Regional Veterinary Laboratories Report

April 2023

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 601 carcases and 61 foetuses during April 2023. Additionally, 1,806 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 April 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 the 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 April 2023.

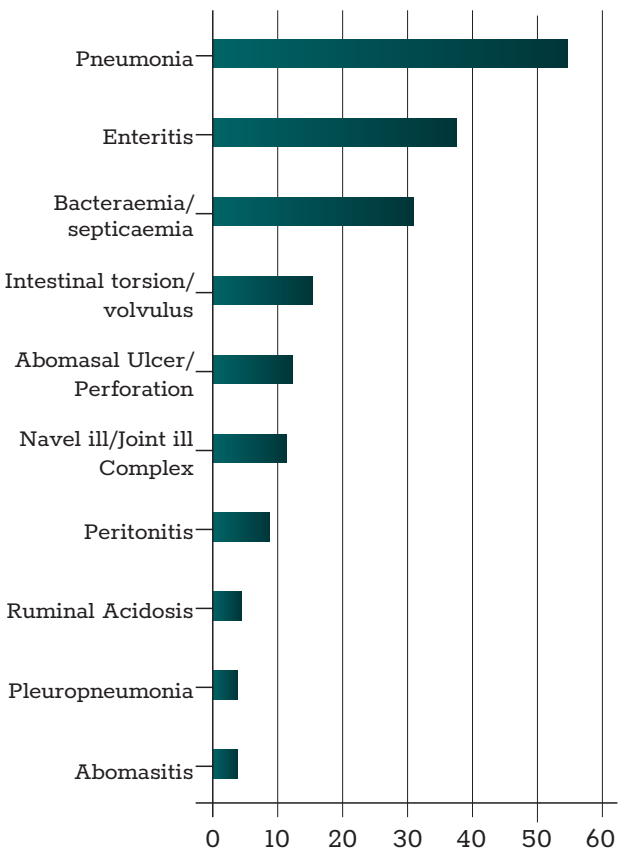

Table 1: The most common diagnoses in cattle submitted for necropsy in April 2023.

GASTROINTESTINAL TRACT

Enteritis

A three-day-old calf was submitted to Kilkenny RVL with a history of having deteriorated rapidly over a few hours before death. The calf was severely dehydrated and there was marked faecal staining on the hind quarters. The intestinal content was very liquid. *Cryptosporidium parvum* was identified in the intestinal contents, and a low score was recorded when the zinc sulphate turbidity (ZST) test was carried out on blood. This finding was suggestive of failure of passive transfer of colostral immunity, and a review of colostrum management at calving was recommended. Monitoring of colostrum management is best achieved by sampling multiple healthy calves from the herd during their first week of life.

Figure 1: Enophthalmos (sunken eyes), a sign of dehydration in a calf with enteritis. Photo: Aideen Kennedy.

Abomasal torsion

A three-week-old calf was found dead and submitted to Kilkenny RVL. The calf was severely dehydrated. Upon necropsy, there was a torsion of the abomasum, which was very bloated, and the abomasal mucosa was a blackish, congested colour (likely due to ischaemic necrosis). The aetiology of gastrointestinal torsions is usually unknown, and most are reported to occur sporadically; they may occur subsequent to increased or decreased gastrointestinal motility which in turn is affected by nutritional changes and upsets, including gas accumulation and bloat.

Figure 2: An abomasal torsion resulting in ischaemia of the abomasal wall. Photo: Aideen Kennedy.

Haemorrhagic abomasal ulcer

Limerick RVL examined a four-week-old Friesian bull calf from a 130-cow dairy herd. It was being bucket-fed on whole milk and had been in good health up to one week before death. It had stopped drinking and developed diarrhoea. Treatment was given but it failed to improve, weakened and died. On post-mortem examination, it was anaemic and the abomasal and intestinal contents were dark in colour. Lesions of focally extensive ulceration of the pyloric region of the abomasum with haemorrhage were seen.

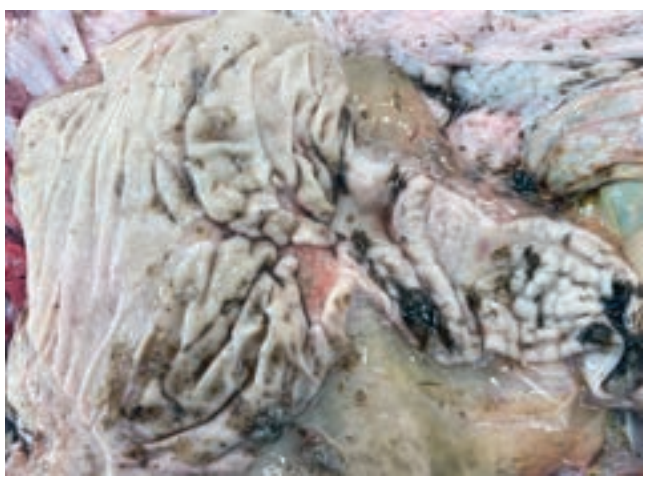

Figure 3: Ulceration in the abomasal mucosa of a calf that had become anaemic. Photo: Alan Johnson.

