

# Regional Veterinary Laboratories Report

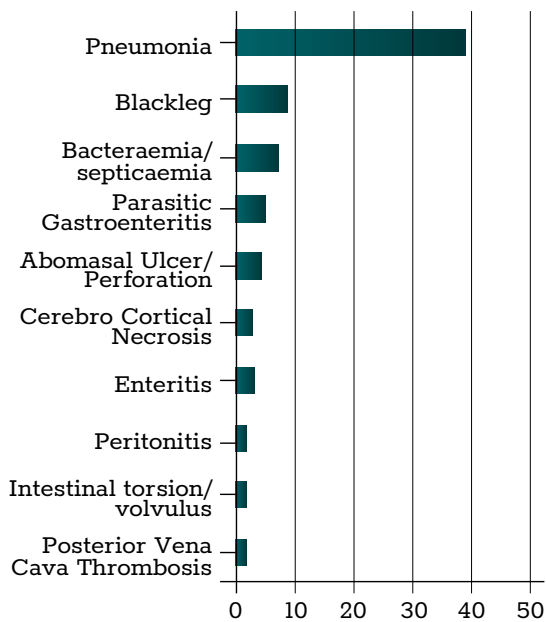
September 2022

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 443 carcasses and 37 fetuses during September 2022. Additionally, 1,819 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 September 2022.

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 blackleg were the most common diagnoses at necropsy in cattle in the RVLs during September 2022.



**Table 1: The most common diagnoses in cattle submitted for necropsy in September 2022.**

## GASTROINTESTINAL TRACT

### Parasitic gastroenteritis

A three-month-old calf was submitted to Limerick RVL for necropsy. This calf had not thrived well since arrival on the farm, where there had been four other calf deaths. The calf was treated with an anthelmintic a few days prior to death. Gross findings included poor body condition and a deep red, roughened abomasal mucosal surface. There was chronic consolidation of the cranial and middle lung lobes suggestive of historic pneumonia. Parasitological examination of a faecal sample showed a strongyle egg count of 3,200 eggs per gram (EPG). A small number of coccidial oocysts were also seen. A diagnosis of parasitic gastroenteritis (PGE) was made. The pneumonia lesions were chronic in nature and may have contributed to the poor thrive of the calf.



**Figure 1: The abomasal mucosa of a calf showing the 'Morocco leather' appearance associated with parasitic gastroenteritis. Photo: Alan Johnson.**

## RESPIRATORY TRACT

### Pneumonia

A yearling heifer was off food and dull. She didn't respond to treatment and was sent to Kilkenny RVL. There were approximately 10 litres of straw-coloured fluid in the thoracic cavity. There was a severe fibrinous pleuritis and fibrinous pneumonia. There were adhesions to the thoracic wall and to the pericardium. There was marked distension of the interlobular septae with fibrinous oedema. Approximately 40-50 per cent of the lungs were consolidated cranioventrally. *Mannheimia haemolytica* was detected by culture. Positive polymerase chain reaction (PCR) results for *M. haemolytica*, *Pasteurella multocida* and *Mycoplasma bovis* were also obtained.



**Figure 2: Fibrinous pneumonia with marked distension of the interlobular septae. Photo: Aideen Kennedy.**

A seven-month-old Friesian-cross weanling was submitted to Limerick RVL from a suckler herd with a calf-to-beef enterprise. There was a history of coughing and diarrhoea in the group for the previous week. The animal had been treated with levamisole and oxyclozanide and appeared to improve for a short time but relapsed and died. There were two other sick animals in the group. Severe pneumonia involving 60 to 70 per cent of the lung was observed at necropsy. The cranial and middle lobes were most severely affected. Blood and purulent material were found in the airways, and no lungworm larvae were seen. PCR results were positive for *Histophilus somni* and *M. haemolytica*. Culture disclosed the presence of *Trueperella pyogenes*.

