Regional Veterinary Laboratories Report

November 2021

The Irish Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 854 carcases and 245 foetuses during November 2021. Additionally, 2,231 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 November 2021.
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 from necropsy in cattle in the RVLs during November 2021.

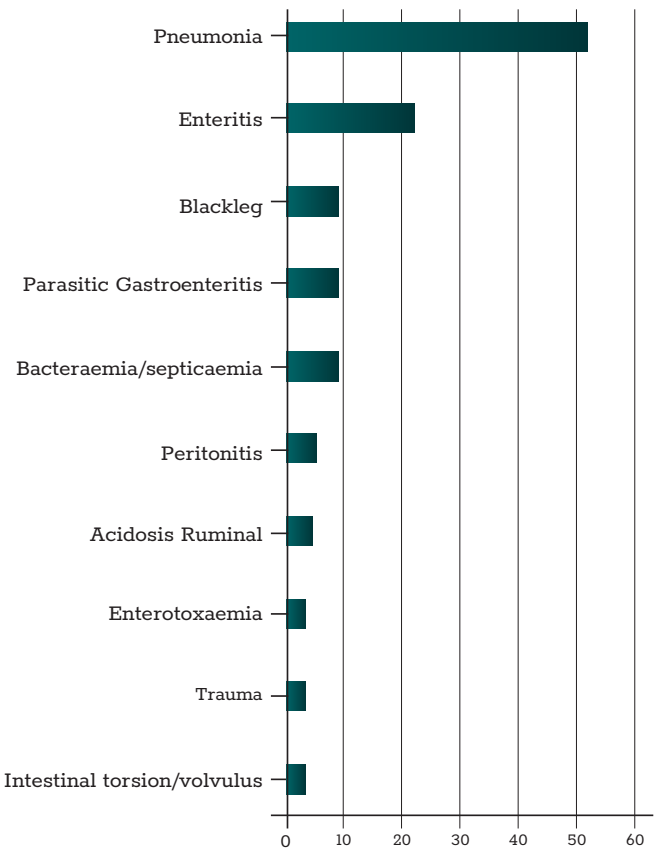

Table 1: The most common diagnoses in cattle submitted for necropsy in November 2021.

GASTROINTESTINAL TRACT

Abomasal ulceration and haemorrhage

A calf with melaena and suspected abomasal ulcers was submitted to Kilkenny RVL. Other animals in the shed were scouring. On necropsy, the carcase was dehydrated and anaemic. The rumen content was porridge-like and suggestive of acidosis, but the pH was normal. There were three to four moderate to deep ulcers on the mucosal surface of the abomasum near the pylorus. There was black tarry faeces and the lung and liver were pale. *Escherichia coli* was cultured from multiple organs suggesting a bacteraemia. On histopathology, there was a marked interstitial pneumonia suggesting a septicaemia and a chronic suppurative ulcerative abomasitis with fibrosis. As the history indicated other calves in the shed were diarrhoeic, the submission of faecal and blood samples from affected cohorts was advised.

Figure 1: Abomasal ulcers from an anaemic calf. Photo: Aideen Kennedy.

Rumen milk feeding

Two calves with a history of diarrhoea were submitted to Kilkenny RVL from a dairy herd of 100 cows. There was gastric ulceration and milk in the rumen of both animals, and very loose contents in the small and large intestines. One of the calves had an oesophagitis. Rotavirus was detected from the intestinal contents of both calves. A review of dam vaccination was recommended, and it was also suggested that the herd owner's stomach tubing technique may have to be reviewed due to the presence of oesophagitis. Dysfunction of the oesophageal groove, diverting the milk into the rumen ('ruminal drinking') is a common finding in calves with enteritis. The main causes of Oesophageal Groove Dysfunction are pathological conditions, e.g.,

- neonatal diarrhoea, pain, phlebitis of the jugular vein;
- suboptimal feeding techniques, such as irregular feeding times, low-quality milk replacer, cold milk, drinking from an open bucket;
- forced feeding – discomfort caused by the passage of the feeding tube inhibits the groove closure reflex;
- stress factors, e.g., long-distance transportation.