Intussusception

A four-month-old suckler calf with a history of scour and depression for four days before death was submitted to Limerick RVL. On necropsy, the carcase was pale. A section of the right cranial lung lobe was consolidated and there were some fibrin strands in the pericardial sac. A 30cm section of the small intestine had an intussusception, with compromised blood supply and ischaemic necrosis.

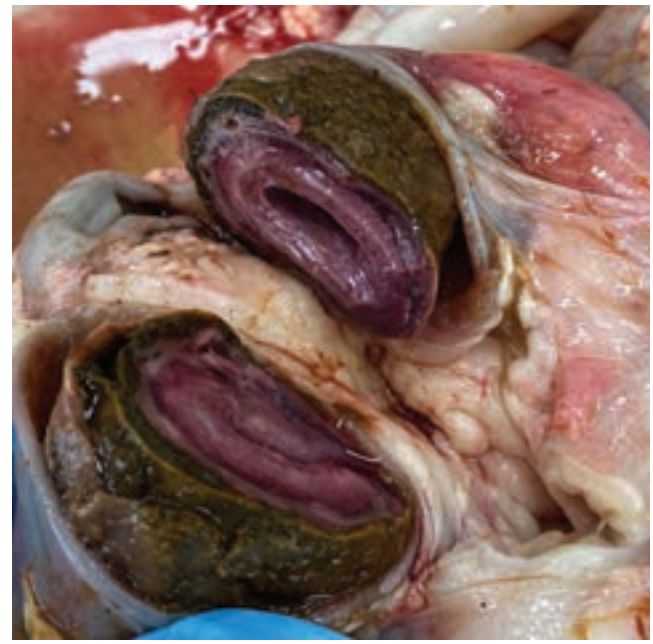

Figure 4: Cross section of an intussusception. Intestinal contents can be seen between two layers of the intestinal wall, the inner of which has become congested and swollen. Photo: Alan Johnson.

Johne's disease

A four-year-old cow was presented to Kilkenny RVL with a history of weight loss and diarrhoea. On post-mortem examination, the intestinal mucosa was thickened, corrugated, and inflamed. On histopathology, there was a diffuse, severe, granulomatous enteritis. Ziehl-Neelsen (ZN) stain revealed large numbers of acid-fast-staining bacteria, consistent with *Mycobacterium avium* subspecies *paratuberculosis* infection or Johne's disease.

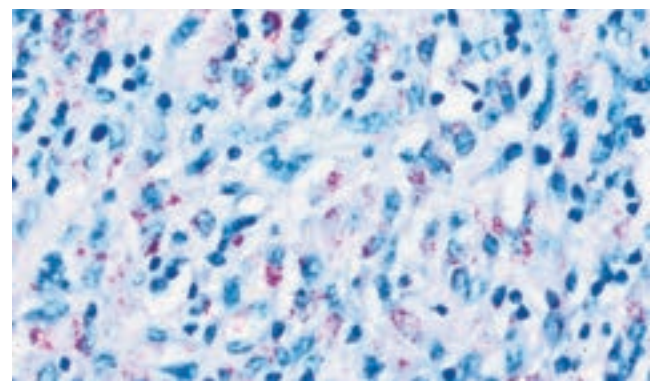

Figure 5: Acid-fast bacteria, such as *Mycobacterium* spp., stain red using a Ziehl-neelsen stain. Photo: Lisa Buckley.

RESPIRATORY TRACT

Pneumonia

Athlone RVL examined a three-month-old calf with a history of respiratory distress, which had been treated several times and had responded initially but relapsed and died. It was the tenth similar loss in a period of four to five weeks. On gross post-mortem examination, there was bilateral cranioventral pulmonary consolidation with abscessation, and the consolidation extended into the proximal portion of the caudal lung lobes. *Histophilus somni*, *Mycoplasma bovis*, *Mannheimia haemolytica* and *Pasteurella multocida* were detected in lung tissue by polymerase chain reaction (PCR). No respiratory viruses were detected. Histopathology of the lung showed a severe, diffuse, fibrinosuppurative bronchopneumonia with streaming 'oat cells' typical of a *Pasteurellaceae*-type infection.

