

# Northern Ireland disease surveillance Quarterly Report

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## NORTHERN IRELAND DISEASE SURVEILLANCE REPORT

## Northern Ireland disease surveillance, October to December 2008

- Isolation of CTX-M *E. coli* from calves
- Cerebellar hypoplasia due to BVDV infection
- Larvae of *Taenia ovis* in lamb carcases
- Mulberry Heart Disease in pigs.

# These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for October to December 2008

# **CATTLE:** Respiratory diseases

Respiratory disease was identified in 86 cattle post mortem submissions between October and December 2008. The most common pathogens identified included *Mannheimia haemolytica* (16 cases), *Pasteurella multocida* (15 cases), *Histophilus somni* (14 cases), *Arcanobacterium pyogenes* (14 cases), *Mycoplasma bovis* (12 cases), bovine respiratory syncytial virus (BRSV) (five cases), *Dictyocaulus viviparus* (four cases) and infectious bovine rhinotracheitis virus (IBRV) (three cases). One of the cases of *H. somni* infection involved an 18-month-old bullock that had been ataxic and died one hour later. On gross postmortem examination there was severe red-purple consolidation of the cranioventral lung lobes. A suppurative bronchopneumonia was seen histologically and a pure growth of *H. somni* was isolated from the lung on bacterial culture.

Two cows, aged two to three years, which had died on successive days were submitted for postmortem examination. Both animals showed severe red consolidation, mainly in cranioventral lung lobes. Haemorrhagic pleurisy and fibrinous adhesions between the pleura and pericardium were also apparent. High levels of *M. haemolytica* were isolated from the lungs of both animals. Although both animals lacked typical gross lesions, immunofluorescence tests for IBRV were also positive and it was thought that mild IBR infection may have predisposed the animals to subsequent pasteurellosis.

Bovine respiratory syncytial virus was identified in a three-month-old calf submitted for postmortem examination from a farm that had over 30 other animals affected with pneumonia and five previous deaths. The histological changes in the case were typical of acute bronchointerstitial pneumonia with hyperplasia of bronchiolar epithelium, syncytial cell formation, alveolar oedema and inflammatory cell infiltrate consisting chiefly of neutrophils and alveolar macrophages. Involvement of BRSV was confirmed by immunofluorescence.

# Alimentary diseases BVDV / Mucosal disease

A total of 659 blood samples were tested by virus isolation or antigen capture ELISA for bovine viral diarrhoea virus (BVDV), of which 81 (12.3 per cent) were positive. In addition, 321 submitted tissues and nasal mucus samples were tested by immunofluorescence for still unresponsive, had developed a black scour and was euthanased. At postmortem examination there was multifocal ulceration of abomasal mucosa with loosely attached blood clots and haemorrhagic content in both the small and large intestines. BVDV immunofluorescence was positive on abomasal mucosa.

## 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.

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

Pathogen	Number Tested	Number Positive (%)
Cryptosporidium species	413	157 (38.0%)
Rotavirus	397	137 (34.5%)
Coronavirus	393	26 (6.6%)
Escherichia coli K99	301	13 (4.3%)

TABLE 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, October to December 2008.

BVDV, with 20 (6.2 per cent) being found positive. Fifteen cases of BVDV infection / mucosal disease were confirmed at postmortem examination during the period.

One atypical case involved a nine-year-old cow that became pyrexic three weeks post-calving. On the third day of treatment the cow was *E. coli*, with extended spectrum beta-lactamase (ESBL) resistance, was isolated from faecal samples submitted from two neonatal calves on the same farm. Both animals had a history of enteritis. Molecular typing at the Veterinary Laboratories Agency, Weybridge identified that the isolates carried CTX-M Group 2 ESBL resistance genes and are the first isolates of CTX-M ESBL *E. coli* to be identified in Northern Ireland since ESBL surveillance commenced in 2006.

## Parasitic conditions

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

## Other enteric conditions

Six cases of enteric or septicaemic salmonellosis due to *Salmonella* Dublin were identified in postmortem submissions during the quarter. One of these involved two, three to five day-old calves, that were submitted for examination.

