Northern Ireland Disease Surveillance Report, October to December 2024

HIGHLIGHTS

- Acute mastitis outbreaks following drying off
- Schmallenberg detection in malformed lambs and calves
- BVDV infection with pneumonia in calves
- Poisoning in cattle and sheep due to toxic plants
- Mulberry heart disease in a pig

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for October to December 2024

CATTLE:

Respiratory diseases

Bovine Viral Diarrhoea: Pneumonia symptoms were present in a group of calves aged between four to ten months old. Two calves were submitted for postmortem following their death. Both calves had evidence of cranio-ventral pneumonia. There was hemoperitoneum with omental haemorrhage related to a ruptured abomasal ulcer and myocarditis in one calf while blood-tinged urine, yellow discolouration of carcass fat and bronzing of the liver were identified in the other calf. Both calves were BVDV antigen positive by RT-PCR of the blood however negative for BVDV antibody on ELISA. The histology of the lungs in both calves correlated with an acute bronchopneumonia likely bacterial with *P. multocida* detected in one calf however antibiosis may have affected results. Vasculitis was present in the lung, liver and kidney on histology, and immunohistochemistry for BVD showed positive staining in a wide variety of cell types throughout the tissues. BVDV was also detected on another farm in two one year old animals submitted after sudden death, and they were found to have pneumonia on gross postmortem. There has been a rise in positive BVDV carcasses submitted and this comes at a time when stricter BVDV control legislation is due to start in NI in February 2025.

Mycoplasma bovis pneumonia: An 18-month-old heifer which had been purchased 1 month earlier was submitted for postmortem examination. There was evidence of severe pneumonia and pleurisy with purulent material and pulmonary sequestrae in the thorax. There was consolidation of 80% of lung volume with interlobular oedema, and multiple large foci of necrosis and suppuration. There was arthritis with fibrinosuppurative material in multiple joints. On histology alveoli and bronchioles were filled with an inflammatory infiltrate rich in oat cells, neutrophils, macrophages, fibrin and oedema. There were abundant intralesional bacterial colonies and areas of coagulative to caseous necrosis. The histology and gross postmortem findings correlate with *Mycoplasma bovis* nucleic acid detection in lung and hock samples by PCR. *Mannheimia haemolytica* was also cultured from the lungs as the source of the secondary bacterial pneumonia.

Alimentary diseases

Johne's disease: A thin Holstein type cow was presented for postmortem following death at calving. Foetal maternal disproportion or malpresentation wasn't present and the cervix was open with the calf's front feet present at the vulva. There was a generalised fibrinosuppurative peritonitis with thickened corrugated mucosa of the small and large intestine. Johnes PCR was positive and correlated with histology of the intestines showing numerous epitheliod macrophages in dense sheets, effacing and distending the mucosa, lamina propria and submucosa. The inflammatory infiltrate contained lesser numbers of lymphocytes and Langhans type multinucleated cells.

Other enteric conditions

Oesophageal perforation: A three-day old calf was submitted following a period of reluctance to feed. Postmortem examination revealed pleuritis with leakage of milk into the right side of the thoracic cavity (photo 1) and atelectasis of the lungs on this side. There was cellulitis and oedema within the neck associated with a 2cm full thickness perforation of the oesophagus at the level of the thoracic inlet. Histology identified sub-acute inflammation in the pleura and oesophagus confirming the perforation and subsequent inflammation was a few days old. The history mentioned the calf was stomach tubed which was likely the source of the oesophageal perforation.

PHOTO 1: Milk accumulating in the right side of the thoracic cavity due to oesophageal perforation in a calf.

