

**Highlights:**

- Parasitic pneumonia in adult cattle
- Copper toxicosis in adult dairy cows
- Bovine herpesvirus type 4 (BHV4) isolated from bovine metritis
- Suspected slurry gas poisoning
- Equine infectious anaemia in a foal
- "Puffhead" in three-week-old turkeys

**CATTLE**

**Respiratory diseases**

Pneumonia was the principal pathological finding in 61 carcase submissions between June and September 2006.

*Dictyocaulus viviparus* (17 cases), *Mannheimia haemolytica* (4 cases), *Mycoplasma bovis* (5 cases), *Pasteurella multocida* (3 cases) and *Histophilus somni* (3 cases) were the most common pathogens isolated.

Several cases of parasitic pneumonia in adult cattle were investigated. One case involved a two and a half year old Ayrshire cross in-calf heifer, which was submitted for postmortem examination with a history of recent condition loss and respiratory problems. The heifer was at grass with a group of 20 others and had been treated six weeks previously with a topical avermectin. At postmortem examination the heifer had extensive pulmonary consolidation and interstitial emphysema, particularly of the caudal lung lobes. The trachea contained 2cm long *Dictyocaulus viviparus* lungworms, which were mixed with blood-stained froth.

Another case occurred on a dairy farm where the cows were zero-grazed. Seven in-calf dry cows had been turned out to grass during the previous two months. One six-year-old cow died and a severe lungworm infection was seen on postmortem examination (Figure 1). Lungworm larvae were also present in the faeces. The remaining cows responded to anthelmintic medication.

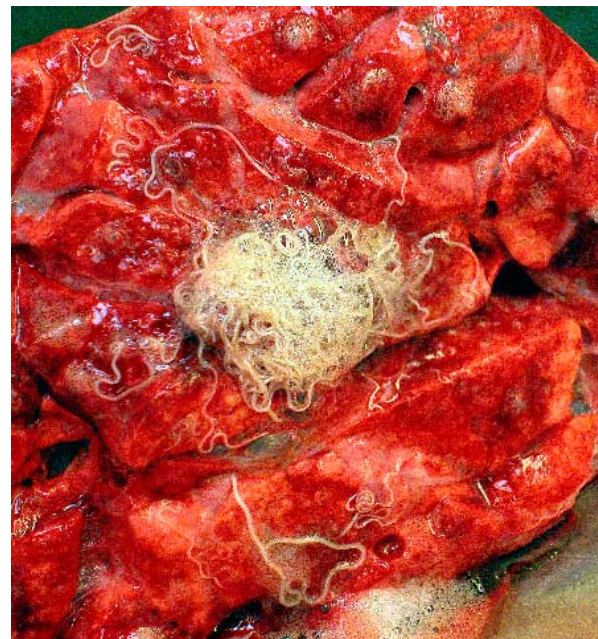


Figure 1.  
Severe Lungworm infection in a six-year-old dairy cow.

A postmortem examination was carried out on a 30-month old dairy cow, from a herd of 260, which had been treated for pneumonia. The cows had been vaccinated for infectious bovine rhinotracheitis (IBR), bovine viral diarrhoea (BVD), salmonellosis and leptospirosis. Caudal vena caval thrombosis, secondary

to a liver abscess was seen. Histological sections of the lungs revealed widespread thrombosis in blood vessels throughout the parenchyma. Two further cases of vena caval thrombosis were diagnosed during this quarter.

### Alimentary diseases

#### BVDV/Mucosal disease

A total of 393 blood samples were tested by virus isolation or antigen capture ELISA for BVD virus. Of these, a positive result was obtained from 58 samples (15%). In addition 239 submitted tissues and nasal mucus samples were tested by immunofluorescence for BVD virus, with 10 (4%) being found positive. Four cases of mucosal disease were confirmed at postmortem examination during this quarter.

