

Regional Veterinary Laboratories Report

May 2023

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 495 carcasses and 31 fetuses during May 2023. Additionally, 1,617 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 May 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 available laboratory diagnostic tools and provide a better context for practitioners when interpreting laboratory reports.

CATTLE

Pneumonia and enteritis were the most common diagnoses at necropsy in cattle in the RVLs during May 2023.

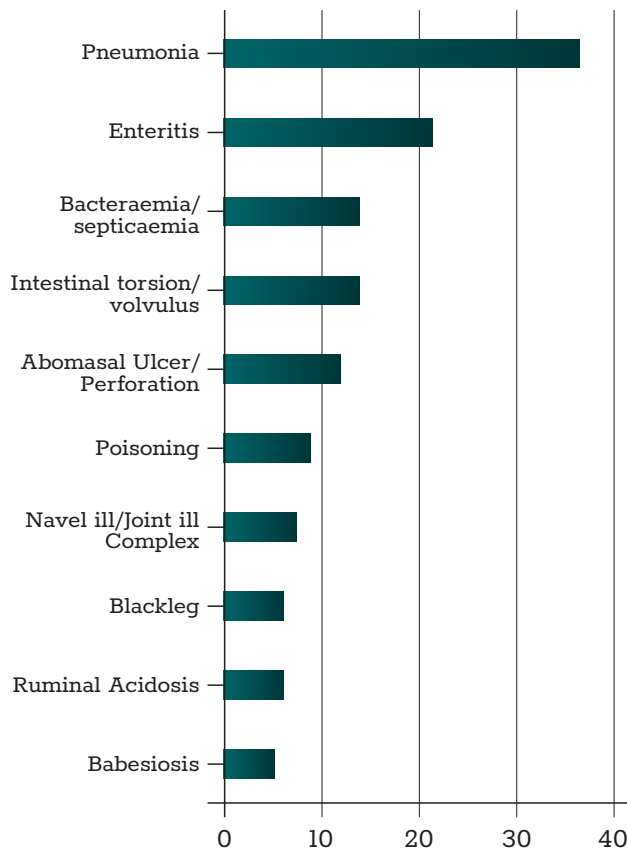


Table 1: The most common diagnoses in cattle submitted for necropsy in May 2023.

GASTROINTESTINAL TRACT

Enteritis

A one-day-old suckler calf was submitted to Limerick RVL. Seemingly perfect at birth, one day later it had become recumbent with enophthalmos (sunken eyes) and yellow diarrhoea and had died within a short time. Necropsy disclosed generalised congestion of liver, lungs, and kidneys.

Analysis of the intestinal contents detected *Escherichia coli* K 99. *E. coli* K99 is an enterotoxigenic *Escherichia coli* (ETEC) that affects the small intestine of new-born calves in their first five days of life. *E. coli* K99 secretes enterotoxins that cause intestinal malabsorption and increase the secretion of fluids and electrolytes into the intestinal lumen.

Perforated abomasal ulcer

A one-month-old calf was submitted to Kilkenny RVL with a history of mild bloating and respiratory signs. Necropsy disclosed a fibrinous peritonitis. The source of the peritonitis was a perforated abomasal ulcer. There were additional multifocal, moderate depth, non-perforated abomasal ulcers. The intestinal contents were very fluid, and the calf tested positive for bovine rotavirus. On histopathological examination, there was a severe, fibrinosuppurative abomasitis with multiple suspect *Sarcina* bacteria visible. *Sarcina* spp. are fastidious gram-positive anaerobic bacteria. The history in calves with *Sarcina*-related disease often includes being found dead, or dying after a short illness, characterised by bloat. The gross lesions included emphysema and oedema of the abomasal wall, mucosal hyperaemia and haemorrhage, and rupture of the abomasum.



Figure 1: A perforated abomasal ulcer, viewed from the serosal aspect. Photo: Aideen Kennedy.

Peritonitis

A two-week-old calf was submitted to Kilkenny RVL with a history of suspected intestinal blockage. On necropsy, there was severe fibrinous peritonitis, with multiple adhesions between the intestinal loops. There were fibrin tags on the umbilical vessels and the umbilicus was inflamed and oedematous. A zinc sulphate turbidity (ZST) of less than 12 units was recorded indicating a failure of passive antibody transfer. A diagnosis of peritonitis was made, with the umbilicus the likely portal of infection from the environment. A review of umbilical hygiene and colostrum management was recommended.



Figure 2: Fibrinous peritonitis with multiple adhesions between the intestinal loops. Photo: Aideen Kennedy.

