REGIONAL VETERINARY LABORATORIES REPORT

June 2024

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 348 carcases and 23 foetuses during June 2024. Additionally, 1,018 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 cases investigated by the Department of Agriculture, Food and the Marine's (DAFM) veterinary laboratories in June 2024.
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 June 2024.

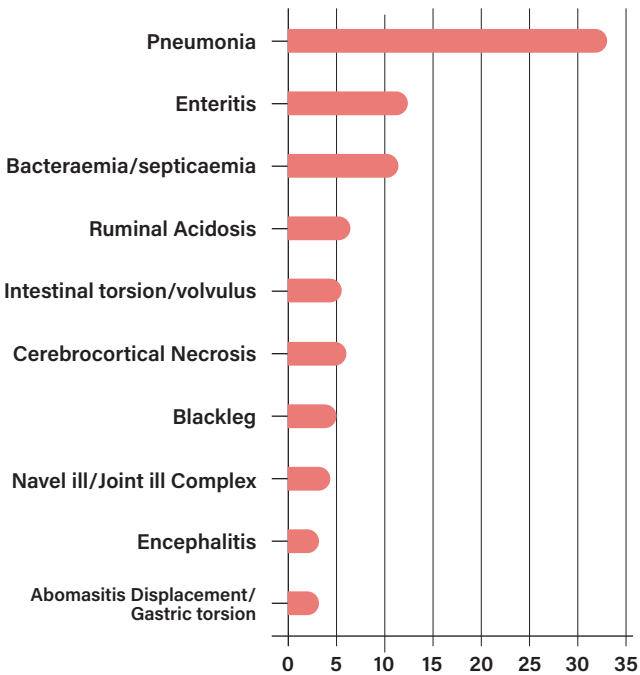

Table 1: **The most common diagnoses in cattle submitted for necropsy in June 2024.**

Gastrointestinal Tract

Rumen drinking and enteritis

A calf was submitted to Kilkenny RVL with a history of diarrhoea. The calf had been fed milk by stomach tube. Previous clinical pathology submissions from the herd had indicated failure of passive transfer of colostral immunity, and *Cryptosporidium parvum*-positive faecal samples. There had been five cases of calves with diarrhoea. On necropsy, the calf was severely dehydrated. There was a mild oesophagitis (possibly relating to stomach-tubing). There was milk in the rumen, and severe inflammation of the ruminal and reticular walls. There were moderate depth abomasum ulcers, and the intestinal contents were very liquid. The calf's faecal sample tested positive for *C. parvum*, and, on histopathology, there was a mycotic rumenitis and abomasitis. While feeding oral rehydration fluids by stomach tube is recommended in dehydrated calves, feeding milk by stomach tube is not recommended as it can lead to 'ruminal drinking'. The resulting inflammation of the rumen and reticulum mucosa – which can cause continued failure of groove closure making the situation worse – impairs ruminal motility and this will also contribute to high volatile fatty acid (VFA) concentrations and low pH in the rumen.

Figure 1: **Inflamed ruminal mucosa in a calf that had been rumen drinking. Photo: Aideen Kennedy.**

Perforated abomasal ulcer

A one-month-old calf with history of omphalophlebitis ('navel ill') and pneumonia failed to respond to treatment and was submitted to Kilkenny RVL. On gross post-mortem examination, there was peritonitis. There was a perforated abomasal ulcer with leakage of the abomasal contents into the abdomen. There was umbilical abscessation and a review of umbilical hygiene was recommended. On histopathology, there was a fibrinosuppurative abomasitis. Risk factors for abomasal ulcers include concurrent disease and stress.

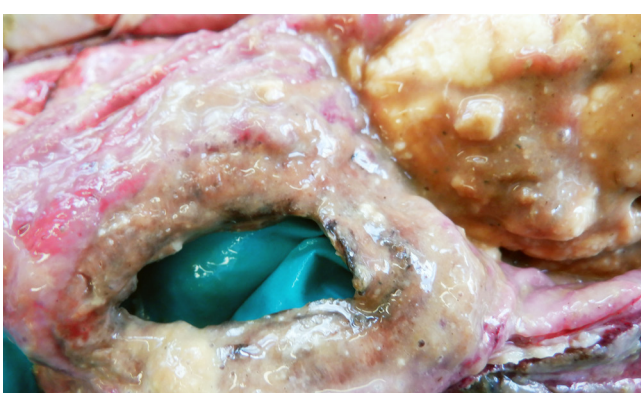

Figure 2: **Perforated abomasal ulcer. Photo: Aideen Kennedy.**

Athlone RVL examined a three-month-old calf with a history of diarrhoea that had initially responded to treatment, but then became recumbent and died. On gross post-mortem examination, ingesta were free in the abdominal cavity and there were focal areas of fibrin deposition on the serosa of the forestomachs. There was a 2cm perforated abomasal ulcer and multiple other non-perforated ulcers on the abomasal mucosa. Other organs were unremarkable. A diagnosis of perforated abomasal ulcer and peritonitis was made.