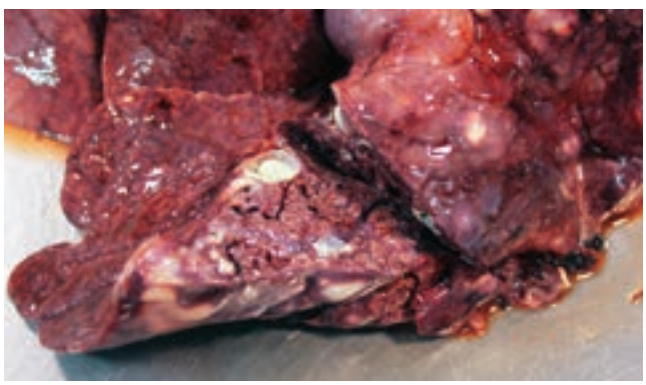

Figure 6: Cross-section of lung tissue in a case of pneumonia from which multiple bacteria were identified. Photo: Denise Murphy.

A two-month-old calf was presented to Kilkenny RVL with a history of sudden death. On post-mortem examination, there was a severe bronchopneumonia with cranioventral consolidation affecting approximately 70 per cent of the lung parenchyma, and multifocal abscessation. *H. somni* and *M. haemolytica* were isolated by PCR. *H. somni* causes septicaemic infection with clinical presentations, including pneumonia, polyarthritis, myocarditis, abortion and meningoencephalitis. *M. haemolytica* is an opportunist, gaining access to the lungs when host defences are compromised by stress or infection. Both of these pathogens are major agents in bovine respiratory disease cases.

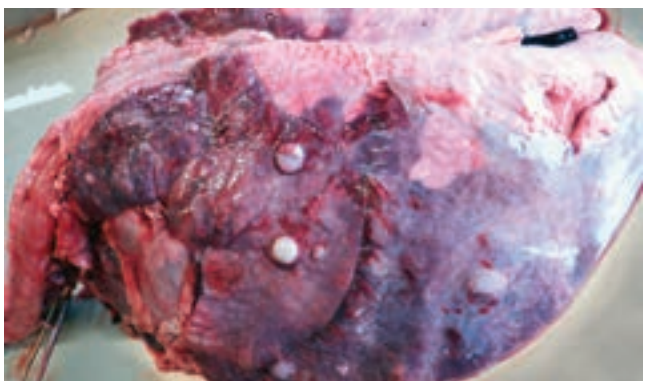

Figure 7: Severe bronchopneumonia with cranioventral consolidation and multifocal abscessation. Photo: Lisa Buckley.

A yearling heifer was found dead and submitted to Kilkenny RVL. Two others in the group were sick. On necropsy, there was gross evidence of pneumonia, with cranioventral consolidation affecting approximately 60 per cent of lungs. There was fibrin expanding the interlobular septae, and there was a fibrinous pleuritis. Both *M. haemolytica* and *P. multocida* were cultured.

Figure 8: Fibrinous exudate in the interlobular septae of a pneumonic lung. Photo: Aideen Kennedy.

Laryngeal abscessation

A six-week-old calf with severe upper respiratory distress died and was submitted to Kilkenny RVL. The calf had been treated for scour approximately two weeks previously, including stomach tubing with fluids. In the larynx, there was a large area of necrosis and abscessation extending into the arytenoid cartilage. The lungs were oedematous and congested. *Bibersteinia trehalosi* and *Trueperella pyogenes* were cultured from multiple organs indicating a bacteraemia, likely subsequent to the laryngeal lesions. These lesions can arise following trauma to the laryngeal mucosa. Disinfection and examination of the stomach tube for sharp edges was recommended, as well as a review of tubing technique.

Figure 9: A larynx with a large area of necrosis and abscessation extending into the arytenoid cartilage. Photo: Aideen Kennedy.

URINARY/REPRODUCTIVE TRACT

Haemorrhage

Athlone RVL examined a one-year-old bull with a history of having swollen and bruised testicles. The animal had seemed to initially respond to treatment but was found dead

the next evening. It had been in a pen with other fattening bulls. When examined in the RVL, its conjunctiva and mucous membranes were pale. The scrotum and prepuce were swollen and there was some skin bruising. There was a large subcutaneous haematoma in the right ventral flank with severe subcutaneous haemorrhage extending along the ventral abdomen from the prepuce to the scrotum, and there was a large haematoma around the right testicle. There was also haemorrhage in the right flank muscles. The bull's rumen contents had a strong acidic smell and a porridge-like consistency, and the intestinal contents and faeces were soft. The pH of the ruminal contents was 5.0; values < 5.2 are highly suggestive of ruminal acidosis. Massive haemorrhage, most likely secondary to trauma, was the diagnosis made in this case. The ruminal acidosis may also have contributed to the animal's death and a review of the diet was recommended.