Paramphistomosis

Sligo RVL diagnosed acute paramphistomosis in several cases in cattle and one in lambs in the month of November. The cases all presented similarly. In one case, a three-month-old calf was observed pining and scouring before death. On necropsy, the carcase was anaemic and presented with diffuse haemorrhagic duodenitis and jejunitis. A heavy infection with rumen fluke larvae was detected.

Caecal torsion

A two–year-old cow with ongoing colic signs prior to death was submitted to Sligo RVL. Necropsy revealed a torsion of the caecum and acute peritonitis. The cause of the caecal torsion could not be established and was likely to have been a spontaneous event, with the peritonitis as a sequel.

Parasitic gastroenteritis (PGE)

A calf was submitted to Limerick RVL from a herd with suspected parasitism issues. It was in poor body condition. Necropsy disclosed a severely oedematous abomasal mucosa and liquid intestinal contents, there was a cranioventral congested consolidated pneumonia. McMasters test on caecal contents disclosed a strongyle egg count of 6,900 eggs per gram (EPG). This herd had been recently dosed, and it was recommended that faeces samples should be retaken from surviving animals to check for worm eggs to determine if dosing had been successful. This calf was the second out of three from the herd to display gross signs of pneumonia as well as PGE, it is likely that the parasite problem in the group was now complicated by pneumonia cases.

RESPIRATORY TRACT

Pneumonia

A three-month-old calf with pneumonia was submitted to Kilkenny RVL. It was the third fatality from a group of 70. On necropsy, there was pneumonia with approximately 40 per cent of the lungs consolidated. The intestinal content was very fluid. *Mannheimia haemolytica* was cultured from the lungs and confirmed by polymerase chain reaction (PCR) testing. PCR results for respiratory viruses were negative. In addition, *Clostridium perfringens* alpha toxin was detected in the intestinal contents. The significance of identifying alpha toxin in isolation is difficult to interpret as type A strains can be present in the normal intestinal microbiota, so isolation of this toxinotype is not diagnostic for disease. A review of vaccination protocols was advised however, with use of a multivalent clostridial vaccine recommended. A diagnosis of pneumonia was made, and a review of respiratory disease controls recommended.

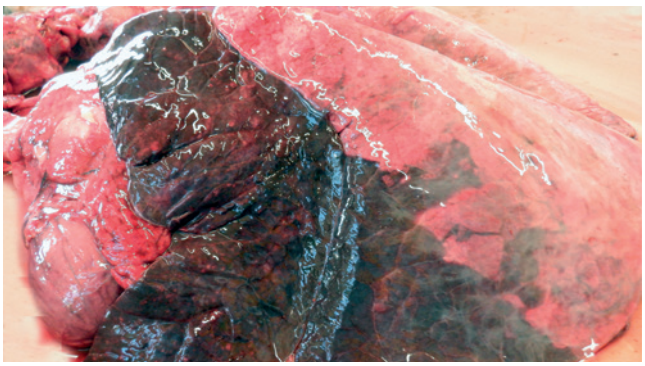

Figure 2: Cranioventrally distributed pneumonia in a calf. Photo: Aideen Kennedy.

A two-month-old calf was submitted to Kilkenny RVL, having failed to respond to treatment for suspect pneumonia and necrotic laryngitis. No other animals in the herd were affected. On necropsy, there were no visible lesions in the larynx. The thoracic cavity contained a large volume of bloody fluid. There was a severe fibrinous pericarditis, severe pneumonia and pleuritis with fibrinous adhesions to the pleural wall and the pericardium. Bronchial lymph nodes were enlarged. The liver edges were rounded with a nutmeg appearance on cross section of liver parenchyma. This was considered likely to be due to passive veinous congestion related to the findings in the thoracic cavity. *E. coli* was cultured from multiple organs suggesting a bacteraemia. Positive results on PCR were recorded for parainfluenza virus 3 (PI3) and *Pasteurella multocida*. PCR results were inconclusive for *M. haemolytica*. A review of pneumonia control was recommended, and submission of future cases recommended.

