

REGIONAL VETERINARY LABORATORIES REPORT

AUGUST 2022

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 426 carcasses and 35 fetuses during August 2023. Additionally, 1,817 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 August 2023.

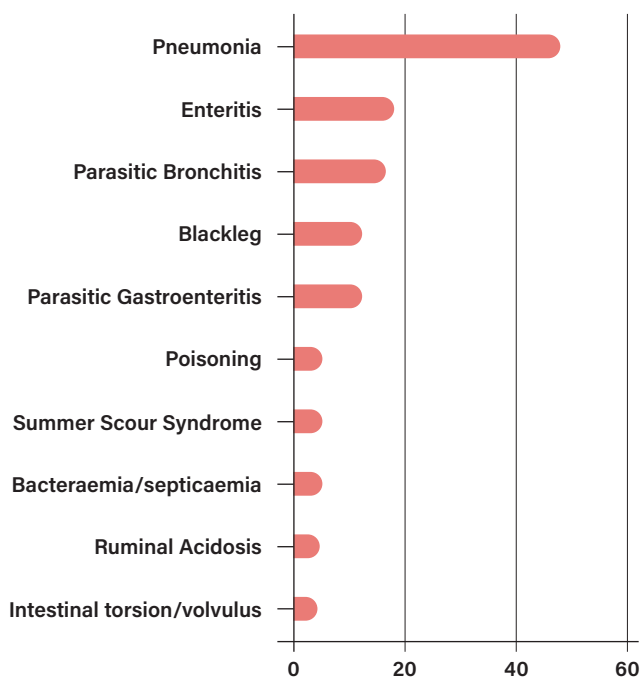
The objective of this report is to provide feedback to veterinary practitioners on the pattern of disease syndromes at this time of the year by describing common and highlighting unusual cases. Moreover, we aim to assist with future diagnoses, encourage thorough investigations of clinical cases, highlight the available laboratory diagnostic tools, and provide a better context for practitioners when interpreting laboratory reports.

Correction to the July 2023 report

The RVL monthly report contained an error in describing the detection of *Anaplasma marginale* in samples from a cow in a case of myocardial and renal abscessation. The pathogen detected was *Anaplasma phagocytophilum*, the causative organism of tick-borne fever in Irish farm animals. To date, *Anaplasma marginale* has not been detected in Ireland. We apologise for the error.

Cattle

Pneumonia and enteritis were the most common diagnoses



at necropsy in cattle in the RVLs during August 2023.

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

Gastrointestinal Tract

Intestinal torsion/volvulus

Athlone RVL examined a three-month-old calf with a history of having been found dead at pasture. There was marked abdominal distension due to distended, reddened loops of intestine with haemorrhagic contents and a gas-distended abomasum. There was a complete intestinal

torsion palpable. The lungs and liver were pale. Testing for *Clostridium perfringens* toxin proved negative and faecal cultures and parasitology yielded no significant results. The rumen pH was 5.3, whereas values generally should be > 5.5. Altered intestinal motility due to ingestion of a rapidly fermentable substrate e.g., concentrates, may predispose to intestinal volvulus. A conclusion of intestinal torsion was made.



Figure 1: Intestinal torsion or volvulus with distended, reddened loops of intestine and a gas-distended abomasum. Photo: Denise Murphy.

Respiratory Tract

Infectious bovine rhinotracheitis

Limerick RVL examined a second-lactation Friesian cow. There was a history of coughing in the dairy herd, particularly affecting first and second-lactation cows. This cow was coughing for two weeks, her milk supply had dried up and she had deteriorated rapidly in the previous few days. On necropsy, there were gross lesions of haemorrhagic tracheitis, severe and diffuse pneumonia and emphysema. Some lungworm larvae were seen in the airways of the caudal lobes. There were nodular and haemorrhagic lesions in the lungs and interlobular oedema.

Polymerase chain reaction (PCR) testing returned a positive result for bovine herpesvirus 1 (BHV1), the causative organism of infectious bovine rhinotracheitis (IBR), and *Trueperella pyogenes* was isolated from the lungs.



Figure 2: Tracheitis in a cow diagnosed with infectious bovine rhinotracheitis. Photo: Alan Johnson.

Pneumonia

A three-month-old calf with a history of sudden death was submitted to Sligo RVL. On post-mortem examination, there was severe fibrinous pericarditis and pleuritis. The lungs presented with severe cranioventral consolidation. On histopathology, there was diffuse, chronic, suppurative bronchopneumonia. Bronchi and alveolae were filled with mixed inflammatory infiltrate, mainly neutrophils and macrophages, and debris. *Mannheimia haemolytica* and *Pasteurella multocida* were detected by PCR. Bacterial pneumonia was diagnosed as the cause of death. However, an initial viral involvement cannot be ruled out.

