

**Northern Ireland disease surveillance
report, April to June 2007**

- **Abortion due to *Brucella abortus* in cattle**
- **Lead poisoning in cattle**
- **Seasonal increase in blackleg cases**
- **Choke in a bull**
- **Nephrosis in sheep**

**These are some of the matters
discussed in the Northern Ireland
animal disease surveillance quarterly
report for April to June 2007**

CATTLE:

Respiratory diseases

Pneumonia was the principal pathological finding in 41 carcase submissions between April and June 2007. The most common respiratory pathogens identified included *Pasteurella multocida* (10 cases), *Mycoplasma bovis* (nine cases), *Arcanobacterium pyogenes* (seven cases), *Mannheimia haemolytica* (six cases) and *Histophilus somni* (five cases).

One case involved a nine-week-old calf that had died suddenly and was submitted for postmortem examination. Widespread consolidation of the cranioventral lung lobes and the cranial part of caudodorsal lobes was evident grossly, while on histopathology a

fibrinonecrotic bronchopneumonia and acute pleurisy were seen. High levels of *Histophilus somni* were isolated from the lung tissue. *Mycoplasma bovis* involvement was also demonstrated by antigen capture ELISA.

Malignant catarrhal fever was diagnosed in a 15-month-old steer. The animal was one of four, out of a batch of 32 on a mixed cattle and sheep farm, to present with similar clinical signs. Postmortem findings included bilateral ocular opacity and corneal ulceration, crusting of the muzzle, dermatitis at the coronary bands and erosive lesions along the gastrointestinal tract. Typical lesions were observed on histology including a widespread vasculitis and lymphoid cell accumulations in sections of brain, kidney and other organs. Cross-reacting antibodies to gamma-herpes virus were detected serologically, while bovine virus diarrhoea (BVD) viral immunofluorescence was negative.

Alimentary diseases

BVDV / Mucosal disease

A total of 611 blood samples were tested by virus isolation or antigen capture ELISA for the presence of bovine viral diarrhoea virus (BVDV). Of these, 68 samples (11.1 percent) tested positive. In addition 253 submitted tissues and nasal mucus samples were tested by immunofluorescence for BVDV, with

18 (7.1 percent) being found positive. Seven cases of mucosal disease were also detected at postmortem examination and confirmed by viral immunofluorescence.

Neonatal enteritis

The pathogens identified in neonatal bovine faecal samples are shown in

Table 1. Overall Cryptosporidium and Rotavirus were the most common pathogens identified, with *E. coli* K99 and Coronavirus occurring less frequently.

Other enteric conditions

The parasitic ova found in ruminant faeces samples submitted during the period are included in Table 2.

TABLE 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, April to June 2007.

Pathogen	Number	
	Tested	Positive (%)
Cryptosporidium	380	127 (33)
Rotavirus	252	57 (23)
Coronavirus	250	2 (1)
<i>Escherichia coli</i> K99	150	12 (8)

TABLE 2: Endoparasitic infections in ruminants in Northern Ireland, April to June 2007.

	No of parasitic ova						Percentage positive
	Total	Negative	+	++	+++	++++	
Liver fluke							
Bovine	361	330	22	6	1	2	8.6
Ovine	90	81	8	0	0	1	10.0
Coccidia							
Bovine	467	320	121	18	6	2	31.5
Ovine	134	39	75	7	12	1	70.9
Strongyle worm egg count							
		<500 epg		≥500 epg			
Bovine	417	394		23			5.5
Ovine	111	85		26			23.4

≥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 (Ziehl-Neelsen staining) on 212 bovine faecal samples. Nine samples (4.2 percent) contained acid-fast organisms typical of MAP. A total of 781 bovine blood samples were tested for antibodies to MAP; 86 samples (11 percent) were positive.

