

REGIONAL VETERINARY LABORATORIES REPORT

November 2023

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 840 carcasses and 238 fetuses during November 2023. Additionally, 2,173 diagnostic samples were tested to assist private veterinary practitioners with the diagnosis and control of disease in food-producing animals. This report describes a selection of the cases investigated by the Department of Agriculture, Food and the Marine's (DAFM) veterinary laboratories in November 2023. The objective of this report is to provide feedback to veterinary practitioners on the pattern of disease syndromes at this time of the year by describing common and highlighting unusual cases. Moreover, we aim to assist with future diagnoses, encourage thorough investigations of clinical cases, highlight available laboratory diagnostic tools and provide a better context for practitioners when interpreting laboratory reports.

Cattle

Pneumonia and enteritis were the most common diagnoses at necropsy in cattle in the RVLs during November 2023.

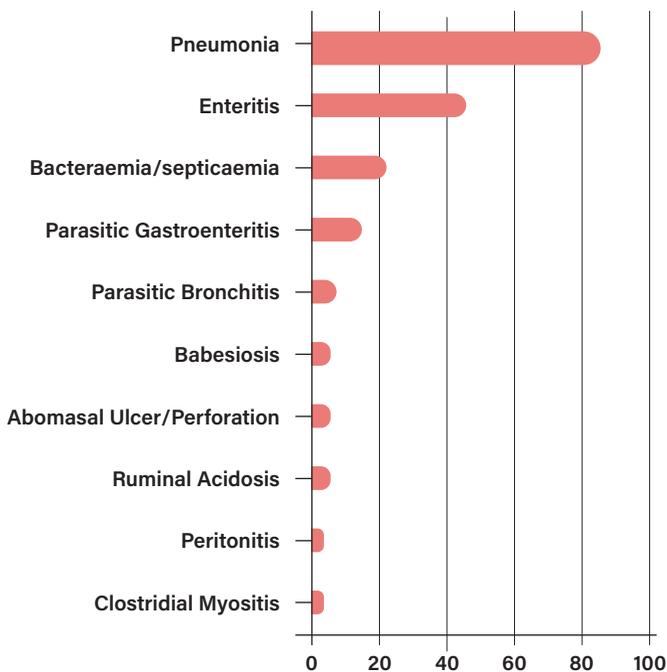


Table 1: The most common diagnoses in cattle submitted for necropsy in November 2023.

Gastrointestinal Tract

Abomasitis

A seven-month-old weanling with a history of ill-thrift and diarrhoea was submitted to Kilkenny RVL. The carcass was very dehydrated. There was marked abomasal fold oedema with a 'cobblestone' appearance to the mucosa, and there were multifocal raised red foci on the abomasum mucosa. The intestinal content was liquid. *Pseudomonas sp.* was cultured from multiple organs indicating a bacteraemia. On histopathology, there was evidence of a mycotic infection in the abomasum. Further findings also suggested previous parasitic involvement and a review of parasite control was recommended. *Pseudomonas* causes a wide range of opportunistic infections. It may occasionally cause acute systemic disease. In cattle, clinical conditions arising from infection with *Pseudomonas* include pneumonia and

enteritis. Fungal issues can occur as opportunistic disease in animals that are immunocompromised.



Figure 1: Raised multifocal plaques on the abomasal mucosa in a case of mycotic infection. Photo: Aideen Kennedy.

Paramphistomosis

As in October, Limerick RVL continued to diagnose acute intestinal infections due to larval paramphistomes (rumen fluke) most likely *Calicophoron daubneyi*; affected animals even included adult dairy cows. In a typical case, two cows were submitted with a history of diarrhoea. Extremely high numbers of rumen fluke larvae were found in the intestinal contents of both cows and adhered to the duodenal mucosa. Intestinal contents were fluid, high in volume and blood-tinged. A diagnosis of acute larval paramphistomosis was made.



Figure 2: Haemorrhagic and thickened duodenal mucosa in a case of acute paramphistomosis. Photo: Brian Toland.



Figure 3: Haemorrhagic tracts visible on the surface of a bovine liver in a case of fasciolosis. Photo: Aoife Coleman.

Athlone RVL examined a case of an eight-month-old weanling with a history of inappetence for a few days with concurrent lethargy and dullness. There had been additional deaths within this cohort group at grass in the preceding two to three weeks. Across the liver there were severe, multifocal, haemorrhagic migratory tracts, and fibrin deposition across Glisson's capsule. Myriad trematodes identified as *Fasciola hepatica* or liver fluke were evident on cross-section of liver parenchyma within bile ducts. Upon incision, several adult trematodes were disclosed within the gall bladder. Further, there was bilateral cranioventral pulmonary consolidation with pleuritis affecting approximately 30-40 per cent of the lung tissue, from which *Pasteurella multocida* was isolated on culture. A review of grazing management and parasite control was advised for this herd.



