

Northern Ireland disease surveillance Quarterly Report

July - Sept 2009 Vol 5 No. 3

Northern Ireland Disease Surveillance Report, 1st July to 30th September 2009

- Bovine conjoined twins born by caesarean section
- Hepatocellular carcinoma in a lamb
- Psittacine beak and feather disease in parrots
- Malignant catarrhal fever in a Sika deer
- Malignant melanoma in an 18-year-old mare

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for July to September 2009.

CATTLE:

Respiratory diseases

Respiratory disease was identified in 52 cattle post mortem submissions between July and September 2009. The most common pathogens identified included: *Mycoplasma bovis* (nine cases), *Pasteurella multocida* (seven cases), *Mannheimia haemolytica* (seven cases), *Histophilus somni* (five cases), *Arcanobacterium pyogenes* (four cases), Bovine viral diarrhoea virus (BVDV) (three cases) and infectious bovine rhinotracheitis virus (IBRV) (two cases).

A five-year-old cow was euthanised due to respiratory distress. On gross postmortem examination there were two broken ribs, one of which was associated with necrosis and abscessation in the chest wall. Numerous small abscesses were also identified in the lungs and viscera and it is likely that these originated from the chest lesion.

On histological examination the lungs were found to be congested, with alveolar and septal oedema, abscessation, bacterial colonisation (small rods), bronchiectasis and emphysema. *A. pyogenes* was isolated from the lesion.

Eight cases of parasitic pneumonia were examined during the quarter.

A 15-month-old heifer was found dead at pasture. On post mortem examination 60 per cent of the lung volume showed red-grey consolidation. Histologically a severe interstitial pneumonia was present with marked epithelialisation and hyalinisation. Eosinophils were frequently seen and the changes were considered suggestive of post-patent parasitic bronchitis.

A five-year-old cow in a batch of 30 that were being fed grass indoors died after exhibiting respiratory signs. Four other cows were also affected. On postmortem examination fibrinous pleurisy, patchy lung consolidation with severe interstitial emphysema and oedema were seen. Lungworm were present in airways. Histology revealed an interstitial pneumonia and bronchiolitis consistent with parasitic pneumonia. No other respiratory pathogens were detected.

Two three-year-old dairy cows from a herd of 150 died suddenly. They were housed and being fed silage. A severe fibrinous pleuropneumonia was seen on postmortem examination of both cows. Profuse growths of *M. haemolytica* serotype A1 were recovered from the lungs. P. multocida was also recovered from the lungs of one cow.

No other respiratory pathogens were detected and the histopathological changes were consistent with pneumonic pasteurellosis.

A two-month-old calf died after showing signs of severe dyspnoea. On postmortem

examination a severe infection with mature and larval lungworm was seen. BVDV antigen was also identified by immunofluorescence in the mesenteric lymph nodes and lung tissue. The cause of death was lungworm infection, but it is likely that there was underlying immunosuppression due to BVDV infection.

Alimentary diseases BVD/Mucosal disease

A total of 674 blood samples were tested by virus isolation or antigen capture ELISA for BVDV, of which 97 (14.4 per cent) were positive. In addition, 305 submitted tissues and nasal mucus samples were tested by immunofluorescence for BVDV, with 29 (9.5 per cent) being found positive. Ten cases of mucosal disease were confirmed on postmortem examination during the period.

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.

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,July to Sept 2009

	Number				
Pathogen	Tested	Positive (%)			
Cryptosporidium species	155	43 (27.7%)			
Rotavirus	124	24 (19.3%)			
Coronavirus	124	0 (0%)			
Escherichia coli K99	39	8 (20.5%)			

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

Table 2: Endoparasitic infections in ruminants in Northern Ireland, July to Sept 2009

	No of parasitic ova								
	Total	Negative	+	++	+++	++++	% positive		
Liver fluke									
Bovine	751	700	46	5	0	0	7.0%		
Ovine	112	99	10	3	0	0	11.6%		
Coccidia									
Bovine	897	574	239	40	22	22	36.0%		
Ovine	175	42	72	40	19	2	76.0%		
Strongyle worm egg count		<500 epg	≥500 epg						
Bovine	829	181	84			10.0%			
Ovine	165	33	52				31.5%		

≥500 eggs per gram of faeces (epg) was considered of likely clinical significance + Low, ++ Moderate, +++ High, ++++ Very high Fibrinonecrotic colitis and typhilitis was detected on postmortem examination of a 14-month-old steer which was found collapsed with a subnormal temperature. There were also multifocal shallow erosions in the abomasum. BVDV immunofluorescence was detected in abomasum, spleen and mesenteric lymph node.

