Regional Veterinary Laboratories Report

October 2020

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 570 carcases and 143 foetuses during October 2020. Additionally, 1,764 diagnostic samples were tested to assist private veterinary practitioners (PVPs) 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 October 2020.
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 bacteraemia/septicaemia were the most common causes of death in bovine carcases submitted to the RVLs in October 2020.

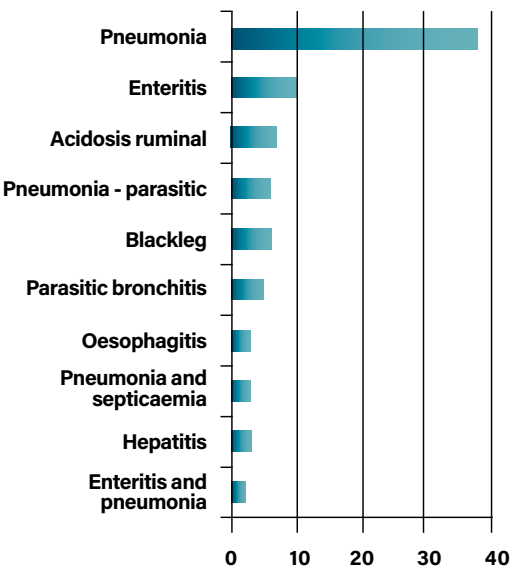

Table 1: The most common causes of death diagnosed in bovine carcases submitted to DAFM RVLs in October 2020.

GASTROINTESTINAL TRACT

Malformation

A neonatal calf that had died shortly after calving was submitted to Sligo RVL. The farmer noticed that the abdomen seemed to be filled with large amounts of fluid. On necropsy, it was discovered that a section of the jejunum was not developed. Atresia jejuni was diagnosed. This is a sporadic but relatively common malformation and has not been linked with a specific infectious aetiology to date.

Bovine popular stomatitis

Athlone RVL examined a six-month-old weanling that had been losing weight for the previous two weeks and was treated with oral antibiotics. Body condition was very poor with serous atrophy of fat around the kidneys and heart. There were multifocal circular lesions with a dark rim on the tongue and the pharyngeal mucosa; and similar lesions extending down the oesophagus. The abomasal mucosa was hyperaemic and sections of the rumen wall were thin with multifocal haemorrhages on the serosa. Small intestinal contents were scant, and faeces were soft. There was chronic cranioventral pulmonary consolidation and fibrosis with fibrous adhesions to the overlying costal pleura and fibrous adhesions to the pericardial sac. *Aspergillus sp.* was isolated from the oesophagus. Histopathology of the lesions in the mouth and oesophagus showed a multifocal superficial glossitis and oesophagitis with epithelial hypertrophy, hyperplasia, erosion, ulceration and ballooning degeneration, suggestive of parapoxvirus infection. A polymerase chain reaction (PCR) test for parapoxvirus was positive. A diagnosis of glossitis and oesophagitis caused by a parapox infection, (bovine papular stomatitis), and chronic bronchopneumonia was made.

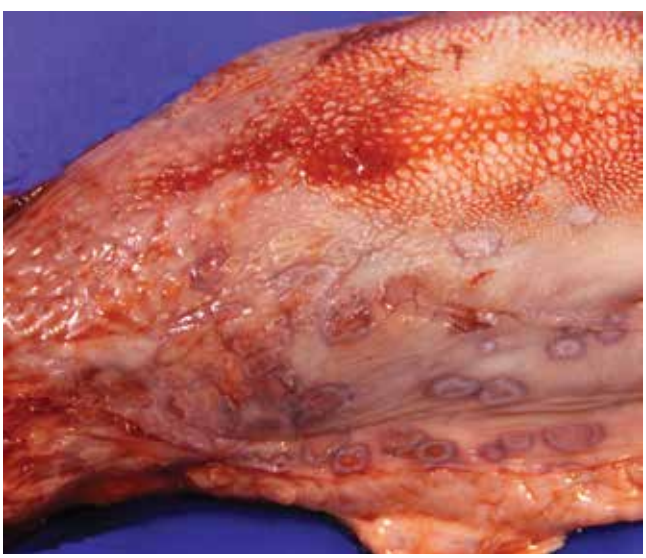

Figure 1: Parapoxvirus lesions on the tongue of a bovine. Photo: Denise Murphy.

