Agri-Food and Biosciences Institute

Northern Ireland disease surveillance Quarterly Report

April to June 2006

Vol 2 No. 2

Highlights:

- *Mycoplasma alkalascens* isolated from calf pneumonia.
- Bovine Viral Diarrhoea virus detected in bovine foetal tissues.
- Hypomagnesaemia in ill-thriving suckler calves in June.
- Lead poisoning in cattle.
- *Nematodirus* infection in lambs in May.

CATTLE:

Respiratory diseases

Pneumonia was identified as the cause of death in 76 carcase submissions between April and June 2006. *Mannheimia haemolytica* (10 cases), *Pasteurella multocida* (9 cases), *Mycoplasma bovis* (8 cases), *Histophilus somni* (5 cases) and bovine respiratory syncytial virus (BRSV) (2 cases) were the most common pathogens identified.

A two-day-old calf, with a history of respiratory disease, was submitted for postmortem examination in June. Pneumonia, with irregular areas of necrosis, was seen in the anterior lung lobes. A purulent bronchiolitis and alveolitis and multifocal areas of necrosis, containing coccoid bacteria, were seen histologically. The interlobular septae were also distended with fibrinous fluid. Aspiration is a possible cause of pneumonia in this age of calf. *M. haemolytica* and *Mycoplasma alkalascens* were isolated from the lungs. Positive immunostaining for *M. alkalascens* was present within areas of necrosis in the lung sections. Immunostaining for *M. bovis* was negative. *M. alkalascens* has more commonly been isolated from mastitis cases, but has been recorded as a respiratory isolate. This is the first isolation of this organism in Northern Ireland.

Pneumonia due to *M. haemolytica* was diagnosed in a 2-month-old calf. Bovine viral diarrhoea virus (BVDV) and *M. bovis* antigens were also detected in lung tissue, underlining the multifactorial nature of bovine respiratory disease.

Alimentary diseases

BVDV/Mucosal disease

A total of 652 blood or tissue samples were tested by virus isolation or by antigen capture ELISA for BVDV. Of these, a positive result was obtained from 60 samples (9.2%). In addition, 411 tissues and nasal samples were tested by immunofluorescence for BVDV, with 23 (5.6%) being found positive.

Five cases of mucosal disease were confirmed at postmortem examination during this quarter. In all five cases, BVDV was detected by immunofluorescence from one or more tissues including spleen, mesenteric lymph node and abomasal ulcer.

Neonatal enteritis

Five hundred and nineteen faeces samples were tested for rotavirus with 127 (24%) positive. Five hundred and two faeces samples were tested for

coronavirus, with 15 (3%) positive. Six hundred and forty three faeces samples were tested for cryptosporidia, with 223 (35%) positive. Three hundred and eight faeces samples were tested for *E. coli* K99 with 10 (3%) positive.

A six-day-old calf was submitted for postmortem examination in June with a history of sudden death. At necropsy there was evidence of dehydration and enteritis. *E. coli* expressing the K99 antigen and rotavirus were identified from intestinal samples taken *post mortem*. Blood from this calf had a zinc sulphate turbidity (ZST) level of 12 indicating inadequate colostral antibody absorption.

Salmonella Dublin was isolated in a septicaemic pattern from two 14-day-old calves submitted for postmortem examination in April. Moderate levels of cryptosporidia were also detected in one of the calves.

Other enteric conditions

Faeces samples which were submitted in April from two dairy cows with a history of scouring, recumbency and hypothermia were both positive for fluke eggs. One sample also contained acid-fast organisms typical of *Mycobacterium avium* subspecies *paratuberculosis* (MAP).

A heifer was submitted in May from an organic suckler herd with a history of respiratory signs. Postmortem examination revealed significant biliary calcification with associated hepatic fibrosis indicating a diagnosis of chronic fascioliasis. This was the first diagnosis of fluke infection on this unit.

A near-term dairy cow was submitted for postmortem in June with a history of scour for several days. The cervix was found to be dilated with the calf in the delivery position suggesting that the cow was aborting. This liver had extensive mineralisation of the bile ducts with significant numbers of adult fluke present. *Salmonella* Dublin was also isolated in a septicaemic pattern.

A postmortem examination was carried out in June on an 8-month-old calf that had been treated for diarrhoea and ill thrift with a broad-spectrum antibiotic and a non-steroidal anti-inflammatory preparation. An enteritis and a severe oesophagitis, with a large linear ulcer approximately 1 cm wide extending the full length of the oesophagus, was present. An omasitis and reticulitis were also detected at postmortem. Subsequent histopathology revealed numerous branching hyphae in the mucosa of these organs confirming a diagnosis of mycotic omasitis and reticulitis. The severe oesophageal lesions (Figure 1) observed may have been caused during administration of oral fluid by stomach tube.

