

**Northern Ireland disease surveillance,  
October to December 2007**

- *Salmonella* Kottbus mastitis in a dairy cow
- Black disease in cattle
- Systemic mycosis in a cow
- Acute fascioliasis in sheep
- Porcine dermatitis and nephropathy syndrome
- Sarcoptic mange in Llamas

**- These are some of the matters  
discussed in the Northern Ireland  
animal disease surveillance quarterly  
report for October to December 2007**

**CATTLE**

Respiratory diseases

Pneumonia was the principal pathological finding in 76 carcase submissions between October and December.

*Mannheimia haemolytica* (14 cases),

*Mycoplasma bovis* (12 cases),

*Pasteurella multocida* (8 cases),

*Dictyocaulus viviparus* (8 cases),

*Histophilus somni* (7 cases),

*Arcanobacterium pyogenes* (7 cases)

and bovine respiratory syncytial virus (BRSV) (6 cases) were the most common pathogens detected.

A number of cases of respiratory disease in adult cows were noted during the

quarter. One case involved a 30-month-old cow that had initially presented with signs of pneumonia and scour. At postmortem examination, there was extensive consolidation of the cranio-ventral lung lobes along with congestion of the abomasal mucosa, abomasal erosions and a fibrinous enteritis in the large intestine. A heavy growth of *A. pyogenes* was isolated from the lung, liver and spleen. An underlying bovine viral diarrhoea (BVDV) infection was detected by immunofluorescence on samples of lung, spleen, mesenteric lymph node and abomasum.

Another case in an adult animal involved a four-year-old recently calved cow that had died after a short respiratory illness. At postmortem examination, the animal was found to have a large abscess between the diaphragm and anterior liver, multiple lung abscesses and a severe fibrinous pleuropneumonia. Large numbers of adult lungworm were also found to be present in the airways.

A sample of lung tissue was received from a six-month old calf that had died after several episodes of pneumonia. On histological examination a suppurative bronchointerstitial pneumonia, with marked pneumocyte hyperplasia, interstitial fibrosis and chronic

inflammation was seen. In addition, numerous multinucleate cells were found to be present in the alveoli and bovine respiratory syncytial virus (BRSV) antigens were identified in the lung tissue by immunofluorescence.

#### Alimentary diseases

##### BVD/Mucosal disease

A total of 709 blood samples were tested by virus isolation or antigen capture ELISA for BVDV. Of these, a positive result was obtained from 71 samples (10 per cent). In addition 248 submitted tissues and nasal mucus samples were

tested by immunofluorescence for BVDV, with 10 (four per cent) being found positive. Two cases of mucosal disease were confirmed at postmortem examination during this quarter.

##### Neonatal enteritis

The pathogens identified in neonatal bovine faecal samples during the quarter are shown in Table 1.

##### Other enteric 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, October to December 2007

Pathogen	Tested	Number	
		Positive (%)	
<i>Cryptosporidium</i> species	406	106	(26.1%)
Rotavirus	307	86	(28.0%)
Coronavirus	301	7	(2.3%)
<i>Escherichia coli</i> K99	208	20	(9.6%)

Table 2: Endoparasitic infections in ruminants in Northern Ireland, October to December 2007

	No of parasitic ova						% positive
	Total	Negative	+	++	+++	++++	
Liver fluke							
Bovine	516	429	67	15	3	2	16.8%
Ovine	182	117	44	15	3	3	35.7%
Coccidia							
Bovine	611	484	105	9	3	10	20.8%
Ovine	186	69	105	10	2	0	62.9%
Strongyle worm egg count		<500 epg		≥500 epg			
Bovine	140	138		2			2.1%
Ovine	174	55		21			12.1%

• ≥500 eggs per gram of faeces (epg) was considered of likely clinical significance

- + Low, ++ Moderate, +++ High, ++++ Very high

One case of coccidiosis involved a one-month-old calf that had initially been losing weight and subsequently became recumbent and died. This farm also had five recent deaths in this batch of calves. At postmortem examination the colonic and caecal mucosa exhibited haemorrhagic striations. Although coccidia were not detected in the faeces, coccidial oocysts were seen in histological sections of the caecum.

#### Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination (Ziehl-Neelsen staining) on 213 bovine faecal samples. Twelve samples (5.6 per cent) contained acid-fast organisms typical of MAP. A total of 1795 bovine blood samples were tested for antibodies to MAP, of which 176 (9.8 per cent) were positive.

#### Reproductive and mammary diseases Abortion

Specimens from 115 bovine abortions and stillbirths were examined between October and December. Significant pathogens were detected in 63 cases (54.8 per cent). Of these *Leptospira* species was the most commonly identified pathogen, and was detected in 26 cases (22.6 per cent of total submissions). *Salmonella* Dublin was isolated from 18 cases (15.7 per cent), *Arcanobacterium pyogenes* from 6 cases (5.2 per cent), *Bacillus licheniformis* from 5 cases (4.3 per cent), and *Aspergillus* species from 4 cases (3.5 per cent). *Neospora caninum* infection was identified in 3 cases (2.6 per cent).

The different causes of abortion and stillbirth diagnosed in bovine submissions throughout 2007 are shown in Figure 1.

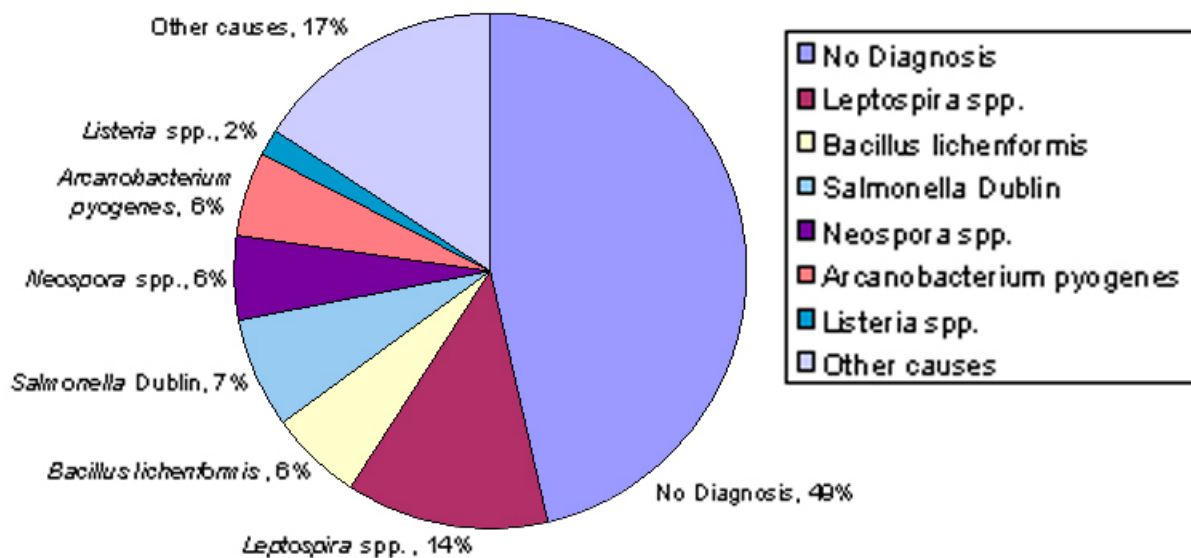


Fig 1: Causes of bovine abortion in submissions during 2007. [Data expressed as a percentage of submissions, with two or more abortifacient agent identified in a percentage of cases]

Overall the most common pathogens identified included *Leptospira* species (14 per cent of submissions), *Arcanobacterium pyogenes* (6 per cent), *Bacillus licheniformis* (6 per cent), *Neospora* species (6 per cent) and *Salmonella* Dublin (7 per cent).

### Mastitis

A total of 1009 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. Ninety-seven (9.6 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured from a further 113 samples. *Escherichia coli* was the most frequently isolated organism and was present in 23.3 per cent of samples from which microorganisms were identified. *Streptococcus uberis* was cultured from 14.2 per cent of samples, *Staphylococcus aureus* from 9.9 per cent and *Streptococcus dysgalactiae* from 3.2 per cent. *Staphylococcus* species (other than *S. aureus*) and *Enterococcus* species were isolated from 5.9 per cent and 4.9 per cent of samples respectively.