Ruminal acidosis

Athlone RVL examined a six-month-old weanling with a history of sudden death. The animal had been weaned six days earlier. The rumen and abomasum contained a high quantity of grain and there was a strongly acidic smell; the ruminal wall was hyperaemic. Small and large intestinal contents were liquid and contained grain. The rumen fluid

pH was 4.9; values less than 5.5 are highly suggestive of ruminal acidosis and it is known that pH values rise post-mortem. The diagnosis of ruminal acidosis/grain overload was confirmed by histopathology of the ruminal mucosa which showed vacuolation of superficial ruminal epithelial cells and neutrophil infiltration (chemical rumenitis).

Johne's disease

A five-year-old cow was submitted to Limerick RVL with a history of weight loss over a two-week period. A number of cows were described as displaying similar signs, but no occurrence of diarrhoea was reported. Necropsy disclosed inflamed intestinal mucosa and multiple white lesions in both kidneys. The mucosa of the distal ileum and proximal caecum was thickened and corrugated; there was minimal content in the large intestines. Histopathology of the kidney disclosed nephritis while histopathology of the intestines revealed a lymphocytic enteritis; a Ziehl-Neelsen stain detected very high numbers of acid-fast bacteria located intercellularly in the intestinal mucosa, a finding associated with *Mycobacterium avium* subspecies (MAP). Results of culture for MAP were positive. A diagnosis of Johne's disease and nephritis was made. Since multiple animals presented with ill thrift it is likely that these signs are due to Johne's disease; it would be unusual to diagnose nephritis in multiple animals.

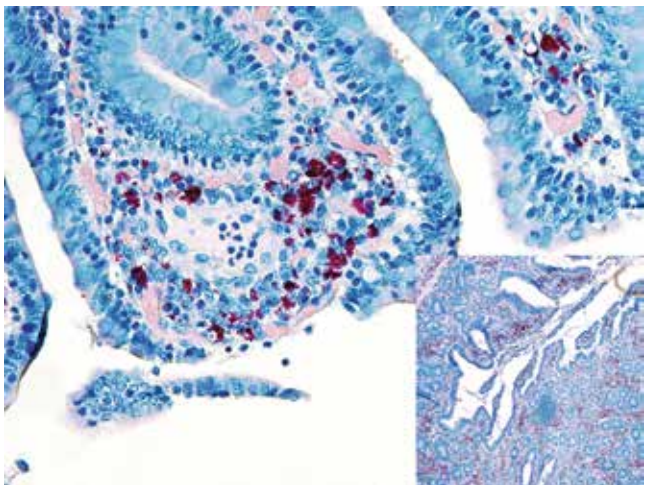

Figure 2: Acid-fast bacteria stained red using a Ziehl-Neelsen stain. The intracellular distribution in intestinal epithelial cells (inset) suggests Johne's disease. Photo: Ian Hogan.

RESPIRATORY TRACT

Pneumonia

An 18-month-old bullock with a history of dyspnoea was submitted to Sligo RVL. The farmer reported further deaths across this management group. On necropsy, there was severe bullous emphysema and pneumonia with multifocal areas of consolidation affecting approximately 60-70% of the lung parenchyma. There was abomasal fold oedema and emphysema. *Mannheimia haemolytica* and *Bibersteinia trehalosi* were cultured from the affected tissue. Acute, severe pneumonia was diagnosed as the cause of death.

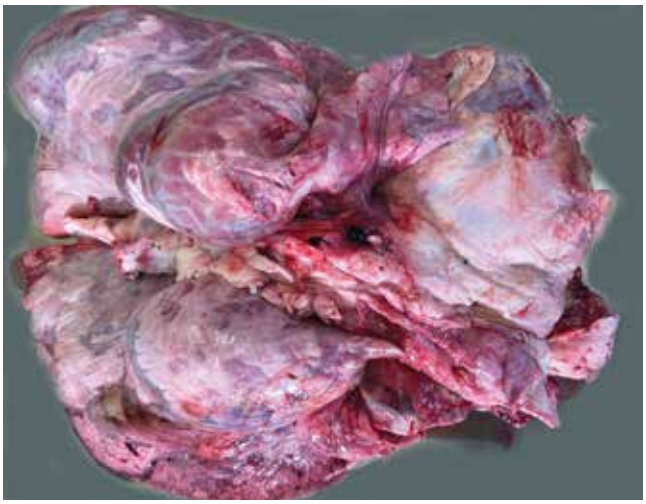

Figure 3: Pneumonia with severe bullous emphysema in a bullock. Photo: Shane McGettrick.