Figure 10: A haematoma in the scrotal sac of a bull. Photo: Denise Murphy.

Polycystic kidneys

Athlone RVL examined a seven-month-old weanling with a history of having been sick for two weeks, with a grossly swollen abdomen. It was examined and treated several times but without response and eventually died. On post-mortem examination, there was marked ascites in the peritoneal cavity. Both kidneys were enlarged and polycystic. A diagnosis of polycystic kidneys was made.

Figure 11: Enlarged, polycycstic kidneys from a weanling. Photo: Seamus Fagan.

CARDIOVASCULAR SYSTEM

Vena caval thrombosis

A three-year-old cow presented to Kilkenny RVL with a history of sudden onset of respiratory distress and blood-coloured urine. On gross examination, there were ecchymotic haemorrhages on the serosal surfaces of the forestomachs, abomasum and intestines. There were adhesions in the cranial abdominal cavity between the liver and diaphragm. There was hepatic abscessation associated with the posterior vena cava and two septic thrombi were observed in the lumen of the vena cava. The urine was red. The lungs were very oedematous and heavy, with multifocal emphysema. The kidneys were congested with bloody fluid in the pelvic areas. Histopathological investigations revealed a severe, diffuse, interstitial pneumonia with septic emboli, consistent with a diagnosis of posterior vena caval thrombosis. Laboratory tests were negative for *Babesia divergens* and tick-borne fever (*Anaplasma marginale*) and pathogenic *Leptospira* spp. Blood samples from cohorts did not suggest a hypophosphataemia. It was suspected that the blood-coloured urine may be related to a disseminated intravascular coagulopathy resulting from the thrombosis. A diagnosis of posterior vena caval thrombosis was made. A role for disseminated intravascular coagulopathy associated with the thrombosis could not be ruled out.

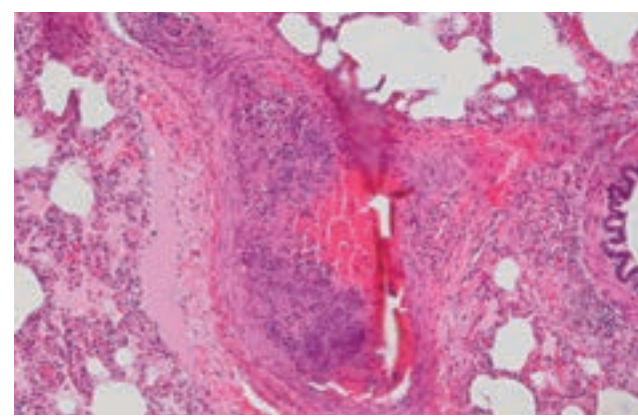

Figure 12: Septic thrombus in a blood vessel in the lung of a cow with posterior vena caval thrombosis. Photo: Maresa Sheehan.

Vegetative endocarditis

An eight-year-old cow was pining, stopped eating, died and was submitted to Kilkenny RVL. On examination, there was vegetative endocarditis on the right atrioventricular (AV) valve. The liver was rounded and there were multifocal infarcts and small abscess in both kidneys. The uterus contained a large volume of purulent material and the skeletal remnants of a mummified foetus. Vegetative endocarditis typically occurs secondary to another disease process. The decomposing foetal material in the uterus may have acted as a source of infection.

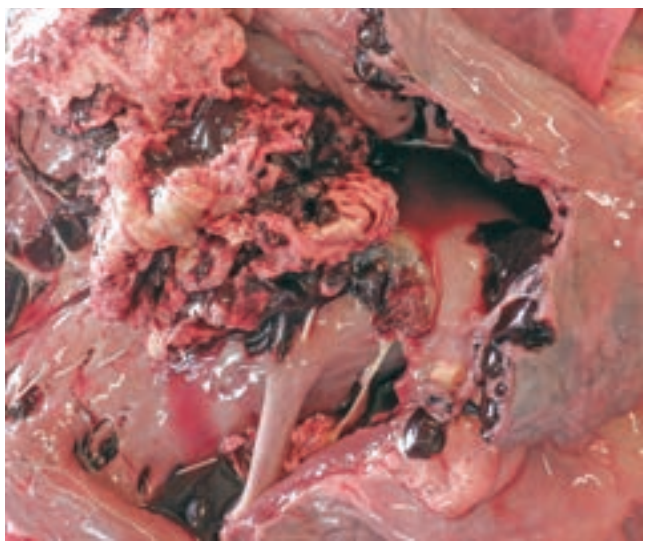

Figure 13: Vegetative endocarditis on the atrioventricular valve. Photo: Aideen Kennedy.