Multiple fronds of yew leaves were found in the rumen of a three-month-old calf that was found dead. The calf was one of a batch of 80 calves. No other deaths had occurred.

Posterior vena caval syndrome was diagnosed in a five-year-old cow that died suddenly. A large hepatic abscess protruded onto the adjacent vena cava causing a suppurative phlebitis. There were large septic emboli in branches of the pulmonary arteries and extensive pulmonary abscessation.

A five-year-old cow was presented to an attending veterinarian with signs of colic and "pings" auscultated high on the right flank. The cow initially responded to treatment but died 48 hours later. On post mortem examination there was a 180 degree torsion of the abomasum and reticulum. The abomasum was distended, fluid filled and occupied a right flank position. The abomasal mucosa was oedematous, haemorrhagic and necrotic.

Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination, with Ziehl-Neelsen staining, on 268 bovine faecal samples. Fifteen samples (5.6 per cent) contained acid-fast organisms typical of MAP. A total of 941 bovine blood samples were tested for antibodies to MAP, of which 158 samples (16.8 per cent) were positive.

Reproductive and mammary diseases Abortion

Specimens from 92 bovine abortions and stillbirths were examined during the quarter.

Significant pathogens were detected in 48 cases (52.1 per cent). Of these, BVDV (11 cases, 12.0 per cent) and *Neospora caninum* (11 cases, 12.0 per cent) were the most commonly identified pathogens. Other pathogens identified included: *Leptospira* Hardjo (8 cases, 8.7 per cent), *Salmonella* Dublin (8 cases, 8.7 per cent), *Bacillus licheniformis* (5 cases, 5.4 per cent), *Streptococcus* spp. (3 cases, 3.3 per cent), and *Escherichia coli* (3 cases, 3.3 per cent)

Several cows in a herd developed an ulcerative mammillitis. Electron microscope examination revealed numerous parapox virus particles in the teat lesions. Parapox virus is the cause of pseudocowpox.

Conjoined twin calves born by caesarian section were examined (Figure 1). Two normal heads were present on two necks and there were four fore-limbs and one fused sternum.



Figure 1. Conjoined twin calves born by caesarian section.

There were four non-inflated lungs and two hearts, each in its own pericardial sac. The cervical, thoracic and lumbar vertebral columns were separate. Each calf had a separate ribcage, fused at the sternum. There were two oesophaguses, continuous with a shared reticulum. One rumen, abomasum and intestinal tract and two spleens were found and there were two semi-fused scrotums. The left testicle was present subcutaneously and the right testicle was retained in the abdomen. There was atresia ani, the vertebral columns fused at the sacrum, there were two tails and there was one umbilicus.

Hancock (1954) and Arthur (1956) report the occurrence of conjoined twins about one in 100,000 bovine births (Arthur, G.H., 1956, Vet Rec., 68:389 and Hancock, J., 1954, Advances in Genetics, 6:141).

Nutritional and metabolic diseases

On gross postmortem examination of a four-year-old cow that had died suddenly the carcase was congested and the liver was pale and mottled. Histological examination revealed a severely fatty liver. In fat dairy cattle fatty liver syndrome usually develops soon after calving, and is commonly precipitated by any situation that interferes with their appetite temporarily such as parturient hypocalcaemia, left displaced abomasum, indigestion, retained foetal membranes or dystocia.

Mastitis

A total of 2131 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases.

173 (8.1 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 449 samples. *Escherichia coli* was the most frequently isolated organism and accounted for 19.2 per cent of isolates cultured. Other frequently identified organisms included *Streptococcus uberis* (14.3 per cent of isolates, *Staphylococcus aureus* (10.4 per cent), *Corynebacterium bovis* (8.1 per cent), *Pseudomonas species* (5.7 per cent), *Enterococcus species* (5.4 per cent), other *Streptococcus species* (9.4%) and other *Staphylococcus species* (8.7 per cent).