An 11-month-old weanling bullock was submitted to Limerick RVL with a history of respiratory signs; three cohort animals had died. Necropsy disclosed cranio-ventrally distributed congested consolidated pneumonia, mild congestion of the tracheal epithelium and petechiae on the myocardium. *B. trehalosi, M. haemolytica* and respiratory syncytial virus (RSV) were detected.

Parasitic bronchitis and parasitic gastroenteritis

Athlone RVL examined a one-year-old bullock with a history of respiratory signs. It was the sixth death in a group of 15 in the previous three weeks. On necropsy, the lungs had severe bilateral subpleural and interlobular emphysema with formation of bullae, the caudo-dorsal lungs were most severely affected. Abundant *Dictyocaulus viviparus* were seen in the trachea, bronchial tree, and throughout the lung parenchyma. The liver was slightly enlarged and dark with a slight nutmeg appearance. The abomasal mucosa was thickened and oedematous with multifocal ulceration, typical of parasitic gastroenteritis. Intestinal contents were dark brown and loose. A strongyle egg count of 800 eggs per gram (EPG) and *D. viviparus* larvae were detected in the faeces. A diagnosis of parasitic/verminous pneumonia and parasitic gastroenteritis was made.

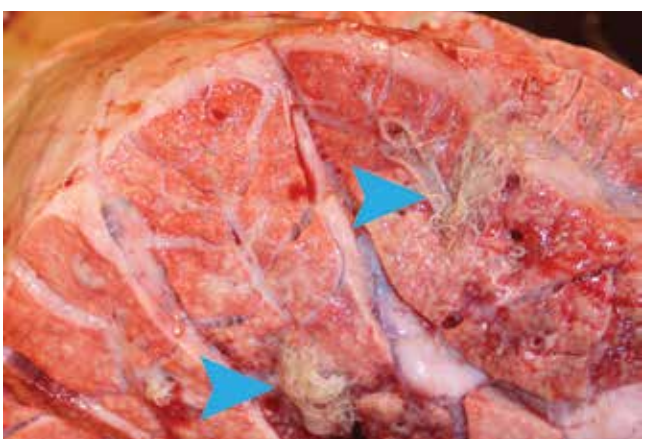

Figure 4: Dictyocaulus viviparus in the lung parenchyma of a bovine yearling. Photo: Seamus Fagan.

Parasitic bronchitis

A six-month-old calf with a history of rapid deterioration due to pneumonia was submitted to Sligo RVL. The lung presented with focally extensive 'ground glass' emphysema and large numbers of *D. viviparus* present in the airways. The lung was cranio-ventrally consolidated affecting approximately 30% of the parenchyma. On histopathology, there was multifocal, marked, broncho-interstitial pneumonia with intralesional nematodes.

Polyserositis

A 10-week-old calf was submitted to Kilkenny RVL. It was found dead with no clinical signs noticed prior to death. Upon necropsy, the calf was moderately dehydrated. There was a pleuritis with fibrinous adhesions to the thoracic wall and there was fibrin on the surface of the pericardium. In addition, there was peritonitis with multifocal fibrinous adhesions between the intestines. There were multifocal, small, white lesions on both kidneys. A diagnosis of polyserositis was made, with *M. haemolytica* cultured from multiple organs. In addition, a liver copper concentration of 0.01mmol/kg was recorded (normal liver copper levels are between 0.06-2.5mmol/kg), sampling from cohorts was advised to further evaluate herd copper status.

CARDIOVASCULAR SYSTEM

Ventricular septal defect

An eight-week-old calf was submitted to Kilkenny RVL with a history of respiratory disease. A large ventricular septal defect was evident in the heart. The liver was enlarged with a 'nutmeg' pattern on cross section, associated with chronic passive venous congestion. A diagnosis of heart failure due to a cardiac septal defect was made.