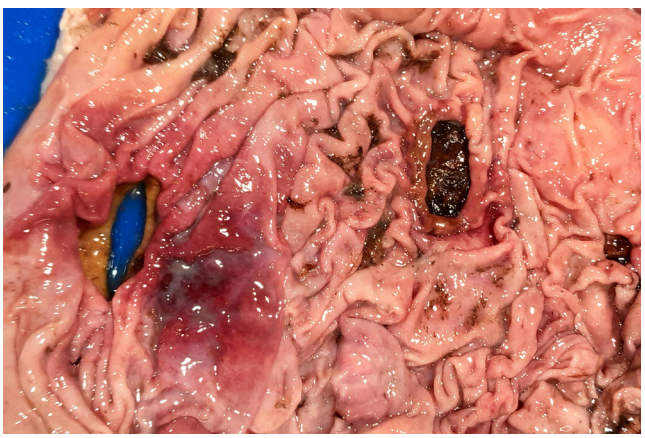

Figure 3: **Perforated abomasal ulcer (left) and a non-perforated abomasal ulcer (right). Photo: Denise Murphy.**

In general, losses due to perforated abomasal ulcers are isolated incidents and the majority of affected calves are found dead. The aetiology is not understood, making it difficult to provide advice on the prevention of future cases. It has been suggested that large intakes of milk, resulting in tympany, which potentially reduces mucosal perfusion leading to mucosal damage, may predispose to abomasal ulceration and perforation. Other potential risk factors that have been suggested in the literature include: concurrent disease or stress; mechanical trauma, e.g., grit/sand or hair balls; viral infection, e.g., bovine viral diarrhoea (BVD); trace element deficiencies, including copper and vitamin E/selenium; bacterial or fungal infection; and hyperacidity.

Displaced abomasum and perforated abomasal ulcer

Sligo RVL examined the carcase of a five-year-old cow which had been losing weight over the previous ten days and presented with diarrhoea and hindlimb lameness. On post-mortem examination, there was severe peritonitis and large amounts of gastric contents free in the abdomen. There was right displacement of abomasum as well as multifocal deep abomasal ulceration, including an ulcer that had become perforated.

Respiratory Tract

Figure 4: **Cranioventrally distributed pneumonia. Photo: Brian Toland.**

Pneumonia

An eight-week-old Aberdeen Angus-cross dairy male calf was submitted to Limerick RVL from a farm with a history of chronic pneumonia in calves over the previous month, and several related deaths. Post-mortem examination revealed severe bronchopneumonia with consolidation of 50 to 60 per cent of the lungs, visible and palpable caseous nodular lesions of varying sizes on the surface and in the body of the lungs, and adhesions to the parietal pleura and pericardium. The lymph nodes were markedly enlarged. A mixed bacterial growth was cultured from the lungs and multiple bacteria including *Histophilus somni*, *Mannheimia haemolytica* and *Pasteurella multocida* were detected by polymerase chain reaction (PCR) testing.

Figure 5: **Fibrinous pleuropneumonia in a calf. Photo: Aideen Kennedy.**

A three-month-old calf was found dead and submitted to Kilkenny RVL. On examination, there was severe fibrinous pericarditis, fibrinous pleuritis, and pneumonia. *M. haemolytica* was identified on culture and PCR, and *H. somni*-positive PCR results were also obtained.

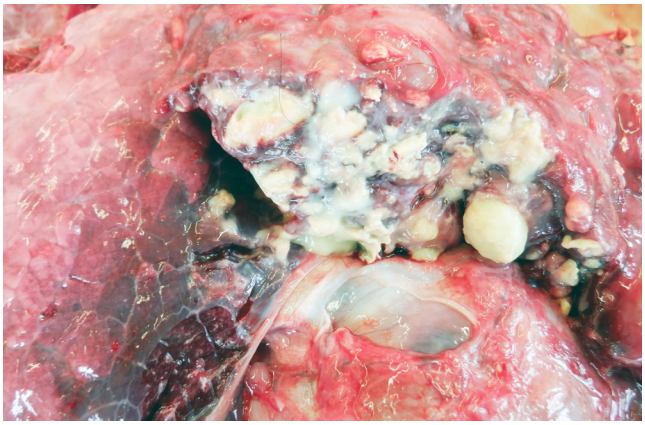

Figure 6: **A cross section of pulmonary tissue from a calf where *Mycoplasma bovis* was detected. Photo: Lisa Buckley.**

A four-month-old calf presented to Kilkenny RVL with a history of poor thrive. On post-mortem examination, there was bilateral cranioventral consolidation in the lungs affecting approximately 50 per cent of the lung parenchyma. The cut surface of the lungs revealed multifocal abscessation. Multiple respiratory bacteria were detected by PCR. Histopathological examination revealed multifocal areas of caseous necrosis, extensive fibrosis and multifocal suppurative bronchopneumonia. The histopathological changes seen were classified as a severe chronic/active bronchopneumonia. Evidence of caseous necrosis is particularly associated with *Mycoplasma bovis* pneumonia. The immune status of the animal is important in the development of *Mycoplasma* pneumonia; failure of passive transfer (FPT) is a risk for the increased severity of respiratory disease in young calves. The submission of blood samples from calves, aged two to 14 days of age, to assess the quality of passive transfer of maternal immunoglobulins is advisable in herds where *Mycoplasma bovis* pneumonia is an issue.