RESPIRATORY TRACT

Pneumonia

A four-month-old calf presented to Kilkenny RVL with a history of sudden death. On opening the thorax there was a diffuse, severe fibrinous pleuritis, pericarditis and bronchopneumonia. *Mannheimia haemolytica* was cultured. This bacterium is a commensal of the upper respiratory tract, which can colonise the lungs when the host's defences are weakened through stress or previous viral infection. On histopathological examination of a lung section, there was a diffuse, severe, fibrinous bronchopneumonia with large alveolar necrotic areas filled with neutrophils and debris. Interlobular septae were markedly expanded with fibrin, oedema, and lesser numbers of neutrophils.

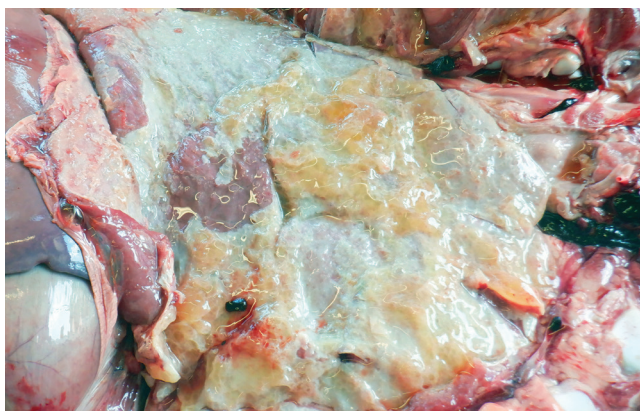


Figure 3: A fibrinous pneumonia and pleuritis in a calf from which *Mannheimia haemolytica* was cultured. Photo: Lisa

Buckley.

A six-week-old calf was submitted to Kilkenny RVL. Respiratory signs were noted prior to death but the calf failed to respond to treatment. On post-mortem examination, there was a severe, fibrinous pericarditis, pleuritis and pneumonia. *M. haemolytica* was cultured from multiple organs indicating a bacteraemia. Polymerase chain reaction (PCR) tests were also positive for *Histophilus somni* and *Mycoplasma bovis*.



Figure 4: Fibrinous pneumonia and pericarditis in a calf. Photo: Aideen Kennedy.

Athlone RVL examined a two-month-old calf with a history of respiratory distress and lethargy with a nasal discharge. The animal was treated for pneumonia without response and died. On gross post-mortem examination, there was mild-to-moderate, left-sided, anteroventral pulmonary consolidation and splenic enlargement. The liver was also enlarged and slightly jaundiced. PCR testing for *Anaplasma phagocytophilum*, the causative agent of tick-borne fever (TBF), was strongly positive and PCRs for *Pasteurella multocida* and *M. haemolytica* in lung tissue were weakly positive. Histopathology of lung showed an acute, fibrinosuppurative bronchopneumonia. A conclusion was made that the infection with TBF resulted in profound immunosuppression and the calf succumbed to an acute bronchopneumonia.

Pulmonary abscessation

Two calves, two-to-three-months-old, were submitted from a herd with a history of respiratory problems. One had a history of poor thrive since birth and had been coughing for the previous week. The other had a history of dullness and anorexia and had been treated for pneumonia. Necropsy of both calves disclosed severe pulmonary abscessation, with the majority of lung volume compromised. These lesions are likely to be chronic in nature in both calves.

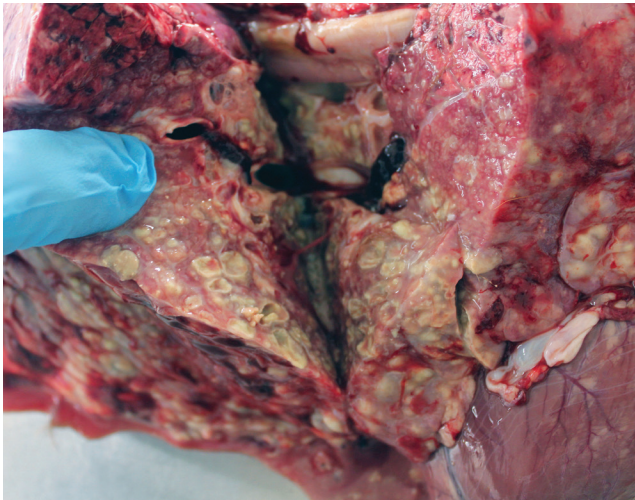


Figure 5: Cross section of lungs with multifocal abscessation. Photo: Ian Hogan.