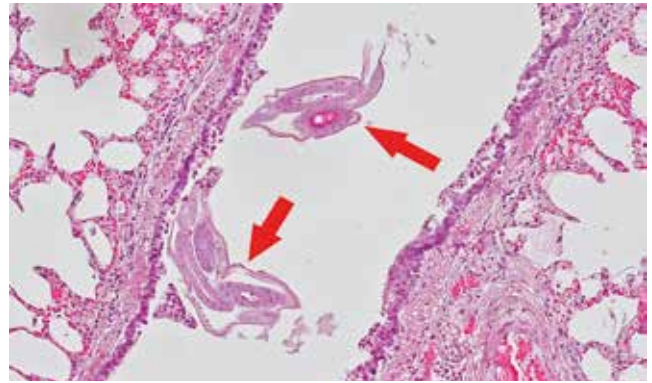
A six-month-old weanling with dyspnoea failed to respond to antibiotic treatment and was submitted to Kilkenny RVL. The pleura was adherent to the thoracic wall and there was cranioventral consolidation affecting 40-50 per cent of lung tissue. There was multifocal purulent abscessation in the consolidated region. *Bibersteinia trehalosi* was cultured from the lung and PCR results were positive for *Mycoplasma bovis*. A review of respiratory disease control was recommended. Chronic pneumonia was diagnosed.



**Figure 3 : Chronic pneumonia in a calf. Photo:Aideen Kennedy.**

#### Parasitic bronchitis (Hoose)

Athlone RVL examined a pregnant two-year-old heifer with a history of acute onset respiratory distress and heavy panting. The initial response to treatment was not sustained and the heifer died and was submitted for necropsy. Bilaterally in the lungs there was severe interlobular and subpleural ('ground-glass') emphysema. There were multifocal bullae, (approx. 4cm), on the lateral aspects of the lungs. There was miliary petechiation of the tracheal mucosa with multifocal blood clots in the bronchial tree. Bilaterally within the bronchioles, there were abundant lungworms (*Dictyocaulus viviparus*). Histopathological review of the lung demonstrated severe, diffuse hyaline membrane formation with severe, diffuse infiltration of the alveoli and bronchioles with eosinophils, oedema, neutrophils, and parasitic life stages. There was no record in the history of the animal of dosing during this grazing season. A review of the parasite control programme and pasture management on farm was advised.



**Figure 4: *Dictyocaulus viviparus* (arrows) in the airway of a heifer with acute onset respiratory distress. Photo: Aoife Coleman.**

Sligo RVL saw patent parasitic pneumonia in September across all age groups from four-month-old calves to two-year-old heifers.

### URINARY/REPRODUCTIVE TRACT

#### Protozoan abortion

A number of mid-term abortions (five to seven months' gestation) in bovines were submitted for examination to Kilkenny RVL. On histopathological examination, a number of these have multifocal areas of inflammation with necrosis. The lesions seen are suggestive of protozoan infection and *Neospora caninum* has been detected by PCR in a number of these cases.

### CARDIOVASCULAR SYSTEM

#### Vegetative endocarditis

A three-year-old dairy cow was found dead with no record of previous clinical signs and submitted to Kilkenny RVL. There was a vegetative endocarditis on the atrioventricular cardiac valve. In the wall of the thoracic cavity, there was an abscess and suspected osteomyelitis affecting one rib, and the thoracic wall beneath this area was congested/hyperaemic. The lesion was chronic. There was no evidence of an external wound at this site. There was a mild pleuritis on the area of lung below the rib lesion. PCR positive results for *H. somni* were obtained from the lung. Vegetative endocarditis was diagnosed. Vegetative endocarditis typically occurs secondary to bacteraemia; the chronic rib lesion may have acted as the source of inflammation.



**Figure 5: Vegetative endocarditis on the atrioventricular valve. Photo: Aideen Kennedy.**

### Traumatic reticulomyocarditis

Sligo RVL diagnosed trauma induced myocardial abscessation in a seven-month-old calf that had a penetrating foreign body (6cm wire) still present in the lesion. There was a continuous fibrous adhesion and fistula connecting the reticulum to the pericardium through the diaphragm. *T. pyogenes* was isolated from the lesion.