A nine-month-old weanling with suspect pneumonia was submitted to Kilkenny. Others in the cohort group were reported as being "off form". On necropsy, the pericardium was adhered to the surrounding lung tissue. The normal architecture of the right cranial lung lobe was disrupted by a large caseous abscess. The lymph nodes were enlarged. There were multifocal raised white areas on the mucosal surface of the abomasum and the intestinal content was very liquid. Histopathology of the abomasum showed multifocal hyperplasia and metaplasia consistent with parasitic gastroenteritis (PGE). Lung tissue showed chronic active inflammation consistent with abscessation. A strongyle egg count of 2,250 EPG was recorded and *Histophilus somni* and *P. multocida* were detected by culture and PCR in the lungs. A review of parasite control and respiratory disease control was recommended.

Figure 3: A chronic lung abscess in a weanling. Photo: Aideen Kennedy.

A six-month-old calf was submitted to Sligo RVL, it was found dead. On post-mortem examination, there was acute cranioventrally distributed broncho-pneumonia and multifocal abscessation. Approximately 60 per cent of the lung parenchyma was affected. There were multifocal pleural haemorrhages. *H. somni* was detected in lung tissue.
Athlone RVL examined an 18-month-old Hereford cross heifer with a history of sudden death. She had been housed indoors on slats. There was a severe, diffuse, anteroventrally distributed, fibrinous pneumonia extending into caudal lobes; with subpleural emphysema caudo-dorsally and a fibrinous pericarditis. The liver was enlarged. *M. haemolytica* was detected by PCR and *Bibersteinia trehalosi* was isolated by bacterial culture from lung tissue. These are both members of the family *Pasteurellaceae*. Respiratory viruses were not detected by PCR. Histopathology of lung tissue showed a severe, diffuse, fibrinosuppurative necrotising bronchopneumonia with coagulative necrosis and streaming "oat cells" consistent with a *Pasteurella* type infection.

Figure 4: Cranioventrally distributed fibrinous pneumonia. Photo: Denise Murphy.

Athlone RVL examined a seven-month-old weanling, the second similar loss in the previous two weeks. There was a diffuse, caudo-dorsal subpleural and interlobular emphysema. Cranial lung areas were multifocally consolidated in a lobular pattern. No lungworm were seen, and the trachea appeared grossly unremarkable. Bovine herpesvirus 1 (BHV-1), bovine respiratory syncytial virus (BRSV), *P. multocida* and *Mycoplasma bovis* were detected in lung tissue by PCR and a high strongyle egg count was detected in the faeces. Histopathology of lungs showed marked alveolar overinflation and diffuse alveolar damage with hyaline membranes with minimal suppurative bronchopneumonia evident in sections examined. A conclusion of a primary viral pneumonia (BRSV and BHV-1) and secondary bacterial infection was made.

Parasitic bronchitis

A Limousin-cross weanling was submitted to Limerick RVL with a history of acute respiratory distress. The animal was treated but deteriorated and died within three days. It was the first death reported. Necropsy disclosed a severe diffuse pneumonia with emphysema, and lungworm larvae were visible in the airways. Histopathology disclosed a suppurative bronchopneumonia and parasitic bronchitis.

NERVOUS SYSTEM

Meningitis

A dairy cow was submitted to Kilkenny, with a history of neurological signs that did not respond to treatment. On gross post-mortem examination, the meninges were considered cloudy. There was no fluorescence when exposed to ultraviolet light. There was mild pulmonary oedema and multifocal haemorrhages on the kidney. Biochemistry results, including lead concentrations, were within normal ranges. Culture results were sterile. On histopathology, there was a suppurative meningitis. It was thought recent antibiotic use may have affected culture results. Although it was an isolated incident, submission of additional cases was recommended if they occurred.

Figure 5: Cloudy gross appearance of meninges from an animal diagnosed with suppurative meningitis. Photo: Aideen Kennedy.

MUSCULOSKELETAL

Blackleg

A seven-month-old weanling bull was submitted to Limerick RVL in a state of advanced post-mortem change. A dry black lesion was found in the muscle under the left shoulder blade. Impressions from this lesion tested positive for *Clostridium chauvoei* using a fluorescent antibody technique (FAT). A diagnosis of blackleg was made.