Nutritional and metabolic disease

Poisoning: An 11-month-old heifer was presented following two deaths on a farm with similar signs including bloody nasal discharge and apparent blindness. Postmortem identified a pale carcass with a large volume of peritoneal free fluid, haemorrhage in the renal pelvises and the lungs, along with dark tarry contents in the caecum, small and large intestines. Testing of the vitreous humour identified a low calcium as well as high urea and creatinine indicating renal failure. Histology identified a large amount of crystalline material within the tubules which were birefringent under polarised light (photo 2). Crystals were similarly evident in the blood vessel walls of the brain. The crystals in the renal tubules had the 'sheaves of wheat' appearance of oxalate crystals. Ethylene glycol toxicity was suggested as the cause of death however other causes could include ingestion of oxalate containing plants or mouldy silage.

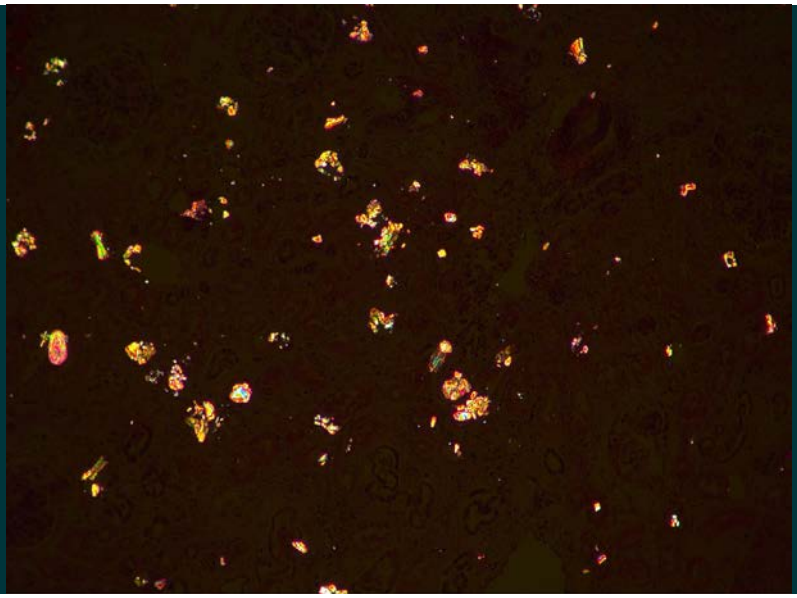

PHOTO 2: Kidney histology section under polarised light showing birefringent crystals.

A second case of poisoning was identified in a 3-year-old cow submitted following four sudden deaths in a batch of cows over a period of 24 hours. Discarded items were identified within the field they grazed including a battery. The carcass appeared bloated on external examination, following incision into the rumen a strong smell of 'garden clippings' was identified. The rumen contents contained many green glossy leaves with 3-5 lobes consistent with ivy.

Reproductive and mammary diseases

Reproductive diseases

Schmallenberg Virus (SBV): A stillborn calf was presented with arthrogryposis of all 4 limbs, cleft palate along with scoliosis of the neck and spine. The case had needed veterinary assistance for parturition and the referring vet indicated there were as many as 8 other similar cases on this farm. Schmallenberg PCR was negative, but SBV antibody ELISA was positive on foetal fluid.

Another calf was submitted after being born weak and unable to rise. This was one of several calves with similar signs born on the farm this year. On gross postmortem a large fluid filled cavity replacing most of the cerebrum (photo 3) was identified and there was an intussusception of the small intestine. Blue tongue and Schmallenberg virus PCRs were negative however ELISA was positive for SBV antibodies on foetal fluid.

PHOTO 3: Sagital section through a calf skull showing a cavity in the location of the cerebrum

Mammary diseases

Mastitis: Four separate farms submitted cows to both postmortem labs that had died within the dry period. Seven cows had died within a period of days from drying off and all had been treated with teat sealants with variable use of antibiotic tubes. Three cows were cases of sudden death while four from one farm deteriorated over a few days with one aborting. Postmortem in all cows identified mastitis with cows having brown watery secretions or fibrinosuppurative clots in affected quarters with associated firmness, red discolouration and oedema. Bacteriology confirmed high levels of *E. coli* in 4 cows and others had *Klebsiella pneumonia* and *Pseudomonas aeruginosa* isolated. Foetuses of two cows had *E. coli* isolated from their foetal stomach contents. Histology of the udders correlated with

an acute mastitis with accumulations of fibrin and neutrophils within alveoli and ducts in all cases. The identification of toxic mastitis due to environmental bacteria in cows after drying off indicates the importance of a hygienic drying off technique and dry cow environment.