Figure 7: **Fibrinous pleurisy and pneumonia in a six-week-old suckler calf, where pericarditis was also diagnosed. Photo: Denise Murphy.**

Athlone RVL examined a six-week-old suckler calf with a history of having been found dead. On gross post-mortem examination, there was a diffuse fibrinous pleurisy, pneumonia and pericarditis. The liver was enlarged with rounded edges and there was mild splenic enlargement. *M. haemolytica* was isolated from the lungs on culture and was confirmed by PCR. Testing for respiratory viruses and tick-borne fever (*Anaplasma phagocytophilum*) proved negative. Histopathology of the lung showed a severe diffuse fibrinosuppurative pleurisy and pneumonia with streaming macrophages ('oat' cells). A conclusive diagnosis of an acute, fibrinous pleuropneumonia and pericarditis caused by *M. haemolytica* was made. The stress of inclement weather (cold nights and heavy rain) may have predisposed the animal to succumbing to the infection.

Figure 8: **Catarrhal exudate in airways in a case of bacterial pneumonia in a calf. Photo: Shane McGettrick.**

The carcase of a two-month-old calf which had been found dead was submitted to Sligo RVL. On post-mortem examination, there was well-demarcated, cranioventrally-distributed bronchopneumonia affecting approximately 40 per cent of the lung parenchyma with large amounts of catarrhal exudate in the airways. The small intestinal mucosa was diffusely sloughing off. There was splenomegaly. Multiple bacterial agents were detected by culture and PCR (*P. multocida*, *H. somni*, *M. haemolytica*). Moreover, *A. phagocytophilum*, the causative agent of tick-borne fever, was detected by PCR. The cause of death in this calf was a typical acute bacterial pneumonia pattern with an underlying acute enteritis. The cause of the enteritis remained unclear; the detection of tick-borne fever suggests that immunosuppression was likely to have worsened the severity.

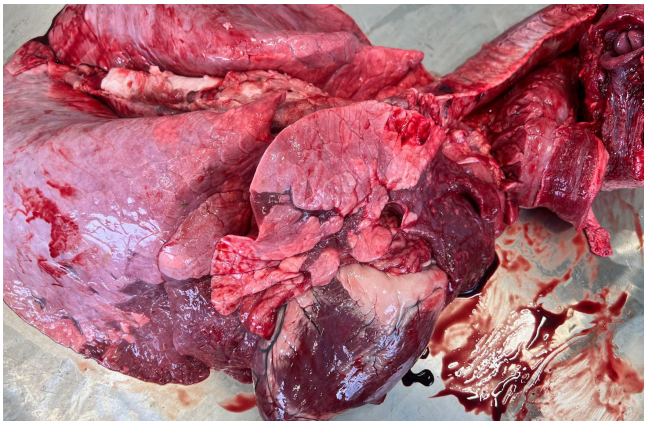

Figure 9: **Cranioventrally-distributed bronchopneumonia in a calf. Photo: Shane McGettrick.**

Parasitic bronchitis

RVLs have seen a number of cases of parasitic bronchitis in first-season grazing animals. These animals presented with a history of severe dyspnoea.

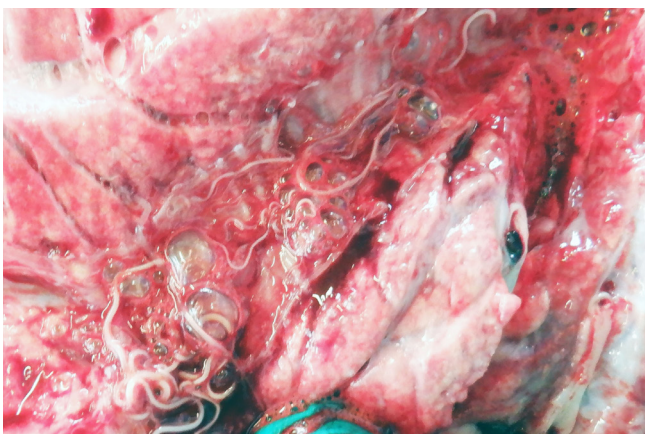

Figure 10: **Lungworm (*Dictyocaulus viviparus*). Photo: Maresa Sheehan.**

Sligo RVL diagnosed parasitic bronchitis and pneumonia due to *Dictyocaulus viviparus* in a six-month-old calf. The calf had been observed panting and breathing heavily before death. On post-mortem examination, there were bilateral adhesions and abrasions as well as 'ground glass' emphysema on the dorsal lobes of the lungs. Adult lung worms were present in the airways. The cause of death in this calf was chronic pneumonia exacerbated by a severe lungworm burden. There was severe chronic pneumonia consistent with early calfhood disease.