#### Neonatal enteritis

Ninety-three faeces samples were tested for rotavirus with 22 (24%) found

positive. Sixty-nine faeces samples were tested for coronavirus, with 2 (3%) found positive. One hundred and eight faeces samples were tested for *Cryptosporidium*, with 32 (30%) positive. Fifty one faeces samples were tested for *E. coli* K99 with 3 (6%) positive.

A two-day-old calf was submitted for postmortem examination in August, with a history of a swollen abdomen and colic. Necropsy revealed emphysema and oedema of the abomasal folds. Immunofluorescence for *Clostridium sordellii* on the abomasal mucosa was positive, confirming a diagnosis of clostridial abomasitis. Vaccination of cohort animals with a clostridial vaccine containing *Clostridium sordellii* toxoid was recommended.

### Other enteric conditions

Parasitic ova found in ruminant faeces samples submitted during the period are shown in Table 1.

	Total	Number		Number of parasites				Percentage positive
		Negative		+	++	+++	++++	
<b>Liver fluke</b>								
Bovine	395	366		21	6	2	0	7.3%
Ovine	261	248		9	4	0	0	5.0%
<b>Coccidia</b>								
Bovine	454	288		128	14	11	13	57.6%
Ovine	270	68		184	12	6	0	74.8%
<b>Strongyle worm egg count</b>			With > 800 epg*					
Bovine	433		29					6.7%
Ovine	280		59					21.1%

- > 800 eggs per gram of faeces (epg) was considered of likely clinical significance
- + Low, ++ Moderate, +++ High, ++++ Very high

Table 1.

Endoparasitic infections in ruminants in Northern Ireland, January to March 2006

Two cases of traumatic reticulitis were diagnosed. One case involved a one-year-old bull, which was found dead. On postmortem examination five pieces of sharp wire were seen within the reticulum and there was a large associated haemorrhage from the reticular wall. Another case involved a two-year old cow, which was submitted for postmortem examination with a history of a short period of dullness and which died within a matter of hours. An 8cm long wire was found protruding from the wall of the reticulum, with haemorrhage into the reticular wall around the puncture site and fibrin tags over the omentum. *Arcanobacterium pyogenes* was isolated from the abdomen.

A two-year-old bull, which had died the previous night, was examined *post mortem*. The animal had been purchased through a market in February and was at grass, with some concentrate feeding. Blood-stained faeces had been seen in the perineal region prior to death. Haemorrhage from an abomasal ulcer was observed at postmortem examination. There had been chronic leakage of abomasal contents into the submucosa with consequent inflammation and containment by localised fibrosis in the abomasal wall.

### **Johne's disease**

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination (Ziehl-Neelsen staining) on 164 bovine faecal samples. Seventeen samples (10%) contained acid-fast organisms typical of MAP.

A total of 557 bovine blood samples were tested for antibodies to MAP. Eighty-seven samples (16%) tested positive.

### **Nutritional and metabolic diseases**

Several cases of copper toxicosis in adult dairy cows were investigated. In one case blood samples were examined from a three-year-old Friesian cow, which had been fed on a diet of grass buffered with silage and concentrate ration. The cow was depressed and had a severe haemoglobinuria. The plasma gamma glutamyl transferase (GGT) activity was 414 U/L (reference range 0–40 U/L) and the glutamate dehydrogenase (GLDH) and aspartate aminotransferase (AST) activities were 1208 U/L (0–30U/L) and 3770 U/L (20–100U/L) respectively; the serum copper was 106  $\mu\text{M}$  (reference range 8–16  $\mu\text{M}$ ). On postmortem examination of the cow a markedly jaundiced carcass and histopathological evidence of centrilobular hepatic necrosis and tubuloepithelial necrosis in the kidneys was seen. The liver copper level was 337.8 $\mu\text{g/g}$  (reference range 0.5–10.08 $\mu\text{g/g}$ ). There had been a history of over supplementation of the concentrate ration with copper.

### **Reproductive and mammary diseases**

#### **Abortion**

Specimens from 74 bovine abortions were examined between June and September 2006.