Other enteric conditions

Two four-day-old calves were received from a farm that had had four other recent deaths. One of the two calves had shown signs of a bloody scour along with respiratory problems, while the other calf had died suddenly. At postmortem examination there was evidence of navel-ill and joint-ill in one, while in the other there was enteritis and pneumonia present. *Salmonella* Dublin was isolated on bacteriology from both carcasses. Focal hepatoparenchymal necrosis, typical of salmonellosis, was noted in histological sections from both animals.

A fungal rumenitis was diagnosed as the cause of death in an eighteen-month-old heifer. This animal, which had died suddenly, was at grass but was also receiving supplementary feeding with bread. At postmortem examination there was evidence of ante-mortem rupture of the rumen and a severe rumenitis with thickening and oedema of the rumenal wall and blood evident on the mucosal surface. Histological examination revealed a severe mycotic rumenitis with fungal hyphae at all levels, from the mucosa through to the muscularis. It was felt that the bread in the diet may

have predisposed either directly to the condition or through an initial acidosis.

Nutritional and metabolic diseases

Two five-month-old Friesian bull calves that had been euthanized on-farm were submitted from a batch of 30, a number of which were showing signs of lameness and arched backs. At postmortem examination there was fracture of the proximal tibia in one calf, while a mid-shaft fracture of the femur was evident in the second animal. The calves were being fed *ad libitum* on a home produced ration without added minerals and osteodystrophy was suspected. Incorporation of minerals into the diet and close monitoring of the welfare of cohort animals was recommended.

Blood samples were received from two calves, aged two to three weeks that had presented with nervous signs. Biochemical analysis indicated that both animals were hypomagnesaemic, with serum levels of 0.28 and 0.32mM respectively (reference range: 0.73 to 1.31mM). In addition, one animal tested positive for BVD virus by ELISA.

Reproductive and mammary diseases

Abortion

Specimens from 73 bovine abortions were examined during the quarter. Abortifacient pathogens were detected in 36 cases (49.3 percent). Of these *Bacillus licheniformis* was the most commonly identified pathogen, and was isolated from nine cases (12.3 percent of total submissions). The presence of *Leptospira* spp. was identified in seven cases (9.6 percent), *Neospora*

caninum in four cases (5.5 percent) while *Arcanobacterium pyogenes* was cultured from six cases (8.2 percent). *Salmonella* Dublin and *Listeria monocytogenes* were cultured from one case (1.4 percent) each.

Significantly *Brucella abortus* was isolated from a foetus from one farm. In this particular case, there had been no other previous indication of infection in the herd until the foetus was submitted as a routine diagnostic submission. Serological tests were positive from both the dam of this particular foetus and one other aborting cow.

Mastitis

A total of 932 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. Sixty-three (6.8 percent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 135 samples. *E. coli* was the most frequently isolated organism and was present in 22.9 percent of samples from which microorganisms were identified. *Streptococcus uberis* was cultured from 18.1 percent of samples, *Staphylococcus aureus* from 6.4 percent of samples, *Bacillus licheniformis* from 6.3 percent of samples and *Streptococcus dysgalactiae* from 4.1 percent of samples. *Staphylococcus* spp. (excluding *S. aureus*) and *Enterococcus* spp. were isolated from 9.6 percent and 4.7 percent of samples respectively.

Nervous diseases

Botulism due to *Clostridium botulinum* type D toxin was diagnosed on four farms during the quarter. One of these cases involved two 18-month-old animals that were euthanized after becoming paraplegic. At postmortem examination there were few significant pathological findings, although in both animals the rumen was noted to be contracted with scant contents and the small intestine hyperaemic with slightly bloody contents in segments. The presence of *Clostridium botulinum* type D toxin was detected in the abomasal and intestinal contents of one animal.

Osteomyelitis affecting the body of the fifth cervical vertebra was diagnosed in a three-month-old Friesian heifer, which had initially presented with ataxia. A high level of *Arcanobacterium pyogenes* and a medium level of *Streptococcus bovis* were isolated from swabs taken from the lesion *postmortem*.