Neurological diseases

Clostridium botulinum type D toxin was identified in seven suspect botulism cases in the 3rd quarter of 2009.

A 15-month old bull was euthanised after developing progressive paraplegia. On postmortem examination a large solid yellowish mass was found in the retropharyngeal area and there were adhesions between the meninges and the dura mater in the cranial cavity. On histological examination the meninges were found to be oedematous and the yellow mass was found to comprise neutrophils, fibrin and necrotic material, indicative of an inspissated and organising abscess. A. pyogenes was isolated from the abscess. The cause of death was a retropharyngeal abscess impinging on the atlanto-occipital joint and extending to the cranial cavity.

Other diseases

Nineteen cases of blackleg were diagnosed during the quarter. An unvaccinated housed 14-month-old bull was submitted for postmortem examination with a history of reluctance to move and death. The bull had never been at grass. On postmortem examination there were multiple blackleg lesions in muscles of shoulder, hindlegs and back, with fibrinous pleuritis and pericarditis. *Clostridium chauvoei* was detected by fluorescence.

Colisepticaemia was diagnosed in a fourday-old calf. The remnants of the umbilical vessels were red and pronounced, there was a fibrinous peritonitis and fibrinopurulent material and excess fluid in multiple joints. *E. coli* was isolated from multiple organs. A very low zinc sulphate turbidity (ZST) test result of 5 (reference range >20 units) indicated inadequate absorption of colostral antibody.

Seven cases of vegetative endocarditis were diagnosed during the quarter. Multiple hepatic abscesses and vegetative endocarditis affecting the pulmonary valve were seen on postmortem examination in a three-year-old cow. *Streptococcus bovis* was isolated from the liver and the heart valve. A 15-month-old bull which had a history of intermittent appetite for more than eight weeks died suddenly. On postmortem examination generalised oedema, pleural and peritoneal effusion and nutmeg liver were seen. There were multiple large vegetative cauliflowerlike lesions on the right atrio-ventricular valve. (Figure 2).



Figure 2. Vegetative endocarditis in a bull.

An eight-year-old cow that was housed on slats, died after a short illness. On postmortem examination cellulitis and muscle necrosis were present in the left hind leg. A septic thrombophlebitis extended from the left hind limb to the caudal vena cava with resultant septic pulmonary thromboemboli throughout all lung lobes.

Actinobacillosis was diagnosed on histopathology of a lip biopsy from a twoyear-old dairy heifer. The heifer had developed hard ulcerating nodules on the lip four weeks previously. The head and prescapular lymph nodes were also enlarged due to abscessation.

A five-month-old bull calf with a history of epistaxis and haemorrhage from injection sites was examined postmortem. Grossly the carcase was pale and wet, with multiple 1-3mm diameter haemorrhages through the muscles, omentum, mesentery, serosa of rumen, epicardium, endocardium, and pleura. The bone marrow was grossly normal and histologically megakaryocytes were numerous. BVDV was detected in mesenteric lymph nodes and blood.

SHEEP:

Respiratory diseases

Respiratory disease was identified in eight ovine postmortem submissions during the quarter. Ovine pulmonary carcinoma (Jaagsiekte) (four cases) was the most common diagnosis.

Ovine pulmonary carcinoma was diagnosed in a two-year-old Blackface ram that was found dead (Figure 3). There was a firm pale tumour occupying the anterior lung and Jaagsiekte was confirmed on histology.



Figure 3. Ovine pulmonary carcinoma in a twoyear-old blackface ram.

Johne's disease

Twelve ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. No samples contained acid-fast organisms typical of MAP. Thirteen ovine blood samples was tested for antibodies to MAP, of which three samples (23.1 per cent) were positive.

Johne's disease was diagnosed in a four-yearold ewe with a history of weight loss. On postmortem examination there was thickening, corrugation and yellow pigmentation of the jejunum and ileum. Histologically transmural granulomatous enteritis was observed and intestinal macrophages contained numerous acid-fast bacilli (demonstrated by Ziehl-Neelsen staining). Antibody to MAP was detected by serology.