	Total	Negative	+	++	+++	++++	% positive
Liver fluke							
Bovine	658	481	97	61	13	6	26.9%
Ovine	105	95	6	3	0	1	9.5%
Coccidia							
Bovine	793	626	138	15	10	4	22.1%
Ovine	106	39	59	8	0	0	63.2%
Strongyle worm egg count		<500 epg	00 epg ≥500 epg				
Bovine	699	647	52				7.4%
Ovine	100	73	73 27				

## Table 2: Endoparasitic infections in ruminants in Northern Ireland, October to December 2008.

≥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 microscopically, with Ziehl-Neelsen staining, on 304 bovine faecal samples. Ten samples (3.3 per cent) contained acid-fast organisms typical of MAP. A total of 1513 bovine blood samples were tested for antibodies to MAP, of which 54 samples (3.6 per cent) were positive. At postmortem both animals showed evidence of enteritis, while in one there was also joint ill, with discoloured synovial fluid and fibrin in multiple joints. High levels of *S*. Dublin were isolated in septicaemic pattern from both calves, while rotavirus was also detected in the caecal contents of one.

# Reproductive and mammary diseases Abortion

Specimens from 142 bovine abortions and stillbirths were examined during the quarter. Significant pathogens were detected in 70 cases (49.3 per cent). Of these, Salmonella Dublin was the most commonly identified pathogen, and was detected in 19 cases (13.4 per cent of cases). Other pathogens identified included Leptospira species (eighteen cases, 12.7 per cent), Arcanobacterium pyogenes (eleven cases, 7.7 per cent), Bacillus licheniformis (seven cases, 4.9 per cent), Neospora caninum (six cases, 4.2 per cent), BVDV (four cases, 2.8 per cent) and Listeria monocytogenes (three cases, 2.1 per cent).

Hydrocephalus and arthrogryposis was diagnosed in one calf that had been aborted at 150 days of gestation. No infectious cause was identified in this particular case (Fig 1).



Figure 1: Hydrocephalus and arthrogryposis in an aborted calf

The different causes of abortion and stillbirth diagnosed in bovine submissions throughout 2008 are shown in (Fig 2). Overall the most common pathogens identified included *Leptospira* species (24 per cent of submissions), *Arcanobacterium pyogenes* (6 per cent), *Bacillus licheniformis* (5 per cent), *Neospora* species (6 per cent) and *Salmonella* Dublin (8 per cent).





## Mastitis

A total of 1237 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. Ninety nine samples (8 per cent) yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured from a further 314 samples. Overall *E. coli* was the most frequently isolated organism and accounted for 18.2 per cent of isolates cultured. Other frequently identified bacteria included, *Streptococcus uberis* (17.9 per cent of isolates), Staphylococcus aureus (7.7 per cent) Enterococcus species (7.6 per cent), Bacillus licheniformis (6.5 per cent) and Corynebacterium bovis (4.8 per cent).

## Neurological diseases

A five-year-old cow with a history of nervous signs and loss of vision was submitted for postmortem examination. The main gross findings were a suppurative metritis, with thickening and necrosis of the endometrial wall. Histological examination of the brain, however, showed changes typical of listeriosis with lesions of microabscessation and vasculitis occurring predominantly in the brainstem.

Meningoencephalitis, as part of a generalised colisepticaemia was diagnosed in an eight-day-old calf. On postmortem examination there was evidence of joint and navel ill, diffuse peritonitis, hepatomegaly and a mucopurulent meningitis. Histology of brain tissues demonstrated a severe suppurative meningoencephalitis. High levels of *E. coli* were isolated in a septicaemic pattern on bacterial culture.

Two three-day-old calves were submitted for postmortem examination from a farm that had a history of calves being born with poor limb coordination and inability to stand up after birth.

Cerebellar hypoplasia was observed in one of the calves (Fig 3), while BVDV

was detected in spleen, blood and lymph node of the other calf.



Fig 3: Cerebellar hypoplasia (shown on the right) in one of two three-day-old calves due to bovine viral diarrhea virus

The farm had ceased BVDV vaccination approximately two years previously. Cerebellar hypoplasia is a recognised sequel to in-utero foetal infection with BVDV and this case highlights the need for herd control programmes to be implemented.

Botulism, due to *Clostridium botulinum* type D, was diagnosed in two cases during the quarter.

## Other diseases

Renal amyloidosis was diagnosed in a 10-year-old cow that had been euthanised after a period of chronic ill-thrift and ventral oedema. Gross postmortem examination revealed extensive oedema of the sub-cutis and digestive tract, marked ascites with approximately 45 litres of sero-sanguineous fluid in the peritoneum, and enlarged pigmented kidneys. Histological changes typical of amyloidosis were seen including extensive deposition of eosinophilic homogenous hyaline material in the renal glomeruli and tubules.

A seven-week-old calf with a history of pneumonic signs was submitted for examination. In addition to marked lung consolidation, severe congenital cardiac abnormalities, including a patent ductus arteriosus and a ventricular septal defect, were identified at postmortem examination.

