
# Northern Ireland Disease Surveillance Report, October to December 2023

- Fungal pneumonia in a calf
- *Prototheca* sp mastitis in a cow
- Larval paramphistomosis in a heifer
- Larval paramphistomosis in a ewe
- Johne's disease in a goat

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for October to December 2023

# CATTLE:

## Respiratory diseases

Infectious bovine rhinotracheitis (IBR) was diagnosed in an eighteen-month-old heifer. At necropsy, there was antero-ventral consolidation affecting 80% of lung volume.

Consolidated lung was red purple, there was fibrinous pleuritis, interlobular septae were markedly distended by fibrinous oedema, tracheal and bronchial mucosa was overlain by thick diphtheritic material (FIGURE 1) and bronchi were occluded by thick yellow debris. Histologically there was a severe fibrino-suppurative pneumonia, with fibrin, oedema, bacteria, necrosis, an infiltrate of neutrophils and macrophages, and haemorrhage affecting alveoli, airways, interlobular septae and pleura. In larger bronchi there was diphtheritic epithelial and mucosal necrosis. IBRv nucleic acid was detected in the trachea and lung by RT-PCR. There was secondary infection with *Bibersteinia trehalosi* and *Trueperella pyogenes.*

FIGURE 1: Purulent tracheitis due to IBR

At gross post-mortem examination of a thirteen-month-old bull there was fibrinous pleuritis with fibrinous pleural adhesions. 60-70% of the lung tissue was consolidated; there was fibrinous distension of the septae and multifocal abscesses throughout the lungs.

Histological examination revealed severe fibrino-necrotic bronchopneumonia with some toxic modification of neutrophils, presence of ring-lesions and heavy bacterial colonization (small rods) in some areas of the lung tissue. There was bronchiectasis, pleurisy, pleural oedema and haemorrhage. *Mannheimia glucosida* was isolated from the lung tissue and also from the spleen and liver. *Mycoplasma bovis* nucleic acid was detected in lung tissue by RT-PCR.

## Pneumonia due to RSV and Mannheimia haemolytica infection

Pneumonia due to RSV and *M. haemolytica* A2 infection was diagnosed in a three-week-old calf submitted with a history of pneumonia. At necropsy there were significant lung lesions with consolidation affecting around 70% of the left lung and 15% of the right lung. Histology showed generalised congestion and areas of haemorrhage into alveoli with evidence of alveolar oedema. There was bronchiectasis and suppurative neutrophilic infiltration showing regions of ‘streaming’ neutrophils surrounding bacterial colonies. Some syncytia were detected in bronchiolar epithelium.

A moderate pure growth of *M. haemolytica* A2 was recovered from lung tissue. RSV antigen was detected by immunofluorescence, presence of RSV nucleic acid was demonstrated by RT-PCR and RSV was isolated in foetal calf lung cultures (FIGURE 2). This calf had not been vaccinated against pneumonia.

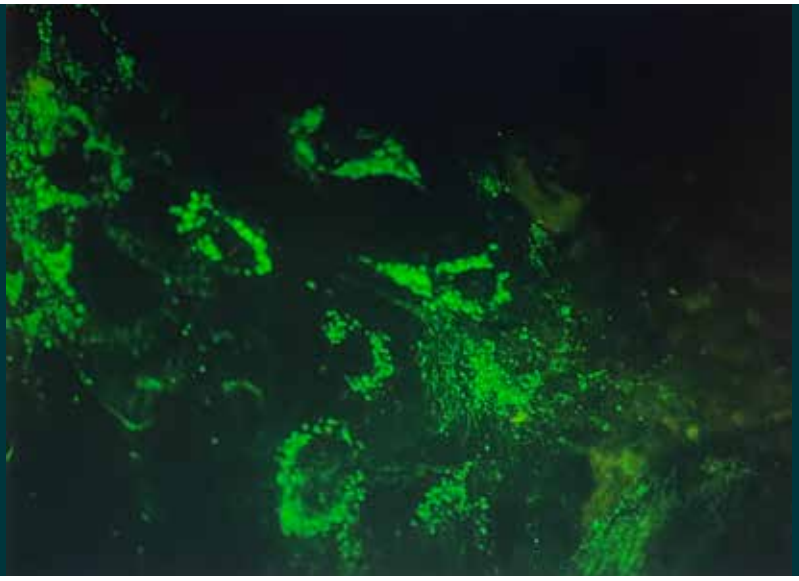

FIGURE 2: Viable RSV isolated in foetal calf lung cell culture from the lung tissue of a pneumonic calf

## Parasitic pneumonia

Cases of Lungworm (*Dictyocaulus viviparus*) infection continued to be diagnosed during the first part of the quarter. Gross postmortem examination, supported by parasitological and histological findings confirmed intercurrent *Mycoplasma bovis* infection in several cases and a co-existent bacterial aetiology in several others.