URINARY/REPRODUCTIVE TRACT

Nephritis

Sligo RVL received a four-week calf, which had been found dead, for post-mortem examination. Opening of the carcass revealed severe, subcapsular haemorrhage, coalescing areas of necrosis on both kidneys. Bilaterally, both ureters were enlarged and necrotic. The lungs were heavy and oedematous. *E. coli* was isolated from multiple sites. Nephritis and sepsis were diagnosed as cause of death and were considered as most likely to be a sequel to an umbilical infection acquired earlier in life.

CARDIOVASCULAR SYSTEM

Babesiosis (Red water)

A ten-month-old, home-reared bullock was submitted to Limerick RVL having been found dead at grass. There had been 28 animals in a group on an out farm. Necropsy disclosed a pale carcass, reddish-brown urine, and an enlarged spleen. A swab from the spleen tested PCR positive for *Babesia divergens*.



Figure 6: *Ixodes ricinus* ticks, the transmitting host of *Babesia divergens*, attached and feeding on the skin of a calf. Photo: Alan Johnson.

Polyserositis

A three-week-old calf with a history of sudden death was submitted to Sligo RVL for examination. On gross post-mortem examination, there was severe chronic pericarditis, and pleuritis, as well as mild acute peritonitis. *M. haemolytica* and *P. multocida* were detected by PCR. Sepsis and acute polyserositis of bacterial origin were diagnosed as cause of death.

Vena caval thrombosis

Athlone RVL examined a two-year-old Friesian cow with a history of dullness and pyrexia, it was treated but didn't respond and died. The carcass preservation and body condition were poor, with a bodyweight of 375kg. There was a large abscess in the liver adjacent to the posterior vena cava and a septic thrombus in the vena cava. There was another abscess and thrombus further cranially along the posterior vena cava at the level of the diaphragm. The spleen was enlarged and there was pulmonary congestion. A conclusion of posterior vena caval thrombosis secondary to liver abscess was made.

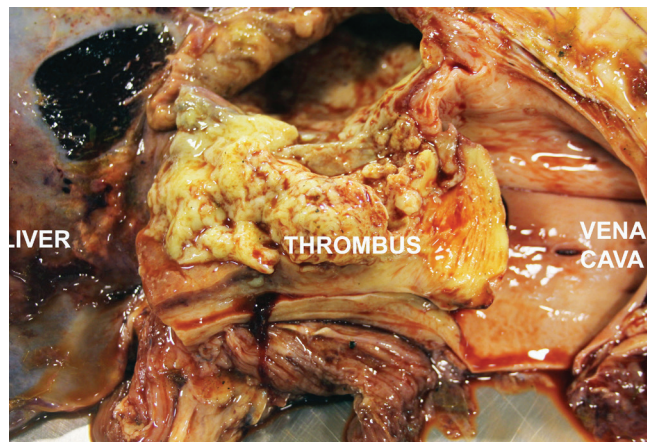


Figure 7: A thrombus detected in the vena cava. Photo: Denise Murphy.

A two-year-old cow was presented to Kilkenny RVL with a history of sudden death. On opening the abdomen, the caudal vena cava was incised and found to be filled with pus. The liver was enlarged, and the cut surface had a nutmeg pattern, typical of passive venous congestion. A diagnosis of caudal venal caval thrombosis was made. This syndrome is frequently caused by hepatic abscesses which form as a result of bacterial translocation from the gastrointestinal tract due to ruminal acidosis inducing a rumenitis, allowing bacteria to travel in the splanchnic bloodstream to the liver. Liver abscesses erode into the caudal vena cava and form a septic thrombus. Emboli can break away and travel to the heart causing an endocarditis, or to the lungs causing an embolic pneumonia. Secondary complications may lead to one or more of the following clinical signs: bilateral epistaxis, respiratory distress, intermittent fever, and weight loss. Management should be aimed at preventing subclinical ruminal acidosis.

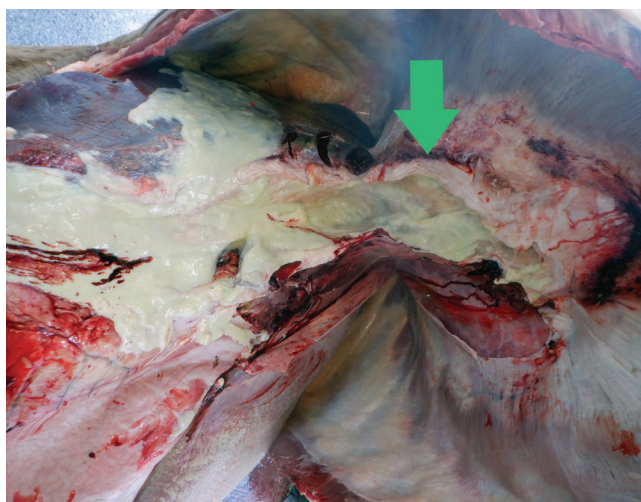


Figure 8: Exudate from an incision into the caudal vena cava (arrow). Photo: Lisa Buckley.