Lead poisoning was diagnosed on seven farms during the quarter. In one case an 18-month-old bullock was submitted for postmortem examination after having initially presented with nervous signs, including abnormal carriage of the head, fasciculation of facial muscles, head-pressing and dullness. The animal was one of two that had shown similar signs out of a batch of 22. On examination, a heavy tick infestation was noted and the brain appeared grossly congested. However, histology on the brain showed no significant abnormality. A concentration of 57 ug/g lead was

detected in wet kidney and elevated blood lead was subsequently detected in a clinically affected cohort animal. A lead-battery was later detected in the area of the farm grazed by the cattle.

A three-month-old calf with a history of nervous signs was also submitted for postmortem examination. The animal was the second of a batch of six to have died on the farm, with similar clinical signs. At gross postmortem examination the brain exhibited flattened gyri and reduced grey matter, which contained peach-coloured foci. A diagnosis of cerebrocortical necrosis was made on the basis of histology, which showed extensive areas of encephalomalacia with the presence of inflammatory cells.

Other diseases

A seasonal increase in the number of animals dying due to blackleg was also noted during the quarter with cases diagnosed on 14 farms in total. One of these cases involved an eight-week-old calf that was found dead 24 hours after turn-out to spring grass. A rancid butter odour was evident at postmortem examination and typical blackleg lesions were detected in muscles of the hind quarters. A fibrinohaemorrhagic pericarditis was also present and the thymus was enlarged and emphysematous. Fluorescent antibody tests for *Clostridium chauvoei* were positive on muscle, heart and thymus.

Choke was diagnosed as the cause of death in a yearling bull that had been found dead. The animal, which was the second recent death on the farm, was

one of a group of 50 bulls that were penned together and being fed on a diet of sugar-beet pulp, straw and silage. A portion of the sugar-beet pulp was found obstructing the oesophagus at the level of the thoracic inlet (Fig 1).



Fig 1. Oesophageal obstruction due to sugar-beet pulp in a year-old bull

SHEEP:

Reproductive diseases

There was the normal seasonal decrease in the number of ovine abortion submissions during the quarter, with 24 cases received. Recognised abortifacient agents were detected in 17 cases (70.8 percent) with more than one pathogen identified in four submissions. Toxoplasmosis was the most frequently diagnosed cause of abortion and was found in 10 cases (41.7 percent of total submissions). *Leptospira* spp. were detected in four cases (16.7 percent), and *Chlamydophila abortus* (EAE) in three cases (12.5 percent), while *Campylobacter* spp. and *Listeria ivanovii* were isolated from one case (4.2 percent) each.

Alimentary diseases

Pulpy kidney disease was diagnosed on seven farms during the quarter. One of these cases involved a three-week-old lamb from a farm that had had six other recent deaths, the majority of which had shown neurological signs. Findings at gross postmortem examination were suggestive of a clostridial enterotoxaemia. These included excess pericardial fluid with fibrin clots, and multiple haemorrhagic foci on the renal cortex. The diagnosis was confirmed on the basis of histopathological findings of a focal symmetrical encephalomalacia and the demonstration of *Clostridium perfringens* epsilon toxin in gut contents.

Coccidiosis and nematodiriosis were also diagnosed as a cause of death on a number of farms. In one case over 40,000 Nematodirus worms were found at postmortem examination in a six-week-old lamb that was submitted from a farm that had experienced five other recent deaths. A press article had been previously issued by VSD AFBI in March warning of the risks of nematodiriosis and with the expected date of peak hatching of Nematodirus larvae, which this year was predicted to be in early April.

Johne's disease

A total of 15 ovine faecal samples were examined microscopically (Ziehl-Neelsen staining) for *Mycobacterium avium* subspecies *paratuberculosis* (MAP). All of the samples were negative.

Respiratory diseases

Pneumonia was identified as principal pathological finding in 10 submissions

during the quarter, with *Mannheimia haemolytica* isolated from five of these cases.

Laryngeal chondritis was also diagnosed in submissions from three farms. One of these involved a two-year-old Texel ram that had been found dead, although the owner had noticed it breathing heavily over the previous month. At postmortem examination an abscess was found in right arytenoid cartilage with associated oedema of laryngeal mucosa.