Figure 1 . Oesophageal ulceration

Johne's disease

A total of 187 bovine faecal or intestinal samples were received for examination by microscopic examination (Ziehl-Neelsen staining). Typical acid-fast organisms consistent with *Mycobacterium avium* subspecies *paratuberculosis* (MAP) were identified in 7 samples.

1267 sera were received for testing for antibodies to MAP. Two sera were from goats, 1 from a sheep and the remainder from cattle. Eighty-seven bovine and one ovine sample tested positive.

Nutritional and metabolic diseases

A twenty-month-old Limousin heifer was submitted in June with a history of acute onset hind limb ataxia and recumbency leading to a presumptive diagnosis of botulism. At postmortem examination there was evidence of traumatic damage to the hip joints with the intracapsular ligaments in both acetabula ruptured. Although the vitreous humour potassium level was slightly increased (indicating a degree of autolysis in the carcase), the magnesium level was still below the expected value. The traumatic damage to the hip joints may have been subsequent to hypomagnesaemic tetany.

Blood samples were submitted in June from three suckler calves ranging from two- to six-months-old, with a history of ill thrift. Serum magnesium levels of 0.37, 0.39 and 0.24mM/L were all within the clinical hypomagnesaemic tetany range (reference range 0.73-1.31mM/L).

Reproductive and mammary diseases

Abortion

Specimens from 52 bovine abortions were examined between April and June 2006. Pathogens associated with bovine abortion were detected in 28 cases (54%). Of these *Leptospira* Hardjo was the most commonly identified pathogen, being detected in 9 cases (31%). *Bacillus licheniformis* was cultured from 7 cases (25%), *Neospora caninum* infection was diagnosed in two cases (7%) and *Salmonella* Dublin was cultured from one case (4%). BVDV was detected by immunofluorescence in liver, lung and kidney of one case and BVDV was isolated from foetal fluid of a second case (7%). Antibodies to bovine herpes virus 1 (BHV1) were detected in foetal fluid of one foetus indicating foetal exposure to BHV1. *Campylobacter fetus* subsp *fetus* and *Escherichia fergusonii* were also cultured from stomach contents of this foetus.

Two fifteen-month-old bullocks were submitted in May from a group which had been castrated one week earlier. There had been a total of 7 deaths in the group since castration. Pulmonary oedema with marked pleural effusion was found on postmortem examination of one bullock. The findings in the second bullock were of cellulitis, peritonitis and septicaemia following castration.

Mastitis

A total of 1080 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. Fifty one (4.7%) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 160 samples (13%). Coliforms were the most frequently isolated organisms and were present in 24.5% of samples where micro-organisms were identified. *Streptococcus uberis* was

cultured from 13.5% and *Staphylococcus aureus* from 8.2% of samples. *Streptococcus dysgalactiae* was cultured from 2.1% of samples and *Streptococcus agalactiae* from 9 cases (0.8%).

Nervous diseases

Four cases of lead poisoning were diagnosed from separate postmortem submissions during this quarter. In one case a three-month-old calf was submitted in May with a history of hyper-excitability and blindness. At necropsy ecchymotic haemorrhages were observed in the thymus and 146 µg/g of lead were detected in the kidney confirming a diagnosis of lead poisoning. Subsequent inspection by the herd owner confirmed the presence of car batteries in one corner of a field where twenty-five cows and calves were grazing. The cows were observed licking the batteries. In a separate case, a faeces sample submitted in June from an adult cow with a history of blindness and depression was found to contain 490 µg/g of lead, confirming lead poisoning. Treatment with calcium EDTA was reported to be successful. In a separate case, a three-year-old cow from a group of 7 was submitted for postmortem examination in June with a history of blindness. Kidney lead levels of 111µg/g were detected confirming a diagnosis of lead poisoning. Two blood samples subsequently submitted from un-treated and treated (calcium EDTA) cohort animals had lead levels of 185µg/g and 23µg/g respectively. A lead battery was found in an open drain at the edge of the field where the cow had been grazing.

Clostridium botulinum type D toxin was detected in six gastrointestinal samples from three separate suspected cases of bovine botulism. Both *C. botulinum* types C and D were detected in another case. Three cases of listeriosis and three cases of cerebrocortical necrosis were confirmed by postmortem examinations carried out during the quarter.