Vegetative endocarditis of the right atrio-ventricular valve with associated pulmonary artery thrombosis was identified as the cause of death in a three-year-old cow. Medium levels of *Streptococcus dysgalactiae* were isolated from the pulmonary thrombus, lung and liver on bacterial culture.

#### SHEEP:

#### Respiratory diseases

Respiratory disease was identified in twelve ovine postmortem submissions during the quarter. Pneumonia due to *Mannheimia haemolytica* (two cases) and pulmonary adenomatosis (jaagsiekte) (two cases) were the most common diagnoses.

Five two-year-old ewes were presented for postmortem examination in October with a history of sudden death. Six ewes, out of a flock of 66 had died approximately 8 hours after injection with a product containing moxidectin 1per cent. On postmortem examination there was severe pulmonary oedema in all five ewes with approximately 1.5 litres of sero-sanguineous exudate in the pleural cavity of each. Histology of lung tissue was consistent with a peracute hypersensity reaction. The flock had been vaccinated 18 days previously with a footrot vaccine. A hypersensitivity reaction to moxidectin 1% in ewes vaccinated against footrot has been reported previously (Veterinary Record, July 31, 1999, vol 145, p 147), and the product had been used in contravention of the data sheet recommendations.

#### Alimentary diseases

Relatively few diagnoses of acute fascioliasis were recorded during the quarter, with only three cases recorded compared to 23 in the same period in 2007. One of the cases involved a two-year-old ewe that had died suddenly and was submitted from a flock that had two previous deaths. Signs at postmortem examination were typical of acute fascioliasis and included haemorrhagic tracts in the liver parenchyma and subcapsular haemorrhage with haemorrhage into the peritoneal cavity.

Traumatic pharyngitis due to a dosing gun injury was diagnosed in a two-year-old ewe that was found dead. Gross signs included fresh haemorrhage in the mouth and large fresh blood clots in the rumen and reticulum. Two other similar deaths were also reported by the farmer.

### Johne's disease

Nine ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. Two samples tested positive. Eighty-nine ovine blood samples were tested for antibodies to MAP; one sample (one per cent) tested positive.

One case of Johne's disease was also diagnosed at postmortem examination during the quarter. The animal was a three-year-old ewe, with a history of losing condition over a number of months. At postmortem there was very limited cardiac or abdominal fat, the abdominal viscera were very oedematous, the ileum and jejunum were thickened and the intestinal mucosa was yellow/orange in pigmentation. Histology of intestinal tissues showed the mucosa to be thickened and infiltrated with large accumulations of macrophages. Ziehl-Neelsen preparations showed these macrophages to be filled with numerous acid fast bacilli.

## Reproductive diseases

Specimens from 17 ovine abortions and stillbirths were examined during the quarter. Significant pathogens were detected in 4 cases (23.6 per cent) with *Leptospira spp* being detected in 2 cases (11.8 per cent of cases) and *Chlamydophila abortus* (one case, 5.9 per cent) and *Toxoplasma gondii* (one case 5.9 per cent).

The different causes diagnosed in ovine abortion and stillbirth submissions throughout 2008 are shown in Figure 4. Overall the most common causes identified were *Toxoplasma* (28 per cent of cases), *Chlamydophila abortus* (16 per cent), *Leptospira* species (18 per cent). *Campylobacter* species, *Listeria* species and *Arcanobacterium pyogenes* were identified in 3 per cent, 3 per cent and 1 per cent of cases respectively.





## Neurological diseases

Six cases of listeriosis were confirmed by postmortem examination during the quarter.

## Skin diseases

One case of sheep scab was confirmed during the 4th quarter of 2008.

#### Other diseases

Samples were received from an eight-month-old animal with a history of weight loss, dullness and death. Histology of liver, lung and kidney all showed infiltration with spindle shaped cells with prominent nucleoli and a high mitotic index. The findings were considered consistent with a multicentric lymphosarcoma.

Larval stages of *Taenia ovis* were detected in samples that were submitted from two lamb carcases. The carcases were part of a batch of lambs, several of which had been condemned at meat inspection. Numerous spherical caseous abscesses approximately

3 millimetres in diameter were seen throughout the musculature. A few of the lesions contained clear, fluid-filled cysts which could be removed by blunt dissection. Microscopic examination of each of these cysts revealed the scolex of a metacestode (Fig 5). Taenia ovis is a tapeworm of dogs and wild canids. Sheep are the intermediate hosts and become infected when exposed to food or water contaminated by Taenia ovis eggs. Four to five weeks after consuming the eggs, the infective cysts develop in the myocardium and skeletal muscle. At about 3-6 months after ingestion most of the cysts die and form caseous abscesses which can be detected as white spots at meat inspection. The larval cysts are not zoonotic, but affected carcases are condemned at meat inspection.