Nervous diseases

Three cases of listeriosis were confirmed at postmortem examination during the quarter. One of these involved a four-year-old ewe that was submitted with a history of nervous signs. On gross postmortem examination the only notable finding was some hepatic fibrosis. On histopathology of the brain, however, a severe meningoencephalitis typical of listeriosis was evident, with pronounced lymphocytic perivascular cuffing, widespread gliosis and microabscess formation.

Other diseases

Joint ill due to *Streptococcus dysgalactiae* was found in two of five lambs that were submitted from one farm. In both lambs multiple joints, including the atlanto-occipital joint, were affected. A valvular endocarditis was also present in one lamb. High levels of *Streptococcus dysgalactiae* were isolated from the joints and internal organs of both lambs.

Nephrosis was diagnosed as a cause of death of lambs on four farms during the quarter. One of these cases involved two

nine-week-old lambs that had been found recumbent prior to death. At postmortem examination both lambs had enlarged kidneys with pale renal cortices, and also evidence of previous diarrhoea. Follow-up tests showed histological evidence of nephrosis along with elevated serum urea (99.5 and 130.0 mM, reference range: 3.3 to 8.3mM) and creatinine levels (828 and 1327 μ M, reference range: 0 to 130 μ M). Large numbers of coccidial oocysts were found in faeces, and it was thought that the nephrosis may have occurred secondary to intestinal coccidiosis.

A second case of nephrosis involved an eight week old lamb from a flock that had a persistent problem with lamb losses. At postmortem examination there was a strong uraemic smell from the carcass and the kidneys were enlarged with pale cortices. Histological changes were again suggestive of nephrosis. Another lamb submitted from the same farm showed a severe necrotising typhlitis with histological evidence of mucosal necrosis and dense neutrophil infiltration. While tests were negative for Border Disease virus, BVD viral antigen was detected in both the caecum and associated lymph node. It is thought likely that infection had occurred in-utero and that this was a case of 'ovine mucosal disease' rather than an acute Border Disease infection.

PIGS:

Reproductive diseases

Four porcine foeti were received from a case of abortion in a gilt on one unit.

At postmortem examination there was evidence of haemorrhage in the kidneys. Tests on foetal blood showed a positive toxoplasma titre, with the presence of *Leptospira* spp. also demonstrated by immunofluorescence in the kidney and lung tissues.

Alimentary diseases

Two 18-month-old sows that had died suddenly on the same day were submitted from one farm for postmortem examination. In one, splenic and gastric torsion was diagnosed as the cause of death, while in the other a large gastric ulcer, with associated melaena and anaemia was evident.

Two pigs were submitted from a unit that had been experiencing enteritis and increased mortality in the first week after weaning. At gross postmortem examination there was a severe fibrinous enteritis affecting the distal small intestine (Fig 2). *Salmonella* Typhimurium DT U288 was isolated on bacterial culture from the intestinal contents of both pigs.

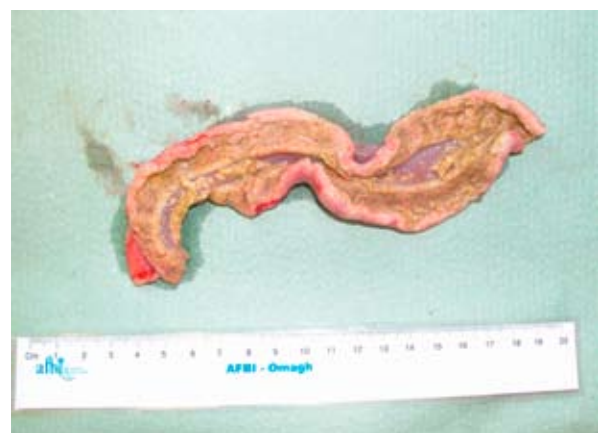


Fig 2. Fibrinous enteritis associated with *Salmonella* Typhimurium infection in a pig

Other diseases

Clostridium novyi hepatitis was also diagnosed as a cause of sudden death in a 16-week-old fattener pig. At postmortem examination the liver had a typical "aero chocolate" appearance and the diagnosis was confirmed by *Clostridium novyi* immunofluorescence.