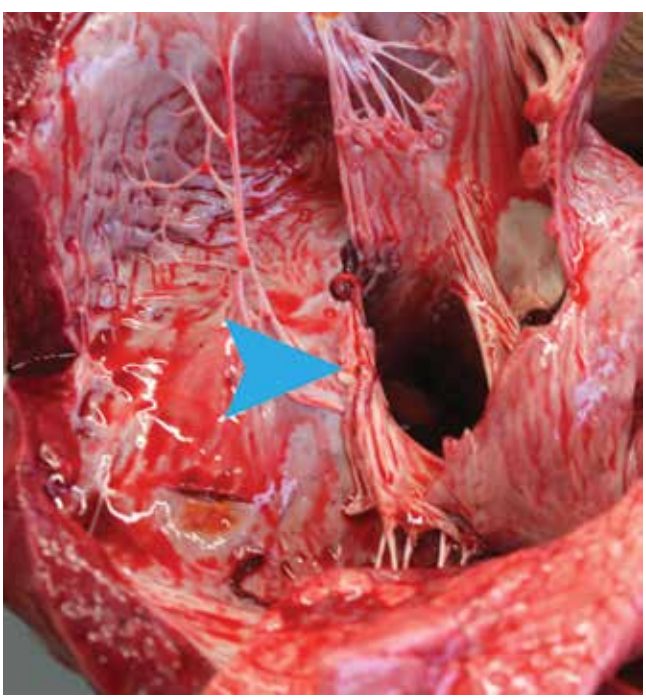

Figure 5: A ventricular septal defect in the heart of an eight-week-old calf. Photo: Maresa Sheehan.

Endocarditis

Athlone RVL examined a nine-month-old weanling with a history of lameness six days previously, followed by death. On necropsy, there was a large (2-3cm), friable, yellow/grey lesion present on the right atrioventricular tricuspid heart valve. The liver had a firm consistency and was diffusely darkened. The lungs were mildly congested cranioventrally. *Escherichia coli* was cultured from the lesion on the heart valve. A diagnosis of right-sided valvular endocarditis resulting in heart failure was made.

NERVOUS SYSTEM

Athlone RVL examined a four-month-old weanling with a history of sudden death. There was severe diffuse sub-meningeal haemorrhage over the rostral cerebral hemispheres, bilaterally, with extensive blood clots. There was no obvious trauma visible to the head externally. The carcase was otherwise unremarkable. Histopathology of the brain showed severe haemorrhage in the meninges of the cerebral hemispheres, but the underlying brain parenchyma was unremarkable. In discussions with the PVP it transpired the animal had been transported in a large trailer with only one other animal the day before death and the possibility that the animal may have hit his head during transportation was thought probable. A diagnosis of brain haemorrhage was made with trauma the most likely aetiology.

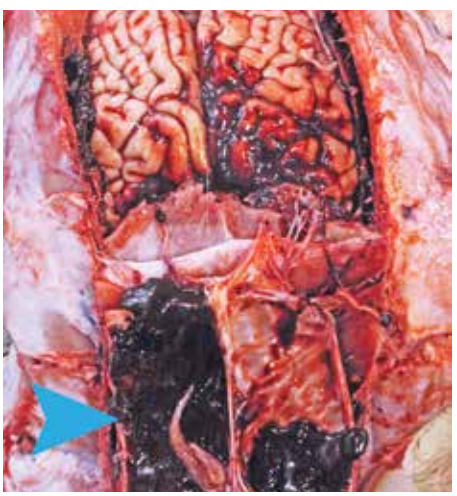

Figure 6: Cerebral haemorrhage in a weanling. Blood clots are visible both on the cerebrum and adherent to the inside of the cranium (arrow). Photo: Denise Murphy.

MUSCULOSKELETAL

Black disease

Sligo RVL diagnosed infectious necrotic hepatitis ('black disease') in a five-month-old calf. The animal had been noticed on the previous day being dull, weak, and collapsing after walking small distances. Treatment efforts were unsuccessful. On necropsy, general congestion of the carcase was apparent and the liver presented with an approximately 2cm-sized area of pale necrosis with a hyperaemic rim. There was excess fibrinous pleural and abdominal fluid. There was fibrinous pleuritis in the mediastinum. The serosa and pleura presented with multifocal haemorrhages. The presence of *Clostridium novyi* was confirmed by fluorescent antibody test (FAT).