Myocardial abscessation

Athlone RVL examined a three-year-old dairy cow that had been milked that morning and seemed perfect but was found dead that evening. There was a large, well-encapsulated abscess attached to the inner wall of the left ventricle muscle of the heart (7 x 9cm). There was grass and some cereal concentrates in the rumen and the ruminal pH was lower than normal at 4.9 and suggestive of ruminal acidosis. Routine culture of the abscess was sterile and the PCR for *H. somni* was inconclusive. According to *Jubb and Kennedy* (Vol. 1, page 410) a major manifestation of *H. somni* infection is myocardial localisation following asymptomatic septicaemia. Infarction, myocarditis, or abscess formation may result and can lead to cardiac failure. In light of the low rumen pH, it was advised to retrospectively assess the milk constituent analysis in the early lactation stock (<60 days in milk) as an indicator of subacute ruminal acidosis (SARA) in the milking cows and review/adjust the diet accordingly.



Figure 9: An abscess attached to the interior of the left cardiac ventricle of a dairy cow. Inset: pus escaping the abscess upon incision. Photo: Denise Murphy.

Traumatic reticulo-pericarditis

A 13-month-old bullock was presented to Kilkenny RVL with a history of respiratory signs. On incision of the pericardium, approximately five litres of straw-coloured fluid was released. The heart and visceral surface of the pericardium was covered in a thick, yellow, fibrinous layer with villus-like projections, a classic 'bread and butter' appearance. A diagnosis of traumatic reticulo-pericarditis or hardware disease was made. The cause of this syndrome is penetration of the reticulum by a sharp object or wire. The foreign body was not identified in this case; nevertheless, a review of feeding areas was advised.

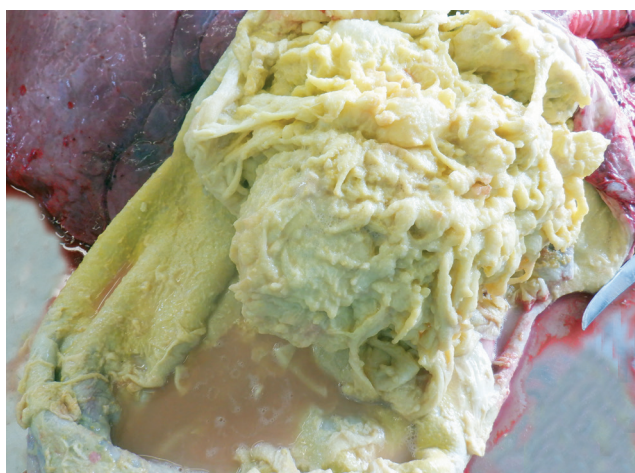


Figure 10: Fibrinous pericarditis with a 'bread and butter' appearance. Photo: Lisa Buckley.

MUSCULOSKELETAL

Navel ill/joint ill complex

A four-day-old calf was submitted to Kilkenny RVL with a history of weight loss before dying. Three cases had occurred in the group of 50 calves. Necropsy disclosed a peritonitis with tags of fibrin on the liver. The umbilicus was swollen and there were fibrin tags on the umbilical vessels. There was fibrinous arthritis in a number of joints. *E. coli* was isolated from a number of organs indicating a bacteraemia. A ZST score of eight units was recorded, indicating failure of passive transfer of colostral immunity. A review of umbilical hygiene at calving and colostrum management was recommended.



Figure 11: Fibrin in the synovial cavity of a calf with navel/joint ill. Photo: Aideen Kennedy.

A five-week-old Limousin suckler calf that died suddenly was submitted to Limerick RVL. On opening the carcass, there was an umbilical abscess tracking up to the liver, and fibrin in the pericardial sac with multifocal haemorrhages on the surface of the myocardium. There was fibrin present in the renal capsule and small cysts/abscesses present in the renal medulla. Multiple joints including hips, knees, hocks, elbows, and the atlanto-occipital joint contained straw-coloured fluid and fibrin. *E.coli* was cultured from multiple organs suggestive of bacteraemia/septicaemia. The bacteraemia/septicaemia originated from the infected umbilicus, and the septic arthritis resulted from haematogenous spread of the bacterial infection from the umbilical infection to the joints.