Figure 4: *Fasciola hepatica* visible on the cut surface of a bovine liver. Photo: Aoife Coleman.

Chronic parasitic gastroenteritis

Sligo RVL examined, over the course of two months, three weanlings from the same holding which had lost several animals. The animals all had presented with severe diarrhoea and rapid weight loss. The animals were treated for parasites before death. In the area which was grazed, there was a known history of cobalt deficiency in lambs leading to an increased number of ill thrift and parasitic gastroenteritis cases in these flocks. On post-mortem examination, thickened small intestinal walls with mucoid contents were observed. In one animal there was mild jaundice and typhlitis. Another presented additionally with ulcerative abomasitis. The strongyle egg count was low in the examined samples. Histopathology of the intestines revealed diffuse, severe, chronic eosinophilic enteritis with loss of crypt architecture, crypt abscessation and

large amounts of eosinophils and lymphocytes as well as occasional hemosiderophages. There was herniation of crypts into Peyer's patches. There was multifocal dilation of glands with attenuation of epithelium containing eosinophils and debris. These findings were considered as highly suggestive of a parasitic aetiology for the enteritis. The liver presented with diffuse and severe vacuolation of hepatocytes and multifocal random hepatic necrosis, indicative of cobalt deficiency as seen in white liver disease. Cobalt concentrations in a sample of liver tissue were far below the reference range in the first examined animal, but normal in the following animals which had been examined after cobalt supplementation was recommended.

Chronic enteritis due to parasitic infestation was diagnosed as cause of death. Cobalt deficiency was highly suspected to have caused hepatic lipidosis and rendered the animals more susceptible to parasitic gastroenteritis.

Summer scour syndrome

A seven-month-old weanling with scour and pneumonia was submitted to Kilkenny RVL. Three others in the herd were showing similar clinical signs. There were moderate numbers of lungworms visible in the lower airways and a review of dosing and lungworm control was recommended. On examination, there were also multifocal ulcers on the hard palate and the tongue and there was a severe oesophagitis. Routine investigations ruled out common bacterial and viral causes of the oral and oesophageal lesions and 'summer scour syndrome' was diagnosed, in addition to the lungworm infection.



Figure 5: Oesophagitis (top) and lungworm (arrow) detected in a seven-month-old weanling. Photo: Aideen Kennedy.

Respiratory Tract Pneumonia

A three-month-old calf was presented to Kilkenny RVL with a history of respiratory signs prior to death. On post-mortem examination, there was a severe, fibrinous pleuritis and pericarditis, and the plural surfaces were adhered to the thoracic wall. On histopathology, there was a diffuse, necrotising bronchopneumonia and fibrinous pleuritis consistent with pleuropneumonia caused by *Mannheimia haemolytica*. This bacterium was detected on culture and polymerase chain reaction (PCR). Bovine respiratory syncytial virus (BRSV) was also detected by PCR. *M. haemolytica* is a commensal of the nasopharynx; it is an opportunistic pathogen, gaining access to the lungs when

host defences are compromised by stress or infection with viruses. In this case, infection with BRSV may have predisposed the animal to secondary bacterial infection.



Figure 6: Fibrinous pleuritis in a case of pleuropneumonia due to *Mannheimia haemolytica*. Photo: Lisa Buckley.

A six-month-old weanling with respiratory signs was examined by Sligo RVL. Necropsy revealed severe, diffuse, pulmonary oedema, haemorrhagic tracheitis and bronchitis. Parainfluenza virus 3 (PI3), as well as RSV, were detected by PCR. Lungworm larvae were detected by the Modified Baermann technique. The cause of death in this animal was severe acute viral bronchopneumonia. There was also a patent lungworm infection detected, which is likely to have contributed to the pulmonary damage.



Figure 7: Viral pneumonia in a weanling. Photo: Shane McGettrick.

Bronchopneumonia and myocarditis

A yearling was submitted to Kilkenny RVL with a history of sudden death, with no observed clinical signs. On post-mortem examination, there was a severe, sub-acute bronchopneumonia with cranioventral consolidation affecting approximately 75 per cent of the right and left lungs. There was also an area of suspected myocarditis. *Histophilus somni* was isolated from the pulmonary and cardiac lesions. Infection of cattle with *H. somni* can result in a number of diseases: septicaemia, thrombotic

meningoencephalitis (TME), polysynovitis, pleuritis, suppurative bronchopneumonia, myocarditis, otitis media, mastitis and reproductive tract disease.