## Fungal pneumonia

Fungal pneumonia (FIGURE 3) was seen in a seven-month-old calf submitted with a history of dyspnoea and weight loss. At gross post-mortem examination the tracheal lumen contained a large amount of muco-pus, and there was diphtheresis in the trachea and major airways, possibly suggestive of IBR. On histological examination of the lung tissue there was severe fibrino-suppurative bronchitis with fibrinous diphtheresis and heavy associated colonisation by fungal mycelium; there was peri-bronchial congestion, alveolar oedema and atelectasis. In the trachea, fibrino-purulent exudate occupied the lumen, and there were occasional colonies of fungal mycelium.

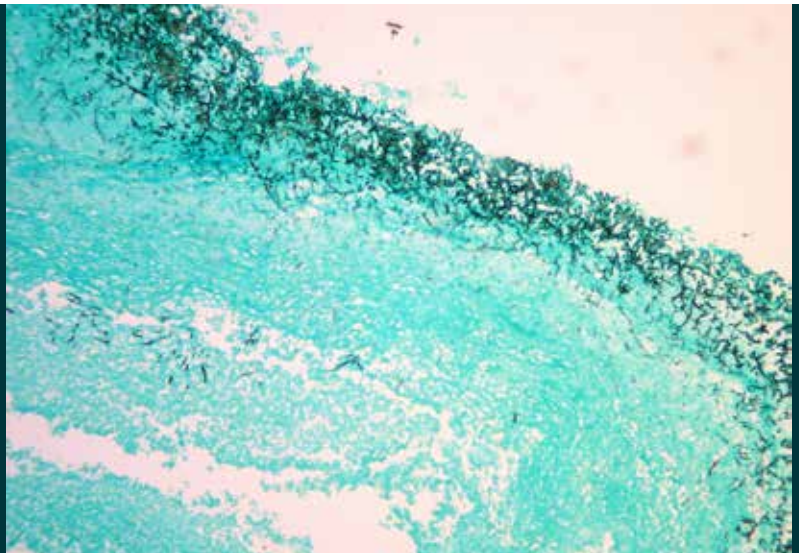

FIGURE 3: Fungal pneumonia in a calf, Grocott stain, showing dark staining fungal hyphae

## Alimentary diseases

### Larval paramphistomosis

A 14-month-old heifer was submitted with a history of weight loss followed by diarrhoea. At gross post-mortem examination, the large intestine contained scant brown watery material, and the mucosa was congested. Small gritty foci were present in the liver tissue. On histological examination these seemed to represent the remains of liver fluke (*Fasciola hepatica*) infection which had been killed by anthelmintic treatment. Numerous paramphistome juveniles were washed from the intestine. Immature paramphistome infection in young cattle can cause muco-haemorrhagic enteritis. The abomasal worm count for *Ostertagia* sp was close to clinical significance.

### Johne's disease

Johne's disease was diagnosed in an adult cow from a herd with a history of chronic diarrhoea in cows. At necropsy there was thickening of small intestinal walls and corrugation of small intestinal mucosa. The gross pathology was considered suggestive of Johne's disease. Acid fast bacilli were very abundant on an intestinal mucosal smear (FIGURE 4) and *Mycobacterium avium* Paratuberculosis (MAP) DNA was detected by PCR.