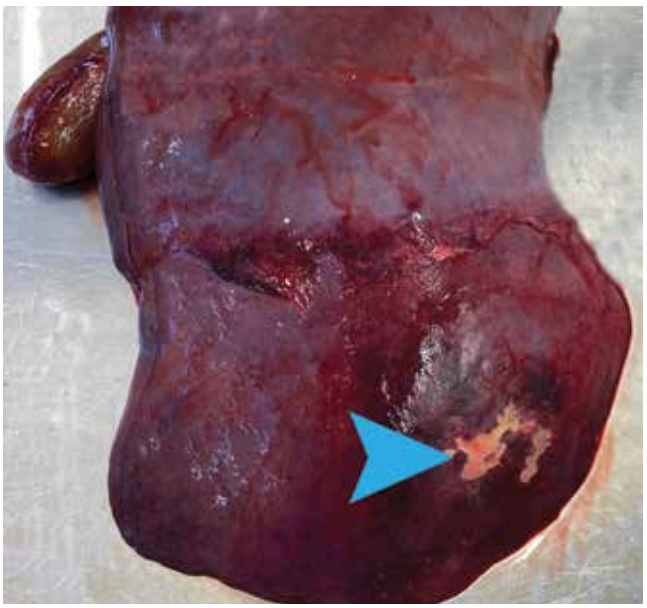

Figure 7: Focal necrotising hepatitis or black disease in a bovine liver. Photo: Shane McGettrick.

Blackleg

Athlone RVL examined a four-month-old calf with a history of sudden death. It was the second death in the herd. The left hindlimb musculature contained a very dark, dry, necro-haemorrhagic lesion with crepitus and a sweet odour, typical of a blackleg lesion. Similar lesions were found in the right forelimb and the myocardium. A marked fibrinous exudate was present within the pericardial sac. *Clostridium chauvoei* was detected by FAT on a tissue smear from the lesion, and *C. chauvoei* was also isolated on anaerobic culture. A conclusion of clostridial myositis (Blackleg) was made.

FEATURED TOPIC: TRAUMATIC RETICULOPERITONITIS

Traumatic reticuloperitonitis (TRP) typically occurs in mature dairy cattle, is occasionally seen in beef cattle, and is rarer in other ruminants. TRP develops as a consequence of perforation of the reticulum. The disease is common where silage or hay is made from fields that contain old rusting fences, or if grazing a pasture where recent building has occurred. Tyre wires have been the causative agents in a number of cases when tyres covering silage pits have fallen into wagon feeders and been chopped into small pieces. Swallowed nails or wire fall directly into the reticulum or pass into the rumen and are subsequently carried into the cranioventral part of the reticulum following ruminal contractions.

Perforation of the reticulum allows leakage of ingesta and bacteria. The resulting peritonitis is generally localised and adhesions may occur; less frequently, a more diffuse peritonitis develops. The object can penetrate the diaphragm and can cause pleuritis and sometimes pulmonary abscessation and pericarditis. Occasionally, the liver or spleen can be pierced resulting in abscessation.

The clinical signs can include sudden onset of rumeno-reticular atony and a sharp fall in milk production. The faecal output is decreased. The rectal temperature is often mildly increased in early cases. The cow may exhibit an arched back and reluctance to move. Firmly pinching the withers may elicit a grunt. Traumatic pericarditis is most commonly characterised by muffled heart sounds; however, early in the disease process splashing sounds (washing machine murmur) can be heard on auscultation. Jugular vein distention, congestive heart failure and marked submandibular oedema are frequent sequela. Prognosis is grave with these complications.

SHEEP

Pneumonia and bacteraemia/septicaemia were the most commonly diagnosed causes of death in sheep carcases submitted to the RVLs in October 2020.

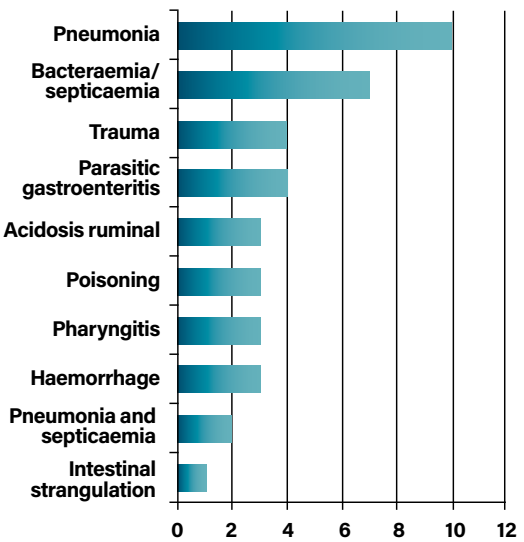

Table 2: The most common causes of death diagnosed in ovine carcases submitted to DAFM RVLs in October 2020.

