

## Northern Ireland disease surveillance report, April to June 2009

- *Salmonella* Dublin septicaemia in calves
- Ventricular septal defect in a bullock
- Johne's disease in sheep
- *Streptococcus suis* septicaemia in pigs

These are among matters discussed in the Northern Ireland animal disease surveillance quarterly report for April to June 2009

### CATTLE:

#### Respiratory diseases

Respiratory disease was identified in 58 cattle postmortem submissions between April and June 2009. The most common pathogens identified included *Pasteurella multocida* (nine cases), *Mannheimia haemolytica* (eight cases), *Mycoplasma bovis* (seven cases), *Arcanobacterium pyogenes* (six cases), *Histophilus somni* (six cases), bovine viral diarrhoea virus (BVDV) (five cases) and bovine herpesvirus type 1 (BHV-1) (five cases).

A three-month-old suckled calf that died after a short illness was submitted for examination. Patchy red to black areas of lung consolidation was evident at gross postmortem. Histological changes were typical of an acute bronchopneumonia, with scattered alveolae and bronchioles filled with small darkly staining neutrophils, some of which were tending to stream. A moderate growth of *Mannheimia haemolytica* was isolated on bacteriology, but, in addition, BVDV was also detected in lung tissue.

On postmortem examination of a two-year-old heifer that had died suddenly, the lungs were found to be overinflated, and there was red-grey consolidation predominantly of the cranio-ventral lung lobes. Histological changes included severe alveolar and interstitial oedema, congestion, suppurative bronchopneumonia with bronchiectasis and some oat-cell formation.

Both IBRV and BVDV were detected in lung samples by immunofluorescence. It is thought likely that BVDV infection may have caused immunosuppression and predisposed the animal IBRV and secondary bacterial infection.

#### Alimentary diseases

##### BVDV / Mucosal disease

A total of 624 blood samples were tested by virus isolation or antigen capture ELISA for BVDV, of which 84 (13.5 per cent) were positive. In addition, 306 submitted tissues and nasal mucus samples were tested by immunofluorescence for BVDV, of which 28 (9.2 per cent) were positive. Ten cases of mucosal disease / BVDV infection were confirmed at postmortem examination during the period.

One case of mucosal disease involved a one-year-old heifer that presented with weight loss, reduced appetite, mucopurulent nasal discharge, watery scour and erosive lesions in the buccal cavity. At postmortem

examination necrotising haemorrhagic lesions were detected on the Peyer's patches. Positive immunofluorescence for BVDV was detected in tissue samples taken from the Peyer's patches, spleen and mesenteric lymph node.

### 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.

### Parasitic conditions

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

Table 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, April to June 2009

Pathogen	Number	
	Tested	Positive (%)
Cryptosporidium species	605	278 (46.0%)
Rotavirus	591	170 (28.8%)
Coronavirus	596	21 (3.5%)
Escherichia coli K99	280	13 (4.6%)

\*Samples were mainly submitted from neonatal calves, although the age was not always given

Table 2: Endoparasitic infections in ruminants in Northern Ireland, April to June 2009.

	No of parasitic ova						% positive
	Total	Negative	+	++	+++	++++	
Liver fluke							
Bovine	511	452	49	9	1	0	11.5%
Ovine	95	83	4	3	1	4	12.6%
Coccidia							
Bovine	711	547	116	26	7	15	23.1%
Ovine	184	62	60	25	21	16	66.0%
Strongyle worm egg count		<500 epg	≥500 epg				
Bovine	571	126	41				7.2%
Ovine	145	40	32				22.1%

≥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 266 bovine faecal samples. Ten samples (3.8 per cent) contained acid-fast organisms typical of MAP. A total of 1719 bovine blood samples were tested for antibodies to MAP, of which 121 samples (7.0 per cent) were positive.