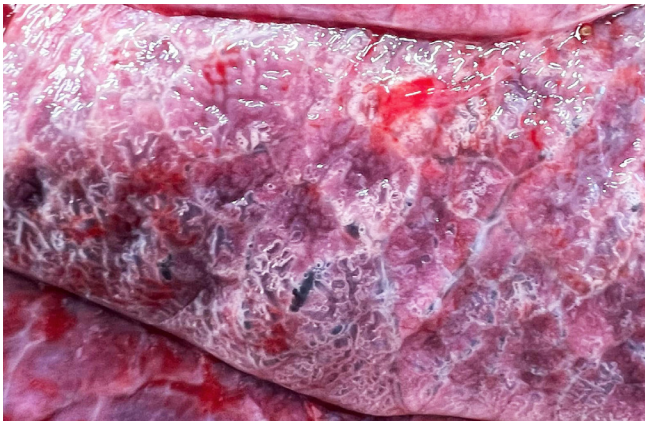

Figure 11: **Diffuse subpleural or 'ground glass' emphysema in a calf with parasitic bronchitis. Photo: Shane McGettrick.**

Cardiovascular System

Traumatic reticuloperitonitis

A 14-month-old Limousin-cross heifer was submitted to Limerick with a six-week history of coughing and wheezing, progressing on to respiratory distress, brisket oedema, and lethargy. The animal was treated a few times but failed to improve. On necropsy, there were lesions of traumatic reticuloperitonitis, and pericarditis associated with a 10cm wire lodged in the wall of the reticulum (Figure 12).

Figure 12: **A 10cm long metal wire (inset) in the wall of the reticulum. Photo: Alan Johnson.**

The pericardial sac was filled with approximately three litres of purulent fluid. Other gross findings included nutmeg liver and brisket oedema.

Figure 13: **Purulent pericarditis due to traumatic reticuloperitonitis. Photo: Alan Johnson.**

Traumatic reticuloperitonitis and thoracic haemorrhage

Athlone RVL examined an 18-month-old bullock with a history of sudden death. It was the second similar loss in seven days spent on the same pasture. On gross post-mortem examination, there was a diffuse, mild, fibrinous peritonitis in the cranial abdomen, with haemorrhages and fibrin on the serosa of the reticulum and on the ventral surface of the diaphragm. A 7-8cm length of wire was found traversing the diaphragm. There was a large free blood clot in the thoracic cavity and the pericardial sac surface was haemorrhagic. There were pleural haemorrhages on the right anteroventral and middle lung lobes. There was a 7cm well-encapsulated abscess in the liver. A diagnosis of foreign body reticulitis with peritonitis and thoracic haemorrhage (cardiac/pleural/pericardial) was made.

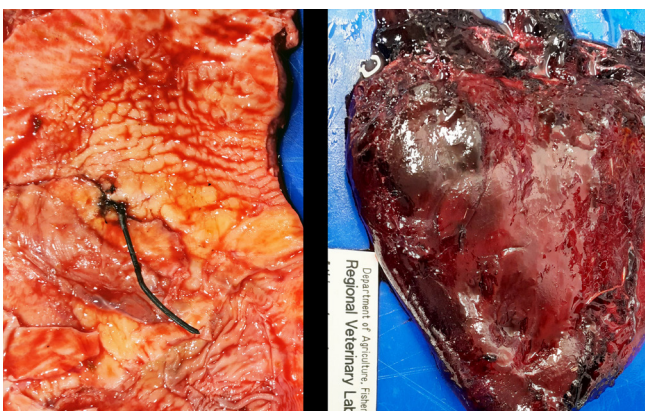

Figure 14: **A wire foreign body in the mucosa of a bullock's reticulum (left) and a blood clot found in the thoracic cavity (right). Photo: Denise Murphy.**

Pericarditis and arthritis

Sligo RVL examined the carcase of a three-month-old calf which had been found dying. On post-mortem examination, there was severe purulent pericarditis. Furthermore, there was severe purulent arthritis in multiple joints affecting all limbs. *Escherichia coli* was cultured from purulent material. This calf had severe acute pericarditis that resulted in cardiac failure. These lesions are typical of a bacterial aetiology.