Parasitic bronchitis



Figure 3: Adult *Dictyocaulus viviparus* (lungworm) present in the airways of a heifer. Photo: Denise Murphy.

Athlone RVL saw several cases of parasitic pneumonia ('hoose pneumonia') in weanlings throughout August. One case was in a six-month-old heifer with a history of sudden death. There was marked, bilateral, caudo-dorsal subpleural and interlobular emphysema and mild anteroventral pulmonary consolidation, and large numbers of *Dictyocaulus*

viviparus (lungworm) were found in the trachea and bronchial tree. Tests for respiratory viruses were negative and a weak positive *P. multocida* result was detected in the lungs by PCR. Histopathology of the lung showed changes consistent with parasitic bronchopneumonia.

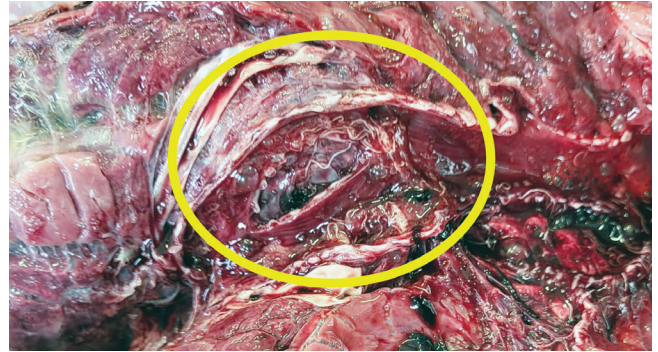


Figure 4: Adult lungworm present in the airways in a calf. Photo: Rebecca Froehlich-Kelly.

Sligo RVL diagnosed parasitic pneumonia in a four-month-old calf. The calf had been found dead and there was a number of further recent deaths in the group. On post-mortem examination, there was diffuse bilateral pneumonia and emphysema associated with the presence of adult lungworm in the airways. There was concurrent parasitic gastroenteritis associated with strongyle infestation and a segmental coccidiosis. *M. haemolytica* was also detected in the lung lesions.



Figure 5: Severe adult *Dictyocaulus viviparus* (lungworm) burden in the trachea of a calf. Photo Shane McGettrick.

An eight-month-old weanling with respiratory and diarrhoeic signs was submitted to Kilkenny RVL. The animal was very dehydrated. There was a heavy lungworm infection in the trachea and the lungs, and there were focal areas of lung consolidation. *M. haemolytica* and *P. multocida* PCR-positive results were obtained. A review of parasite control was recommended.

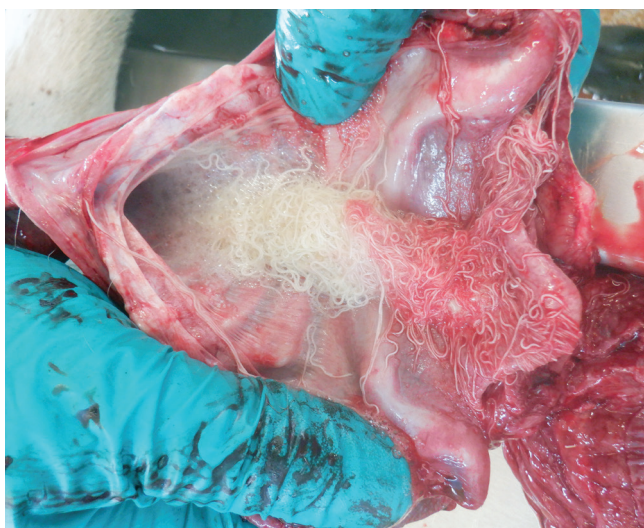


Figure 6: A heavy lungworm burden in the cranial trachea. Photo: Aideen Kennedy.

Urinary/Reproductive Tract Bovine Abortion

Dublin RVL investigated an abortion, the second of the breeding season from a small suckler herd. No vaccinations had been used. On gross post-mortem examination, the placenta presented with marked oedema, fibrosis, congestion and thickening of the intercotyledonary areas. There were multifocal circular areas, measuring approximately 0.5-1.5cm, of haemorrhage and necrosis. The liver was increased in size with rounded edges and diffusely orange in colour. The carcass was diffusely pale. *Bacillus licheniformis* was isolated from the placenta. Histopathological examination of the placenta revealed multifocal necrotising and bacterial placentitis. The bacteria were filamentous and consistent with the isolation of *B. licheniformis*. *B. licheniformis* is most commonly diagnosed in housed, silage-fed, spring-calving beef cows in the last two months of gestation and because of that, can be associated with the ingestion of poorly conserved forage. In this case, it was not clear if the animal was at pasture or on silage at time of infection. This case illustrates the importance of submitting placenta (as well as the foetus and a maternal blood sample) when investigating abortions.