**Figure 6:** A metal wire penetrating the myocardium causing abscessation (left). Photo: Colm Ó Muireagáin.

### Vena cava thrombosis

Athlone examined a 21-month-old bullock that had been found dead. Carcase preservation was extremely poor with advanced tissue autolysis. There was a large abscess in the liver that had infiltrated the wall of the caudal vena cava resulting in a septic thrombus. There were multifocal randomly distributed abscesses in the lungs, bilaterally. A diagnosis of posterior vena cava thrombosis and multifocal pulmonary abscessation was made. The pulmonary abscessation occurs as the result of septic embolism of the pulmonary arterial vascular system arising from the septic thrombus in the caudal vena cava. The most common cause of vena caval thrombosis in cattle is ruminal acidosis leading to mycotic rumenitis, loss of integrity of the ruminal mucosa, and subsequent hepatic abscessation.

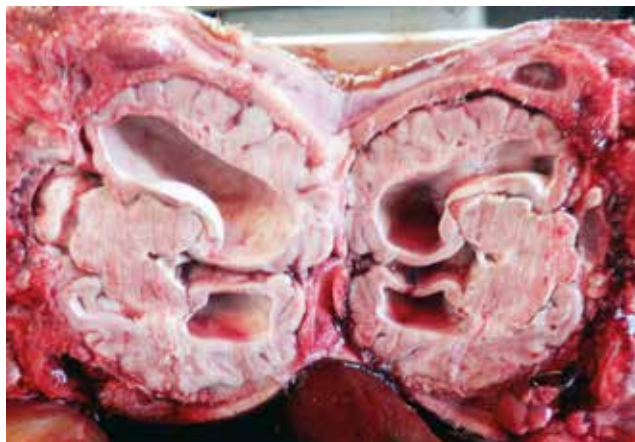


**Figure 7:** Posterior vena cava thrombosis. Photo: Denise Murphy.

## NERVOUS SYSTEM

A full-term stillborn calf was submitted to Kilkenny RVL. On post-mortem examination, there was mild doming of the skull externally, and internally, there was a cleft palate and hydrocephalus. The limbs appeared normal. On

histopathology, there was moderate cerebral oedema and rarefaction. The lateral ventricles were diffusely, markedly dilated. The foetus tested negative for likely teratogenic viruses that can be associated with these lesions i.e., Schmallenberg virus and BVD.



**Figure 8:** Dilated lateral ventricles in the brain of a full-term bovine stillbirth. Photo: Aideen Kennedy.

### Cerebrocortical necrosis

A seven-month-old Friesian male weanling was submitted to Limerick RVL with a history of recumbency with neurological signs, and plant poisoning was suspected. Three animals had died previously. Upon necropsy, the brain displayed fluorescence under ultraviolet illumination from a Woods Lamp. The rumen contained wet green forage, with no evidence of toxic plants or leaves seen. The intestines displayed segmentally hyperaemic mucosa with loose green contents. The strongyle egg count was 1,050EPG. Upon histopathological examination of the brain, there was focally extensive, pan-laminar neuronal necrosis throughout the cerebral grey matter. The necrotic neurons were characterised as shrunken, angular, hypereosinophilic with variable karyorrhexis and karyolysis. Multifocally, there was moderate to marked neuropil rarefaction and vacuolation. The cortical blood vessels exhibited plump and reactive endothelium. Focally and extensively within leptomeninges were moderate to very large numbers of macrophages (gitter cells). Multifocally, the cerebellum exhibited decreased numbers of Purkinje cells and multifocal neuronal necrosis. Diffusely, in the abomasal and intestinal mucosa, there were moderately increased numbers of eosinophils suggestive of parasitic enteritis. The main changes were seen within the brain and were consistent with cerebrocortical necrosis (CCN) which can involve a wide range of pathogeneses, including toxic, metabolic, dietary/nutritional and even infectious events. In addition to thiamine deficiency, some of the specific causes of CCN in ruminants include sulphur excess, and less commonly lead poisoning, salt poisoning (water deprivation), administration of levamisole or thiamine analogues such as amprolium, and ingestion of thiaminase-rich plants.