GASTROINTESTINAL TRACT

Ruminal acidosis

Sligo RVL diagnosed ruminal acidosis in three cases in fattening lambs. In one such case, a five-month-old ram lamb had been found dead and submitted. The ruminal contents were of soft, creamy, porridge-like consistency. There was mild, chronic pleuritis and the lungs appeared congested. The ruminal contents returned a pH value of 4.1. Usually, post-mortem ruminal pH values below 5.5 are considered suggestive of ruminal acidosis. *M. haemolytica* and *Pasteurella multocida* were detected in lung tissue. Ruminal acidosis, with concurrent pneumonia was diagnosed as cause of death. The pathophysiology of ruminal acidosis usually involves a sudden dietary change to energy-rich, easy fermentable feed often accompanied with a lack of fibre. It needs to be highlighted that a certain amount of roughage is needed for healthy ruminal function.

RESPIRATORY TRACT

A seven-month-old lamb was found dead, having displayed no previous signs, and was submitted to Kilkenny RVL. Seven lambs had died recently in the flock. Upon necropsy, examination of the lungs showed severe cranioventrally

distributed consolidation. Within the consolidated areas were small grey/white foci of suspected necrosis. There was moderate fibrinous exudate on the pleural surfaces. Histopathology disclosed a multifocal necro-suppurative bacterial bronchopneumonia and multifocal necrotising bacterial hepatitis, changes indicating a likely systemic infection. Agents identified included *B. trehalosi*, *M. haemolytica* and *Mycoplasma ovipneumonia*. A review of control measures for respiratory disease on the farm was recommended.

Figure 8: Clearly demarcated bronchopneumonia in the lung of a lamb. Photo: Aideen Kennedy.

URINARY/REPRODUCTIVE TRACT

Urolithiasis

Athlone RVL examined a six-month-old lamb with a history of impaired micturition. There was clear oedema fluid with a uremic smell in the subcutaneous tissues of the ventral abdomen extending cranially from the scrotum to the umbilicus and with associated haemorrhage and congestion around the penile urethra. The urethra was patent to a point cranial to the scrotum but was blocked at the tip of the penis in the region of the vermiform appendix, which is the commonest location of urinary obstruction in male lambs. The kidneys were enlarged. The urea concentration in the aqueous humour was 71.6mmol/L. The measurement of urea concentration in eye fluid is considered a useful indicator of acute or chronic renal failure leading to uraemia, and values for aqueous humour urea >30mmol/L in ruminants are consistent with significant renal disease. Although urinary calculi were not detected in the urine sample, a diagnosis of uraemia was made, likely secondary to urolithiasis as evidenced by the penis lesions.

MUSCULOSKELETAL

Fractures

A five-month-old lamb was submitted to Sligo RVL with a history of being unable to stand or feed for the previous two days. On necropsy, there were fractures to the rib cage bilaterally from the fifth to the tenth thoracic ribs. There was severe bruising and haemorrhage in the intercostal muscles. There was a laceration on the liver along the diaphragmatic surface with associated haemorrhage and blood clots. There was multifocal haemorrhage and haemothorax. Blunt-force trauma to the thorax and cranial abdomen was diagnosed as cause of death.

Cellulitis/Myositis

A nine-month-old ram with a history of vaccination two weeks previously was submitted to Sligo RVL. The animal had presented with severe swelling and lameness in the left front leg, which spread finally along the body to the back legs. Veterinary treatment was not successful. Necropsy revealed purulent necrotising cellulitis and oedema, extending from the left shoulder along the neck and trunk. There was a focal area of necrotising myositis on the left shoulder thought to be the source of the initial injury. The cause of death was a severe cellulitis and myositis. The use of a contaminated needle at vaccination was considered a possible source of infection.

Figure 9: Cellulitis in a nine-month-old ram. Photo: Shane McGettrick.

POISONINGS/MISCELLANEOUS

Dosing injury

A five-month-old lamb was submitted for necropsy to Kilkenny RVL. It was one of 14 lambs that had died on the farm of origin. The lamb had pale mucous membranes and was dehydrated. There were blood clots in the nostrils. There was a healing pharyngeal lesion and an oral dosing bolus was found in the caudal nasal cavity with an associated blood clot. There were large blood clots in the rumen. A diagnosis of haemorrhage associated with pharyngeal injury and malposition of a bolus in the caudal nasal cavity was made. A review of bolus application techniques was recommended.