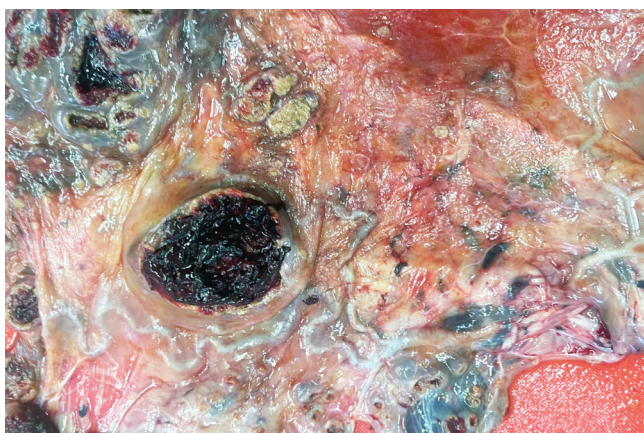


Figure 7: Necrotising placentitis from *Bacillus licheniformis* infection in a bovine abortion. Photo: Sara Salgado.

Myoglobinuria

Limerick RVL examined a Friesian heifer with a history of inappetence, recumbency, and passing red urine, with no response to veterinary treatment, and there had been convulsions observed prior to death. On necropsy, the liver had an orange colour, and the urine was dark brown in colour. A sample tested positive for myoglobinuria on immunohistochemistry on fixed kidney tissue. Myoglobinuria, in the form of brown or brownish-red urine, may be seen with severe myopathies due to physical causes such as trauma, crush injury, heatstroke, hypothermia, seizures, strenuous exercise, and prolonged immobility, as seen in 'downer cows'. Non-traumatic causes include hypoxic injury, metabolic disturbances, genetic disorders, infections, drugs, toxins and diffuse nutritional myopathy involving the heavy muscle groups in selenium deficiency (white muscle disease). Care must be taken not to mistake myoglobinuria with haemoglobinuria, which has a different pathogenesis and differential diagnoses. The cause of the myoglobinuria in this case has not been determined.



Figure 8: Brown urine from a case of myoglobinuria. Photo: Brian Toland.

Cardiovascular System

Babesiosis

A seven-year-old cow was submitted to Limerick RVL with a history of suddenly starting to display severe aggression, before dying within a few hours. Necropsy disclosed port wine-coloured urine in the bladder. PCR testing of the spleen detected *Babesia divergens*, the causative organism of the haemolytic disease babesiosis ('red water'). A diagnosis of babesiosis was made. During the terminal stage of this disease, affected animals are hypoxic; while this most commonly presents as weakness, and often recumbency, some individuals may show excitability or aggressive behaviour due to hypoxic effects on the brain.

Pericarditis

A three-year-old cow was euthanised and submitted to Kilkenny RVL to investigate a suspected heart problem. On examination, there was a severe, fibrinous pericarditis. There was marked hypertrophy of the ventricular walls and there were multifocal random abscesses within the myocardium. There was multifocal embolic pneumonia. The liver had a mottled 'nutmeg' appearance. *T. pyogenes* was cultured from multiple organs indicating a bacteraemia. No wire

was identified in the reticulum. However, given the findings, the previous involvement of a foreign body could not be excluded.

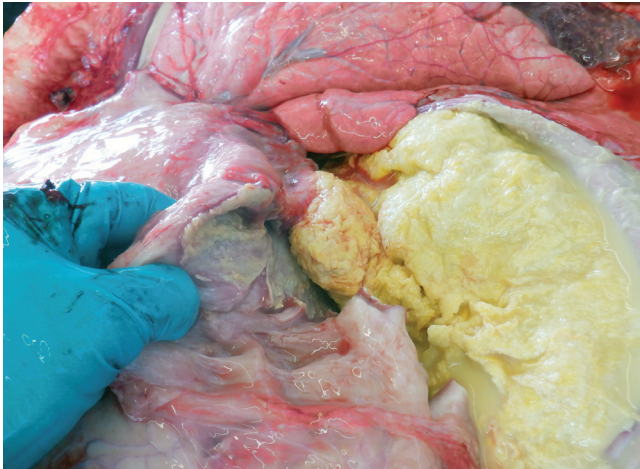


Figure 9: Severe fibrinous pericarditis. Photo: Aideen Kennedy.

Musculoskeletal Clostridial myositis/Blackleg



Figure 10: Dark red to black necrotising myositis, typical of blackleg, in a calf. Photo: Shane McGettrick.

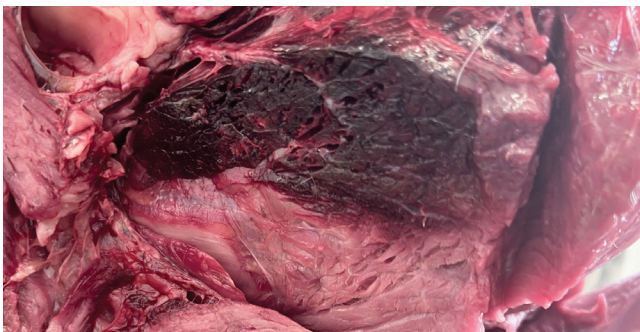


Figure 11: Necrotising myositis typical of blackleg in a calf. Photo: Shane McGettrick.