## Other enteric conditions

A six-week-old calf in poor body condition was submitted from a farm where six of a batch of twenty calves had died in the previous few weeks. At postmortem examination there was a fibrinous enteritis affecting the small and large intestines, several small lung abscesses and a solid plug of bile in the gall bladder. High levels of *Salmonella* Dublin were isolated in septicaemic distribution on bacteriology. *Mycoplasma bovis* and BVDV antigens were also detected in the lung and spleen respectively.

*S. Dublin* was also isolated from a three-day-old calf that was submitted from a unit where there had been twelve deaths of diarrhoeic calves over the previous month. At postmortem examination the calf showed signs of dehydration and the small intestines were distended with watery flocculent contents. Rotavirus and coronavirus were also detected in the intestinal contents.

A seven-year-old dairy cow with a history of diarrhoea, dehydration and weakness was submitted from a farm that had a number of other recent deaths. At gross postmortem examination, the liver was found to be bronze coloured, fatty, and there was generalised

fibrosis with thickening of the bile ducts and adult fluke present. Histology indicated periportal and interlobular fibrosis along with severe hepatocellular vacuolation consistent with fatty change. It was thought likely that the fasciolosis had compromised liver function and predisposed to subsequent hepatic lipidosis.

Mycotic rumenitis was diagnosed in a three-month-old calf that had a history of enteritis. At postmortem examination the rumen was filled with foul smelling grey fluid. The rumenal villi had failed to develop normally, and there was a white coating on the mucosal surface and multifocal areas of necrosis. Histological examination revealed a severe mycotic rumenitis with fungal hyphae extending into the muscularis layers. High levels of *Candida* spp. were recovered on culture. No specific enteropathogens were detected and tests for BVDV were negative.

Postmortem examination of a three-month-old calf that had died suddenly revealed marked distension of the small intestine, which distally was up to 10cm in diameter. The mucosal surface at the ileocaecal valve was irregular with large depressed areas of what appeared to be healed ulceration. The ileocaecal valve was stenosed and had only a five mm diameter remaining. It seems probable that the near total obstruction of the terminal ileum occurred as the ulcerated mucosa healed, with scarring stenosis of the intestinal lumen.

A sample of liver was submitted from a two-year-old bullock. Histological changes included periportal fibrosis and megalocytosis and were consistent with ragwort poisoning.

## Reproductive and mammary diseases

### Abortion

Specimens from 94 bovine abortions and stillbirths were examined during the quarter. Significant pathogens were detected in 42 cases (47.7 per cent). Of these, *Leptospira* species was the most commonly identified pathogen, and was detected in 11 cases (11.7 per cent of cases). Other pathogens identified included *Bacillus licheniformis* (nine cases, 9.6 per cent), BVDV (seven cases, 7.4 per cent), *Escherichia coli* (seven cases, 7.4 per cent), *Neospora caninum* (seven cases, 7.4 per cent) and *Arcanobacterium pyogenes* (4 cases, 4.3 per cent).

### Mastitis

A total of 1100 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 112 samples (10.2 per cent) yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 190 samples.

*Escherichia coli* was the most frequently isolated organism and accounted for 22.2 per cent of isolates cultured.

Other frequently identified organisms included: *Streptococcus uberis* (11.6 per cent of isolates), *Staphylococcus aureus* (9.1 per cent), *Enterococcus species* (4.8 per cent), *Pseudomonas species* (3.6 per cent), *Corynebacterium bovis* (3.1 per cent), other *Staphylococcus species* (7.8 per cent) and other *Streptococcus species* (6.8%).

### Neurological diseases

A five day-old calf was submitted from a farm on which several other calves had died after exhibiting a range of nervous and other signs including dullness and unwillingness to suck.

Gross and histological examinations showed a combination of navel and joint infections along with a suppurative meningo-encephalitis. High levels of *E. coli* were isolated in a septicæmic pattern on bacteriology.

Advice was subsequently given on navel treatments and the disinfection of calving and calf accommodation.

Three cases of lead poisoning in cattle were diagnosed during the quarter. One case involved a five-month-old calf that died shortly after presenting with signs of restlessness and abdominal pain. On postmortem examination there were ecchymotic haemorrhages in the muscles and subcutaneous fascia. Tests on the kidney indicated toxic levels of lead (72ug per g; reference range <25ug per g).