Athlone RVL examined a three-year-old ewe with a history of dullness since the previous evening, and of panting and bleeding from the mouth shortly before death. It was the third similar loss in three months. On gross examination there was submandibular swelling, and a large, necrotising haemorrhagic mass approximately 7-8cm in diameter in the left pharyngeal region. There were blood clots filling the oral cavity and extending into the oesophagus and rumen, and blood clots present in the trachea and bronchi. The carcase was diffusely pale. A diagnosis of pharyngitis/pharyngeal abscess resulting in haemorrhage was made. The most likely cause is trauma, eg. dosing gun injury.

Coagulopathy

A nine-month-old lamb, which had been found dead, was submitted to Sligo RVL. Necropsy revealed the presence of large blood clots in the caecum and large intestine. There were multifocal petechial haemorrhages at the base of the heart and including the serosal surface of the great vessels. There were multifocal variable sized, 1-3cm areas of haemorrhage and consolidation throughout the lungs. Histopathology revealed reduced precursor cells also described as trilineage hypoplasia in the bone-marrow. Haemorrhages due to bone-marrow suppression and coagulopathy was diagnosed as cause of death. This case presentation was rather unusual. The cause of the coagulopathy could not be established, but bracken-fern poisoning is an important differential diagnosis and it was later confirmed that the lambs had access to areas of bracken in the preceding weeks.

Figure 10: Multifocal haemorrhage in the lungs of a sheep with coagulopathy. Photo: Shane McGettrick.

HIGHLY PATHOGENIC AVIAN INFLUENZA IN A WILD BIRD IN IRELAND

Ireland has confirmed Highly Pathogenic Avian Influenza (HPAI) virus subtype H5N8 in a wild bird (Peregrine Falcon – *Falco peregrinus*) in Co. Limerick. The bird was submitted as part of the National Parks and Wildlife Service's RAPTOR programme to Limerick Regional Veterinary Laboratory, which monitors causes of death in wild Irish birds of prey. Confirmatory testing in the Central Veterinary Research Laboratory confirmed avian influenza subtype H5N8 on November 6, 2020. This subtype has been confirmed elsewhere in Europe this winter, especially in migrating wildfowl and waders and it is likely that the falcon contracted the disease through predation. The disease is highly contagious for birds. The risk to Irish poultry flocks from avian influenza has increased following the confirmation of HPAI H5N8 in a wild bird. Strict biosecurity measures are needed to prevent the introduction of avian influenza into poultry and captive bird flocks. Flock owners should remain vigilant for any signs of disease in their flocks and report any disease suspicion to their nearest Regional Veterinary Office.

The disease poses no food-safety risk for consumers. Properly cooked poultry and poultry products, including eggs are safe to eat. Members of the public are advised not to handle sick or dead wild birds. Please report sick or dead wild birds to the local Regional Veterinary Office or contact the DAFM disease hotline on 1850 200456.

ALPACAS

An alpaca was submitted to Kilkenny RVL for tuberculosis (TB) investigation. The necropsy findings included caseous necrosis and lymphadenopathy of the bronchial and submandibular lymph nodes. The lung, liver and spleen had variably sized multifocal coalescing white areas. Approximately one third of the right lung lobe was consolidated and pale in colour. Histopathology indicated a multifocal granulomatous hepatitis and pneumonia with an appearance consistent with TB. *Mycobacterium bovis*, the causative organism of TB, was confirmed on culture.