Musculoskeletal

Myositis and polyarthritis

The carcase of a ten-week-old calf was submitted to Sligo RVL for examination. The calf appeared fine for the first six weeks of its life but then developed severe hindlimb weakness. Standing was only possible with assistance and all treatment efforts failed. The animal was euthanised.
On post-mortem examination, there was focally-extensive necrosis on the inguinal aspect of the left medial deep gluteal muscles. The lesion was well-circumscribed, approximately 4cm in diameter, and necrotic with a hyperaemic rim. There was polyarthritis affecting both carpal and tarsal joints with abscessation. This calf had chronic long-standing myositis in the hindlimb and chronic polyarthritis. The pattern of lesions, especially the gluteal lesion, is considered unusual. Joint involvement is likely secondary to embolic spread of bacteria and explains clinical signs observed. The cause of the gluteal injury is unknown but may be due to a penetrating trauma/injection site.

Arthritis

A forelimb of a cow was submitted to Kilkenny RVL. There was a suspicion of *Mycoplasma* infection within the herd. On examination of the joints, there was severe necrosis, with purulent necrotic tracts running subcutaneously. The joints contained a large volume of fibrin/pus. *Trueperella pyogenes* was cultured from joint swabs and *Mycoplasma bovis* was detected on PCR.

Figure 15: **Arthritic lesion from which *Trueperella pyogenes* and *Mycoplasma bovis* were detected. Photo: Aideen Kennedy.**

Dosing Gun Injury

Limerick RVL examined a four-month-old Friesian heifer calf that was dosed for lungworm two weeks previously and subsequently developed a large cranial swelling with a nasal discharge and cough. Necropsy revealed the swelling in the sub-mandibular area; incision revealed a large haematoma and a small abscess at the entrance to the upper airways and oesophagus. The surrounding tissue was necrotic with rupture of the proximal end of the oesophagus. The lungs had a multifocal, dark-red lobular pattern, and the rumen contained a few small ingested blood clots. A careful inspection of the farm's dosing gun and a review of the technique for dosing calves was advised.
Another four-month-old calf was presented with a history of rapid deterioration following bolus administration. The bolus was located within the retropharyngeal space with extensive inflammation and infection of the surrounding tissues. A review of bolus administration technique was advised.

Blackleg

Limerick RVL examined a yearling Charolais-cross bullock that was found isolated and recumbent at pasture with suspected blackleg and did not respond to treatment. Post-mortem examination revealed dark-red haemorrhagic lesions on the right-hand side of the neck and chest with a fibrinous pericarditis (noted as a roughened appearance to the serosal surface). Impression smears from these muscle lesions confirmed *Clostridium chauvoei* using fluorescent antibody technique (FAT). Blackleg involves the ingestion of spores that are transported to muscle tissues where they lie dormant until anaerobic conditions promote germination. The activation of spores can result from muscle trauma and stress with the production of toxins that are responsible for the clinical signs and lesions. Adult fluke were also observed in the liver and adult rumen fluke in the rumen; it is thought

high rainfall may assist in the dissemination of spores and water-saturated soils favour germination of *C. chauvoei* spores. A review of fluke management and clostridial vaccination together with the use of a multivalent clostridial vaccine were recommended.

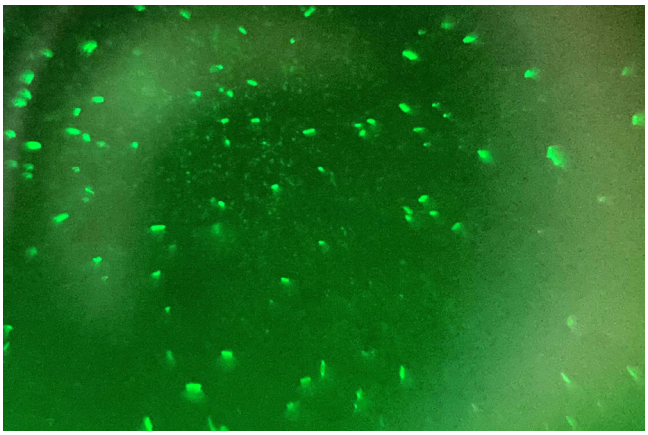

Figure 16: ***Clostridium chauvoei*** **fluorescing in a well-visualised example of positive staining with a fluorescent antibody technique. Photo: Brian Toland.**

Poisonings

Ragwort Poisoning

One 15-month-old heifer was submitted to Dublin RVL. This heifer had been treated but died approximately two weeks later. The entire cohort group was lost – eight yearlings dead in total. The herd owner reported that this group of animals were fed a lower quality silage during four-to-five months of the winter period, as he ran out of silage and had to purchase some.