Pathogens associated with bovine abortion were detected in 27 cases (37%). Of these, *Leptospira* Hardjo was the most commonly identified pathogen, being detected in 10 cases (37%). *Salmonella* Dublin was cultured from

5 cases (18%). *Neospora caninum* infection was diagnosed in 3 cases (11%), and BVD virus was isolated in 3 cases (11%). *Bacillus licheniformis* was cultured from 2 cases (7%),

A stillborn calf from a primiparous beef heifer, which had calved without assistance, was examined from a herd that had three recent stillborn calves. Some cows also had retained foetal membranes. On postmortem examination leptospiral immunofluorescence was detected in kidney and lung cryosections and *Salmonella* Dublin was cultured from the abomasal contents. Vaccination for salmonellosis or leptospirosis was not routinely practised on this farm; vaccinal strategies for both diseases have since been implemented. Public health advice was given to the herdowner.

Samples were submitted from a herd with a history of metritis and poor performance post-partum. Bovine herpesvirus type 4 (BHV4) was isolated from uterine discharges and seroconversion to BHV4 was demonstrated in blood samples from two other animals. BHV-4 is a gammaherpes virus, with a worldwide distribution. BHV-4 has been isolated from a wide range of clinical presentations, including metritis, abortion, mastitis and respiratory disease, although its role as a primary pathogen in such cases remains to be demonstrated.

### **Mastitis**

A total of 1349 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. Seventy four (5%) samples yielded cultures of more than two organisms and were considered to have been potentially contaminated at sampling. No

bacteria were cultured from a further 286 samples. *E. coli* was the most frequently isolated organism and was present in 25% of samples where microorganisms were identified. *Streptococcus uberis* was cultured from 19% of samples, *Staphylococcus aureus* was isolated from 14% of samples and *Streptococcus dysgalactiae* was isolated from 3% of samples. Both *Staphylococcus* (not *S. aureus*) and *Enterococcus* species were isolated from a large number of samples (7% and 14% respectively).

Medium levels of a pure growth of *Listeria monocytogenes* were isolated from a milk sample from the right forequarter of a dairy cow. The milk sample was not visibly clotted and had a cell count of  $37 \times 10^3$  cells per ml. The farmer had noticed that the fore-quarters of this animal were red and hard. Milk had been withheld from the bulk tank. Advice was given to treat and resample all quarters before returning milk to the tank. The zoonotic potential of this organism was also stressed and advice given not to drink raw milk and to ensure that all milk was pasteurised. A subsequent sample from this animal was received two months later.

*L. monocytogenes* was not isolated on this occasion.

### **Nervous diseases**

*Clostridium botulinum* type D toxin was detected in liver, small intestine contents and faeces from one bovine submission that had a history of suspected botulism.

### **Other diseases**

Five heifers, from a batch of 35 yearling cattle, were found dead. No abnormalities had been detected the previous night. The heifers, which had

recently been weaned, were housed and fed a diet of grain, beet pulp and straw from a feeder wagon. No significant findings were detected at postmortem examination of two heifers. The farmer had removed 10,800 gallons of slurry from the slurry tank about 12 hours before the deaths. The tank had not been agitated and the cattle had not been turned outside. Slurry gas poisoning was thought to be responsible for the deaths. An 8-month-old Friesian heifer was submitted with a history of ill-thrift and abdominal enlargement. At postmortem examination the heifer was emaciated and had a massively distended abdomen containing copious amounts of fluid. A tumour mass replacing the right kidney and extensive transcoelomic spread was observed. Histologically the tumour was poorly differentiated and appeared to be of epithelial origin with mesenchymal support. Possibilities for a tumour at this site in a young animal include an anaplastic nephroblastoma, renal carcinoma, or a mesothelioma. Several blackleg cases were diagnosed at postmortem examination during this quarter. In the majority of cases *Clostridium chauvoei* was detected in the affected muscles by immunofluorescence. In one case immunofluorescence for *C. chauvoei* was negative but positive immunofluorescence results were obtained for *C. novyi*, *C. septicum* and *C. sordellii*. In another case immunofluorescence for *C. chauvoei* was negative while immunofluorescence for *C. septicum* was positive. Babesiosis was diagnosed following examination of blood samples from several submissions during this quarter. One sample, which was submitted from a hypothermic, recumbent bullock had

a packed cell volume of 0.8 L/L, a red cell count of  $2.11 \times 10^{12}/L$  and *Babesia divergens* was seen in 5-7 per cent of red blood cells.