Sligo RVL diagnosed necrotising myositis ('blackleg') in a four-month-old calf. The calf had been found dead. On necropsy, there was locally extensive, gangrenous myositis of the medial musculature of the right foreleg which exuded a characteristic sickly-sweet smell upon incision. *Clostridium*

chauvoei was detected by fluorescent antibody technique (FAT) on an impression smear of the lesion.

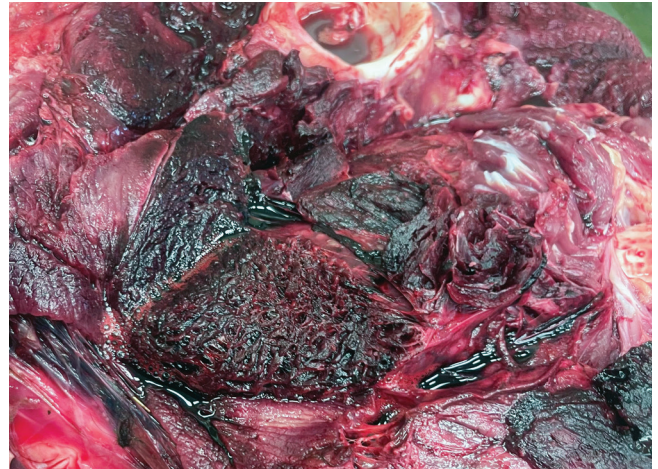


Figure 12: Clostridial myositis ('blackleg') lesions in a weanling. Photo: Sara Salgado.

Dublin RVL investigated a sudden death of an eight-month-old beef weanling, the second one of the cohort to die. The animal was seen the day before, and was described as being "off form". In the morning it was still alive, so the farmer brought it indoors and one hour later, before the PVP arrived, the animal was dead. On gross post-mortem examination, there were patches of dark red and dry musculature with emphysema in the large muscles of the right rump. There were heavy fibrin deposits in the pericardial sac. The myocardium was enlarged with multifocal to coalescing haemorrhagic foci. *C. chauvoei* was detected by FAT on smears taken from the affected skeletal muscle and myocardium. It was also isolated on culture from the liver, affected skeletal muscle and myocardium. Vaccination of the cohorts with a multivalent clostridial vaccine and, if possible, their removal from the present pasture was recommended. During last month, Dublin RVL diagnosed three different cases, from three different origins of clostridial myositis all caused by *C. chauvoei*, the causative pathogen of blackleg.

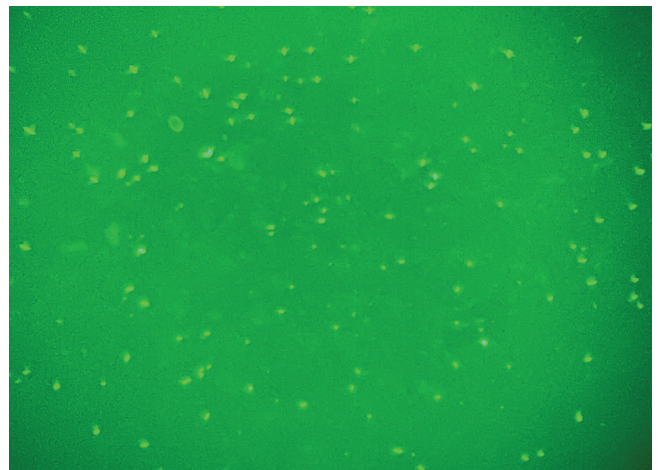


Figure 13: Photomicrograph of a fluorescent antibody test (FAT) positive for *Clostridium chauvoei*. Photo: Sara Salgado.

Poisonings Copper toxicity

A five-month-old calf that had developed anorexia prior to

death was submitted to Kilkenny RVL. On gross examination, the carcass was jaundiced. The liver was rounded and very jaundiced. The kidneys were dark-to-black, and the urine was port wine-coloured. The lungs were oedematous and jaundiced. Liver and kidney copper concentrations were high, indicating copper toxicosis, and a review of copper supplementation was advised.



Figure 14: Icteric (jaundiced) liver, dark kidney and port wine-coloured urine from a calf diagnosed with copper toxicosis. Photo: Aideen Kennedy.