NERVOUS SYSTEM

Meningoencephalitis

Sligo RVL examined a six- year-old cow which had been reported to be unwell for a week prior to her death. On post-mortem examination, there was severe dehydration. On opening the skull, there was a fibrinopurulent meningoencephalitis associated with penetration of the skull and cerebrum by an embedded 60mm x 7mm tapered triangular spike. There were multifocal anteroventral pulmonary abscesses with pleural adhesions. The origin of the spike remained unclear but was likely to have caused the meningoencephalitis.

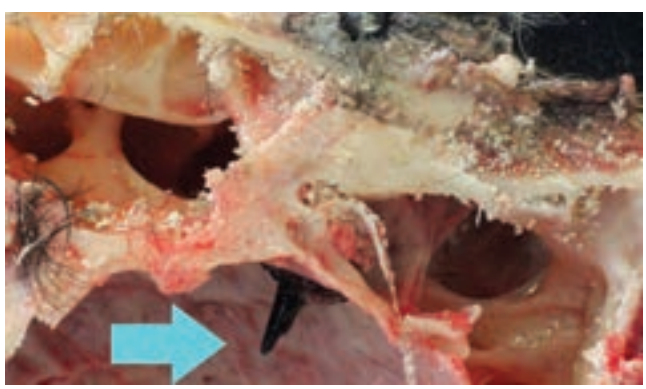

Figure 14: Spike (arrow) penetrating the skull and causing meningoencephalitis in a cow. Photo: Colm Ó Muíreagaín.

Subdural haemorrhage

A six-week-old calf was submitted to Sligo RVL. The calf had been reported to hit its head while being loaded. Instantly after the accident, it showed some disorientation, then became recumbent with muscle spasms and kicking. Post-mortem examination revealed an extensive subdural haemorrhage which was likely to have caused the observed clinical signs and subsequent death.

MUSCULOSKELETAL

Blackleg

Athlone RVL examined an 18-month-old heifer with a history of sudden death. There was marked subcutaneous haemorrhage and oedema bilaterally over the hindquarters and caudal back and dry haemorrhagic myositis in the deep hindquarter muscles on the left side. Similar muscle lesions were also seen in tongue and heart muscles. *Clostridium chauvoei* was detected in the muscle lesions by fluorescent antibody technique (FAT). A diagnosis of blackleg or clostridial myositis was made and advice given to vaccinate comrades with a multivalent clostridial vaccine.

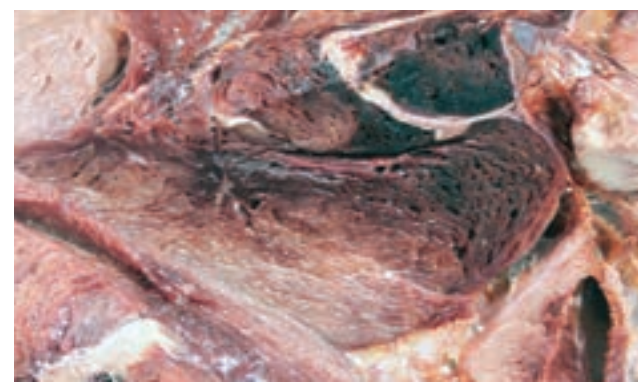

Figure 15: A dry haemorrhagic myositis characteristic of blackleg infection. Photo: Denis Murphy.

MISCELLANEOUS

Black disease

A six-year-old cow with a history of sudden death was submitted to Sligo RVL. On post-mortem examination, the liver was enlarged and friable with multifocal emphysema, haemorrhage and some mild fibrotic tracts. Multifocal adhesions were present, in the area from the liver to the diaphragm. There was a significant rumen fluke burden present. FAT was positive for *Clostridium novyi* and *chauvoei* in the emphysematous liver tissue. This finding was deemed significant and considered the most likely cause of death. Infectious necrotising hepatitis (black disease) is caused by liver fluke migration in the liver parenchyma, creating an anaerobic environment suitable for the proliferation of clostridial spores. It is noted that this animal had a significant rumen fluke burden and is likely, therefore, to have been exposed to significant liver fluke challenge and related liver damage.