Figure 12: Joint containing straw coloured fluid and fibrin in a calf with septic arthritis. Photo: Brian Toland.

Gangrenous myositis

Sligo RVL diagnosed gangrenous myositis in several cases in cattle in May 2023. The disease is also known as blackleg and is caused by *Clostridium chauvoei*. Pseudo-blackleg which is caused by *Clostridium septicum* presents with post-mortem lesions similar to blackleg but unlike *C. chauvoei*, it may proliferate after death and the lesions are less emphysematous, making its interpretation as the causative agent more difficult especially if mixed bacterial populations are present, if time has elapsed since death or if fluorescent antibody technique (FAT) is used for diagnosis. *C. septicum* is a recognised cause of malignant oedema and gas gangrene, both of which may also be lethal, and are associated with skin wounds.

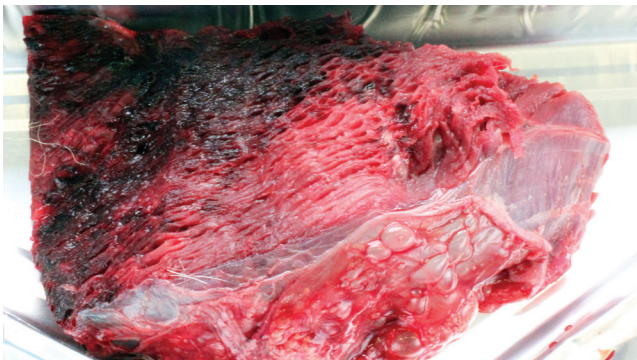


Figure 13: Blackleg lesion in a calf. Photo: Colm Ó Muireagáin.

Blackleg

Blackleg was diagnosed as cause of death in a four-month-old calf submitted to Sligo which had been noticed lame the previous day. On post-mortem examination, there was a locally extensive, gangrenous myositis in the left hindleg musculature. FAT on an impression smear of the lesion identified *C. chauvoei* as the causative agent.

Pseudo-blackleg

Pseudo-blackleg was diagnosed by Sligo in a four-month-old weanling which had history of sudden death. In this case, there were several separate areas of dry myositis bilaterally in the shoulder girdle. *C. septicum* was identified in the affected tissue by FAT on an impression smear of the lesion.

POISONINGS

Ragwort (*Jacobaea vulgaris*) toxicity

A herd with multiple losses in 2022-born cattle submitted a number of animals for necropsy to Limerick RVL. Clinical signs of affected animals included lethargy, watery scour with blood in some cases, tenesmus, and neurological signs such as wandering aimlessly, aggression and blindness. The yearlings had not thrived over the winter compared to other years. Two bullocks and a heifer were necropsied, and a number of findings were common to all three animals. The livers had a pale, firm texture, and were difficult to cut, strongly suggestive of cirrhosis. There was marked oedema in the mucosa of the rumen, intestines, and, most noticeably, in the abomasum of all animals. One animal also displayed pulmonary congestion and oedema. Testing of renal cortex for lead proved negative.

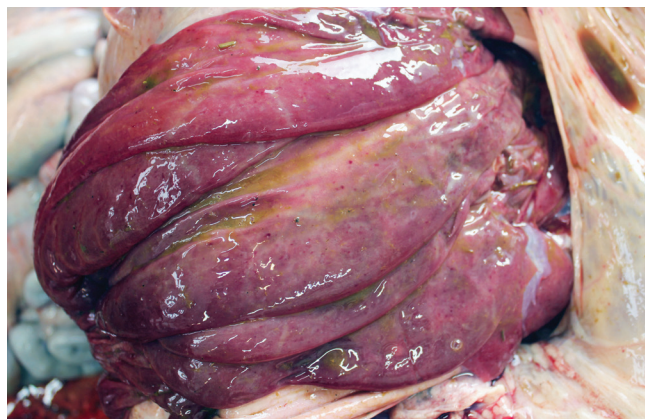


Figure 14: Severe oedema of the abomasal mucosa in a yearling diagnosed with ragwort toxicity. Photo: Ian Hogan.

Histopathology of all three revealed chronic bridging hepatic fibrosis with bile duct hyperplasia and megalocytosis. These findings are consistent with pyrrolizidine alkaloids toxicity. These toxins are produced by over 6,000 plants as a deterrent to consumption by herbivores. They become hepatotoxic by conversion to their metabolically activated form, dehydropyrrolizidine. Ragwort (*Jacobaea vulgaris*) is an example of such a plant and the most common source of these alkaloids in an Irish context.