Unusual isolates included a high level of *Salmonella* Kottbus, which was isolated in pure growth from a case of clinical mastitis. Although the mastitis responded clinically to antibiotic treatment, repeat sampling continued to show low levels of the organism in the milk and the animal was culled by the owner two months

later. Other unusual isolates included *Yersinia enterocolitica*, which was isolated in pure culture from a clinical sample and both yeast and *Prototheca* species, which were isolated from a case of non-responsive mastitis in an eight-year-old cow.

### Nervous diseases

Botulism, due to *Clostridium botulinum* type D, was diagnosed in five submissions from four farms during the quarter. A number of cases of hypocalcaemia and hypomagnesaemia were also noted. In one of these, blood samples were received from four bulls with a history of recumbency. On biochemical analysis two of the animals were found to be hypocalcaemic (1.39mM and 1.59mM, reference range 2.0 - 2.8mM), while one was also hypomagnesaemic (0.68mM, reference range 0.73 - 1.31mM). A concurrent hypomagnesaemia (0.30mM,) and pneumonia was also diagnosed in a six-month-old heifer that was submitted for postmortem examination after having been found recumbent and collapsed.

### Other diseases

Seventeen cases of black disease were recorded during the quarter. One of these involved two Friesian cows, from a group of 50, which had died suddenly on the same day. Postmortem lesions in one animal that was submitted, included a dark congested carcass, hyperaemic omentum and mesentery, and large jelly-like fibrin clots free in the abdomen.

A single focus of liquefactive necrosis / early abscessation was evident in the liver. *Clostridium novyi* and *A. pyogenes* were both recovered on bacterial culture of the liver lesion.

A similar number of diagnoses of blackleg was also recorded during the quarter. While most of these had typical presentations, two unusual cases were recorded. In both these cases, while the initial gross postmortem appearance of the animals was suggestive of black disease with congested carcasses and brick red or black omentum, typical liver lesions were absent. The diaphragm muscles in both animals, however, were thickened, oedematous and darkened in places and showed histological changes consistent with clostridial myositis including oedema, haemorrhage and myofibril necrosis.

Posterior vena cava thrombosis was diagnosed in a nine-month-old calf. On gross postmortem examination the right atrium of the heart was enlarged and there was a large thrombus present in the lumen of the posterior vena cava. Congestive heart failure was also evident with hepatic enlargement and a nutmeg appearance grossly, together with histological changes which included dilation of the hepatic sinusoids and centrilobular congestion.

Concurrent lesions of actinobacillosis were found in a 10-year-old suckler cow,

which had presented with a severe toxic mastitis. Multiple small firm nodules were evident throughout the muscles of the tongue and there was related pharyngeal swelling and oedema. Multifocal pyogranulomas, ranging in size up to 5mm in diameter, and consisting of radiating eosinophilic club colonies were observed on histology.

Samples of abnormal liver and lung, taken at routine slaughter, were submitted from a 14-year-old cow. Liver histology demonstrated diffuse hepatitis with hepatoparenchymal necrosis and the presence of fungal hyphae. Numerous foci of fungal hyphae were also found on examination of lung sections. Systemic mycoses are relatively uncommon in cattle, and are thought to arise from dissemination of an initial pulmonary or alimentary tract infection.

A six-year-old cow that had a reduced appetite and was losing condition was also received for postmortem examination. The main finding grossly was an enlarged kidney, which had multiple pale foci throughout the cortex and a distended calyx containing blood stained fluid, pus and necrotic debris. Multiple foci of fibrinoid necrosis, which were associated with large colonies of small rod-shaped bacteria were found on histology, while a medium level of *Corynebacterium* species and a low level of *E. coli* were isolated on bacteriology.