Fig 5a: Cysticercus larva of *Taenia ovis* from a lamb carcase



Fig 5b: Scolex of a cysticercus larva of *Taenia ovis* 

Control is by regular worming of farm dogs with an effective anthelminthic, careful disposal of dog faeces and prevention of scavenging of sheep carcases.

## PIGS

Three four-month-old pigs that had died suddenly were submitted for examination. Postmortem lesions in all three included a severe and extensive fibrinous pleurisy and pneumonia, with affected lung tissue dark red to black in colour. High levels of *Actinobacillus pleuropneumoniae, Pasteurella multocida* and *Salmonella* Typhimurium were isolated on bacteriology. Two of the three pigs also had heavy Ascarid worm burdens in their stomachs, with refluxed Ascarids also evident in the pharynx, trachea and bronchi.

Perforation of the colon and peritonitis was diagnosed as the cause of death in eighteen-month-old sow that was near-term and that had died suddenly. At postmortem examination the carcase was found to be very congested, with excess bloody fluid in the abdominal cavity and intestinal content together with fibrin in the caudal abdomen.

Mulberry Heart Disease was diagnosed in three four-week-old pigs that had died suddenly. On postmortem examination the hearts had a mottled appearance and showed conspicuous zones of haemorrhage in the myocardium. The thorax and pericardial sac had also an excess of clear yellowish fluid. On histological examination, hyaline degeneration of myofibrils was noted, with marked haemorrhage and scattered foci of myofibrillar mineralisation.

### HORSES

Twelve blood samples were submitted for serology for equine viral arteritis by virus neutralisation test, one sample was positive. All 30 swabs that were examined for the presence of *Tayorella equigenitalis* were negative.

Eight animals were submitted for postmortem examination during the quarter. These included three equine foeti in which no significant pathogens were detected and the cause of abortion was not established.

Cyathostomiasis was diagnosed as the cause of death in a yearling filly that was submitted with a history of weight loss and loose faeces. At gross postmortem examination the carcass was found to be in poor body condition and slightly oedematous. The large intestine was also distended with very fluid contents and the mucosa had a slightly frosted appearance. Cyathostome fragments were evident in the mucosa on histology, along with a mixed inflammatory infiltrate including eosinophils. A cyathostome worm count of approximately 6,000 was found in the large intestine on parasitological examination.

Hepatic failure was diagnosed in an adult pony that died after a sudden onset of illness. At postmortem examination the liver was found to have firm, fibrous consistency and was yellow in colour. Petechial haemorrhages were also evident on the serosal surfaces of the small intestine and there were ecchymotic haemorrhages in the mesenteries. Histology of the liver showed haemosiderosis and marked peri-lobular fibrosis with numerous encapsulated eosinophilic, possibly parasitic, foci.

An eight-year-old standard bred stallion was examined *post mortem* after showing clinical signs of colic. A single tear, approximately 30cm long, with haemorrhages at the edges, was found along the greater curvature of the stomach. Stomach contents were found in the peritoneum and there was extensive fibrinous peritonitis. In a similar case, the cause of sudden death in a six-month-old foal was found to be overeating and gastric rupture with resultant fibrinous peritonitis. Approximately 20Kg of forage and whole grains were found in the peritoneum. A tear, approximately 25cm in length, was present in the greater curvature of the stomach with haemorrhages along the edges.

#### **BIRDS**

A number of cases of respiratory disease in growing turkeys were investigated during the quarter. One of these involved a four-month-old turkey submitted from a small flock in which a number had been reported to be inappetant and dull, with showing swelling of the face and excess lacrimation. At postmortem examination the infraorbital sinus were found to be swollen and contained mucopurulent fluid. *Mycoplasma gallisepticum* and *Pasteurella multocida* were both isolated from swabs of the fluid.

#### **MISCELLANEOUS MAMMALS**

Parasitic pneumonia was diagnosed in two six-month-old red deer from the same premises. In total there had been five sudden deaths out a group of 300 deer within a few days. At postmortem examination the lungs of one animal were found to be overinflated with plugs of frothy mucus, purulent material and worms in trachea and bronchioles. In the second animal, the lungs showed severe consolidation with a liver-like appearance, along with scattered haemorrhages, emphysema and large numbers of worms in the airways.

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.