Miscellaneous Neoplasia

A nine-year-old cow which had been presented with respiratory distress, frothing and weight loss in the three weeks prior to euthanasia was submitted to Sligo RVL. On gross post-mortem examination, a round mass approximately 3cm in diameter was discovered in the left dorsal nasal conchae. The surrounding mucosa presented with multiple haemorrhages and erosions. There was a large blood clot extending from the caudal nasal passage into the larynx. The upper larynx was swollen. Petechiae were present in the trachea. Histopathology of the lesion revealed a fibrous haemorrhagic mass, containing dilated vessels and areas of severe haemorrhage. Multifocally within the fibrous stroma of the mass, there were nests of neoplastic epithelial cells with variable keratinisation. Squamous cell carcinoma and subsequent haemorrhage was diagnosed.

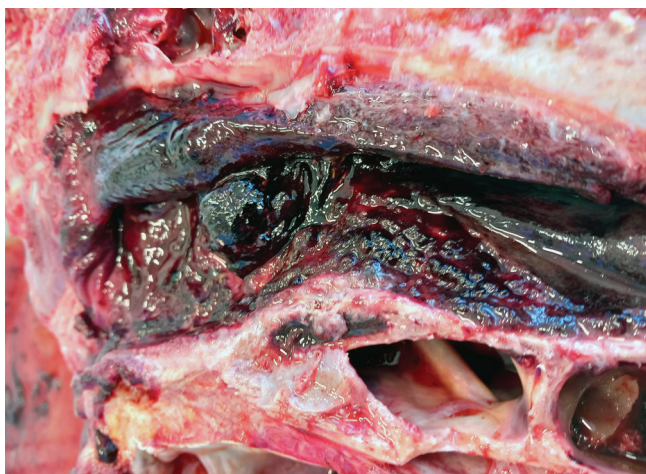


Figure 15: Squamous cell carcinoma in the nasal conchae of a cow. Photo: Rebecca Froehlich-Kelly.

Systemic fungal infection

Athlone RVL examined a three-month-old calf with a history of illness of three weeks' duration, it was treated repeatedly with no response and died. There were multifocal 1-4mm circular cream lesions throughout the liver parenchyma. The small intestines contained grey, pasty, putty-like contents and there were multifocal abscesses on the ileal and caecal mucosa, and some were transmural. The large intestinal contents were scant and dry. There was bilateral abscessation of the larynx and multiple 1mm red circular ulcers and fibrin on the oesophageal mucosa. *Escherichia coli* was cultured from the liver. PCR tests for viral and protozoal pathogens were negative. Histopathology showed a systemic mycotic infection in the spleen, liver and kidney. There was also a multifocal ulcerative colitis with colitis cystica profunda, thrombosis and depletion of gut-associated lymphatic tissue (GALT) and pulmonary thrombosis. The cause of death was diagnosed as systemic mycotic infection.



Figure 16: Multifocal pale hepatic lesions in the liver of a calf with a systemic mycotic infection. Photo: Denise Murphy.



Figure 17: Ulcerative colitis in a calf with a systemic fungal infection. Photo: Denise Murphy.

Selective Dry Cow Therapy Risks

Selective dry cow therapy carries risks that need to be considered and managed carefully. If internal teat sealant (ITS) only is being used on cows, it is vitally important to practice a rigid, high standard of hygiene to avoid the introduction of environmental pathogens such as *E.coli*, which can cause severe illness. Animals may suffer acute infection, or the bacteria may persist and cause clinical mastitis around calving. Endotoxic shock can rapidly develop and the response to therapeutic intervention can be mixed.



Figure 18: Cleaning and disinfecting of teats prior to administering dry cow therapy. Photo: Teagasc.

A comprehensive hygienic approach is necessary with ITS administration and the technique required for ITS use alone is more exacting and demanding than that employed for administering DCT.



Figure 19: Hygienic administration of dry cow therapy. Photo: Teagasc.

Sheep

Parasitic gastroenteritis and pulpy kidney disease were the most common diagnoses at necropsy in sheep in the RVLs during August 2023.

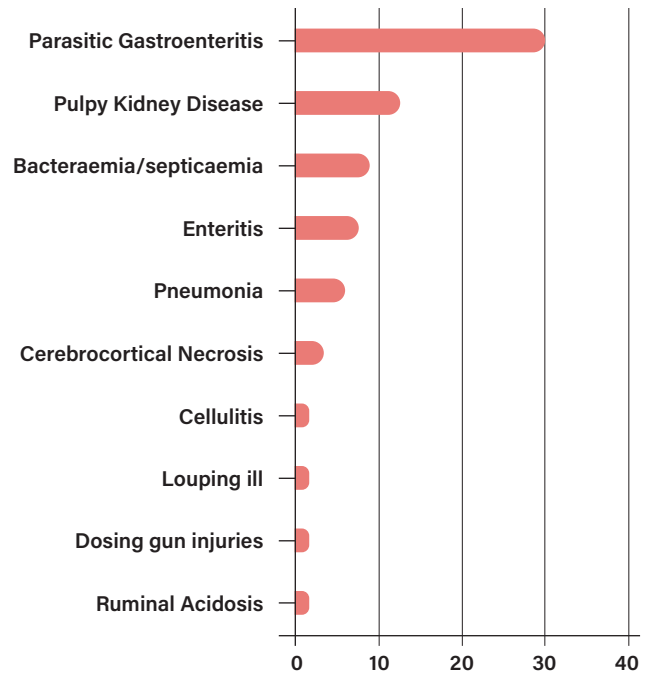


Table 2: The most common diagnoses in sheep submitted for necropsy in August 2023.