## SHEEP

### Respiratory diseases

Pneumonia was identified as the principal pathological finding in eight ovine carcass submissions during the quarter. Pulmonary adenomatosis (jaagsiekte) (2 cases), laryngeal chondritis (2 cases) and *Mannheimia haemolytica* (1 case) were the most commonly identified causes.

One of the cases of jaagsiekte involved a four-year-old ewe that was submitted with a history of sudden death. At gross postmortem examination, the lungs were enlarged and had a number of diffuse solid cream-white lesions, which were located mainly in the cranioventral and middle lung lobes. Histopathology showed multiple foci of a well differentiated bronchioloalveolar carcinoma consistent with pulmonary adenomatosis.

### Alimentary diseases

Acute fascioliasis was diagnosed in 23 submissions during the quarter. One of these cases, which was typical of the pattern seen, involved a three-year-old ewe that was submitted after having been found dead. At gross postmortem examination there were typical signs of acute fascioliasis. These included a pale carcass, the presence of haemorrhage in the abdomen and blanching of the liver with acute fluke tracts. In a number of the cases significant mortality was described in the

rest of the flock.

Parasitic gastro-enteritis was also a common diagnosis during the quarter.

One of these cases involved an eight-month-old lamb submitted from a flock that had three other recent deaths out of a group of 100 lambs. At gross postmortem, the submitted lamb had severe faecal caking on the tail and legs, and lesions of abomasitis and enteritis. Over 18,000 *Teladorsagia* species and 43,300 Trichostrongyles were found in the abomasum and small intestine respectively.

Two three-year-old ewes were submitted from one flock with a history of frothing, breathing heavily and recumbency. At necropsy no significant abnormalities were found except for the presence of *Pieris* species leaves and stalks in the rumen. *Pieris*, which belongs to the same family of plants as rhododendron group, is one of the more commonly detected plant poisonings at the Veterinary Sciences Division.

### Johne's disease

A total of 15 ovine faecal samples were examined microscopically (Ziehl-Neelsen staining) for *Mycobacterium avium* subspecies *paratuberculosis* (MAP). Three samples (20 per cent) tested positive. Two ovine blood samples were tested for antibodies to MAP; both tested negative.

### Reproductive diseases

Samples from 16 ovine abortions and stillbirths were examined between October and December. Recognised pathogens were detected in nine cases, with some having more than a single pathogen identified. Overall *Leptospira* species were detected in seven cases (44 per cent of total submissions), *Toxoplasma* in two cases (13 per cent) and *Listeria* species in one case (6 per cent).

The different causes diagnosed in ovine abortion and stillbirth submissions throughout 2007 are shown in Figure 2.

Overall the most common causes identified were *Toxoplasma* (23 per cent), *Chlamydomphila abortus* (Enzootic Abortion of Ewes) (16 per cent of cases), *Leptospira* species (14 per cent) and *Campylobacter* species (4 per cent). *Arcanobacterium pyogenes*, *Salmonella*

species and *Listeria* species were identified in 2 per cent, 1 per cent and 1 per cent of cases respectively.

### Nervous diseases

Cerebrocortical necrosis was diagnosed in a blood sample from a seven-month-old lamb (410 per cent increase on transketolase test), which had shown signs of opisthotonus, nystagmus, and dullness. Four previous deaths had also occurred on the farm over the previous two weeks.

An eight-month-old lamb, which had been found in lateral recumbency was submitted for postmortem examination. Grossly there were few notable findings but a clinical significant level of lead (45 µg per g) in the kidney was found on biochemistry. Three cases of listeriosis were confirmed by postmortem examination during the quarter.