Malignant catarrhal fever

Sligo RVL examined the carcase of a bull, which had been

staggering and became recumbent, with colic as well as neurologic symptoms, i.e., blindness. There was also a notably foul-smelling diarrhoea. Due to the advanced state of autolysis, significant gross lesions were not observed, but some tissues could be examined for histopathology. Examination of the brain revealed multifocal lymphocytic infiltration of the meninges as well as a necrotising vasculitis with perivascular lymphocytic infiltrates. Ovine herpesvirus 2 (OHV2), the causative agent of malignant catarrhal fever, was detected by PCR.

SHEEP

Enteritis and pneumonia were the most common diagnoses at necropsy in sheep in the RVLs during April 2023.

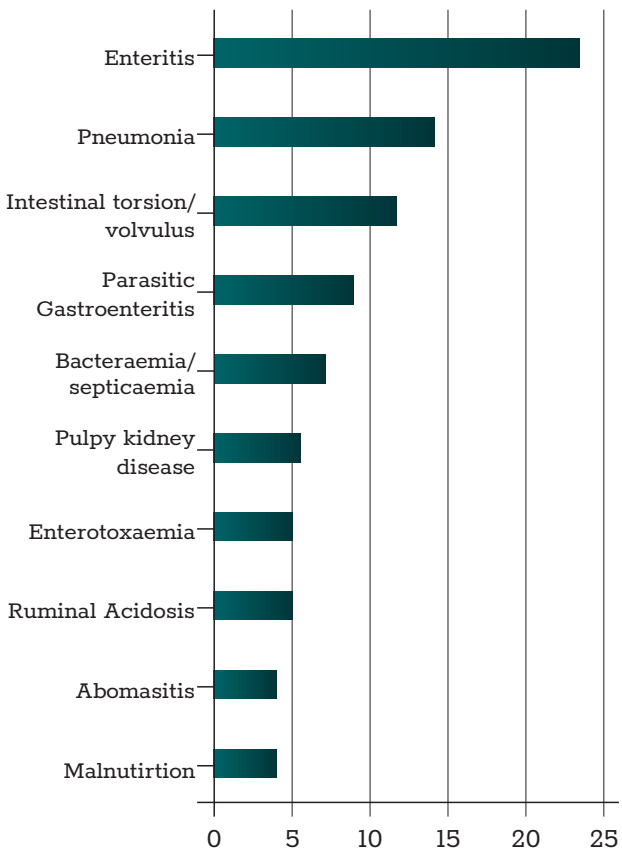

Table 2: The most common diagnoses in sheep submitted for necropsy in April 2023.

GASTROINTESTINAL TRACT

Laryngeal chondritis

A three-month-old Texel-Charolais-cross lamb from a 25-ewe flock was submitted to Limerick RVL. It was at pasture and had developed respiratory stertor (snoring) two days before death. It was treated with an anti-inflammatory drug. The Texel sire had died with stertor during the hot weather last August. On necropsy, there was gross evidence of abscessation of the larynx and diffuse pulmonary congestion. The appearance of the larynx was consistent with laryngeal chondritis or 'Texel throat'. No significant bacterial pathogens were isolated from the larynx or lung.

Figure 16: Laryngeal chondritis or 'Texel throat'. Photo: Alan Johnson.

Parasitic gastroenteritis

Athlone RVL examined two two-year-old ewes from a farm with a history of sudden death, where there had been eight similar sudden deaths recently. Both ewes had similar gross post-mortem findings. Their body condition was poor, with weights of 50kg and 40kg respectively. Both carcases were very pale, and both had faecal soiling of the perineum. There was marked submandibular oedema, as well as oedema of the neck and forequarters, and there was ascites and excess pericardial fluid. The liver, kidneys and lungs were extremely pale. The abomasal mucosa was thickened and oedematous, and abomasal contents were brown-coloured liquid with tiny worms visible to the naked eye. Intestinal contents and faeces were liquid. *Haemonchus contortus* worms ('Barber's Pole worm') were identified in the abomasal contents and there was a very high strongyle egg count of 50,000 eggs per gram (EPG) in the faeces.

Coccidiosis (with concurrent tick-borne fever)

Sligo RVL diagnosed coccidiosis in several submissions of lambs in the month of April. In one case, two three-month-old lambs with a history of sudden death were examined. On post-mortem examination of the first lamb, its intestinal contents were noted to be very watery and there was extensive perineal staining. The second lamb also presented with very liquid, but also haemorrhagic, intestinal contents. The intestinal mucosa was necrotic in areas. Histopathology revealed necrotising enteritis with protozoal developmental stages present. A severe infection with coccidia was detected on the examination of intestinal contents. Moreover, *Anaplasma phagocytophilum*, the causative agent of tick-borne fever, was detected in both lambs. Tick-borne fever or anaplasmosis is likely to have exacerbated other disease processes due to immunosuppression. There was also a very high strongyle burden which is significant as it confirms heavy pasture contamination. Coccidiosis with concurrent tick-borne fever was diagnosed.