### Other diseases

Hydronephrosis and hydroureter were diagnosed as incidental findings in an adult dairy cow, in which the main cause of death was acute metritis. At post-mortem examination the right kidney was found to be distended and measured 40cm from pole to pole, with most of the parenchyma lost leaving a urine distended capsule. The proximal two thirds of the right ureter was also distended and fluid filled.

A one-year-old heifer that had died shortly after developing sub-mandibular swelling was submitted. At postmortem examination, an abscess was found at the base of the tongue and there was associated cellulitis extending from the sub-mandibular region to the brisket. A single barb of barbed wire, which had four sharp points protruding, was found in the reticulum. It was thought likely that the sub-lingual abscess and cellulitis had resulted from puncture wounds while the barbed wire was being ingested.

A ventricular septal defect was diagnosed in a sixteen-month-old bullock that died suddenly. At post-mortem examination the heart was enlarged and rounded, and the left and right ventricular walls were of similar thickness. A one-to-two cm diameter hole was found in the ventricular septum.

Nephritis and cystitis due to *Corynebacterium renale* was diagnosed in a five-year-old cow. At postmortem examination there was a haemorrhagic cystitis, while both kidneys showed severe chronic nephritis with abscessation.

## SHEEP

### Respiratory diseases

Respiratory disease was identified in eleven ovine post mortem submissions during the quarter. *Mannheimia haemolytica* (four cases), ovine pulmonary adenomatosis (jaagsiekte) (three cases) and laryngeal chondritis (two cases) were the most common diagnosis.

An adult ewe that had been found dead was submitted. At postmortem examination there was pleuritis and acute pneumonia with indurated areas in the middle lung lobes. Histological examination of the indurated areas showed changes consistent with ovine pulmonary adenomatosis. Secondary bacterial infection with *M. haemolytica* was also identified on bacterial culture.

### Alimentary diseases

A four-year-old ewe that had been found dead post-lambing was submitted from a farm that had a history of ill-thrift in ewes and four other similar deaths. Previous blood samples had shown elevated gamma glutamyl transferase (GGT) and glutamate dehydrogenase (GLDH)

levels. Postmortem findings were typical of acute fascioliasis with numerous haemorrhagic tracts in the liver and excessive levels of straw coloured peritoneal fluid.

A one-year-old sheep with a history of diarrhoea was submitted for examination. At postmortem there were signs of enteritis with necrosis of the mucosal surface and fibrin deposition evident histologically.

The spleen and mesenteric lymph nodes were positive by immunofluorescence for BVDV but were negative for Border Disease Virus. No significant bacteria were isolated and tests for coccidia and helminths were negative.

An intussusception of the mid jejunum was diagnosed in a six-week-old lamb that had a history of abdominal swelling. High levels of coccidia were detected on parasitology and were thought likely to have predisposed to the development of the intussusception.

### Johne's disease

Sixteen ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP; one sample (6.2 per cent) contained acid-fast organisms typical of MAP. Two ovine blood samples was tested for antibodies to MAP, of which 1 sample (50 per cent) was positive.

A ewe was submitted from a flock that had a history of ill-thrift and scour affecting 20 ewes in a flock of 800. At postmortem examination, the mucosa of the distal ileum was thickened, corrugated and showed yellow pigmentation. Histological examination showed changes typical of Johne's disease and high numbers of acid-fast organisms were observed in Ziehl-Neelsen stained sections.

## Reproductive diseases

Specimens from 21 ovine abortions and stillbirths were examined during the quarter. Significant pathogens were detected in 11 cases (52.4 per cent). Of these, *Chlamydophilia abortus* was the most commonly identified pathogen and was detected in four cases (19 per cent of cases). Other pathogens identified included, *Leptospira species* (3 cases, 14.3 per cent), *Toxoplasmosis* (3 cases, 14.3% per cent), *Arcanobacterium pyogenes* (2 cases, 9.5 per cent) and *Listeria monocytogenes* (1 case, 4.8 per cent).