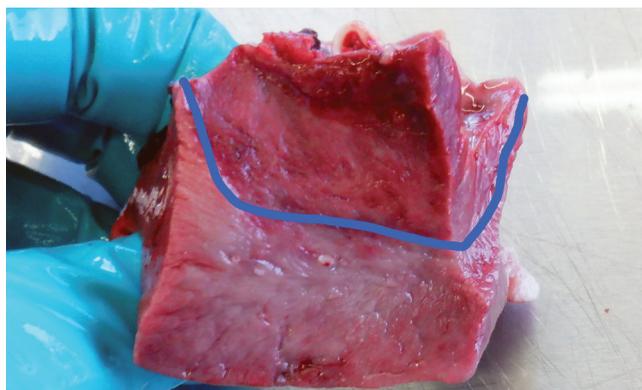


Figure 8: Myocarditis in a yearling submitted to Kilkenny RVL. Photo: Maresa Sheehan.

Urinary/Reproductive Tract

A large number of foetuses are submitted to the laboratories at this time of the year. We encourage the submission of placenta with all foetuses where this is possible as it enhances our diagnostics. The most common bacterial and fungal pathogens isolated from bovine foetuses are *Trueperella pyogenes*, *Bacillus licheniformis*, *Salmonella* Dublin, *Aspergillus* spp. and *Listeria monocytogenes*. The protozoan organism, *Neospora caninum*, is also identified with some frequency in bovine foetuses (All-Island Animal Disease Surveillance Report 2022). Viral causes, including Schmallenberg virus (SBV), are also investigated if changes/deformities are seen in the foetus that may suggest its involvement. SBV was detected from a foetus with deformities (arthrogryposis, scoliosis and hydranencephaly) in Kilkenny RVL in late 2023.

Neosporosis

Dublin RVL investigated an abortion storm affecting a considerable number of dairy cows in a herd. The submitted case was the sixth abortion. No vaccinations had been used. The estimated gestational age was six months. On gross post-mortem examination, there were no significant gross lesions. PCR testing detected *N. caninum* in the foetal brain. Histopathology of the foetal midbrain showed multifocal areas of necrosis, surrounded by a narrow zone of glial cells. This is indicative of protozoal infection. Submission of the dam's blood for *Neospora* serology testing was recommended. Antibodies to *N. caninum* fluctuate at various stages of the reproductive cycle, and blood and milk serology may give negative results at certain times in infected animals. *N. caninum* spread is linked to canine access to infected aborted material and subsequent faecal contamination of cattle feed. Dogs should be kept away from feeding areas and feed storage areas; and should not be allowed to defecate on pasture. Dogs should be kept away from calving areas and should not have contact with foetuses (or any carcasses), placentas or uterine discharges. Foetuses and placentas should be disposed of so that dogs or foxes may not gain access to them. However, the major route through which infection is maintained in a herd is

vertical, with infection passing from dam to calf in utero. The dam of the positive animals and its siblings and progeny should be tested for *Neospora*. It would be advisable not to cull an animal for *Neospora* until at least two tests are positive.

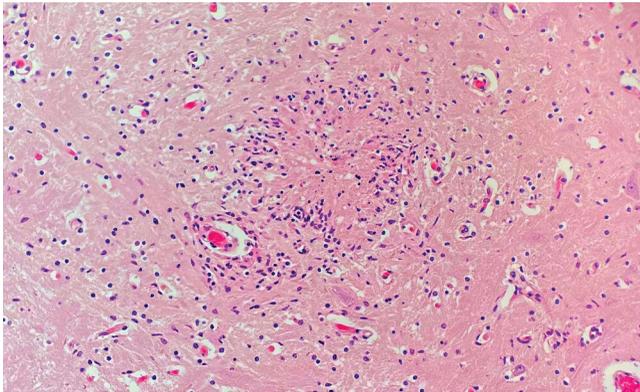


Figure 9: Focal necrosis is surrounded by a narrow zone of glial cells in the midbrain. Photo: Sara Salgado.

Atresia

A foetus with a grossly distended abdomen was submitted to Kilkenny RVL for post-mortem investigation. An atresia jejuni was diagnosed. Occasionally, an atresia can result in dystocia due to abdominal distension.



Figure 10: Atresia jejuni in a foetus. Photo: Maresa Sheehan.

Cardiovascular System

Vena caval thrombosis

A two-year-old heifer presented to Kilkenny RVL with a history of sudden death. On necropsy, the lungs were heavy, congested, and oedematous with suspected emboli within the pulmonary arteries. There was a large abscess in the liver eroding into the caudal vena cava. A diagnosis of vena caval thrombosis and embolic pneumonia was made. The pneumonia occurs due to septic embolism of the pulmonary arterial vascular system arising from septic thrombi in the caudal vena cava. The most common cause of vena caval thrombosis is ruminal acidosis leading to rumenitis and subsequent liver abscessation, which may result in a thrombus in the caudal vena cava if the vessel wall is infiltrated by the abscess. *T. pyogenes* was cultured from the liver. Other bacteria frequently involved include: *Fusobacterium necrophorum*, staphylococci, streptococci, and *Escherichia coli*.