MISCELLANEOUS

Abscessation/ruminal acidosis

Sligo RVL examined a two-year-old bull with a history of sudden death. Necropsy revealed an approximately 5x10cm-sized lung abscess protruding into the mediastinum. There was a large amount of meal present in the rumen, and the ruminal pH was 4.9 indicating ruminal acidosis. On histopathology, there was diffuse, chronic, moderate interstitial pneumonia and pleuritis suggestive of bacteraemia or septicaemia. In this case, it is difficult to determine if the septicaemia, the abscessation or ruminal acidosis was the final cause of death. It is considered likely however that the various conditions are all related to a variable high concentrate diet altering rumen pH, causing subsequent damage to rumen wall, hepatic abscessation, and predisposing the animal's lungs to regular bacterial embolic showers. This pattern of disease is relatively frequently observed in poorly managed bull rearing and finishing operations where animals are offered ad lib concentrates without sufficient roughage or where diets are changed abruptly.

Tuberculosis

Sligo RVL diagnosed bovine tuberculosis in a three-year-old cow. The animal had been noticed losing weight in the weeks prior to death. On post-mortem examination, there were myriad pale yellow coalescing plaques and nodules disseminated throughout the carcase with large numbers of granulomatous lesions in the mesentery and omentum. Laboratory tests indicated *Mycobacterium bovis* infection.

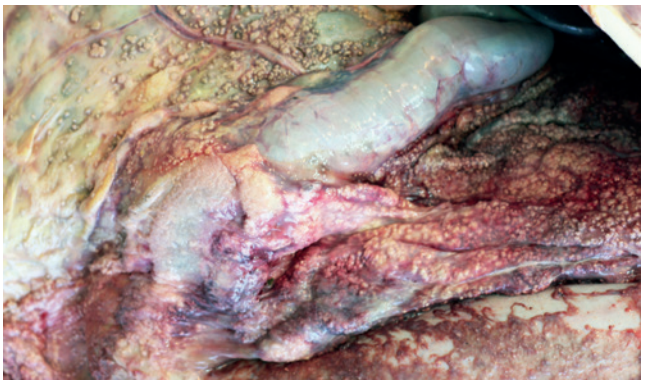

Figure 6: Coalescing pale yellow granulomatous nodules in the abdomen of a cow with bovine TB. Photo: Colm O'Muireagaín.

Traumatic reticuloperitonitis

Athlone RVL examined an 18-month-old bullock with a history of dullness and diarrhoea on the previous day. There had been one other similar loss in the herd. On gross post-mortem examination, there was a moderate, diffuse fibrinous peritonitis which was more severe in the cranial abdomen, surrounding the reticulum and extending cranially through the diaphragm. There was a marked, diffuse fibrinous pericarditis, and a fibrinous pleuritis caudally with oedema of the diaphragm. *Streptococcus* spp. and coliforms were isolated from the liver. A diagnosis of traumatic reticulopericarditis, peritonitis and pleuritis was made. Perforation of the forestomachs of cattle by foreign objects is usually caused by a long, thin, sharp foreign body such as a wire or nail, penetrating the reticular wall and resulting in reticulitis and local peritonitis, with sequelae including traumatic pericarditis, pneumonia and pleuritis. In this carcase a wire or nail was not found, but it is suspected to have been the initiating cause.

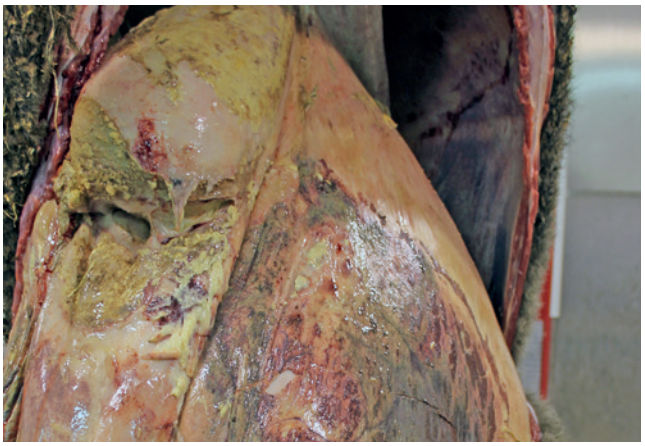

Figure 7: Traumatic reticuloperitonitis. Photo: Sarah Delaney.