On post-mortem examination, the carcase was in very poor condition, was mildly pale and there was a rectal prolapse. The abdominal cavity contained a large excess of serosanguineous fluid, approximately two litres in volume. The peritoneum, the serosa of the rumen, and the intestinal tract were moderately expanded with gelatinous oedema. The serosa and mucosa of the abomasum were severely expanded with gelatinous oedema. There was a fibrinous perihepatitis with multifocal fibrinous adhesions between the liver capsule and the diaphragm. The consistence was severely increased and, on cross section, it had a fibrous texture and diffuse mottled, pale parenchyma. The mesenteric and gastric lymph nodes were severely enlarged and oedematous. Histopathological examination of the liver showed extensive centrilobular, portal, and bridging fibrosis, with compression and obliteration of the central veins, extensive ductular reaction and hepatocyte necrosis. Many remaining hepatocytes were swollen with large nuclei (megalocytosis). In the brain, there was vacuolation of the neuropil in the midbrain: encephalopathy. The histological changes in the liver and brain, and the gross findings, were consistent with pyrrolizidine alkaloid toxicity due to ingestion of a plant such as ragwort (*Jacobea vulgaris*).

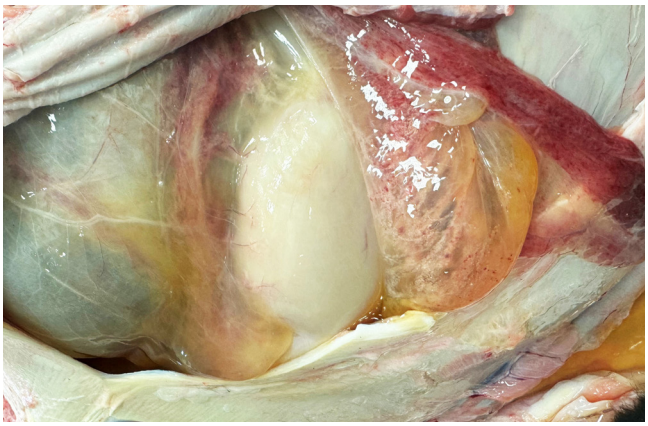

Figure 17: **The peritoneum, the serosa of the forestomachs, and the intestinal tract expanded with gelatinous oedema. Photo: Sara Salgado.**

Pyrrolizidine alkaloids are not directly toxic to the liver but require bioactivation in the hepatocytes. Clinically, this condition is characterised by hepatic failure. Secondary neurological signs can develop due to build-up of ammonia, which the liver is not able to metabolise, and which then remains in the bloodstream, passing through the blood-brain barrier causing encephalopathy. Grazing animals tend to avoid eating ragwort as it is bitter-tasting. However, when the plant is cut, such as for silage, it loses the bitter taste, and while the plant is dead and now palatable, all parts are still poisonous.

Figure 18: **Fibrinous perihepatitis with multifocal fibrinous adhesions between the liver capsule and the diaphragm. Photo: Sara Salgado.**

Miscellaneous

Lymphosarcoma

A nine-week-old calf presented with a history of ill thrift and peripheral lymph node enlargement. On post-mortem examination, there was a generalised lymphadenopathy involving the central and peripheral lymph nodes. A diagnosis of bovine juvenile lymphosarcoma was made based on histopathological examination of the lymph nodes. Lymphosarcoma in cattle may occur spontaneously or as a result of infection with bovine leukaemia virus, which was ruled out in this case by PCR testing. Juvenile lymphosarcoma is often characterised by sudden onset of lymphoid hyperplasia with or without visceral involvement. There are no viable treatment options.

Figure 19: **Juvenile lymphosarcoma in a young calf. Photo: Lisa Buckley.**

Sheep

Parasitic gastroenteritis and enteritis were the most common diagnoses at necropsy in sheep in the RVLs during June 2024.

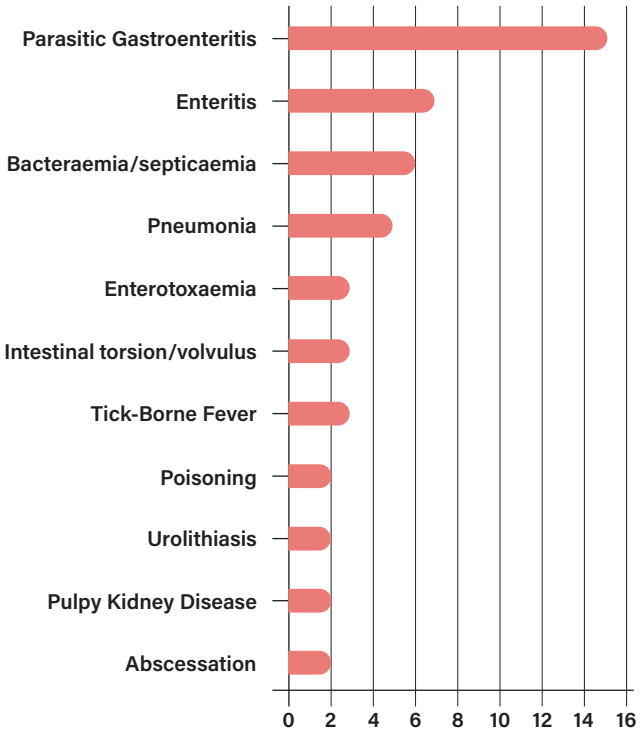

Table 2: **The most common diagnoses in sheep submitted for necropsy in June 2024.**