## POISONINGS

### Ragwort poisoning

A ten-year-old cow was submitted for necropsy to Limerick RVL. Gross examination disclosed a pale firm liver, suggestive

of fibrosis. Oedema of the abomasal mucosa and liquid intestinal contents were also found. Histopathology of the liver disclosed a large amount of collagen bundles and bile duct hyperplasia, with larger than expected hepatocytes (megalocytosis). These lesions are consistent with toxicity due to pyrrolizidine alkaloids or aflatoxin. The history on the farm suggests a higher likelihood of pyrrolizidine alkaloid toxicosis, or ragwort (*Senecio jacobea*) toxicity.

**MISCELLANEOUS**

**Malignant catarrhal fever**

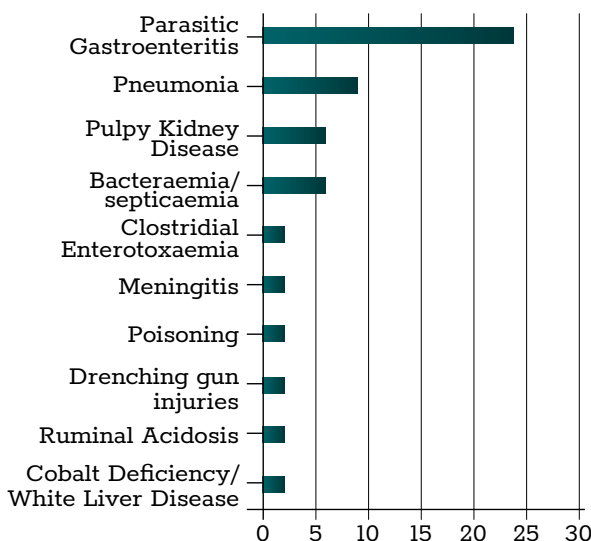
Athlone RVL examined a 15-month-old heifer with a history of having been sick for four-to-five days, with ocular keratitis/conjunctivitis, it received veterinary treatment without response and died. At necropsy, there was bilateral corneal opacity and crusting of the periorbital skin and conjunctiva. There were multifocal circular ulcers with a haemorrhagic outline present bilaterally on both sides of the tongue and on the hard palate. Severe haemorrhage, ulceration and necrosis of the pharyngeal mucosa, also extending down into the oesophagus, was observed. Similar ulcerative lesions were present on the tracheal mucosa. There was abomasal fold oedema and thickening and multifocal ulceration of the abomasal mucosa. Histopathology of the ulcerative lesions of the tongue and pharynx showed widespread arteritis and vasculitis; marked lymphoid proliferation and epithelial ulceration were seen which are consistent with malignant catarrhal fever (MCF). PCR for ovine herpesvirus 2 (OHV2), the causative organism of MCF, was positive confirming the diagnosis.

**Clostridial diseases**

Clostridial diseases diagnosed by Sligo RVL included black disease, blackleg and pulpy kidney disease.

**SHEEP**

Parasitic gastroenteritis and pneumonia were the most common diagnoses at necropsy in sheep in the RVLs during September 2022.



**Table 2: The most common diagnoses in sheep submitted for necropsy in September 2022.**

**GASTROINTESTINAL TRACT**

**Parasitic gastroenteritis (PGE) and pneumonia**

Athlone RVL examined a five-month-old lamb with a history of ill-thrift and diarrhoea. It was the sixth similar loss since the lambs were weaned in late July and there was a general lack of thrive in the group. They had been dosed with an ivermectin-based anthelmintic and been drenched with cobalt twice since weaning. Body condition was poor, weight 27kg. The carcass was very pale, pale conjunctiva, liver, kidneys and lungs. There was an abscess and consolidation in the right cranial lung lobe. Multiple thin, long worms were visible in the abomasal contents, and the small intestinal contents were very watery and the faeces soft. The abomasal worms were identified as *Haemonchus contortus* and *T. pyogenes* was isolated from the lung lesion. 3,600 strongyle eggs per gram were detected in the faeces. Liver mineral levels were within normal ranges. A diagnosis of PGE due to *H. contortus* and pneumonia was made, and a review of the anthelmintic programme was advised as resistance is common with *H. contortus* infection.