Streptococcus suis septicaemia was diagnosed as the cause of mortality in weaner pigs on three units. In one of these, four pigs aged between 17 and 25 days had been submitted for postmortem examination. A fibrinous peritonitis was evident grossly in all four, with heavy growths of *Streptococcus suis* isolated on bacteriology from the internal organs. A mild meningitis was also evident on brain histology in two animals.

HORSES:

Respiratory diseases

Rhodococcus equi was isolated from the lungs of two foals. In one case an acute bronchopneumonia was seen in a three-week-old foal that had been found dead. The second case involved a one-month-old foal that had been born prematurely and died subsequently after a sudden onset of acute respiratory distress. On postmortem examination there was widespread consolidation and abscessation of the lungs and also a purulent arthritis in several joints.

Rhodococcus equi was isolated from the joints and viscera in this case.

Nasal and other swabs were cultured from a number of horses with a history suggestive of strangles. *Streptococcus*

equi was isolated from five samples from four separate premises.

Other diseases

A three-day-old foal that had died suddenly was also examined post mortem. The main findings on gross examination were the presence of cloudy fluid in the carpal and tarsal joints and an adherent kidney capsule with a pericapsular fibrinous exudate. On histopathology an acute focal suppurative interstitial nephritis, and necrosis and inflammation of the hepatic parenchyma were evident. High levels of *Actinobacillus equuli* were isolated from both the internal organs and joints.

Nutritional myopathy was suspected in a six-week-old donkey foal that died after having been ill for 10 days. Initial clinical signs were of a high temperature, and more latterly dullness and respiratory signs. The most striking finding on gross examination was slight pallor of the heart muscle along with congestion and firmness of the body fat. On histopathology there was degeneration and mineralisation of Purkinje fibres, with scattered foci of myofibre mineralisation. A steatitis was also evident. In foals nutritional myopathy is associated with Vitamin E deficiency, though levels are not always subnormal and response to supplementation can be variable.

DOGS:

Carbofurans and bromadiolone were detected in the vomitus of a seven-year-old English Setter that presented to a local practitioner showing signs of jerking and fitting, and with severely

congested mucous membranes and tachycardia. The setter died 90 minutes later despite sedation. The other family dog, a Rottweiler pup, also died suddenly at home on the same night and malicious poisoning was suspected.

A five-year-old West Highland terrier, in which the owners had suspected poisoning was also examined post mortem. In this case, cause of death was found to be due to occlusion of the small intestine with a four to five cm diameter piece of plastic.

ZOO AND EXOTIC ANIMALS:

A generalised hepatopathy was diagnosed in an adult prairie dog that was euthanized after being found collapsed.

At gross postmortem examination the liver was found to be enlarged with multilobular fluid-filled cysts throughout the parenchyma. On histology there was evidence of generalised hepatoparenchymal damage with focal to confluent areas of fatty change, fibrosis, chronic inflammation and megalocytosis, with numerous abnormally large multinucleate hepatocytes. There also was severe cystic biliary hyperplasia. No evidence of malignancy was noted, and the overall appearance was suggestive of a toxic aetiology, possibly due to pyrrolizidine alkaloids.

This summary has been compiled by the Veterinary Sciences Division of the Agri-Food and Biosciences Institute (AFBI*) of Northern Ireland and is based on diagnostic submissions to AFBI's veterinary laboratories at Stormont, Belfast, and Omagh, Co Tyrone.

<http://www.afbini.gov.uk/index/services/diagnostic/adds.htm>

*AFBI was created on 1st April 2006 as the amalgamation of DARD Science Service and the Agricultural Research Institute of Northern Ireland. AFBI operates a farm animal disease diagnostic service on behalf of the Department of Agriculture and Rural Development for Northern Ireland.