Neurological diseases

Malignant Catarrhal Fever (MCF): An adult dairy cow was submitted with a history of suspected allergic reaction. Gross postmortem examination findings were unremarkable, but histology of the brain revealed perivascular lymphoid cuffs in the brainstem, cerebellum and meninges with lymphoid infiltrate into cerebellar meninges. Malignant catarrhal fever was suspected based on histological changes in the vasculature, with MCF antibodies detected in the carcass blood.

Cerebrocortical necrosis (CCN): Two 3-month-old calves were submitted following a period of neurological signs progressing to opisthotonus and recumbency. Both calves had been treated with vitamin B, steroid and oxytetracycline. Two other calves on the farm were still showing similar signs. On gross postmortem examination there were focally extensive to multifocal areas of yellow to grey discolouration of the cerebral cortex (photo 4) of both calves. The brain tissue also auto fluoresced under UV light and was confirmed as CCN on histology.

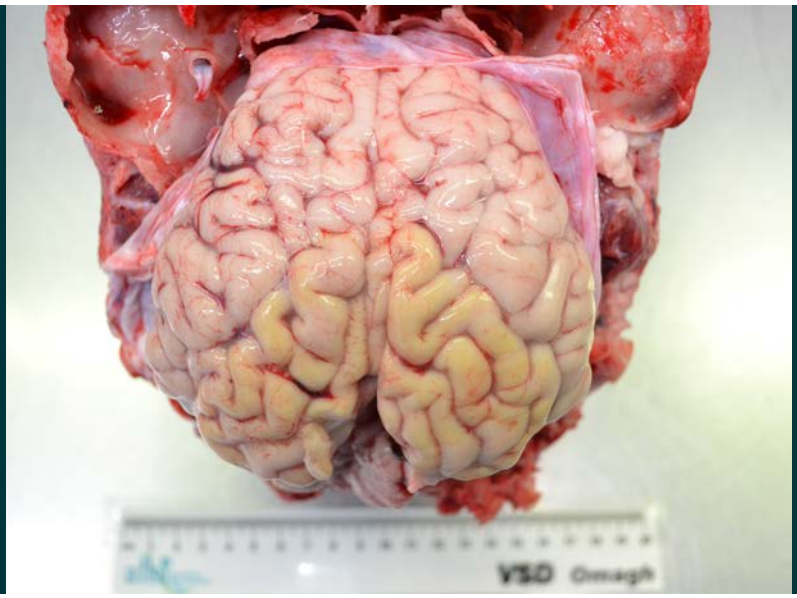

PHOTO 4: Cerebrum of a calf with CCN

SMALL RUMINANTS: SHEEP

Respiratory diseases

Ovine pulmonary adenocarcinoma (OPA): One week after shearing a 3-year-old ewe presented for sudden death. On gross pathology and histopathology lesions classical of Jaagskiekte with secondary bacterial infection were identified. Bacteriology confirmed *Mannheimia haemolytica* infection. It was also noted *Salmonella* Diarizonae was present in the small intestine but wasn't causing clinical disease.

Pasteurellosis: *Pasteurella septicaemia* was diagnosed in two 6-month-old ram lambs presenting after sudden death. They had both been given *Pasteurella* vaccinations. Gross postmortem identified fibrinous pleurisy and consolidation of the cranial lung lobes, with histology confirming acute pleuropneumonia with oat cell changes to neutrophils classic of *Pasteurella*. *Mannheimia haemolytica* was isolated in a septicaemic pattern.