Gastrointestinal Tract

Parasitic gastroenteritis

A five-month-old lamb was submitted to Limerick RVL with a history of ill-thrift. Necropsy disclosed faecal staining all over hind quarters and torso, and fluid intestinal contents. Very mild congestion of the lateral margins of the lungs was also noted. A faecal egg count of 2,100 strongyle eggs per gram (EPG) and 500 *Strongyloides* EPG were reported. Histopathology disclosed signs of enteritis, and pulmonary and hepatic congestion. A diagnosis of parasitic gastroenteritis was made.

Traumatic pharyngeal laceration ('dosing gun injury')

Athlone RVL examined a six-month-old lamb with a history of sudden death. Its body condition was moderate to poor, and it weighed 20.5kg. The conjunctiva were pale. There was a blood clot in the mouth and a large, necrotic, foul-smelling lesion on the left side of the pharynx with a large associated blood clot. There were multiple, variably-sized blood clots in the rumen and reticulum. There was a history of the lamb having been dosed 10 days previously. A diagnosis of necrotic pharyngitis and haemorrhage secondary to a dosing gun injury was made.



Figure 20: Necrotic pharyngitis, a sequel to injury of the pharynx with a dosing gun. Photo: Denise Murphy.

Retropharyngeal abscessation

Sligo RVL received the carcass of a ewe with a history of foul-smelling nasal discharge, crackling lung fields, sunken eyes, and a fluid-filled abdomen. On post-mortem examination, there was extensive purulent cellulitis tracking dorsally along the oesophagus up to the thoracic inlet. *Streptococcus* spp. was cultured. This pattern of injury is quite common, together with retropharyngeal abscessation, in sheep, and commonly associated with dosing gun injuries.



Figure 21: Retropharyngeal suppurative infection in a ewe. Photo: Rebecca Froehlich-Kelly.

Acute fasciolosis

Sligo RVL received a one-year-old ram which suddenly died after transport and dosing. On necropsy, there was diffuse parasitic hepatitis associated with a myriad of haemorrhagic tracts of migrating immature *Fasciola hepatica*. The intestines were diffusely expanded with fluid ingesta. There was segmental coccidiosis. Acute fasciolosis and parasitic gastro-enteritis was diagnosed.

'Pulpy kidney disease'

Sligo RVL diagnosed several cases of pulpy kidney disease, caused by *C. perfringens*. In one of those, a four-month-old lamb was found recumbent and shaking before death. On post-mortem examination, there was a serous pericardial effusion with clots likely causing cardiac tamponade. Large numbers of *C. perfringens* bacteria were present in the intestinal contents and highly pathogenic epsilon toxin was detected by a clostridial enterotoxin ELISA. There was concurrent parasitic gastroenteritis associated with strongyle infestation and a segmental coccidiosis. DNA specific to *A. phagocytophilum* ('tick-borne fever') was detected systemically by PCR technique. This was a typical presentation.

Intestinal adenocarcinoma



Figure 22: Gross lesions of intestinal adenocarcinoma in a ewe. Photo: Maresa Sheehan.

The ongoing RVL Thin Ewe Survey, which allows for the investigation of possible causes of ill-thrift in up to three ewes from a flock, free of charge, has revealed some interesting diagnoses. One ewe that was submitted to Kilkenny RVL was diagnosed with intestinal adenocarcinoma. Intestinal adenocarcinoma is relatively common in sheep in New Zealand, the UK, and other countries. There is a high prevalence in breeds used for fat lamb production. The cause of the increased prevalence is unknown but may be related to exposure to bracken fern (*Pteridium* sp.) or other unidentified carcinogens. Tumours occur mainly in animals greater than five years of age. Clinically affected sheep lose weight and may have abdominal distension.

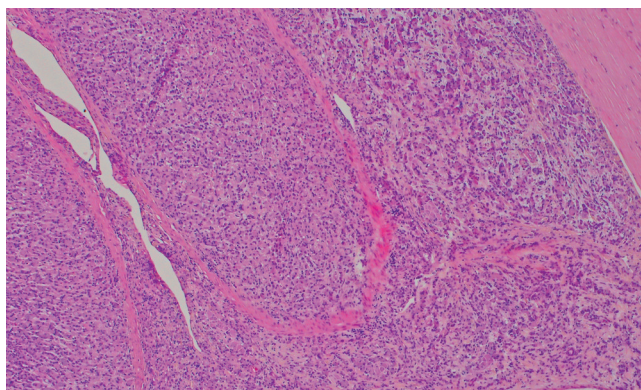


Figure 23: Histological lesions of an intestinal adenocarcinoma. Photo: Maresa Sheehan.