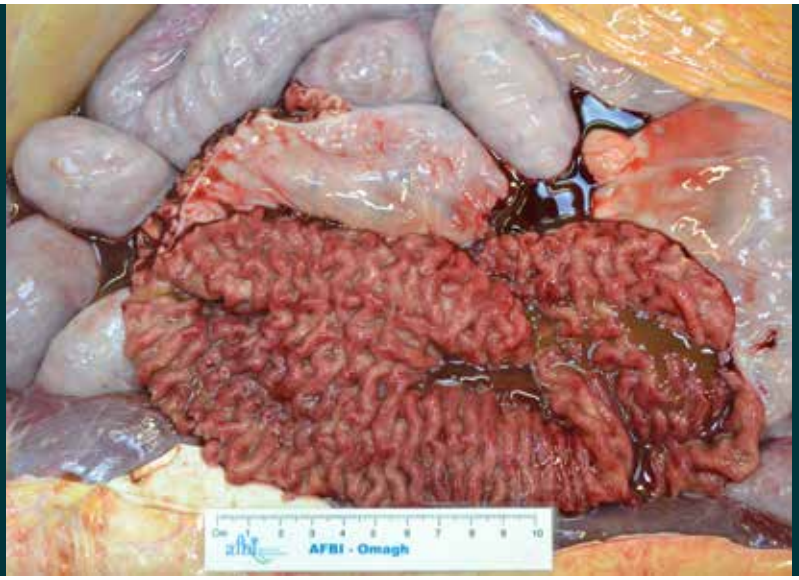


FIGURE 4: Thickening of the ileal mucosa in a cow with Johne's disease

A diaphragmatic tear with displacement of the abomasum into the thoracic cavity was diagnosed in a young milk – fed calf. There was a secondary pleural effusion and localised peritonitis in the cranial abdomen associated with a small perforation in the abomasum.

## Nutritional and metabolic disease

Poisoning by pyrrolizidine alkaloids due to eating ragwort (*Senecio jacobaea*) was diagnosed during the reporting period following on from cases reported in other herds during quarter two. Histologically there were changes in the liver of biliary duplication, peri-portal fibrosis and megalocytosis. Several heifers were lost during the incident and the ragwort was believed to be present in the silage.

## Reproductive and mammary diseases

### Mastitis

A milk sample was received for culture following unresponsive mastitis in a dairy cow. *Prototheca* was isolated on Sabouraud's agar medium (FIGURE 5). Infections due to the colourless alga genus are opportunistic, and mastitis can be caused by entry of the organisms through the teat canal. Asexual reproduction results in the development of 2-16 sporangiospores within a sporangium, which eventually ruptures to release the spores. Although commonly present in the environment, infections are infrequent, and may be related to immunosupression. Treatment is unsuccessful and infection persists intracellularly. Affected cows should be culled because milk yields are permanently reduced and because they represent potential sources of infection.

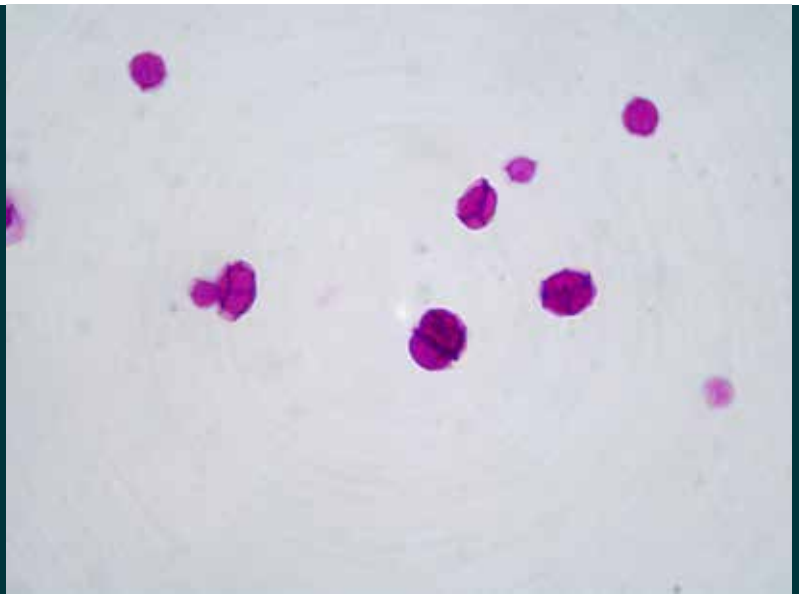

FIGURE 5: *Prototheca* sp detected in a milk sample; showing endospore formation in some cells.

### Foetal deformity

A twenty - four – hour- old black and white Friesian Holstein type calf was submitted

for examination.  There was spina bifida at the sacrum, atresia ani, a single conjoined and polycystic kidney, hind limb deformation and arthrogryposis (FIGURE 6). The cause was considered to be genetic.

FIGURE 6: Multiple deformities including polycystic kidneys in a calf.

### Rupture of the uterine artery

Rupture of the uterine artery was diagnosed in an adult dairy cow. At gross postmortem examination there was a large quantity of clotted and free blood in the peritoneal cavity. A late term foetus was present in the uterus. There was massive haemorrhage into the left uterine broad ligament from an aneurysm in the left uterine artery.

### Neurological diseases

Pituitary abscessation was diagnosed in a twelve-month-old heifer submitted with a history of neurological signs including ataxia and fitting. At necropsy; the right eye was bulging out of its orbit and there was yellow opacity of the cornea surrounded by a 2mm rim of erythema at the margins of the cornea (at the uvea). Structures in the orbital canal and deep in the orbit were bound in copious thick yellow purulent fluid. There was thick inspissated material in the pituitary fossa, and at the optic nerve chiasm, and along the basal aspect of the brain. There was watery yellow purulent fluid along the basal aspect of the brain at the obex, and distending the brain ventricles. A profuse growth of *T. pyogenes* was recovered from the lesion.