Alimentary diseases

Subacute Fascioliasis: Multiple sheep have been submitted with subacute fascioliasis. Submissions were from at least 5 different farms and ages ranged from 7-month-old lambs to older sheep. All carcasses were pale on initial postmortem examination and had haemorrhagic tracts in the liver parenchyma with livers swollen and friable (photo 5). Some livers were overlain with fibrin or had evidence of chronic fluke damage with fibrous biliary hyperplasia or mineralised foci. There was evidence of varying sized flukes in the bile ducts and gallbladders with a variable fluke egg count on the faeces. Some of the carcasses had transudate in the thorax and abdomen, with one animal having oedema of the head and neck. History on one farm had alluded to a possible triclabendazole resistance problem. A younger 3–4-month-old lamb was submitted with a large blood clot adhered to the liver extending from a large haemorrhagic cavity within the liver parenchyma. A low level of fluke eggs was detected in the faeces and numerous flukes ranging from 4 weeks to adult were detected in the liver. In another case Clostridium novyi fluorescence was detected in the liver of an 8-month-old lamb with sub-acute fascioliasis. This bacterium is involved in Black disease and can germinate in areas of necrosis caused by liver fluke migration.

PHOTO 5: Liver from ewe with sub-acute fascioliasis

Parasitic gastroenteritis (PGE): Nematodirosis and PGE were diagnosed in a seven-month-old ewe lamb submitted with a history of dullness and separation from the flock. This was typical of several instances of nematodirosis diagnosed in different flocks in this quarter. *Nematodirus* although more common in the warmer months can cause problems in flocks in autumn as well.

Nutritional and Metabolic disease

Poisoning: A 1-year-old ram was presented for postmortem examination following sudden death after moving fields, other rams already grazing the field were unaffected. On gross postmortem examination there were numerous evergreen leaves, with serrated edges, shiny waxed appearance and spindle shaped. Leaf appearance was consistent with *Pieris* species. They are poisonous due to the acetylandromedol toxin they contain and account for many of the poisoning cases seen in sheep which are most common in the winter months as grass is scarce.

Reproductive diseases

Abortion

Schmallenberg virus (SBV): A 2-day old lamb was submitted with evidence of arthrogryposis. The flock had a history of other lambs with similar limb deformities being born in the last few months of 2024. The lamb tested positive on RT-PCR of the brain for Schmallenberg virus. This is the first case of PCR positive SBV in a lamb detected in NI in five and half years. Since this case was submitted in mid-December there have been multiple submissions of lambs with deformities such as arthrogryposis, scoliosis, torticollis, hydrocephalus, brachygnathia superior, cleft palate and reduced cerebellum size. Another still born lamb was confirmed to be SBV positive by PCR on its lung, brain and spinal cord and ELISA on foetal fluid.

PHOTO 6: Hydrocephalus in a newborn lamb

Neurological diseases

Botulism: A 3-year-old sheep was presented for postmortem examination after 'swelling with gas' the previous day, and having a ruminal trocar inserted. There were no findings of significance on gross postmortem, but *Clostridium botulinum* C/D toxin was detected in the caecal contents by ELISA.

Cerebrocortical necrosis (CCN) was detected in a 7-month-old lamb that presented after a short period of dullness while at grass. Under ultraviolet light the brain auto-fluoresced appearing apple green in colour. Histology confirmed CCN with cortical spongiosis, cerebral oedema, gitter cell presence, endothelial swelling, neuronal shrinkage and eosinophilia. The lamb also had a high strongyle egg count, nematodirus eggs present and a body condition score of 2.5/5.

Other diseases of sheep

Oropharyngeal trauma: Multiple ewes and an 11-month-old ram from different farms presented with sudden death, with a short history of blood coming from the nose and mouth of one of the ewes. Carcasses were found to have evidence of oropharyngeal trauma with haemorrhage, necrosis, abscessation and cellulitis of the tissues in the oropharynx and tongue. There was evidence of blood clots present in the rumen and a bolus was in the forestomachs in nearly all cases. One ewe had sub-meningeal abscessation which may have occurred due to direct extension from the infected traumatic lesion, and she had also aborted. Bolus or dosing gun injury is becoming an increasing problem and is multifactorial including improper restraint, inappropriate guns and damaged guns.