**Clostridial enterotoxaemia**

A nine-month-old lamb was submitted to Limerick RVL with a history of sudden death. Liquid intestinal contents were present at necropsy, also diffuse pulmonary congestion with the right lung more severely affected. Kidneys were soft and autolysed. An enzyme-linked immunosorbent assay (ELISA) detected *Clostridium perfringens* in the intestinal contents along with its alpha and epsilon toxins, confirming the presence of *C. perfringens* Type D. A diagnosis of *C. perfringens* Type D enterotoxaemia or pulpy kidney disease was made.

**RESPIRATORY TRACT**

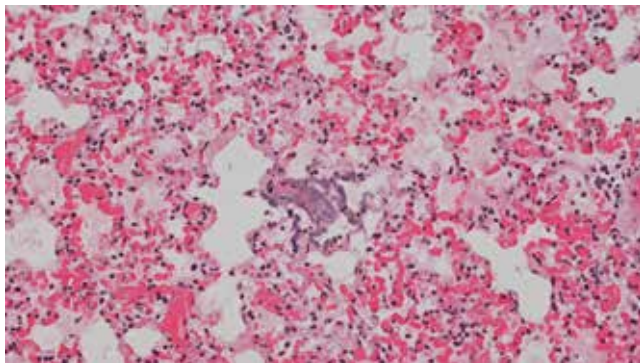
**Pneumonia and oesophagitis**

A number of lambs with pneumonia and oesophagitis were submitted to Kilkenny RVL with a history of sudden death or occasionally with a history of coughing in the flock. Laboratory tests have detected *B. trehalosi* and *M. haemolytica* from these lambs. Oesophagitis, pharyngitis, laryngitis and tonsillitis are occasionally observed in systemic or septicaemic forms of pasteurellosis in weaned lambs and are usually associated with *B. trehalosi* infection. It is thought that this bacterium is present in tonsil tissues of clinically healthy lambs, with septicaemia and associated lesions developing subsequent to a period of stress. On histopathological examination of lungs in some of these animals, we see an interstitial pneumonia with intralesional bacteria, consistent with a bacteraemia or septicaemia. A review of *Pasteurellaceae* control and management of any co-morbidities e.g., parasitic gastroenteritis, is recommended.



**Figure 9: Oesophagitis in a lamb in which pneumonia was also diagnosed. Photo: Maresa Sheehan.**

Sligo RVL cultured *B. trehalosi* from a myocardial abscess in a two-year-old ewe with no indications of traumatic inoculation. This is likely to be another presentation of *B. trehalosi* septicaemia. *B. trehalosi* was the primary agent isolated in two cases of pneumonia and two cases of bacteraemia, with sepsis, in sheep.



**Figure 10: Pulmonary tissue displaying lesions of interstitial pneumonia associated with *Bibersteinia trehalosi* infection. Photo: Maresa Sheehan.**

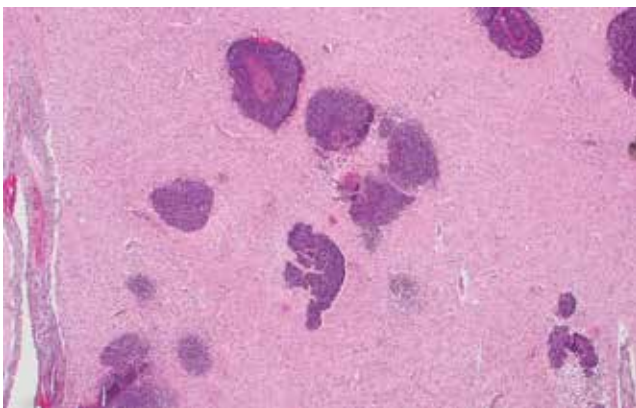
### NERVOUS SYSTEM

#### Louping ill

Sligo RVL had two cases of viral encephalomyelitis due to Flavivirus infection ('Louping ill') in September. One was in a three-year-old ewe and the other in a six-month-old lamb. Both carcasses were infested with *Ixodes ricinus* (castor bean ticks). Other tick-associated diseases diagnosed by Sligo RVL in September included: Anaplasmosis (tick-borne fever), Babesiosis (red water) and tick pyaemia.