Respiratory Tract

Ovine Pulmonary Adenomatosis

Another ewe submitted to Kilkenny RVL as part of the Thin Ewe Survey was diagnosed with ovine pulmonary adenomatosis (OPA or jaagsiekte). This is one of the 'iceberg diseases' of sheep, where the number of animals showing clinical signs represent the 'tip of the iceberg', i.e., a fraction of the number in the flock with subclinical disease. Other 'iceberg diseases' include Johne's disease, border disease, caseous lymphadenitis, and maedi-visna. These diseases are refractory to treatment and control options must include culling of affected sheep. It is important to recognise these diseases in sheep flocks and establish control programmes

as they can have serious consequences for animal health and welfare, and productivity.

Chronic pneumonia

An 11-week-old lamb that had suffered from poor thrift and diarrhoea before death was submitted to Kilkenny RVL. There was a severe fibrinous pleuritis and pneumonia. There were multifocal random purulent abscesses and necrotic foci in the lungs. No agent was isolated from the lungs, likely due to the chronicity of the lesions or recent antimicrobial treatment. *A. phagocytophilum* (tick-borne fever) PCR results were negative. Submission of further samples was recommended if other cases occurred.

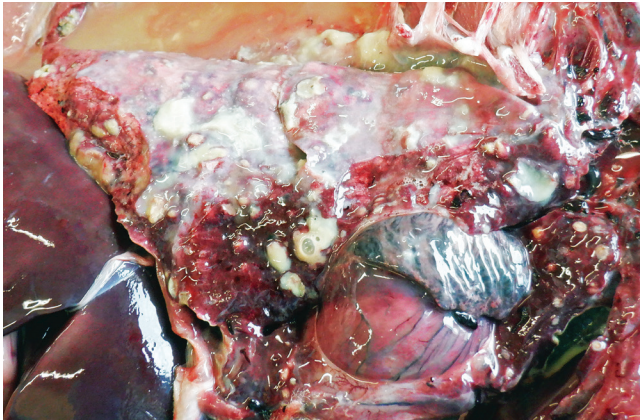


Figure 24: Chronic pneumonia with purulent and necrotic foci. Photo: Aideen Kennedy.

Nervous System Meningitis/pneumonia

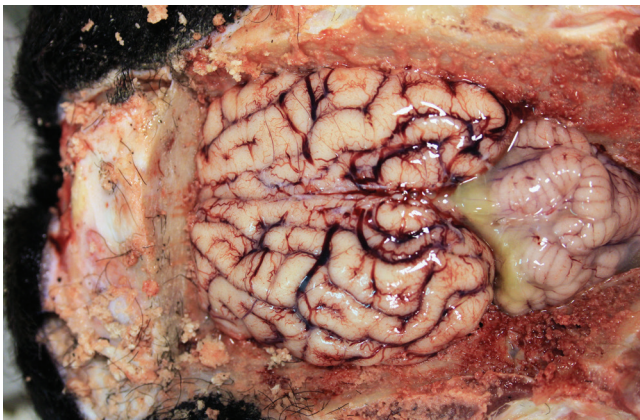


Figure 25: Fibrinous meningitis in a lamb. Photo: Denise Murphy.

Athlone RVL examined a five-month-old lamb with a history of having been found dead. There was bilateral, anteroventral, fibrinous pleurisy and pneumonia with multifocal abscesses extending into all lung lobes. The spleen was enlarged, and the liver and kidneys were congested. There was fibrin on the meninges between the cerebrum and cerebellum, and the meningeal vessels were congested. *T. pyogenes* was cultured from lung abscesses and *P. multocida* was detected in the lungs by PCR. A moderately high (800EPG) strongyle egg count was detected in faeces and the PCR for *A. phagocytophilum* was negative. There was a severe, diffuse, suppurative meningitis and a fibrinosuppurative bronchopneumonia with abscessation on histopathology.

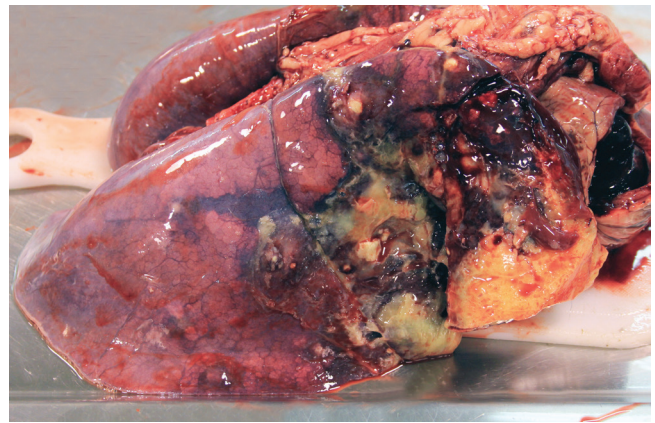


Figure 26: Fibrinous pleuropneumonia in a lamb. Photo: Denise Murphy.