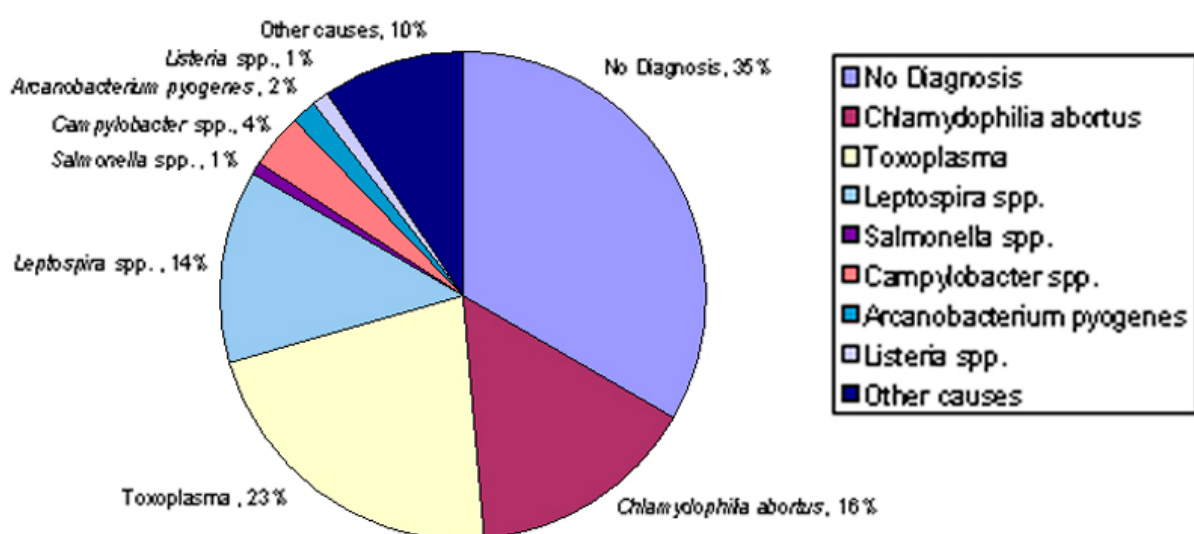


Figure 2: Causes of ovine abortion and stillbirths in submissions during 2007. Data are expressed as a percentage of submissions, with two or more abortifacient agents identified in a percentage of cases.

### Other diseases

A one-year-ewe that had been euthanized on farm was examined postmortem. A dosing gun injury was found to be present, with perforation of the oropharyngeal mucosa and musculature and formation of a pus-filled cavity in the tissues dorsal and lateral to the pharynx. In addition, there was a significant haemorrhage around the brainstem. The animal had been dosed for fluke the previous week.

## PIGS

### Alimentary diseases

Two sows were presented for postmortem examination from a 350-sow unit on which four sows had died over the previous week. Torsion of the left lateral lobe of the liver was diagnosed as the cause of death in one sow, while a splenic torsion was evident in the other. Following advice to change from a once-a-day to twice-a-day feeding, along with alteration in the fibre source used in the diet, no further deaths were reported.

### Other diseases

Vegetative endocarditis was diagnosed as the cause of death in a three-year-old boar that had died suddenly. At post mortem examination, well developed vegetative lesions were noted in the aortic valve, along with smaller lesions affecting the left atrioventricular valve. Medium levels of *Erysipelothrix rhusiopathiae* and *Escherchia coli* were isolated from the lesions on bacteriology.

Porcine circovirus type 2 (PCV-2) infections were also noted on a number of units. In one case three nine-week-old piglets were submitted from a farm that had lost approximately 20 out of a batch of 200 over the previous month. Despite being weaned at the same time, there were notable size and weight differences between the three animals. A marked systemic lymphadenopathy was evident grossly in two. Typical PCV-2 associated changes were seen on histology, including lymph node lymphocyte depletion, infiltration of histiocytic and multinucleated cells, and basophilic intracytoplasmic botryoid inclusion bodies in one animal.

Porcine dermatitis and nephropathy syndrome (PDNS) was diagnosed on one unit. At gross postmortem examination, the affected animal had multifocal to coalescing red-purple macules and papules affecting the skin of the hind limbs, perineum and the posterior half of pig (Figure 3).



Figure 3: Skin lesions in a pig affected with porcine dermatitis and nephropathy syndrome



The inguinal lymph nodes were also enlarged. Histologically there was a marked fibrinous glomerulitis, a necrotizing vasculitis affecting the renal pelvis and a mild interstitial nephritis.