Enterotoxaemia

Sligo RVL examined a lamb with a history of death following a sudden onset of colic symptoms. Gross post-mortem examination revealed fibrinous pericarditis. There was a herniated cerebellum. Urinalysis showed glucosuria. *Clostridium perfringens* with its epsilon toxin was detected. Clostridial enterotoxaemia was diagnosed as the cause of death.

RESPIRATORY TRACT

Pleuritis

Two one-month-old lambs with a history of sudden death were submitted to Sligo RVL. The first lamb presented with unilateral pleuritis. The second lamb presented with pericarditis and multifocal myocardial abscesses. *Staphylococcus aureus* was isolated from the lesions in both lambs. The observed lesions commonly occur during a bacteraemia. Common entry sites for this agent are umbilical infections, tail-docking or tick bites (tick pyaemia).

NERVOUS SYSTEM

Meningitis

Sligo RVL diagnosed listerial meningoencephalitis in two yearling hoggets. The animals had been found recumbent and kicking before death. Four further animals were found to be sick concurrently on the farm. On post-mortem examination, there were no significant gross findings with the exception of enteritis and a high strongyle burden in one of the hoggets. Histopathology of the brain revealed in one hogget multifocal encephalitis with marked lymphoplasmacytic perivascular cuffing which appeared most severe in the medulla and spinal cord. There was focally extensive necrosis with gitter cells and neutrophils in sections of spinal cord. Moreover, there was multifocal random necrotising hepatitis in the liver indicating concurrent septicaemia. Examination of a section of the medulla and spinal cord of the second animal revealed multifocal lymphoplasmacytic perivascular cuffing, lymphoplasmacytic vasculitis and mild lymphoplasmacytic meningitis. There was multifocal microabscessation. Meningoencephalitis with septicaemia was diagnosed as cause of death. *Listeria sp.* is considered the most likely aetiology.

GOATS

Parasitic gastroenteritis

A four-month-old pygmy goat was presented to Kilkenny RVL with a history of generalised weakness prior to death. On histopathology, there was a severe lymphocytic enteritis with multiple cross sections of nematode parasites seen in the intestines. It is important to remember that goats do not appear to mount an age-acquired resistance to nematode parasites like sheep and cattle, so adults of all ages are susceptible if exposed to contaminated pasture. This may be because they evolved as browsers rather than grazers and they are poorly-adapted to the heavy parasite contamination found in farmed pasture.

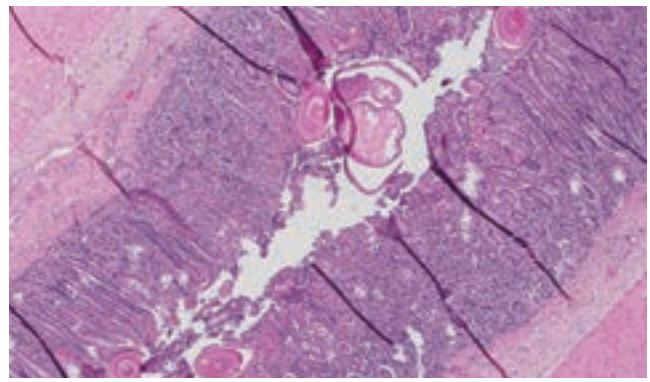

Figure 17: Cross section of nematode parasites visible in the intestine of a goat. Photo: Lisa Buckley.

A nine-year-old 'Old Irish' doe goat that had presented with progressive weight loss, weakness, and diarrhoea, was submitted to Limerick RVL. There was faecal staining of the tail and hind quarters, and mucous membranes were white. Necropsy revealed generalised subcutaneous oedema with excess fluid in the abdominal cavity and pericardial sac. Abomasum had a mild cobblestone appearance suggestive of parasitism, intestines contained watery green contents and the lungs were pale in appearance. Testing of intestinal contents revealed a severe coccidial infection and a strongyle egg count of 700 EPG which was in the medium-to-high range but was from a diarrhoeic sample. The faecal egg count in animals with watery diarrhoea may be an underestimate of the true nematode parasite burden because of the dilution effect from the increased faecal volume or in the presence of large numbers of immature worms even when many adult worms are present. *B. trehalosi* was identified in the lung tissue on PCR, which is a commensal organism of the tonsils and upper gastrointestinal tract and under stressful conditions such as heavy parasitism the bacteria multiply and rapidly spread to the lungs and other organs and can cause acute systemic infection. Histopathology identified numerous lungworm larvae in the lungs, coccidia in the intestines and lymphocytic abomasitis suggestive of parasitism in the abomasum.