Formalised lung, liver and broncho-mediastinal lymph node from a yearling crossbred lamb were submitted by a meat plant. Histological examination of the liver revealed neoplastic tissue, with cells in an acinar or trabecular arrangement, and having a generally hepatocyte-like appearance. The neoplasm was partially encapsulated by a layer of fibrous tissue, separating it from normal-appearing liver tissue. There were nests of lymphocytes amongst the neoplastic tissue, and individual giant cells with either enlarged irregular nuclei or multiple nuclei were frequent. There were extensive areas of necrosis and haemorrhage and the mitotic index was moderate. The appearance was considered consistent with a moderately well-differentiated primary hepatocellular carcinoma. No metastatic lesions were found in the lung or lymph node tissue.

Six lamb livers were submitted for examination by a meat plant. Gross inspection revealed numerous pale tracks in the parenchyma, especially in the subcapsular area. Histologically, the subcapsular tracks were found to be lined with macrophages, including many multinuclear 'foreign body' type macrophages, and filled with eosinophils in various stages of degeneration. Numerous lympho-plasmacytes were evident in some foci. The likely aetiology is migrating Cysticercus tenuicollis (Taenia hydatigena) onchospheres, but fasciolosis might also be considered. No flukes were found in the parenchyma or bile ducts.

Neurological diseases

Osteomyelitis of the fourth thoracic vertebra was seen on postmortem examination of a three-year-old ewe which was presented live, bright and alert but unable to stand on the hindlegs. Small numbers of *E. coli* were cultured from the affected vertebra. Listerial encephalitis and septicaemia was diagnosed in a two-year-old ewe which died suddenly. *Listeria monocytogenes* was isolated in pure culture from multiple organs including the brain and characteristic histological lesions were detected on examination of the brain.

PIGS:

Respiratory diseases

Pleuropneumonia was diagnosed in two fourmonth-old fattening pigs which died suddenly. In both pigs the pneumonic lesions consisted of large necro-haemorrhagic foci. *Actinobacillus pleuropneumoniae* was cultured from the lung. Immunofluorescence for influenza viruses was negative.

Other diseases

A four-month-old pig with a history of lameness and stiff gait was examined postmortem. Purulent joint fluid was observed in both hock and stifle joints. *Erysipelolthrix rhusiopathiae* was isolated from multiple joint fluid samples.

Two adult sows that died suddenly were examined postmortem. The cause of death in one of them was gastric ulceration and haemorrhage. The second pig had evidence of healed gastric ulceration, and there was a chronic fracture of the femoral head that showed evidence of sequestration and necrosis. *Streptococcus dysgalactiae* subsp. *equisimilis* was isolated in large numbers and in a septicaemic pattern from the second pig. This infection is the most important ß-hemolytic streptococcal infection involved in lesions in pigs, and is associated with arthritis and periarticular necrosis in young animals. It can be carried by previously affected adult sows.

BIRDS:

Poultry

A four-week-old chicken from a batch of 14 was presented dull and listless. Coccidiosis had been suspected by the referring veterinary surgeon and treatment had been commenced. The bird was euthanised and on post mortem examination there was a severe haemorrhagic typhilitis with the caecal lumen filled with blood. Although no coccidial oocysts were detected on faecal examination, numerous coccidia at various stages of the life cycle were detected in the caecal mucosa on histological examination. This bird also had a severe infestation of biting lice.

Two batches of 53-week old layers were examined postmortem. All the birds were very heavily infested with poultry red mites, which were alive and very active at the time of examination. The carcases all appeared bled-out, and the histological changes found in the liver (centrilobular to bridging necrosis) were consistent with anaemia.

A live six-week-old pigeon with clinical signs of listlessness and loss of balance was submitted for examination. The pigeon had watery droppings and was losing weight. Pigeon paramyxovirus-1 (PMV-1) was detected by immunofluorescence and PCR for PMV-1 gave positive results. Histological examination of the kidney revealed interstitial nephritis that was mainly monocytic and plasmacytic in nature, but also featured some heterophils. This histological picture is consistent with PMV-1 infection.

Game

Four 12-week old pheasants were submitted alive with a history of wasting and diarrhoea. On postmortem examination the intestines were distended with frothy yellow contents and large numbers of live *Spironucleus* (*Hexamita*) organisms were seen in wet preparations of the intestinal contents. It is likely that this infection is underdiagnosed in pheasants because the organisms only survive for a short time after the death of the host.