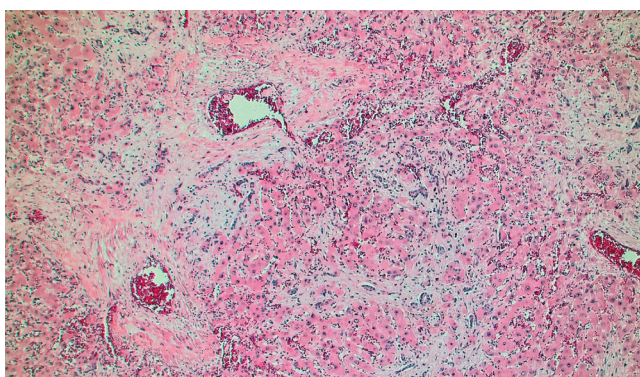


Figure 15: Bridging fibrosis with bile duct proliferation in a case of ragwort poisoning. Photo: Brian Toland.

The affected cattle were housed in December and turned out again in mid-March; all of the affected animals were fed silage which had been baled from the same pastures for the last number of years. During a farm visit, ragwort rosettes (the low-growing, non-flowering form of the plant in its first growing year) were identified in many fields with varying degrees of cover. The paddock for cows and calves had the heaviest contamination and the silage fields also contained a significant amount of ragwort rosettes. The fields were searched for other poisonous plants, but none were found.

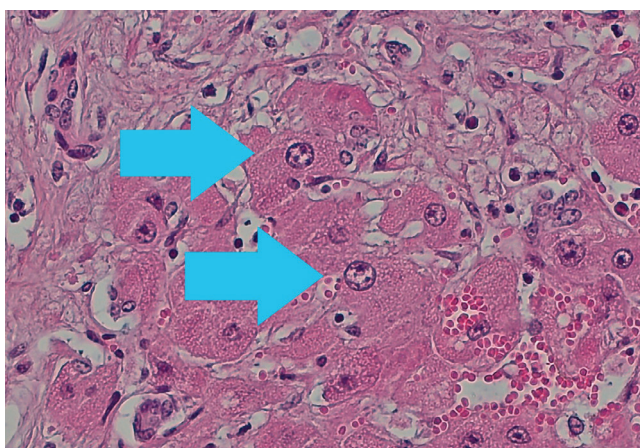


Figure 16: Enlarged hepatocyte (megalocytosis) in a case of ragwort poisoning. Photo: Brian Toland.

MISCELLANEOUS

Oesophageal obstruction



Figure 17: Magnesium boluses adhered in the oesophagus at the thoracic inlet leading to death by choke in a heifer. Photo: Shane McGettrick.

Sligo RVL examined the carcass of a one-year-old heifer. The animal had been noticed in the days prior to death with her head down, frothing and salivating. She had received two Magnesium boluses in the days prior to her death. On post-mortem examination, there were two boluses lodged side by side in the oesophagus at the thoracic inlet. The surrounding tissue was oedematous and inflamed. The lung presented with multifocal lobular consolidation and necrosis due to an aspiration pneumonia. The cause of death in this animal was choke. Boluses were not able to pass thoracic inlet and had become adhered to the oesophageal mucosa. It is considered likely that ruminal gas was able to bypass boluses for some time as the rumen was not excessively bloated but the ruminal contents were dry.



Figure 18: Aspiration pneumonia in a case of choke. Photo: Shane McGettrick.

Tick-borne Fever in a Dairy Herd

Samples were submitted to Cork RVL from a 120-cow dairy herd with a six-day history of abrupt milk drop. Additional clinical signs in affected cows included dullness, reduced appetite, pyrexia, mild diarrhoea and nasal discharge. An infectious bovine rhinotracheitis (IBR) outbreak was suspected by the PVP. The adult herd is vaccinated routinely against leptospirosis and salmonellosis. Blood, faecal samples and nasal swabs were submitted from five cows. Of the five blood samples, four were PCR-positive for *A. phagocytophilum*, the causative agent of TBF. The fifth sample returned an inconclusive result. In contrast, only one sample was positive for antibodies to *A. phagocytophilum*, indicating that the infection was relatively acute, and most animals had not yet seroconverted. Leukogram abnormalities, including lymphopaenia, eosinopaenia and profound neutropaenia, were consistent with a diagnosis of TBF. Other findings on diagnostic testing included seropositivity to bovine herpesvirus 1 (BHV-1) in all five cows, presence of rumen fluke eggs in three out of five, and strongyle egg counts of between 100 and 500 eggs per gram in three out of five. Testing for common bovine respiratory viruses via PCR on nasal swabs was negative. The *A. phagocytophilum*-positive PCR results were considered the most significant in this case.