## HORSES

Forty blood samples were submitted for serology for equine viral arteritis by virus neutralisation test; one sample tested positive. Seventy-one swabs were examined for the presence of *Tayorella equigenitalis*; all were negative. Twenty-five swabs were cultured from horses with a history suggestive of strangles. *Streptococcus equi* was detected in three samples from three separate premises.

A case of steatitis in a donkey foal associated with low vitamin E / selenium levels was diagnosed during the quarter. The four-week-old foal had died after a brief illness and was one of three to have died on the same premises in similar circumstances. On postmortem examination the carcass fat was yellow-orange in colour with thickened plaques evident, particularly over the ventral abdomen. Adipose degeneration and necrosis, with a mixed inflammatory infiltrate was observed histologically. Biochemical analysis on a blood sample taken prior to death showed markedly reduced glutathione peroxidase (13 U/gHb), selenium (0.21 uM) and vitamin E levels (0.4 uM). Blood samples submitted subsequently from four adults on the same premises also showed low

selenium (0.16 to 0.49 uM) and vitamin E levels (0.8 to 1.3uM). One further case of steatitis in a seven-month-old pony was also diagnosed during the quarter (Figure 4).



Figure 4: Steatitis affecting the abdominal fat in a seven-month-old pony

A five-year-old mare that had a history of pneumonia was submitted for postmortem. At gross examination the left lung lobes were consolidated and there were widespread fibrous adhesions to the parietal pleura. A copious amount of purulent fluid was also present within the pleural cavity. Histology of lung tissue demonstrated severe bronchointerstitial pneumonia. High levels of *Streptococcus zooepidemicus* were isolated on bacteriology from samples of lung, liver and spleen.

Strangles was diagnosed in a seven-month-old pony. On postmortem examination a large abscess was found in the right retropharyngeal lymph node, along with smaller abscesses in left retropharyngeal and right

submandibular lymph nodes. A high level of *Streptococcus equi* was isolated on bacteriology.

A case of clostridial myositis was diagnosed in an eight-month-old foal, which had initially presented with a penetrating wound of the right upper lip. On postmortem examination there was haemorrhage and subcutaneous oedema over the dorsal head and right side of the face. The pericardial sac and the right side of the thorax also contained large volumes of serosanguinous fluid with some fibrin clots. No bacteria were isolated from the facial soft tissue but *Clostridium novyi* was detected by FAT. *Cl. septicum* is reported as the most common cause of clostridial myositis in horses. However, *Cl. chauvoei*, *Cl. novyi* and *Cl. fallax* can also cause infections, which, as in this case, usually occur subsequent to a penetrating wound.

## BIRDS

Two cases of erysipelas in turkeys were diagnosed during the quarter. One of these involved a farm that had had three deaths out of a batch of 40 three-month-old birds over an eight hour period. The chief findings on postmortem examination were cyanosis of the head, carcass congestion and the presence of a few fibrin tags on the pericardium and lungs. *Erysipelothrix rhusiopathiae* was isolated from the liver and spleen.

Fungal air sacculitis was diagnosed in a six-month-old female rock peddler parrot that had been ill for one week. On gross postmortem, one of the abdominal air sacs had a white fibrinous plaque, which was adherent to the gizzard and proventriculus. Subsequent histology of the air sac demonstrated acute inflammation and numerous fungal hyphae which were invading the adjoining proventriculus.

## MISCELLANEOUS MAMMALS

Sarcoptes mange mites were detected in skin scrappings submitted from adult llamas. Two animals were affected and had developed generalised scabby lesions on the skin over the head, neck, legs, ventral abdomen and perineal region (Figure 5 (a), (b)). The owner also reported having developed skin rashes on their arms after handling the animals.

An adult camel was submitted after having died a short time after presenting with colic-type signs. At gross postmortem examination rhododendron leaves were detected in the rumen contents. The only other significant finding was severe pulmonary congestion. Rhododendron has been associated with poisoning in a number of animal species and clinical signs can include drooling, attempts to vomit, abdominal pain, respiratory distress, and collapse leading to death.

Figure 5: (a) Skin lesions in an adult Llama due to sarcoptic mange. (b) *Sarcoptes* species mange mites.



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.