Two eight to 10-week-old partridges from a batch of 150 were examined postmortem. Ten birds had died within the previous 48 hours and many of the remaining birds were dull, thin and inappetant. Both birds were in very poor condition with prominent keels and poor fleshing. Enteritis was detected in both birds with multifocal mucosal necrosis and off-white caecal cores were present in one bird. Large numbers of coccidial oocysts were detected in samples of the caecal contents.

Cage and aviary

Two parrots, 11 weeks and six weeks old which had been ill for three days were examined postmortem. On histological examination of the bursae severe lymphoid depletion and numerous basophilic intracytoplasmic inclusion bodies were found; these changes are consistent with psittacine beak and feather disease virus. This virus belongs to the genus *Circovirus* and causes profound immunosuppression. *Klebsiella oxytoca* was isolated in pure culture and septicaemic distribution. This may represent opportunistic infection by the microorganism, which is a normal resident in the upper respiratory tract of psitticines.

Circovirus infection was also detected in 3 racing pigeons aged 3-6 months. 18 birds had died in the previous 6 weeks. The pigeons were showing clinical signs of inappetance, weakness, watery stools and increased thirst. Histological evidence of pigeon circovirus infection was seen in the bursae.

OTHER SPECIES:

Cats

Alphachloralose detected in the stomach contents of an adult cat. Six cats were found dead in the vicinity during a five day period.

Deer

A one-year-old deer was found dead. On postmortem examination there was evidence of diarrhoea, and the walls of the ileum and proximal jejeunum were very thickened. The mesenteric and broncho-mediastinal lymph nodes were enlarged and contained caseous/ mineralised material. Histologically, very numerous acid-fast microorganisms were demonstrated by Ziehl-Neelsen staining in macrophages of the intestinal submucosa and in all of the lymph nodes. These postmortem findings are typical of Johnes disease. A five-year-old male captive Sika deer died after a short illness. The deer had been ill for 36 hours prior to death. It had been pyrexic and had a bloody enteritis. Gross examination revealed haemorrhagic turbinates with fibrin on the pharynx, congested tracheal mucosa with petechiation, scattered lung haemorrhages, pale foci in kidneys, bloody intestinal contents and severe meningeal haemorrhage. No skin lesions were evident. Histology revealed perivascular infiltrates of lymphocytes and plasma cells in the liver and lungs and scattered focal interstitial infiltrates of lymphocytes and plasma cells in the kidney. In the brain vasculitis, perivascular lymphoid cuffing and occasional microthrombi were seen.

Serological tests were positive for malignant catarrhal fever (MCF). The first two cases of MCF in captive Sika Deer were recently published in the Veterinary Record (VR, Vol 165, No 15, pp445-447), so this would appear to be only the third case in the United Kingdom and the first in Northern Ireland.

Horses

Six blood samples were submitted for serology for equine viral arteritis by virus neutralisation test, all of which were negative. All 16 swabs that were examined for the presence of *Tayorella equigenitalis* were negative. *Dictyocaulus arnfieldi* larvae were detected in the faeces of a foal. The foal had a chronic cough and its dam had a nasal discharge.

A six-month-old foal had sudden onset diarrhoea and colic which was unresponsive to treatment. On postmortem examination the abdomen was found to be very tense, and the caecum and colon were severely distended with gas and watery content. *Clostridium difficile* toxin was detected in the intestinal contents.

Significant numbers of *Strongyloides* worms were detected on postmortem examination of three foals, aged three, four and twelve weeks, from two separate premises. A ten-day-old donkey foal was found to have 180,000 *Strongyloides* worms at post-mortem examination. An 18-year-old grey mare was euthanised and submitted for post mortem examination after a 12-hour history of bleeding from the rectum. Multiple skin melanomas were seen around the perineum and root of tail with multiple metastases to the liver and spleen (Figure 4).



Figure 4. Malignant melanoma in the liver of a mare.

There was distension of the colon at the diaphragmatic flexure with focal thinning of the colonic wall, with haemorrhage into the wall and extensive haemorrhage into the lumen of the colon distal to the flexure. Histologically there was evidence of vascular damage in the thinned portion of wall.

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.