Paired serology was requested to further investigate possible co-infection with BHV-1, as single seropositive results do not confirm involvement in clinical disease. TBF should be considered as a differential diagnosis in cases of milk drop.

SHEEP

Enteritis and parasitic gastroenteritis were the most common diagnoses at necropsy in sheep in the RVLs during May 2023.

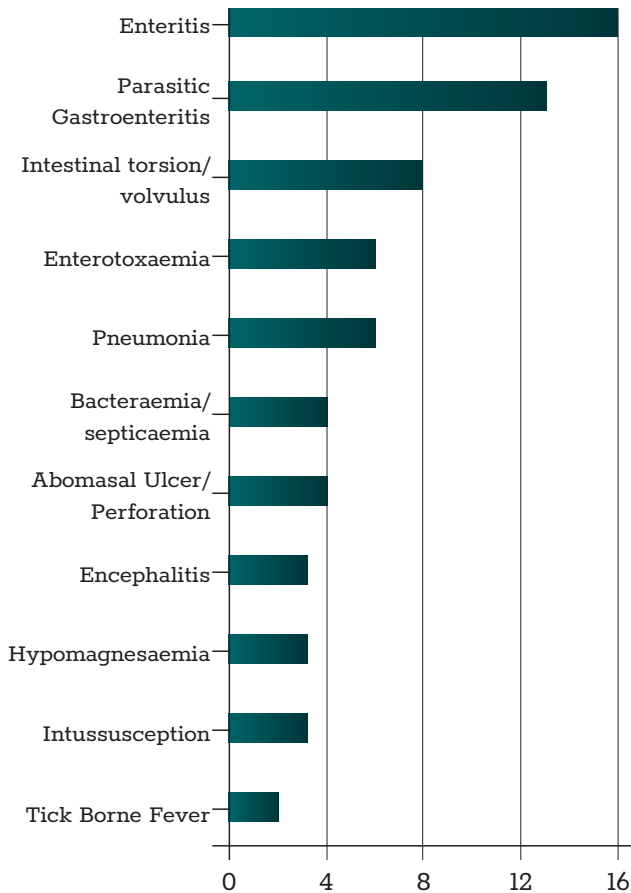


Table 2: The most common diagnoses in sheep submitted for necropsy in May 2023.

GASTROINTESTINAL TRACT

Omphalophlebitis ('navel ill')

A two-week-old lamb was found dead and submitted to Kilkenny RVL. Others in the flock had joint ill but it was not reported in this one. On examination, there was an umbilical infection with abscessation and purulent material tracking from the umbilicus along the umbilical vessels to the liver. There were multiple foci of necrosis and abscessation in the liver surrounded by suspect areas of fibrosis. The synovial fluid was cloudy. *E. coli* was cultured from multiple organs. A diagnosis of omphalophlebitis ('navel ill') and subsequent bacteraemia was made and a review of umbilical hygiene at lambing was recommended.

URINARY/REPRODUCTIVE TRACT

Mastitis

Sligo RVL examined an eight-year-old ewe which had been found dead. On gross post-mortem, there was severe dehydration and the right half of the udder was severely enlarged and oedematous. The liver presented with multiple haemorrhagic tracts on the surface. *Staphylococcus aureus* was cultured from udder tissue. DNA specific to *A. phagocytophilum* was detected. Histopathology of the udder revealed diffuse, acute, severe purulent mastitis with abundant bacterial colonies, large numbers of neutrophils and neutrophilic debris. The liver presented with chronic-active, moderate hepatitis with biliary hyperplasia. There was inflammatory portal infiltration with eosinophils, globular leucocytes and lymphocytes, portal fibrosis and foci of haemorrhage. The findings in the liver are suggestive of acute fasciolosis. The mastitis was most likely the cause of death however, there was concurrent TBF. In sheep, as described above in cattle, TBF is caused by *A. phagocytophilum* and spread by the tick, *Ixodes ricinus*. After a short febrile phase, it is characterised by immunosuppression, rendering the animal susceptible to a range of secondary infections. A review of the farm's tick management (which is effectively pasture management with some seasonal chemoprophylaxis) was recommended.

Thin Ewe Survey – Iceberg diseases

Post-mortem examination can be valuable in diagnosing or negating the presence of iceberg diseases. Ewes on good grass that fail to gain body condition in the four to eight weeks after weaning are good candidates for investigation if there is no other obvious explanation for the ill thrift. This year, the RVLs are running a Thin Ewe Survey to look at the causes of ill-thrift/failure to regain bodyweight after weaning in ewes.