Miscellaneous Sheep scab

Ovine psoroptic mange ('sheep scab') was diagnosed on skin scrapings from pruritic lambs with hair loss that were submitted to Kilkenny RVL. Sheep scab is an allergic dermatitis caused by a reaction to the faeces of the scab mite, *Psoroptes ovis*. Although the entire life cycle of the mite is spent on the sheep, these mites can also survive off the host and maintain infectivity for up to 16 days. Thus, fields or sheds which previously housed sheep scab-infested animals can only be considered mite-free areas if these locations have been kept free of sheep for more than 16 days. The treatment of sheep scab involves the use of either dips or injectable macrocyclic lactone anthelmintics. There are significant differences between the treatment options relating to the speed of action and persistence of action. Sheep scab is a notifiable disease.



Figure 27: *Psoroptes ovis*, the causative organism of sheep scab. Photo: Aideen Kennedy.

Megaesophagus

Sligo RVL received an eight-month-old lamb with a history of regurgitating and failing before euthanasia. On post-mortem examination, a megaesophagus was discovered containing vegetation. There was also evidence of regurgitation of material into the nasal sinuses. There was concurrent moderate parasitic gastroenteritis associated with strongyle infection. Megaesophagus is a rare condition which can occur either congenitally or as a result of trauma and has been described in several species, including dogs and cattle, and is considered rare in small ruminants.

Horses

Parasitic gastroenteritis

A nine-week-old foal was submitted to Sligo RVL. The foal had presented with diarrhoea and swollen fetlocks in the days prior to death. The dam also had presented with diarrhoea but recovered. On post-mortem examination, intestinal walls appeared thin and intestinal contents were soft. There were petechiae present on the spleen. There was pleural effusion and mild pleuritis. The lungs were congested. There was mild oedema and mild tendonitis in the right fetlock. Faecal flotation tests identified a burden of 2,600EPG *Strongyloides westeri* eggs. This is considered a significant burden given clinical signs described. Histopathology diagnosed diffuse, acute, severe parasitic gastro-enteritis with large amounts of parasitic cross sections present in the lumen and mucosa of all sections of intestines examined. Acute parasitic gastro-enteritis was diagnosed as the cause of death. The other findings are most likely attributed to a protein-losing enteropathy due to the parasitic burden as well as secondary septicaemia.

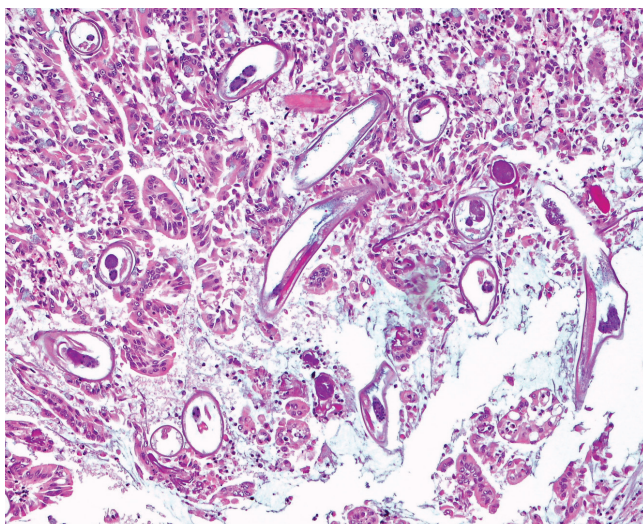


Figure 28: Cross-section view of nematodes in the intestinal lumen of a foal. Photo: Rebecca Froelich Kelly.

Two trotter foals were submitted to Limerick RVL from a farm with a history of high mortality in foals. A foal previously submitted to the Irish Equine Centre had tested positive for *Salmonella* sp. The first was a one-month-old foal. It had had diarrhoea two weeks previously, was treated but did not improve, weakened, and died. A very high number of *Strongyloides* eggs (>40,000EPG) was detected in the faeces. *S. westeri* can cause clinical signs of diarrhoea and weight loss in young foals.

Salmonellosis

The second foal from the above holding was a two-month-old foal that was found dead. On necropsy, it had fluid intestinal contents, enlarged mesenteric lymph glands, and splenomegaly. Pulmonary and hepatic congestion was seen. All organs cultured positive for *Salmonella* Bovismorbificans. *Salmonella* Bovismorbificans is occasionally isolated in Ireland but is more commonly isolated in New Zealand. It has been occasionally associated with human infection (zoonotic disease), so hygienic practices are important in preventing zoonotic transfer.