Other diseases

Sixteen cases of blackleg and two cases of black disease were confirmed by postmortem examination of cattle during the quarter. In one case, a 10 week-old Belgian blue calf was submitted for postmortem examination in June. The calf had been observed dull and dyspnoeic by the herdowner and died a few hours later. Blackleg lesions were detected in both the diaphragm and heart. Clostridial vaccination had not been undertaken on this farm.

A fifteen-month-old heifer was euthanased and submitted for postmortem examination in April with a history of dyspnoea, which had been unresponsive to antibiotic treatments for several months. Postmortem findings included cardiomegaly with multiple caseous abscesses throughout myocardium, including the interventricular septum. Abscesses were also observed in the spleen and liver. It is likely that these resulted from an earlier septicaemic episode. No bacteria were isolated, but it is likely that antibiotic treatment prior to euthanasia influenced the bacteriological results.

A four day-old calf was submitted for postmortem examination in May with a history of dyspnoea since birth. This was the fourth calf to die shortly after birth on the farm. At necropsy there were congenital cardiac defects, including a ventricular septal defect and the aorta emerging from the pulmonary artery.

SHEEP:

Reproductive diseases

Samples from 13 ovine abortions were examined during the second quarter of 2006. Recognised pathogens were detected in 8 cases. Of these, leptospirosis was detected in three cases, two cases of *Salmonella* abortion were detected (*Salmonella* Montevideo and *Salmonella* Orion), chlamydial abortion (EAE) was detected in one case and toxoplasmosis was detected in one case.

Nutritional and metabolic diseases

Two ewes were submitted for postmortem examination in early April from a group of ewes recently introduced to fresh grazing. Five ewes were found dead within 48 hrs of introduction to lush grass. The ewes were all approximately one month lambed and suckling lambs. Urine in the bladder of both ewes reacted positively to the Rothera's test indicating ketosis. Vitreous humour collected at postmortem examination indicated hypocalcaemia (1.6 mmol/L, reference range: 2.0-2.8 mmol/L).

One hogget from a batch of 20 developed inappetance, a high temperature, rapid respiratory rate and diarrhoea and failed to respond to treatment with broad spectrum antibiotics. Postmortem examination revealed a jaundiced carcase, a bronzed liver and dark kidneys. Tissue copper levels were elevated (liver copper 211 µg/g, kidney copper 21 µg/g). Several other hoggets developed similar clinical signs. A change of management had accidentally led to this batch of hoggets being fed on beef nuts at the time. This case highlights the dangers of feeding sheep on rations formulated for cattle.

Alimentary diseases

Nematodirus infections were frequently diagnosed during this quarter.

One-thousand-two-hundred *Nematodirus* eggs per gram of faeces were detected in a composite faeces sample collected from 8-12 week old lambs, which had developed a grey diarrhoea in May. The lambs had not previously been treated although the ewes had been dosed at lambing. A warning of high nematodiriasis had been issued by AFBI at this time.

Diarrhoea and loss of condition was also reported in a flock of 500 March born lambs on lowland pasture. Coccidiosis was considered by the owner to be a recurrent problem on this farm. Several lambs were submitted for postmortem examination in May as lambs had continued to scour despite treatment for coccidiosis and worming with an injectable avermectin. More than 10,000 *Nematodirus* worms were detected in the small intestine of the lambs examined. Weighing of the lambs prior to postmortem examination indicated that the lambs had been underdosed with anthelminthic. Advice was given to retreat the lambs with anthelmintic based on accurate individual weights, or to dose to the weight of the heaviest lamb in the group. Details were also given on the samples required for the faecal egg count reduction test. Two further lambs died; however the remainder recovered after anthelmintic medication.

A diagnosis of nematodiriasis and renal nephrosis was made in two lambs examined postmortem in May. Lambs in this batch developed diarrhoea followed by hindlimb paresis and death of some lambs several days later. Large numbers

of *Nematodirus* worms were detected in the small intestine. Both lambs had large pale kidneys and biochemistry on a blood sample taken from the live lamb revealed elevated creatinine (1338 µmol/L, reference range 0-130 µmol/L) and urea (87.9 mmol/L, reference range 3.3-8.3 mmol/L).

A five-year-old Suffolk ram was found to have died from an abomasal emptying defect. The abomasum was distended and contained layers of dry contents. This condition is reported most frequently in Suffolks and an hereditary component has been suggested for this condition. Abomasal impaction has been reported in scrapie-affected sheep, but examination for scrapie was negative on this occasion.