## **SHEEP**

### **Alimentary diseases**

#### **Johne's disease**

A total of 9 ovine faecal samples were examined microscopically (Ziehl-Neelsen staining) for *Mycobacterium avium* subspecies *paratuberculosis* (MAP). All of the samples were negative.

A total of 7 ovine blood samples were tested for antibodies to MAP. Three samples (43%) tested positive.

Three young ewes, from a batch of 650 with a history of condition loss, were examined *post mortem*. Grossly they were emaciated with faecal soiling of the fleece and legs. All had moderate to high mixed burdens of enteric parasites and one had gross and histological changes typical of Johne's disease, while another was serologically positive for Johne's disease.

#### **Respiratory diseases**

Pneumonia was the principal pathological finding in 7 ovine carcass submissions during the third quarter of 2006.

Pasteurellosis, due to *Mannheimia haemolytica*, was the most common cause, having been diagnosed in 2 cases. Jaagsiekte was also diagnosed in a two-year-old Texel ram.

#### **Skin diseases**

Composite wool plucks were taken from four rams in a group of nine, which were showing signs of pruritis. Samples were negative for ectoparasites, including



*Psoroptes*. The sample was positive for ringworm microscopically.

### **Nervous diseases**

Two cases of listeriosis were confirmed by histopathological examination during the third quarter of 2006.

### **Other diseases**

A 7-year-old ewe was submitted with a history of condition loss, wheezing, inappetance and pain. At postmortem examination the peripheral, bronchomediastinal and lumbar lymph nodes were massively enlarged, pale with a uniform cut surface. Histology confirmed a multicentric lymphosarcoma.

## **PIGS**

### **Alimentary diseases**

Two 10-week old pigs, with a history of wasting, were euthanased and examined *post mortem*. Thirty pigs had died within the previous month. All 300 pigs in the unit had been vaccinated for enzootic pneumonia. The most significant findings at postmortem examination were suppurative bronchopneumonia and gastric ulceration. The intestinal contents contained digested blood, indicating gastric haemorrhage. Low levels of porcine circovirus 2 (PCV2) antigen were observed in cryostat sections of the spleen and lymph node of one pig, but the histological findings indicated that the PCV2 infection was unlikely to have been clinically significant.

## **HORSES**

Thirty-one swabs from 18 animals were examined for the presence of the contagious equine metritis organism. All were negative.

Thirty-nine swabs were cultured from mares with a history suggestive of

strangles. *Streptococcus equi* was detected in nine samples from nine separate premises.

Equine infectious anaemia (EIA) was suspected in a three-month-old foal that had epidemiological links to the EIA outbreak in the Republic of Ireland (Menzies and Patterson, Veterinary Record, 2006, 159, pp753-754). The foal had been lethargic, had stopped feeding and was pyrexemic. The animal was euthanased when its condition deteriorated.

At post mortem examination the carcass was pale and slightly jaundiced, the blood was thin and watery and there were many subcutaneous haemorrhages. There were widespread intestinal serosal haemorrhages (Figure 2) and haemorrhages in the renal cortices, the epicardium, the thoracic pleura and lung parenchyma. The liver was pale and mottled.



Figure 2.  
Intestinal serosal haemorrhages in a three-month-old foal with equine infectious anaemia.

Histological examination of the liver revealed portal and sinusoidal infiltrates of lymphocytes and plasma cells. In the lung there was thickening of alveolar walls with a mainly lymphocytic infiltrate. There

was a widespread interstitial lymphocytic infiltrate in the kidneys with interstitial haemorrhage. The spleen was autolytic, but there were apparent haemorrhages and depletion of germinal centres.