Flock owners undertake to send up to three thin ewes to the local regional vet lab (RVL) for euthanasia and post-mortem examination with a view to reaching a tentative diagnosis on what is causing the problem in their flocks. Testing will be carried out free of charge for all the iceberg diseases – ovine pulmonary adenocarcinoma, maedi visna, caseous lymphadenitis (CLA), Border disease and Johne's Disease (pseudotuberculosis).

The target is three thin ewes per flock. The sheep can be booked in by the PVP, or directly by the farmer ringing their local RVL and nominating their PVP (reports will only be issued via the PVP):

Athlone RVL: 0906 441900;

Cork RVL: 021 4543931;

Dublin RVL: 01 6157115;

Kilkenny RVL: 056 7721688;

Limerick RVL: 061 582610;

Sligo RVL: 071 9142191.

CARDIOVASCULAR SYSTEM

Vegetative endocarditis and fibrinosuppurative arthritis

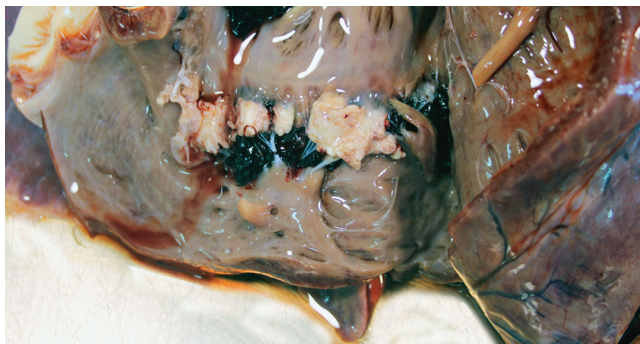


Figure 19: Vegetative endocarditis of the atrio-ventricular valve. Photo: Denise Murphy.

Athlone RVL examined a three-year-old ewe with a history of dullness and altered gait of one-week's duration prior to death; it had received antibiotic treatment without response. This was the second similar case. The animal's body condition was moderate to poor, weight 55kg. There were vegetative endocarditis lesions on the atrio-ventricular (AV) valves bilaterally, but more severe on right side than the left. There was a fibrinosuppurative arthritis in both stifle joints and in the right elbow joint and the liver was enlarged. A very high strongyle egg count of 25,000 eggs per gram (EPG) was detected in the faeces. A diagnosis of vegetative endocarditis and fibrinosuppurative arthritis was made and advice given to conduct parasite monitoring in the flock.



Figure 20: Fibrinosuppurative arthritis in a ewe. Photo: Denise Murphy.

GOATS

Johne's disease

A two-year-old goat with a history of severe diarrhoea in the two weeks prior to death was submitted to Sligo RVL. There was no improvement following treatment attempts, and it died. On necropsy, the carcass was emaciated. There was diffuse enteritis and associated peritonitis characterised by mineralised lymphadenopathy and peritoneal tags and adhesions. A previous blood sample with the same tag ID,

and serum taken from the carcass, were antibody-positive for Johne's Disease by ELISA. Histopathology revealed a granulomatous enteritis with many cells packed with acid-fast bacteria. Johne's disease (pseudotuberculosis) was diagnosed as most likely cause of death in this animal.

HORSES

Navel ill/joint ill complex

A one-week-old filly foal had difficulty rising since birth and was treated for a patent urachus. Upon necropsy, multiple joints were incised, revealing varying degrees of straw-coloured synovial fluid and fibrin adherent to a pus-filled joint in the right front fetlock. *E. coli* was cultured from multiple organs and there was generalised lymph node enlargement suggestive of a bacteraemia/septicaemia.



Figure 21: Purulent fluid in the fetlock of a foal with septicaemia. Photo: Brian Toland.

DEER

Abomasal torsion

A deer from a petting farm with a history of harsh lung sounds, died rapidly in spite of treatment and was submitted to Kilkenny RVL. Necropsy disclosed a torsion of the abomasum. There appeared to be ischaemia of the wall of both the rumen and abomasum with marked hyperaemia and oedema in the rumen. The rumen contained a large volume of undigested grain, and a very low pH was recorded. A diagnosis of acidosis and abomasal torsion was made, and a review of diet was advised. Gastrointestinal torsion may occur subsequent to increased or decreased gastrointestinal motility which, in turn, is affected by nutritional changes and upsets, gas accumulation and bloat, carbohydrate overload and acidosis.



Figure 22: The hyperaemic rumen mucosa of a deer with ruminal acidosis and abomasal torsion. Photo: Aideen Kennedy.