SHEEP

Parasitic gastroenteritis and enteritis were the most common diagnoses from necropsy in sheep in the RVLs during November 2021.

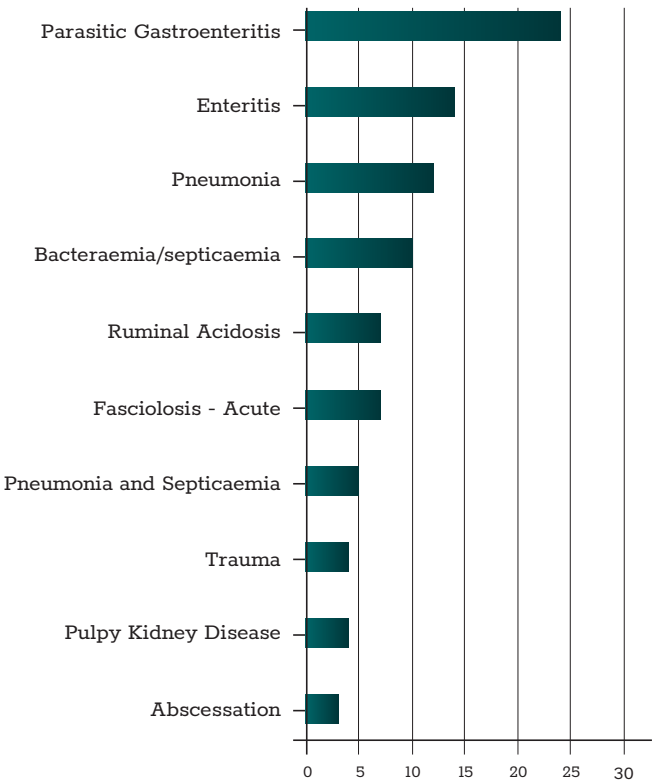

Table 2: The most common diagnoses in sheep submitted for necropsy in November 2021.

GASTROINTESTINAL TRACT

Ruminal acidosis

Several cases of ruminal acidosis in lambs were diagnosed in Sligo RVL. All cases involved the feeding of supplementary meal and mainly presented as sudden deaths. In one case involving an eight-month-old lamb, necropsy also revealed a serous pericardial clot. Ruminal pH was at 5.3. Histopathology of the lung revealed diffuse, chronic, severe interstitial pneumonia suggestive of bacteraemia or septicaemia. While post-mortem ruminal pH below 5.5 is highly suggestive of ruminal acidosis as cause of death, gross and histopathology findings were indicative of clostridial involvement in this case as well.

Acute fasciolosis

Eight cases of fasciolosis, acute or chronic/active, were submitted to Sligo RVL. Ewes and hoggets, as well as lambs were affected. Sudden death or slight dullness prior to death was a typical history in most cases. In one case, two eight-month-old lambs, which had appeared dull and distressed before death and were unresponsive to treatment, were submitted. Both lambs presented with diffuse parasitic hepatitis characterised by a myriad of haemorrhagic tracts and fibrinous exudates ('Acute Fluke').

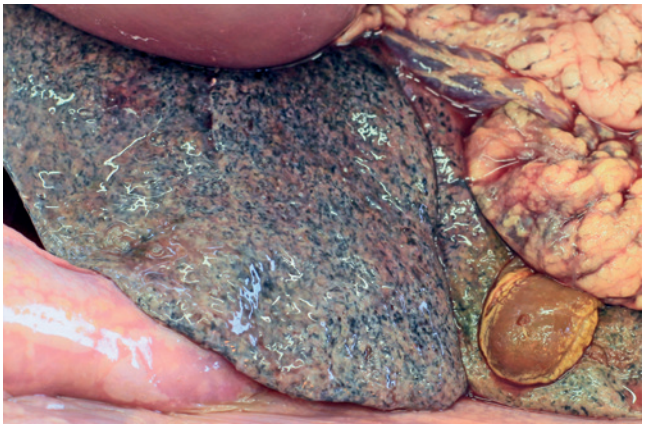

Figure 8: The liver of a lamb suffering from acute fasciolosis. Photo: Colm O'Muireagáin.