ALPACAS:

Squamous cell carcinoma (SCC) was identified in the forestomachs of an alpaca. The 12-year-old alpaca was submitted following a period of weight loss. Gross postmortem examination revealed white proliferative masses extending from the C1 mucosa of the stomach and multifocal pale areas on the liver. Histology confirmed the presence of SCC of the gastric mucosa with metastasis via the lymphatics to the liver. SCC is the 2nd most common neoplasia of camelids, and the gastric form was one of the first reported neoplasia types within camelids.

PIGS:

Lesions suggestive of vitamin E/selenium deficiency were detected in a 12–15-week-old female piglet presented following sudden death. Gross postmortem examination revealed multiple to coalescing foci containing central haemorrhage circumcised by a white border in the left ventricular myocardium. There was also evidence of an umbilical abscess. Histology of the heart revealed severe myocardial degeneration and necrosis, mild lymphohistiocytic myocarditis, myocardial mineralisation and haemorrhage. This is also known as Mulberry heart and is often a disease of young fast-growing pigs with a dietary deficiency which can be related to low protein, excess selenium antagonists, or the presence of vitamin A or mycotoxins.

BIRDS -Poultry:

Six hens near the end of their lay were submitted for postmortem following a mortality of 6-8 hens per day. There were no findings of significance on gross postmortem, but bacteriology identified *Erysipelothrix rhusiopathiae* in a septicaemic pattern in all birds. Histology confirmed a severe bacterial septicaemia with evidence of fibrinoid

necrosis in the spleen with intralesional bacteria and lesions associated with a bacterial septicaemia in the lung and liver. *E. rhusiopathiae* is a bacterium that can live in the environment for long periods and infects birds through breaks in the skin, across mucous membranes or by mechanical vectors. Birds can act as a carrier and shed it in faeces or nasal/oral secretions and other animals such as rodents can also be involved in the spread of infection to poultry.

WILDLIFE and EXOTICS:

A squirrel was submitted for postmortem examination after being found dead. On gross postmortem examination multiple cystic structures were identified in the thorax adhered to the pericardium, mediastinum and pleura. On histology the membranous/cystic structures (photo 7) featured a typical cestode tegument syncytium (Ts) with nucleated cell bodies (Tc) underlying musculature (M) and calcareous corpuscles (Cc). There was no evidence of development of reproductive organs, so the material represented the larval/cysticercus stage of a tapeworm. *Taenia martis* is found as an adult tapeworm in pine martens, and the larval stage parasitizes voles, fieldmice and squirrels amongst other small mammals. The larvae are frequently located in the chest cavity of the intermediate host. Notably, *T. martis* has zoonotic potential, with several human infections being recorded recently in Europe.

PHOTO 7: Cysticercus of a taeniid cestode, probably *Taenia martis*, from the thorax of a red squirrel *Sciurus vulgaris*.

Haematoxylin and Eosin stain; photographed at X200 magnification.

To allow prevention and preparation for the upcoming months it is worth noting these cases were identified in Northern Ireland in January to March over the last 4 years:

- **Respiratory disease:** Acute pneumonia was detected in both cows and calves caused by *Mannheimia haemolytica*. *Mycoplasma bovis* was also regularly detected causing pneumonia, arthritis and middle ear disease in a mixed age range of bovines.
- **Alimentary disease:** Both calves and lambs had cases of rumenitis secondary to ruminal drinking or grain overload causing ruminal acidosis and secondary abomasitis. In some cases, this also led to mesenteric torsion.
- **Reproductive disease:** Given it is the spring season more cases of abortions and still births were noted with a rise in ovine associated abortion agents, but also a seasonal rise in *Bacillus licheniformis*. Given the risk of BTV and Schmallenberg virus, submission of all deformed foetuses is advised.