#### Tick pyaemia

A five-month-old lamb, observed to be drooling the day previous to death, was submitted to Limerick RVL. Necropsy disclosed pulmonary congestion, more marked in the right lung. Enlargement of the lymph nodes in the head and thorax was present. Histopathology of the brain disclosed severe abscessation in the cerebrum, cerebellum and brainstem. These findings are characteristic of tick pyaemia, a *Staphylococcus aureus* infection spread by tick bites. A diagnosis of tick pyaemia was made.



**Figure 11: Abscessation in the brain characteristic of tick pyaemia. Photo: Ian Hogan.**

### POISONINGS

#### *Pieris* (andromedatoxin) poisoning

Sligo RVL diagnosed Rhododendron poisoning (andromedatoxin) in an 18-month-old hogget that gained access to *Pieris japonica* shrubs in a garden. The reticulo-rumen contained a substantial amount of the half-chewed leaves.

### OTHER SPECIES

#### Egg peritonitis

A 15-month-old hen was submitted to Kilkenny RVL. There had been some vent pecking and feather loss in the other birds in this backyard flock. On examination, there was a fibrinous peritonitis. There were multiple adhesions between the intestines. There was one large-shelled egg and multiple suspect follicles visible. *Escherichia coli* was cultured from multiple organs and histopathology indicated a bacterial peritonitis. A diagnosis of egg peritonitis was made. Egg peritonitis is a common cause of sporadic death in layers or breeder hens and is caused by reverse movement of albumen and *E. coli* bacteria from the oviduct into the abdomen. Antibiotic treatment is usually ineffective. Overfeeding broiler breeder hens during sexual maturation can cause larger outbreaks in flocks, while, in general, prevalence of the condition tends to spike at the beginning and end of lay.



**Figure 12: Egg peritonitis in a hen from a backyard flock. Photo: Aideen Kennedy.**

### FIELD VISITS

Limerick RVL carried out a field visit to investigate high incidence of mastitis in a high-yielding dairy herd. A small number of milk samples collected from affected cows had yielded a pure growth of *Serratia marcescens*. During the visit, it was established that pre-milking teat spraying had been introduced to try to tackle a separate mastitis issue earlier in the year. The product used contained 6,000ppm Chlorhexidine and 1,000ppm Amphoteric biocides. At that time, it was understood that *Streptococcus uberis* was the primary mastitis pathogen involved. Samples of the teat disinfectant were collected from all of the spraying guns and the 200-litre barrel of ready-to-use disinfectant solution used to supply the spray guns.



**Figure 13: Milking parlour with teat sprayers, samples from which culture positive for *Serratia marcescens*. Photo: Alan Johnson.**

All samples yielded a pure growth of *S. marcescens* in aerobic culture on blood agar in Limerick RVL. Mastitis associated with *S. marcescens* has been reported, often associated with environmental contamination or a point source, such as a teat disinfectant. *Serratia* spp. are gram-negative bacteria found commonly in the environment. The teat spray in use on this farm was a chlorhexidine product, licensed for both pre- and post-milking teat disinfection. On this farm, it was purchased as a ready-to-use product. Teat spraying was halted temporarily, and the lines were disinfected with a different chlorine-based disinfectant. The product was then reintroduced, and all appeared to be normal for a period. However, after a few weeks, samples collected from the teat spray guns again cultured positive for *S. marcescens*. At that stage, a decision was made to change to a teat disinfectant containing a different active ingredient. Chlorhexidine is not considered to be effective against *S. marcescens* and extended survival and growth of this pathogen in chlorhexidine solutions in both human and veterinary healthcare settings has been extensively documented over several decades (Keck *et al*, 2020; Gandhi *et al*, 1993 Marrie & Costerton, 1981).



**Figure 14: A pure culture of *Serratia marcescens* taken from samples of teat disinfectant. Photo: Alan Johnson.**

## REFERENCES

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- Marrie, T. J., and J. W. Costerton.1981. Prolonged survival of *Serratia marcescens* in chlorhexidine. *Appl. Environ. Microbiol.*42:1093-1102.