Parasitic gastroenteritis

Two ewe lambs with a history of sudden death were submitted to Limerick RVL. Necropsy disclosed poor body condition, very watery intestinal contents and faecal soiling of the wool around the perineal area. There was some congestion of the abomasal mucosa in both lambs. Caecal contents disclosed very high strongyle egg counts of 2,050 EPG and 7,800 EPG respectively. A count in excess of 750 EPG is considered to be of clinical significance. It was recommended that the parasite control programme in place on the farm be urgently reviewed. Athlone RVL examined a seven-month-old lamb with a history of sudden death. It was the fifth similar loss in the flock. The lamb was bought in along with 120 lambs two months earlier. Body condition was poor, and the perineum and tail were faecally soiled. There were well demarcated haemorrhagic areas on the oesophageal mucosa and the abomasal mucosa was thickened; there were fluid red/brown proximal small intestinal contents while distal intestinal contents and faeces were loose. A light paramphistome burden was detected in intestinal contents and a high strongyle egg count was detected in faeces. *P. multocida* and *B. trehalosi*, the causative agent of systemic pasteurellosis, were detected in the lungs by PCR. Autolysis limited the value of histopathology. A diagnosis of parasitic gastroenteritis, larval paramphistomosis and suspected systemic pasteurellosis was made.

RESPIRATORY TRACT

Laryngeal chondritis

Athlone examined an eight-month-old pedigree Blue Texel ram with a history of sudden death. The ram had been running with 24 hoggets. Body condition was good, weight was 45kg. The laryngeal opening was markedly reduced and there was right-sided laryngeal ulcerative chondritis. A conclusion of necrotising laryngeal chondritis was made.

Diaphragmatic rupture and pleural haemorrhage

Athlone RVL examined a yearling Texel hogget with a history of sudden death. There had been one other similar loss in the flock. On gross post-mortem examination, the carcase was diffusely very pale, and the mucous membranes were white. There was a large diaphragmatic rupture and massive haemorrhage into the pleural space. There was a moderate, bilateral, necrotic laryngeal chondritis mainly affecting the arytenoid cartilages which appeared chronic. A diagnosis of pleural haemorrhage was made. A syndrome of diaphragmatic rupture and massive haemorrhage secondary to laryngeal chondritis has been described in the Texel and Belgian Texel ('Beltex') breeds. This may be attributed to the large intra-thoracic forces in these breeds.

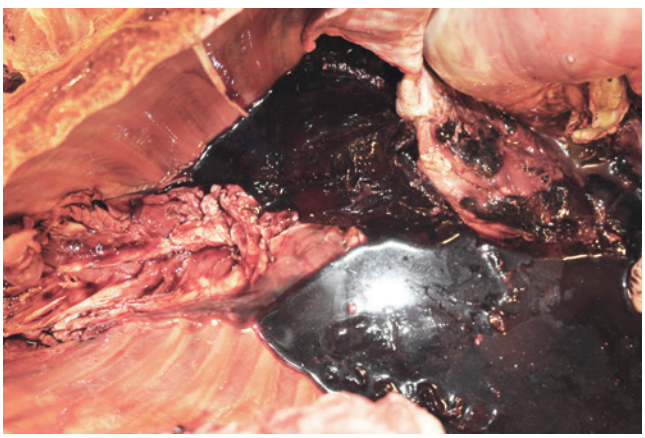

Figure 9: Blood in the thoracic cavity of a hogget with a pleural haemorrhage. Photo: Sarah Delaney.

