on histological examination of the thyroid gland submitted from an aborted lamb. The thyroid follicles were empty or poorly filled with colloid and the follicular epithelium showed columnar metaplasia with numerous papillary infolds.

Neurological diseases

Listerial encephalitis was diagnosed on full post-mortem examination of an adult ewe which presented with nervous signs shortly after lambing. There was a same season history of listerial abortion in the flock although this ewe had not aborted. Histological examination of the midbrain showed peri-vascular cuffing with lymphocytes, macrophages and scattered neutrophils. There was spongy change of the neuropil with neurone cell body necrosis and microgliosis, micro-pyogranulomas were present. It was noted that listerial encephalitis may occur following episodes of listerial abortion in the same flock.

Acute suppurative meningitis was diagnosed in a three-month-old lamb: Histological examination of the brain showed expansion of the meninges by numerous neutrophils and lymphocytes. There was an associated peri-vascular oedema and infiltration of the superficial neuropil with neutrophils. Moderate growths of *Streptococcus equi* subspecies *zooepidemicus* were recovered from brain cultures.

Spinal abscessation was detected in a two-week-old Charollais lamb, one of four out of a group of eighteen to die following presentation with nervous signs. *E. coli* was recovered from the spinal abscess and in septicaemic distribution. There were no histological lesions consistent with cerebellar abiotrophy (which occurs in the Charollais breed), liver copper levels were normal and RT-PCR for the presence of BVDV / border disease virus (BDV) was negative.

Tick pyaemia with encephalitis in a lamb

A ten-day-old lamb, with a history of swelling on the nasal plenum and sudden onset of seizures and unconsciousness was presented for examination. On gross postmortem examination there was abscessation

of multiple tissues including the nasal plenum, oesophagus, heart, lungs and kidneys. Histologically the lesions consisted of bacterial clumps bordered by degenerate and degenerating neutrophils. Similar lesions were detected histologically in the cerebrum, midbrain and cerebellum thus explaining the seizures. *S. aureus* was cultured from multiple tissues. Pyaemia due to *S. aureus* in young lambs is usually associated with tick borne fever (TBF: *Anaplasma phagocytophilum* infection).

TBF leads to leucopaenia and prolonged neutropaenia causing immune compromise during which time secondary infections and tick pyaemia are not uncommon. Septicaemia due to *S. aureus* in young lambs in the absence of TBF has also been described.

Urinary tract disease

Urolithiasis in ram lambs

Severe urolithiasis and hydronephrosis were diagnosed in a group of young pedigree ram lambs. Lesions were present in the kidneys, bladder and penile urethra: There was massive swelling of the renal cortex and medulla and distension of the pelvis with urine, fine sand and large crystals (Figure 3). In the bladder, mucosal hyperaemia, necrosis and haemorrhage were associated with the presence of fine sand and crystals whilst the serosa showed ecchymotic haemorrhage and fibrin tagging. The crystals were confirmed as magnesium ammonium phosphate by chemistry.



Figure 3

Distension of the pelvis of the kidneys of a ram lamb with fine sand and magnesium ammonium phosphate crystals (Photo: AFBI)

Musculoskeletal disease

A seven-week-old lamb that had been born with congenital abnormalities and was being bottle fed died suddenly and was presented for examination. The lamb appeared excessively hairy and this was particularly pronounced on the legs. The skull was rounded with a shortened maxilla and, as a result, mandibular prognathism was present. The lamb had died of pneumonia which had probably resulted from initial aspiration. Tests for BVDV, Border Disease virus and Schmallenberg virus (SBV) were all negative. However, SBV antibody was present. This may have reflected maternally derived antibody, foetally derived antibody or post natal infection, but confirmed the presence of the virus within the flock. There has been very little evidence of SBV in Northern Ireland flocks after the initial cases two years ago.

Skin diseases

No cases were examined for sheep scab during the 2nd quarter of 2015.

HORSES:

86 swabs were examined for the presence of *Taylorella equigenitalis* during this quarter, all of which were negative. Eleven swabs were cultured from horses with a history suggestive of strangles during this quarter, from two of which *Streptococcus equi* subspecies *equi* was recovered.

PIGS;

Salmonella Typhimurium septicaemia was diagnosed in two batches of young pigs from the same unit during the reporting period. Pigs showed enteric and nervous signs and in one instance the presence of PRRSV was demonstrated by immunofluorescence on lung tissue.