Gastrointestinal Tract

Caecal torsion

Sligo RVL examined a two-year-old ewe which had been found lying down and kicking before death. On post-mortem examination, there was a caecal torsion and splenomegaly. The cause of death in this ewe was a twisted caecum. This may occur as a spontaneous event, especially if sheep have been introduced to fresh pasture or receive concentrates. *Clostridium perfringens* and its alpha toxin were identified in the intestinal contents and may have been a predisposing factor.

Clostridial enterotoxaemia

A three-month-old lamb which had been found recumbent and kicking was submitted to Sligo RVL. On post-mortem examination, the carcase was severely dehydrated, and the internal adipose depots were depleted. There was an extensive serous pericardial clot. Intestinal contents were scant. *C. perfringens* and its alpha and beta toxins were detected. Faecal examination revealed very high strongyle and *Nematodirus battus* egg counts and a moderate burden of coccidia oocysts. The gross findings in this case were suggestive of clostridial enterotoxaemia as terminal cause of death, secondary to a severe parasitic gastroenteritis. The high *Nematodirus* egg counts are of particular interest as they indicate a severe pasture contamination which needs to be considered in relation to the grazing management of lambs on the holding in the following year.

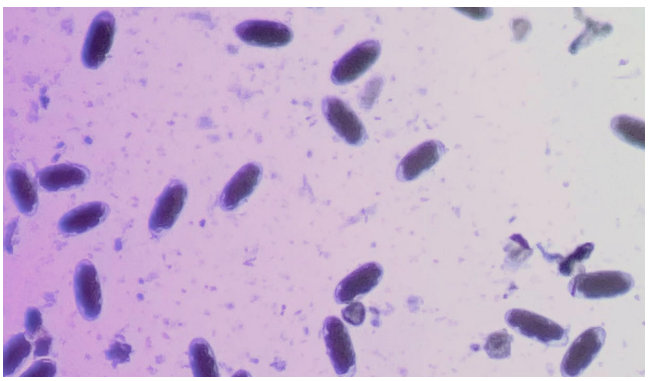

Figure 20: ***Nematodirus* eggs from a faecal sample, visualised using McMasters Method. Photo: Shane McGettrick.**

A three-month-old lamb presented to Kilkenny RVL with a history of sudden death. The main finding was a large fibrin clot in the pericardium. This finding is commonly seen in clostridial disease, and the epsilon toxin of *C. perfringens*, the toxin associated with pulpy kidney disease, was detected in this lamb. A review of clostridial vaccination was recommended. Overeating, starchy diets, and sudden dietary change have been identified as risk factors. Clostridial vaccination involves a primary course of two shots, four to six weeks apart. Lambs may be vaccinated from two to three weeks of age. A yearly booster for ewes, four to six weeks before lambing, should be given to boost immunity in lambs.

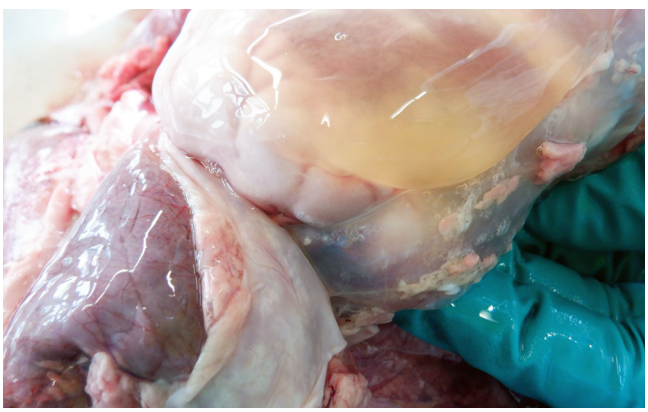

Figure 21: **A fibrin clot in the pericardium, characteristic of pulpy kidney disease, or clostridial enterotoxaemia. Photo: Maresa Sheehan.**

Urinary/Reproductive Tract

Uterine torsion

A two-year-old ewe was found dead and submitted to Kilkenny RVL, from a flock where there had been four other deaths. On examination, there was a severe fibrinous peritonitis. The source was a ruptured uterus that had undergone torsion. The uterus contained the decomposing remains of a lamb foetus – the decomposition was in an advanced state. *E. coli* was cultured from multiple organs indicating a bacteraemia. While peritonitis was the cause of death in this ewe, it was unlikely the findings in this case were representative of the flock problem and the submission of additional cases was recommended.