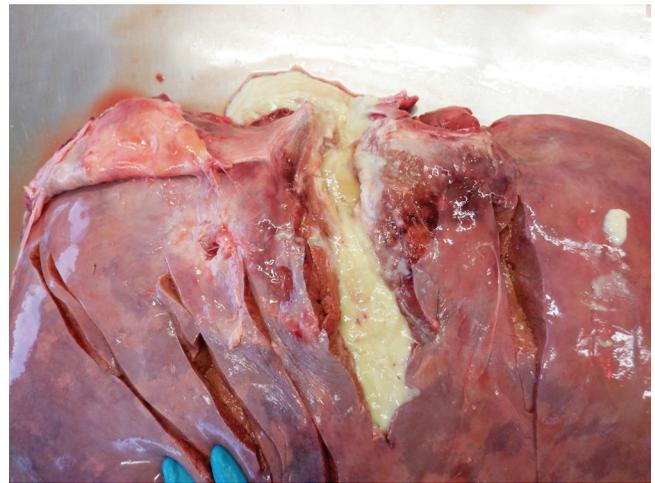


Figure 11: An abscess in the liver eroding into the caudal vena cava. Photo: Lisa Buckley.

A 17-month-old heifer with respiratory signs was submitted to Kilkenny RVL. On necropsy, the heifer was dehydrated. There was a very large thrombus in the vena cava extending towards the liver. The liver was enlarged and there was a marked 'nutmeg' pattern of congestion. There was multifocal embolic pneumonia. *Streptococcus sp.* and *E. coli* were cultured from multiple organs indicating a bacteraemia.

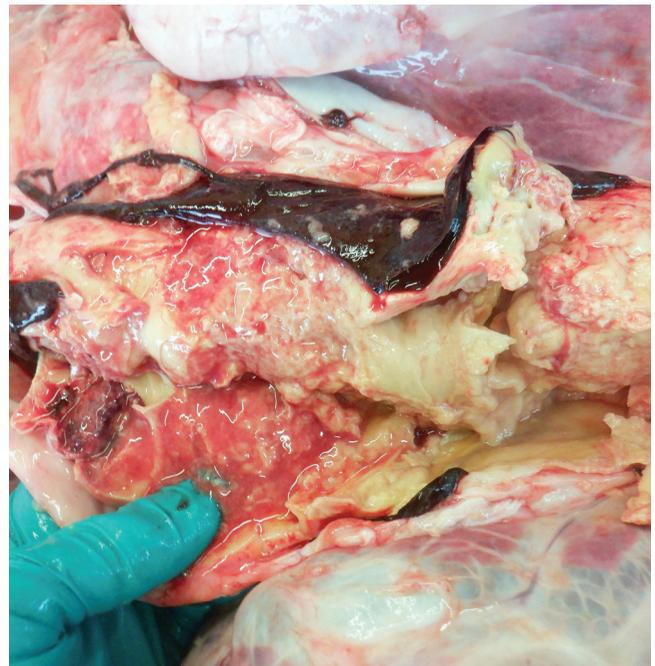


Figure 12: A thrombus in the vena cava. Photo: Aideen Kennedy.

Myocardial abscess

A 10-year-old pedigree Limousin cow with a history of sudden death was presented to Limerick RVL. Post-mortem examination revealed a fist-sized abscess in the wall of the heart's left ventricle. A diagnosis of cardiac failure due to myocardial abscessation was made. The source of bacterial spread within the bloodstream is usually a chronic infection from a distant site. The source of the infection was not determined; however, the cow had been previously treated for lameness.

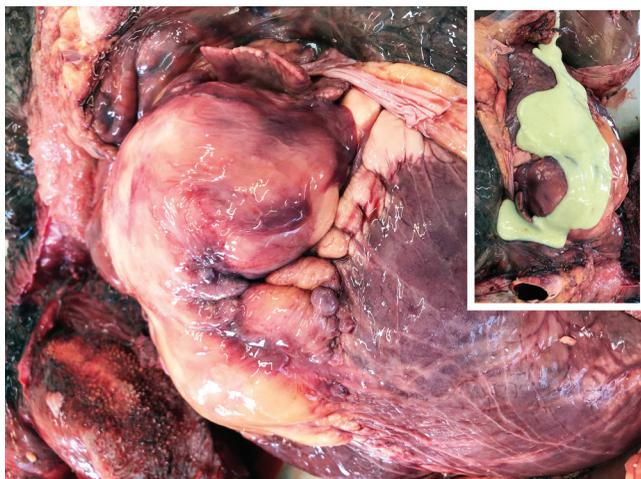


Figure 13: An abscess in the myocardium and (inset) purulent material released upon incision. Photo: Brian Toland.