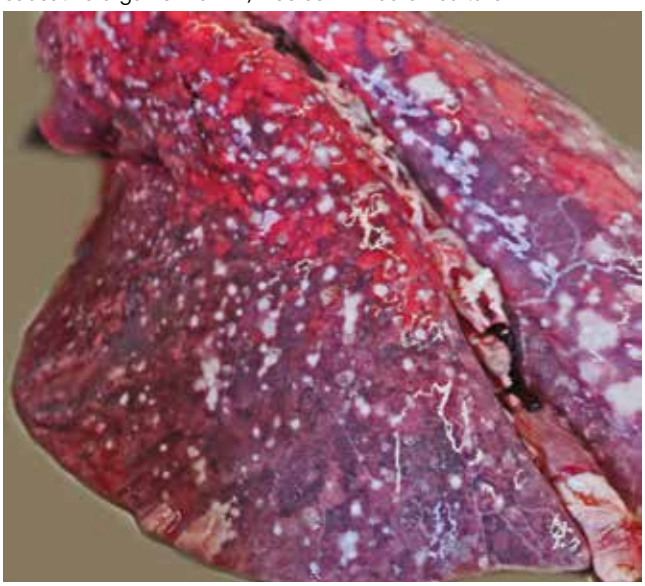

Figure 11: Multifocal lesions of tuberculosis in lungs from an alpaca. Photo: Aideen Kennedy.

GOATS

Parasitic bronchitis and parasitic gastroenteritis

A five-month-old goat was presented to Limerick RVL with a history of sudden death. Necropsy revealed oedematous lungs and soft intestinal contents. Laboratory examination revealed a strongyle burden of 1,550 eggs per gram (EPG), a *Strongyloides westeri* burden of 12,950 EPG and a mild burden of coccidial oocysts. Histopathology of the lung revealed the presence of numerous nematode larvae within the airways.

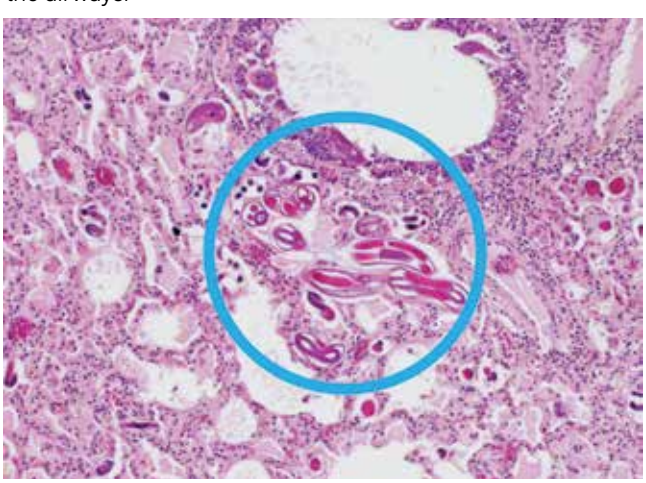

Figure 12: A photomicrograph of a section of a goat's lung illustrating numerous (encircled) nematode larvae within the airways and parenchyma. Photo: William FitzGerald.

Clostridial enterotoxaemia

Sligo RVL received a three-year-old Boer goat for examination. On necropsy, the caecum and colon presented with haemorrhagic contents. The serosal surfaces of the intestines, particularly of the ileum, caecum and spiral colon, appeared roughened and covered in fibrin. The mucosa of the associated parts of intestine appeared congested and the intestinal contents were haemorrhagic distal to the lesions. The mesenteric lymph nodes were grossly enlarged. The abomasal mucosa was diffusely haemorrhagic and congested. There was diffuse pulmonary oedema and multifocal haemorrhages in the bladder serosa. *Clostridium perfringens* (with alpha and epsilon toxin) was detected in intestinal contents. A diagnosis of clostridial enterotoxaemia caused by *C. perfringens* type D was made. This agent is responsible for 'pulpy kidney disease' in sheep, but the presentation of the disease in goats is typically as an acute necrotising enteritis.

Figure 13: Acute severe fibrinous peritonitis due to clostridial enterotoxaemia in a goat. Photo: Shane McGettrick.

PIGS

Dublin RVL assisted in the investigation of two outbreaks of epidermitis in weaner piglets on separate farms. In both cases, the necropsy revealed variably extensive cutaneous lesions consisting of multifocal to coalescing raised areas of dark brown crusting particularly affecting the ear pinnae, head and neck areas. On histopathology, there was severe multifocal/coalescing intracorneal pustule formation with intralesional coccoid bacteria in bunches, along with variable epidermal thickening and ulceration. There was diffuse moderate dermal oedema and superficial mononuclear cell infiltration. *Staphylococcus hyicus* was isolated from the skin of affected cases. The gross lesions, histopathology and isolation of *S. hyicus* are all consistent with a diagnosis of exudative epidermitis or 'Greasy Pig Disease.'

Figure 14: The ear of a pig displaying the lesions of Greasy Pig Disease. Photo: Margaret Wilson.