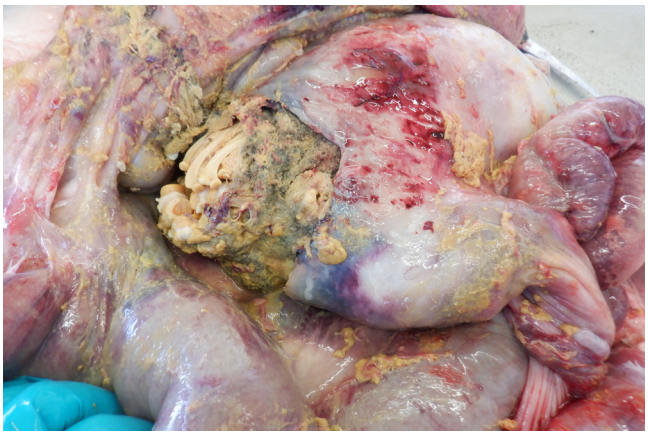

Figure 22: **Peritonitis with severely decomposed foetus in a ruptured uterus. Photo: Aideen Kennedy.**

Nervous System

Hypomagnesaemia

A four-year-old ewe was found dead and submitted to Kilkenny RVL. On necropsy, the rumen was very bloated and contained frothy contents. Small numbers of *Haemonchus contortus* were also observed in the abomasum. The rumen pH was mildly acidotic and the magnesium concentration in the eye fluid was low. Hypomagnesaemia was diagnosed; however, a review of parasite control was recommended, including examination of cohorts for signs of anaemia.

Figure 23: ***Haemonchus contortus*** **worms showing the characteristic 'barber's pole' appearance, due to the white ovaries coiled around the blood-filled intestine. Photo: Aideen Kennedy.**

Poisonings

Pieris poisoning

Sligo RVL diagnosed plant poisoning by *Pieris japonica* in two three-year-old ewes that had been observed to cough up green material and were treated for pneumonia due to raspy lung sounds. On post-mortem examination, there was oedema along the ventral neck, splenomegaly, and haemorrhagic intestinal contents. *Pieris* leaves were present in the rumen.

Copper poisoning

Sligo RVL examined the carcase of a three-year-old ewe which had been observed depressed, lethargic, panting, grunting, and twitching before death. On necropsy, icterus and dehydration were noted. There also was haemoglobinuria. The tissue copper levels were in the toxic range. Copper toxicity was diagnosed as cause of death.

Goats

Aneurysm and parasitic bronchitis

A six-year-old pygmy male goat was submitted to Limerick RVL with a history of sudden death. Opening into the thorax revealed a large haematoma approximately 30cm X 18cm with a ruptured aortic aneurysm approximately 2cm in diameter. The aorta proximal to the aneurysm seemed to be inflamed and there appeared to be occlusion of the lumen of the aorta. The lungs were firm and pale in colour with multifocal-to-coalescing, pale-yellow spots 1-2mm in diameter on the surface and in the body of the lungs. Histopathology of the aorta identified a multifocal necrotising arteritis; no agent was detected but it was not possible to rule out a bacterial infection. Examination of the lungs revealed a multifocal verminous pneumonia due to *Dictyocaulus filaria* lungworm. The main findings were the thoracic aortic aneurysm and lungworm infection. Aneurysms can result from inflammation, injury, inherited conditions, such as Marfan syndrome, and infections. The impact of parasitic pneumonia in goats varies widely between individuals and breeds, and causes clinical disease less frequently than lungworms in cattle. However, goats appear to be more susceptible to *D. filaria* than sheep.

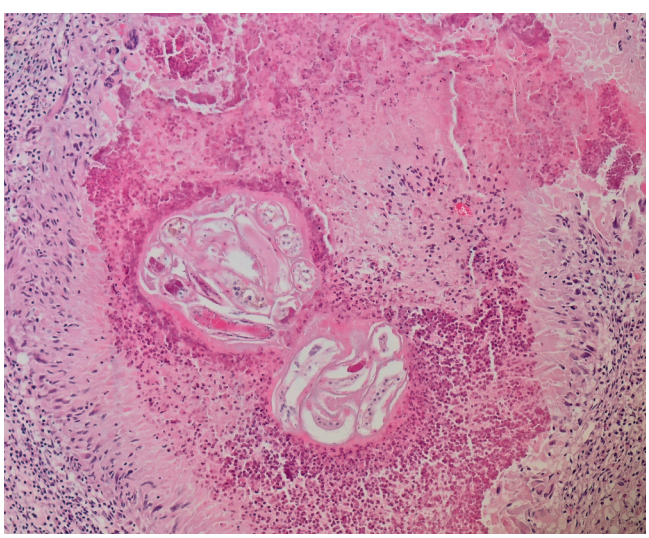

Figure 24: **Lungworm (*Dictyocaulus filaria*) in cross section in the lung of a goat. Photo: Brian Toland.**