### Other diseases of cattle

### Malignant Catarrhal Fever (MCF)

MCF was diagnosed from the autolytic carcase of a one-year-old bullock submitted after having been treated for respiratory disease. The diagnosis was achieved mainly through histology, serology and detection of OHV-2 nucleic acid in tissues by RT-PCR. Histology showed characteristic vascular changes in the brain and kidney. There was vasculitis; endothelial cells were plump, there were leucocytes within vessel walls, and there was cuffing of vessels by lymphocytes. There were fibrin aggregates in vessel lumens and within vessel walls.

### Mesenteric aneurysm

Catastrophic haemorrhage resulting from an arterial tear, likely in the cranial mesenteric artery or the renal artery was the cause of death in a two-year-old dairy cow. These cases may be due to congenital defects in artery walls.

## SMALL RUMINANTS: SHEEP

### Alimentary diseases

### Larval paramphistomosis

Larval paramphistomosis was the cause of death in an 18-month-old ewe. The body condition was good, but there was heavy wet faecal soiling around the tail and perineum, and the small and large intestine contained copious watery green-brown content. Large numbers of Juvenile paramphistomes were washed from the small intestine. Migrating juvenile paramphistomes are a recognised cause of clinically significant muco-haemorrhagic enteritis in sheep.

### Urinary tract disease

Urolithiasis (FIGURE 7) was diagnosed in a yearling ram. The urethral mucosa was haemorrhagic over most of its length. There was marked bruising and haemorrhage of the urethra at the sigmoid flexure. The urethral process was completely obstructed by a plug of fine gritty crystals and sludge. The bladder was severely dilated with urine. The bladder wall was thick, oedematous and haemorrhagic. There were multifocal haemorrhages on the bladder mucosa. The bladder contained a large volume of bloody urine, a large quantity of clotted blood and gritty material. There was severe peri-renal haemorrhage (to about 20cm diameter at the left kidney and to about 12cm diameter at the right kidney).The renal pelvices were markedly dilated and filled with strongly uraemic smelling haemorrhagic fluid.

FIGURE 7: Urolithiasis in a ram lamb; the severity of the condition was notable in this case.

### Septicaemic pasteurellosis

Septicaemic pasteurellosis due to infection with *Bibersteinia trehalosi* continued into quarter four having first been diagnosed in first season lambs earlier in the year. This disease typically affects spring born lambs in their first autumn. Intestinal parasitism was present in many cases and parasitic gastro-enteritis and coccidiosis are amongst the identified risk factors for the disease. Septicaemic carcases often show enlargement, haemorrhage and necrosis of the retro - pharyngeal lymph nodes and erosions of the oesophageal mucosa may be present. The lungs are congested and oedematous with a deep purple colouration.

## SMALL RUMINANTS: GOATS

### Johne's disease

A three-year-old female goat was submitted with a history of wasting and death. The body condition was poor, and there was moist faecal soiling at the tail and perineum. At post-mortem examination there was a ketotic odour from the carcase. There were occasional pale foci in the myocardium, vegetative endocarditis of the left atrio-ventricular valve, and multiple small abscesses in the caudo-dorsal lung fields. On histological examination of the ileum there was superficial mucosal necrosis with lymphohistiocytic inflammation; the mucosa was strongly positive for acid-fast microorganisms by ZN staining. Associated lymph nodes, which were enlarged, exhibited focal to confluent lesions of caseous

necrosis with mineralisation and presence of Langhans-type macrophages. The lymph nodes were positive for acid-fast microorganisms by ZN staining. These lesions were considered consistent with Johne's disease, and the diagnosis was subsequently confirmed by PCR on a faecal sample.

## PIGS;

Avulsion of the liver was diagnosed in ten-month-old sow. At post-mortem examination, much free blood was present in the abdomen. A large clot was attached to the liver, over a fresh rupture which appeared to represent an avulsion lesion. The sow had recently given birth to a small litter, and a dead foetus remained in the uterus.

## BIRDS: Poultry

Three geese were submitted from a backyard flock of seven, having died following reduced mobility and collapse. At post-mortem the carcases were emaciated, pale, and avian influenza virus (AIV) testing by RT-PCR gave negative results. Faecal examination revealed severe *Capillaria* sp infection. *Capillaria*, are mucosal-invading intestinal nematode parasites, which can cause diphtheritic inflammation, leading to inappetence and emaciation. Some species require the involvement of earthworms in the life-cycle, and therefore occur commonly amongst birds kept outdoors.