Respiratory diseases

A fifteen-month-old Beltex ewe was found dead at pasture. Postmortem examination revealed a severe fibrinous pleurisy and pericarditis and the lungs were severely consolidated. A profuse growth of *Mannheimia haemolytica* was isolated. Histological examination revealed early lesions of pulmonary adenomatosis (jaagsiekte) underlying the lesions of acute bronchopneumonia. Pulmonary adenomatosis and secondary bacterial pneumonia was also diagnosed histologically in a thirty-month-old ewe, which was found dead at grass on another farm.

Nervous diseases

Two eleven-month old hoggets from a batch of 120 in which 10 were presenting with hindlimb paresis were presented for postmortem examination. No grossly apparent lesions were noted. Histologically, a severe lymphocytic meningoencephalitis with marked perivascular cuffing and focal gliosis with neuronal necrosis was found affecting all regions of the brain, particularly the cerebrum. Low to moderate numbers of *Toxoplasma gondii* cysts were identified by immunoperoxidase labelling in the brain and spinal cord tissue. The number of cysts seen was not considered to be sufficiently high to account for the degree of inflammatory change present. The histopathological features seen in the central nervous system of these ewes were considered to be characteristic of louping ill.

In a separate case louping ill was diagnosed histologically in one lamb; one of 5 found dead in a batch of 14 lambs.

Mannheimia haemolytica was cultured from the brain of a 5-month-old lamb found dead. Grossly the meninges had appeared cloudy and a purulent meningitis was seen histologically.

Two three-year-old ewes were presented with similar clinical signs, including inappetence and ataxia, which progressed to recumbency. They were examined *post mortem* after failure to respond to veterinary treatment. An abscessed parotid lymph node and abscessation of the cerebrum was detected in one ewe (Figure 2). The gross lesions were suggestive of caseous lymphadenitis, but bacterial cultures were negative.

Fig 2: Abscessation of the cerebrum in a three year old ewe.

Fatty liver and pregnancy toxaemia was diagnosed in the second ewe and histology of the brainstem revealed concurrent scrapie lesions. Prion protein was demonstrated by immunoperoxidase staining. At a subsequent farm visit another ewe had clinical signs suggestive of scrapie. EU measures as set out in Annex 7 of Directive 999/2001 were applied to the flock. Follow-up genotyping of the remaining sheep in the flock was carried out and all males in Northern Ireland Scrapie Plan groups 2, 3, 4 and 5 and females in groups 3, 4 and 5 were culled (representing 41 of 100 sheep).

BIRDS:

Poultry

An adult hen from a collection was found dead and submitted for investigation. A cream-coloured necrotic nodule was adherent to the lateral wall of the pharynx. Histologically, a poorly differentiated carcinoma infiltrating the connective tissue and muscle was seen adjacent to the necrotic nodule.

Other avian

A speckled pigeon (*Columba guinea*) from a zoological collection was found dead. The liver was mottled and histological examination revealed marked perivascular lymphocytic accumulations. Hepatocytes were rounded and dense, and basophilic intranuclear inclusion bodies were seen. The most likely causes were either adenovirus (inclusion body hepatitis) or Herpes virus infections.

Salmonella Typhimurium was isolated in low numbers from joint-fluid submitted from the elbow of a racing pigeon. No other birds in the loft were affected and no other clinical signs were observed. *S.* Typhimurium is a known cause of joint inflammation in adult pigeons, in particular the elbow joint (wing boil).

HORSES:

Two hundred and fifty swabs were examined for the presence of *Taylorella equigenitalis*. All cultures were negative. *Pseudomonas aeruginosa* was isolated in low levels from one sample. *Klebsiella pneumoniae* was also isolated from one sample but the isolate did not belong to capsule types 1, 2 or 5.

WILDLIFE:

Wild birds

A Whooper swan (*Cygnus cygnus*), which was submitted as part of the avian influenza wild bird survey, was in an emaciated condition. The proventriculus and gizzard were impacted with fibrous material. A kidney lead level of 44 µg/g confirmed lead poisoning.

A male gannet (*Morus basanus*), which was found dead on a beach on the East coast of Northern Ireland, was submitted for post mortem examination. The proventriculus was found to contain a fishing hook and weight. Adjacent to the proventriculus there was an area of perihepatitis. It was concluded that the hook had pierced the proventricular wall and introduced infection into the body cavity.

Marine mammals

A severe *Pseudalius inflexus* lungworm infection was seen in a young porpoise. The lungworms had completely occluded the bronchi. There were several raised, white focal lesions on the pharyngeal and oesophageal mucosa. Histologically

the epithelium was hyperplastic and eosinophilic intranuclear inclusions were present. There was degeneration of the underlying mucus glands and a lymphocytic infiltrate was seen. These changes are typical of a herpesvirus infection.

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.