The gross and histological changes were consistent with EIA. The Coggins test for EIA was also positive. This was the first recorded case of EIA in Northern Ireland. A foal was submitted for postmortem examination in September with a history of sub-cutaneous oedema and rapid weight loss. The foal was reported to have been in contact with a mare, which was under EIA restriction. A blood sample taken prior to death had a plasma albumin concentration of 24g/L (30-45g/L) and a plasma urea of 17.1mM (3.3-8.3mM). A Coggins test on the foal had been negative, indicating that the foal was free of EIA. At necropsy large numbers of adult cyathostomes were seen in the large intestine (Figure 3).



Figure 3.  
Cyathostomiasis in a foal.

## BIRDS

### Poultry

Three 7-week-old ducks, which had been found dead, were presented for examination. The ducks were being reared for wild fowling. All three were in an emaciated state. A wad from a

shotgun cartridge was found to be obstructing the gizzard of each of the ducks. The farmer was advised to clean the area in which the ducks were reared.

Four dead and one live 3-week-old turkeys were submitted for examination.

Fifteen birds had died in the previous two days. These poults had high mortality since placement, with yolk sac infection and septicaemia diagnosed in their first week of life. The owner reported that some birds had swollen heads. Vaccination for turkey rhinotracheitis virus was undertaken at the hatchery. The dead birds appeared septicaemic and had significant pulmonary haemorrhage. A coagulase-positive *Staphylococcus* was isolated from the liver. The live bird had subcutaneous emphysema of the head and neck, but there was no gross evidence of air-sacculitis. 'Puffhead' is a recognised condition in turkey poults that has been attributed to rupture of air sacs subsequent to handling.

Seven 49-day old organically-reared commercial broilers, with a history of high mortality and birds going off legs, were examined *post mortem*. Unilateral hock enlargement with caseous material in the joint space was seen in four birds. The spleens were enlarged in five birds. *Pasteurella multocida* was isolated from the joints and viscera.

### Other avian

A 6-month old male pigeon was submitted from a flock with diarrhoea and weight loss. Several birds had died. At postmortem examination the bird was in poor body condition with scattered fungal-type nodules in the lungs and air sacs. Fungal hyphae were seen

histologically. Bursal changes consistent with pigeon circovirus infection were also seen histologically, suggesting that the fungal pneumonia and airsacculitis may have been secondary to circovirus-mediated immunosuppression.

A 3-month-old male pigeon from a group of 20, with a history of inappetence, vomiting and brown jellied droppings, was submitted for examination. One other pigeon in the group was showing similar signs. At postmortem examination the bird was in good body condition, with the crop distended with cereal grains and with fluid intestinal contents. Histologically an inclusion body hepatitis and bursal changes consistent with pigeon circovirus infection were seen. Whether the inclusion body hepatitis was due to pigeon herpesvirus or adenovirus was not determined, however immunosuppression due to circovirus infection might have predisposed the bird to developing hepatitis.

A three month old female parrot was submitted for examination, with a history of having been acquired a week previously and sleeping most of the time before dying. At postmortem examination the bird was in poor body condition, with scant ingesta. The small intestine was distended by a tangled mass of over 100 ascarid worms, which had obstructed the lumen.

On postmortem examination a 13 year old tragopan, from a zoological collection, was found to have a heavy burden of *Heterakis* and *Capillaria* worms in the small intestine. The caeca were grossly distended and the caecal walls showed marked nodular thickening. At

histological examination, a proliferative fibro-granulomatous reaction enclosing profiles of nematode parasites was seen. Superficially there were areas of focal necrosis and profiles of nematodes free in the lumen. A Ziehl-Neelsen stain for acid-fast organisms was negative.

## CANINE

On postmortem examination an adult German shepherd dog was found to have severe shotgun injuries to the chest. A wad of shotgun cartridge was recovered from the mediastinum and there was no exit wound indicating the dog had been shot from close range. An accusation was made that this dog had been sheep worrying. White fibres (probably wool) were recovered from the stomach.

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.