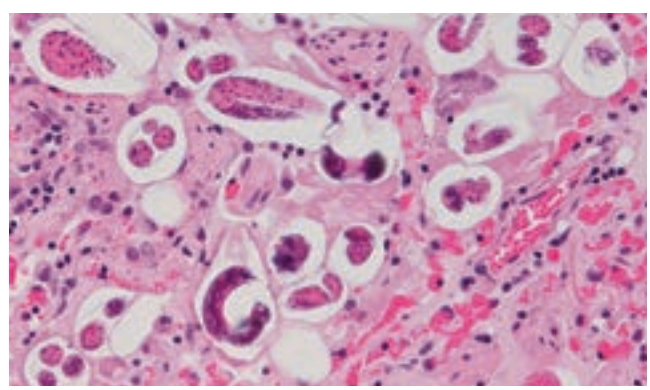

Figure 18: Lungworm visible in the lung parenchyma of a goat. Photo: Brian Toland.

The significance of lungworm in sheep and goats has not been fully established. Clinical disease is typically only seen in lambs and kids and there is evidence that the impact of infection varies widely among individuals and between breeds; goats appear to be more susceptible to *Dictyocaulus filaria* than sheep (Al-Sammarrae and Sewell, 1977; Dhar *et al.*, 1981; Alemu et al., 2006).

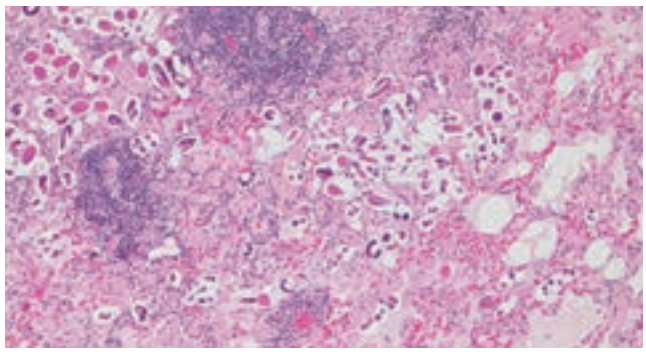

Figure 19: Lungworm and an inflammatory reaction in the lung of a goat. Photo: Brian Toland.

PIGS

Pleuropneumonia

Six second stage weaner pigs (eight-weeks-old) were submitted to Dublin RVL. These pigs had been affected with diarrhoea issues in first weaner stage, been treated and recovered. *Salmonella Typhimurium* had been confirmed, and a *Salmonella* vaccine was introduced to the sow herd. On moving to second weaner stage, 30 of this cohort died suddenly within two days. Some pigs were seen panting and a respiratory problem was suspected. On gross post-mortem, the lungs were all mottled dark in colour, swollen, and haemorrhagic with meaty consistency. There was bilateral, severe, diffuse, fibrinous pleurisy. There was cranioventral consolidation of approximately 20 per cent to 60 per cent of the lungs. The lymph nodes were diffusely enlarged. There was also severe diffuse fibrinous pericarditis. The histopathology revealed severe, diffuse, fibrinosuppurative pleuropneumonia with intralesional bacteria and streaming accumulations of macrophages or 'oat cells.' Laboratory testing isolated *Actinobacillus pleuropneumonia* from all the lungs and confirmed on PCR with high bacterial loads.

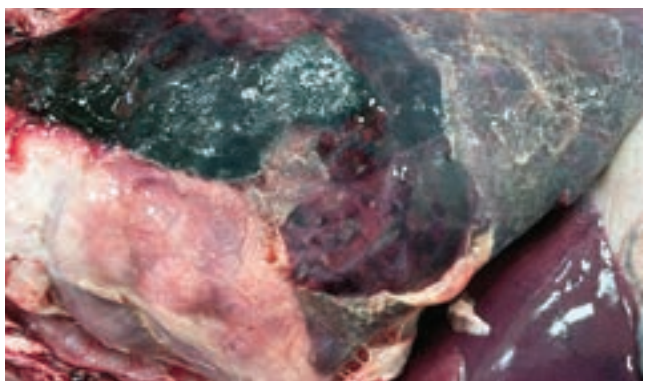

Figure 20: Severe diffuse pleuropneumonia and pericarditis, characteristic of *Actinobacillus pleuropneumonia*. Photo: Sara Salgado.