## Neurological diseases

One case of listeriosis was confirmed by postmortem examination during the second quarter of 2009.

An eleven-week-old lamb with a history of hindlimb paralysis was submitted. At postmortem examination the caecum and colon were distended with abundant dry faecal material and the bladder had ruptured with urine present in the abdomen. Examination of the spinal column revealed an abscess in the thoraco-lumbar region and *Staphylococcus aureus* was isolated on bacterial culture.

## Other diseases

Systemic mycosis was diagnosed in a two-week-old lamb. At postmortem examination there were multiple small pale foci in the lung and kidney, and haemorrhagic foci in mesenteric lymph nodes. No significant bacteria were cultured from the lesions but histological examination showed a multifocal suppurative inflammation containing branching fungal hyphae.

Copper toxicosis was diagnosed in an adult ewe that had been found dead. At postmortem examination, there was widespread jaundice

of the carcase, and the liver was swollen and yellow. Histologically there was diffuse hepatocellular necrosis. Liver and kidney copper levels were elevated 214ug per g and 68ug per g (wet weight respectively) confirming copper toxicity.

## PIGS

Septicaemia due to *Streptococcus suis* type 1 was diagnosed in three three-week-old pigs. At post-mortem examination, all three showed signs of peritonitis and pleuritis, with multiple fibrin tags in the peritoneal and pleural cavities. High levels of *S suis* were isolated in septicaemic pattern on bacteriology.

A number of cases of salmonellosis due to *Salmonella Typhimurium* were also diagnosed during the quarter. In one case six four- to six-week-old pigs that had been found dead were submitted for examination. In four of the animals there was acute necrotising typhlitis and colitis characterised by grey foul-smelling caecal and colonic content with necrosis and diphtheresis of the mucosa. In one animal there was oedema of the stomach wall with full depth haemorrhagic ulceration. High levels of *S Typhimurium* were isolated on primary culture from three animals, with low levels from the remaining three.

## HORSES

Two hundred and sixteen samples were submitted for serology for equine viral arteritis by virus neutralisation test, three of which tested positive. All 278 swabs that were examined for the presence of *Tayorella equigenitalis* were negative. Thirteen swabs were cultured from horses with a history suggestive of strangles, one of which was positive.

Hepatic lipidosis was diagnosed in a four-year-old Shetland pony, that had aborted two weeks previously and then presented as dull, stiff and dyspnoeic. At gross post-mortem examination widespread icterus and typical fatty change affecting the liver were evident [Photo available].

Clostridial myositis was diagnosed in a two-year-old pony that had previously presented with sudden onset swelling of the throat and neck 48 hours prior to death. At gross post-mortem examination there was marked swelling and oedema of the head and haemorrhage, oedema and necrosis of left caudal neck musculature. Histological examination showed evidence of myofibril necrosis, emphysema, oedema, leucocyte infiltration and numerous rod-shaped bacteria.

## BIRDS

A ten-month-old rhea was submitted. Postmortem examination revealed the presence of extensive haemorrhage in both the thorax and abdomen. Further dissection showed that this had originated from a linear rupture in the dorsal aorta.

## MISCELLANEOUS MAMMALS

An aged Siberian tiger with a history of increasing lethargy, weight loss and suspected neoplasia was submitted. At postmortem examination a large 12cm diameter mass, which was black and friable on incision, was evident on the left lateral aspect of neck. Further lesions were also present in the neck, the drainage lymph nodes, lungs and spleen. Histological findings were characteristic of a well-differentiated malignant melanoma.

An adult red deer stag, in which tuberculosis was suspected clinically, was submitted after having been euthanized. At postmortem examination the bronchomediastinal, neck and mesenteric lymph nodes were all found to be abscessed, containing yellow/green pus. *Mycobacterium bovis* was isolated on culture from samples of the lymph nodes and lung.

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.