CARDIOVASCULAR SYSTEM

Pericarditis and pneumonia

Athlone RVL examined a three-year-old ram with a history of weight loss, inappetence, and weakness over a number of weeks. On gross post-mortem examination, there was a pericarditis with fibrous adhesions at the heart apex and an abundant volume of clear fluid in the pericardial sac. There was cranioventral congestion and consolidation of approximately 20-30 per cent of lung parenchyma. *P. multocida* was detected by PCR examination of lung tissue. A diagnosis of pericarditis and secondary bronchopneumonia was made.

NERVOUS SYSTEM

Intracranial haematoma

Sligo RVL examined an eleven-month-old ram with a history of sudden death. On necropsy, there was an extensive subdural haematoma surrounding the caudal cerebrum and cerebellum. Trauma was assumed to be the most likely cause. Head trauma is a relatively common cause of death in the breeding season, particularly if there are several rams present in the group.

Louping ill

Athlone RVL examined a three-year-old ram with a history of depression, weakness, neurological signs, and paresis, with no response to treatment. There had been four other similar losses in the flock. There were no grossly visible lesions in the carcase, and the brain did not fluoresce under ultraviolet light. Histopathological examination of the brain revealed a marked, multifocal, lymphoplasmacytic meningoencephalitis. These changes are seen in viral encephalitis cases. Louping

Ill virus was detected by Immunohistochemistry. A diagnosis of viral meningoencephalitis caused by louping ill virus was confirmed. Louping ill virus is a Flavivirus which is transmitted by the castor bean tick *Ixodes ricinus*. The host range of this tick is wide, therefore infection with louping ill virus can occur in many species including sheep, cattle and humans. The virus is thought to be maintained in endemic areas through a sheep-tick-wildlife cycle.

MISCELLANEOUS

Dosing gun injury

Sligo RVL examined an eight-month-old lamb which had presented sick and coughing before death; it was the third death in the group and several other animals were affected. On necropsy, there were enlarged retropharyngeal lymph nodes and retropharyngeal abscessation. *Streptococcus suis* was cultured from abscess material. The location of the abscessation is highly suggestive of traumatic origin usually a dosing gun injury. A further carcase had been submitted by the farmer since with similar findings. This case highlights the relative fragility of the distal pharynx in sheep; and the need for training, and the care needed for routine treatments.

ALPACAS

Gastric ulcer

A 16-month-old alpaca was submitted for post-mortem examination to Kilkenny RVL. It had died unexpectedly after a mild diarrhoea. On gross post-mortem examination, there was a peritonitis associated with a perforated gastric ulcer in the C3 compartment, which is roughly the equivalent of an abomasum in the camelid digestive system. Gastric ulceration in new world camelids is not uncommon. Proposed causes of C3 ulceration include stress; stressors may be environmental, social or metabolic in nature. They may also be secondary to other disease (Whitehead, In Practice, Volume35, Issue6, June 2013, Pages 317-324).

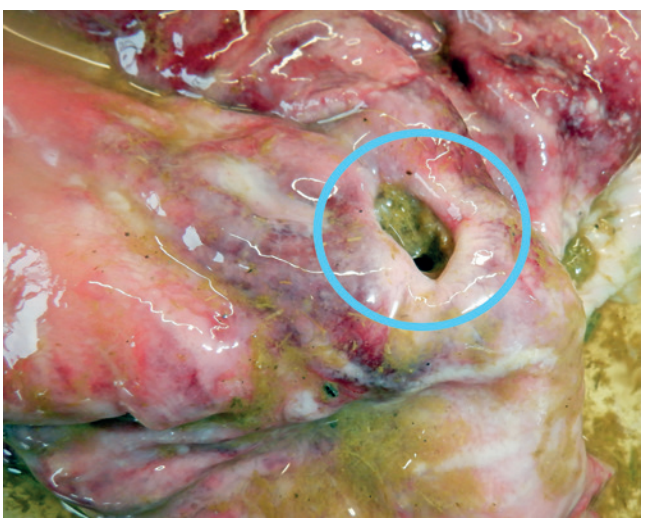

Figure 10: A perforated ulcer in the mucosa of the C3 stomach compartment of an alpaca. Photo: Maresa Sheehan.