Vegetative endocarditis

An eight-month-old weanling presented to Kilkenny RVL with a history of multiple treatments for pneumonia. On post-mortem, the lungs were overinflated, there were multifocal areas of abscessation and mottled congestion. The airways contained blood clots. There was a large, vegetative mass on the right atrioventricular valve in the heart, the cut surface of this mass revealed purulent material. *T. pyogenes* was cultured from the lungs. On histopathology, there were multiple septic thrombi visible within the pulmonary arteries. A diagnosis of vegetative endocarditis with secondary embolic pneumonia was made. Currently, it is thought that abscesses or chronic infection play an important role in the pathogenesis of the disease.

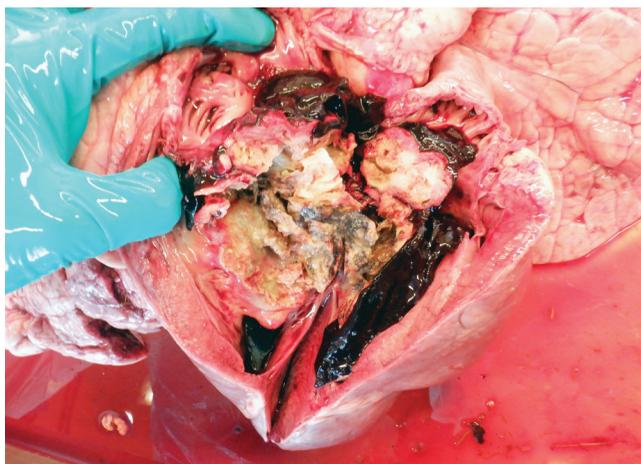


Figure 14: Vegetative endocarditis. Photo: Lisa Buckley.

Babesiosis

Sligo RVL diagnosed two cases of Babesiosis ('red water') in cows from different holdings. On post-mortem examination, both presented with icterus and haemoglobinuria. DNA specific to *Babesia divergens* was detected systemically by PCR technique. One cow also tested positive for *Anaplasma phagocytophylum*, the causative agent of tick-borne fever. Babesiosis as well as tick-borne fever are diseases spread by ticks. These cases highlight the ongoing activity of ticks quite late in the year due to the ongoing mild weather.

Nervous System

Intracranial haemorrhage

A yearling bull was found dead and submitted to Kilkenny RVL. The owner had queried the possibility of trauma due to recent mixing of animals. On necropsy, there was a large blood clot/haemorrhage adjacent to the cerebrum and ventral to the midbrain. No significant abnormalities were detected on lab tests and trauma was the most likely cause of death.



Figure 15: A haemorrhage adhered to the brainstem possibly due to trauma. Photo: Aideen Kennedy.

Thrombotic meningoencephalitis

Athlone RVL examined two cases from two separate farms where the animal, a weanling, had a history of presenting with acute neurological signs and dying soon afterwards. On gross necropsy in one case, the meningeal vessels of the brain were cloudy, and in the other, there were haemorrhages in the cerebral cortex, basal ganglia and midbrain. These lesions were suggestive of thrombotic meningoencephalitis (TME) caused by *H. somni*. In both cases, the lungs appeared congested but there was no obvious consolidation although there were a few collapsed lobules in the apical lobes in one animal. In this animal, there was also a necrotic lesion in the papillary muscle of the left ventricular free wall of the heart. On histopathology, there was haemorrhage, vasculitis and thrombosis in the brain and heart sections, and an acute suppurative bronchopneumonia in the lungs. There was a strong positive *H. somni* PCR result from lung, brain and heart lesions.

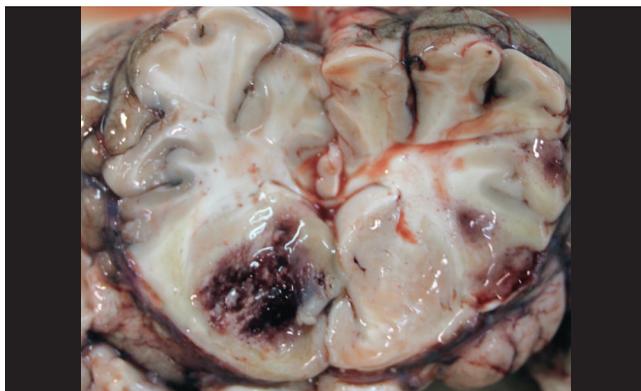


Figure 16: Haemorrhage in the cerebral cortex suggestive of thrombotic meningoencephalitis. Photo: Denise Murphy.

Musculoskeletal Blackleg

A seven-month-old Aberdeen Angus cross weanling which was presented to Limerick RVL was one of four animals found dead after being moved to fresh grass two days previously. There was no history of diarrhoea or pneumonia and the animals had received one injection of vaccine against blackleg at the start of the summer. Post-mortem examination revealed a fibrinous pericarditis of the heart suggestive of blackleg; however, there was no visible evidence of blackleg in the rest of the carcass. *Clostridium chauvoei* was confirmed using fluorescent antibody technique (FAT) on a section of the heart. A diagnosis of blackleg was made.

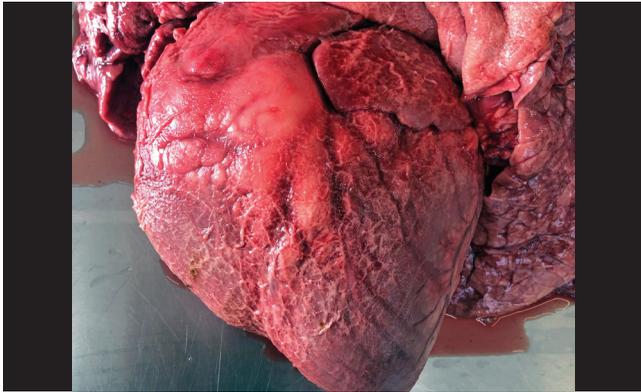


Figure 17: Fibrinous pericarditis from which *Clostridium chauvoei* was detected. Photo: Brian Toland.

Miscellaneous Cellulitis



Figure 18: Cellulitis in a weanling. Photo: Rebecca Froehlich-Kelly.

Sligo RVL examined the carcass of a nine-month-old weanling which had presented with a swollen hind foot and signs of pneumonia prior to death. On post-mortem examination, there was extensive gangrenous and emphysematous cellulitis, as well as multifocal abscessation on the full length of the right hind leg. The lung presented with severe bullous emphysema and random abscessation. There was abscessation in the base of the papillary muscle in the myocardium. Histopathology of the lung revealed diffuse, severe pulmonary abscessation and diffuse chronic-active, suppurative interstitial pneumonia with thrombosis. *T. pyogenes* was cultured from the lesions. Cellulitis with bacteraemia was diagnosed as the cause of death.



Figure 19: Myocardial abscessation in a weanling. Photo: Rebecca Froehlich-Kelly.

Intussusception

Sligo RVL examined a two-month-old calf with signs of colic and no defecation in the days prior to death. On post-mortem examination, an intussusception of the distal jejunum and ileum was revealed, involving approximately 100cm of the intestines. There was severe fibrous peritonitis, necrosis, and haemorrhage focally. The ileus caused by the intussusception is considered the cause of death in this case. Intussusception can occur spontaneously or as a result of intestinal hypermotility. This animal had a significant parasitic burden which could have led to intestinal hypermotility.

Black disease

Sligo RVL diagnosed black disease in an 18-month-old heifer. The animal had been noticed dull and with reduced appetite before death. On post-mortem, the serosal surfaces were diffusely reddened. The liver presented with a raised area on the diaphragmatic surface with a pale (white) centre. The diaphragm had haemorrhagic and necrotising myositis in the area adjacent to the observed liver lesion. There was localised peritonitis and haemorrhagic pleural effusion. There was segmental haemorrhagic jejunitis. *Clostridium novyi* was detected by FAT in the liver lesion. Histopathology of the liver revealed multifocal extensive, acute, severe coagulative-necrotising hepatitis with complete loss of architecture and areas of haemorrhage. In the diaphragm there was focal, mild, necro-purulent myositis. Infectious necrotising hepatitis was diagnosed as cause of death.

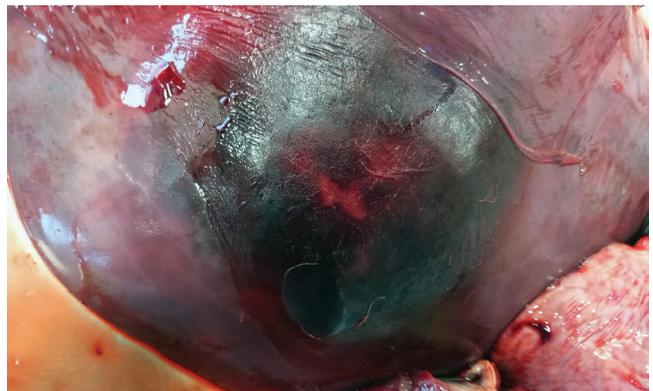


Figure 20: Raised necrotic area in a case of Black disease in a heifer. Photo: Rebecca Froehlich-Kelly.

Sheep

Parasitic gastroenteritis and acute fasciolosis were the most common diagnoses at necropsy in sheep in the RVLs during November 2023.

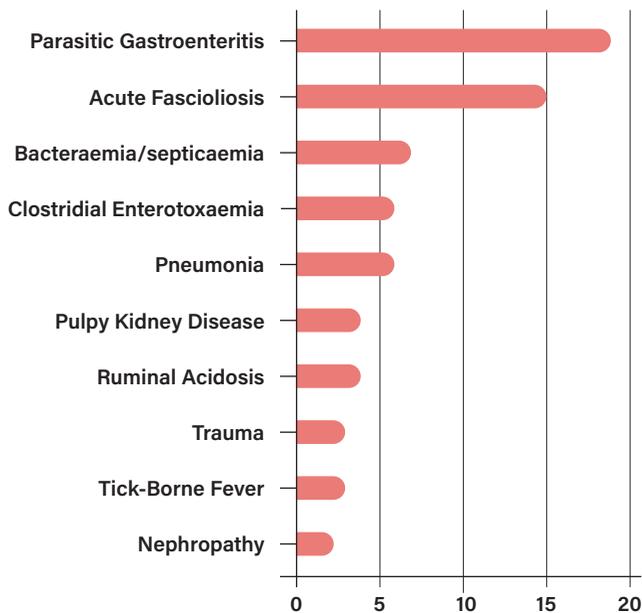


Table 2: The most common diagnoses in sheep submitted for necropsy in November 2023.

Gastrointestinal Tract

Fasciolosis

Athlone RVL saw several cases of acute fasciolosis in both lambs and ewes during November. In many cases, the livers were severely damaged, and, in some cases, there was rupture of the hepatic capsule and haemoabdomen with a markedly pale carcass.

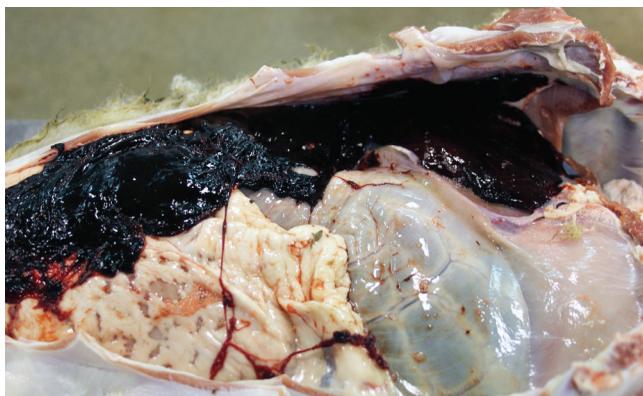


Figure 21: Haemoabdomen due to rupture of the hepatic capsule in a case of fasciolosis. Photo: Denise Murphy.

Like in October 2023, Sligo RVL continued to report a high number of acute fasciolosis cases in sheep of all ages in November 2023. In some cases, there was chronic-active fasciolosis in which the liver displayed haemorrhagic tracts, haemorrhages, and peritonitis, which are hallmarks of acute fasciolosis, as well as adult flukes in the gall bladder, which indicate a chronic or ongoing infection. In some cases, additional, also concurrent, strongyle infestation or secondary bacterial infection were present.



Figure 22: Haemorrhagic tracts visible in the liver due to acute fasciolosis. Photo: Denise Murphy.

Parasitic gastroenteritis

Similarly, there was a significant number of cases of parasitic gastroenteritis as cause of death. Common history was either sudden death or weight loss and diarrhoea at times observed. On post-mortem examination, depletion of fat depots along with enteritis were common findings. Trichostrongylidae, *Strongyloides* spp., *Nematodirus* sp., *Trichuris* sp., *Coccidia* sp., *F. hepatica* and *C. daubneyi* were the commonly detected parasites.

Parasitic gastroenteritis was often also a concurrent diagnosis with other conditions. Weak or moribund animals often present a significant rise in faecal worm egg counts. In these cases, further faecal samples are recommended to investigate the flock parasite burden before treatment.

Enterotoxaemia

A seven-month-old lamb with a history of being dull the evening before death was submitted to Sligo RVL. On post-mortem examination, there was a large pericardial fibrin clot. There were multifocal haemorrhages on the lung, adrenal and kidney walls. *Clostridium perfringens* and its alpha and epsilon toxins were detected in intestinal contents. There was a significant parasite burden. Clostridial enterotoxaemia (pulpy kidney) was diagnosed as cause of death.

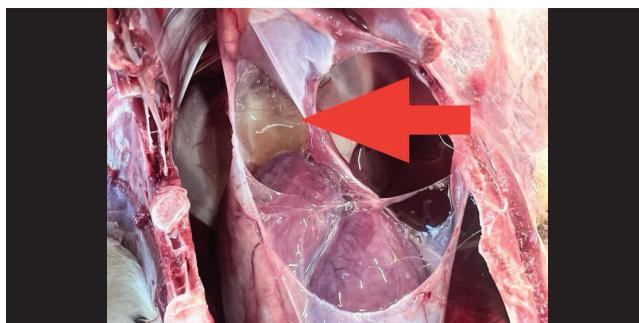


Figure 23: Pericardial fibrin clot in a case of enterotoxaemia in a lamb. Photo: Shane McGettrick.

Respiratory Tract

Traumatic pharyngeal laceration ('dosing gun injury')

Sligo RVL diagnosed four cases of dosing gun injuries in lambs. In one case, there were extensive necrotic pharyngitis and cellulitis, often accompanied by antero-ventral

pneumonia. In another submission, boluses were still present in the oesophagus.

Cardiovascular System

Vegetative endocarditis

Athlone RVL examined a seven-month-old lamb with a history of ill thrift. Its body condition was poor, weighing just 18.5kg. There was a large vegetative endocarditis lesion on the right atrioventricular (AV) valve and multifocal small abscesses throughout the right lung lobe. There were a few small haemorrhagic tracts evident in the liver, suggestive of migrating liver fluke larvae. On histopathology of the liver, there was moderate periportal fibrosis, lymphocytosis, biliary proliferation, hemosiderin-laden macrophages and multifocal, irregularly-shaped areas of hepatocyte degeneration and haemorrhage. These lesions are consistent with liver fluke injury and warranted further investigation and treatment of comrades. A diagnosis of vegetative endocarditis and pulmonary abscessation was made.

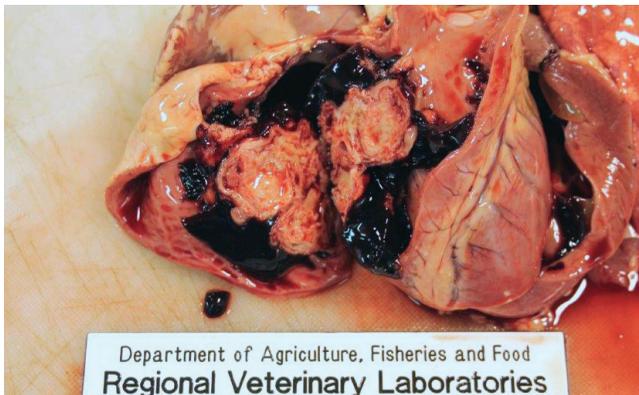


Figure 24: Vegetative endocarditis in a ewe. Photo: Denise Murphy.

Miscellaneous

Trauma

A one-year-old ram with a history of recumbency and kicking was submitted to Sligo RVL. On post-mortem examination, there was a significant sinus haemorrhage contrecoup to a subdural haematoma. This finding was considered highly suggestive of a traumatic injury, e.g., fighting. There was concurrent acute fascioliosis that may have weakened the animal.

Goat

A milking goat was presented to Limerick RVL from a tuberculosis (TB) restricted herd with a history of mastitis, ill-thrift, and multiple deaths. Post-mortem examination revealed caseous abscessation of retropharyngeal, bronchial, mediastinal, mesenteric, and hepatic lymph nodes, the lungs contained multifocal non-uniform and multifocal to coalescing abscesses, there was also nodular and caseous abscessation of the pericardium, pleura, and spleen. No gross lesions were seen in the mammary gland. *Mycobacterium bovis* was detected by culture. A diagnosis of generalised TB was made. It may be noted that the calcified lesions associated with TB in cattle may not be characteristic of the disease in other species.



Figure 25: Abscessation in a cervine lung due to *Mycobacterium bovis*. Photo: Brian Toland.

Poultry

Marek's disease and *Enterococcus* infection

A group of five 58-day-old ranger broilers was submitted for necropsy to Dublin RVL. History reported a high percentage of animals in poor condition, suffering from lameness, and experiencing increased mortality in a house of 22,500 birds. On gross examination, they showed uni- or bi-lateral mild tarsal swelling, multifocal mild ecchymosis on the subcutis of the legs, uni- or bi-lateral necrosis of the head of the femur, and tibial fracture after moderate pressure. Birds had also moderate diffuse sero-fibrinous and fibrinous pericarditis. On histopathology, they showed multifocal, moderate-to-severe lymphocytic infiltrates in multiple organs, consistent with Marek's disease. They had also tenosynovitis, epiphysitis, pericarditis, and multifocal heterophilic infiltrates in many other organs consistent with systemic bacterial infection. *Enterococcus faecium* was cultured in some birds from heart and liver, and *Enterococcus cecorum* from bone marrow. Based on these findings, a diagnosis of Marek's disease, and *E. faecium* and *E. cecorum* infections was made. In this case, it was supposed that Marek's disease predisposed the enterococcal infections.

Diseases associated with enterococci in poultry, although worldwide in distribution, are relatively uncommon. However, it has recently been shown that early mortalities in flocks, which are likely to be attributed to "poor chick quality", are in some cases due to enterococcal infection. Enterococci can be recovered from the intestinal content, litter and hatchery, but they can be associated with septicaemia. In particular, *E. faecium* has been recovered from cases of endocarditis in chickens, while *E. cecorum* has been recovered from cases of bacterial chondronecrosis with osteomyelitis in broilers.



Figure 26: Chondronecrosis and osteomyelitis by *E. cecorum* infection in a Ross broiler on the right. Healthy bone and joint on the left. Photo: Sebastian Alessandro Mignacca.