

Regional Veterinary Laboratories Report

March 2021

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 744 carcasses and 526 fetuses during March 2021. Additionally, 2697 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 March 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 presentations 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

Enteritis and pneumonia were the most common causes of death in bovine carcasses submitted to the RVLs in March 2021.

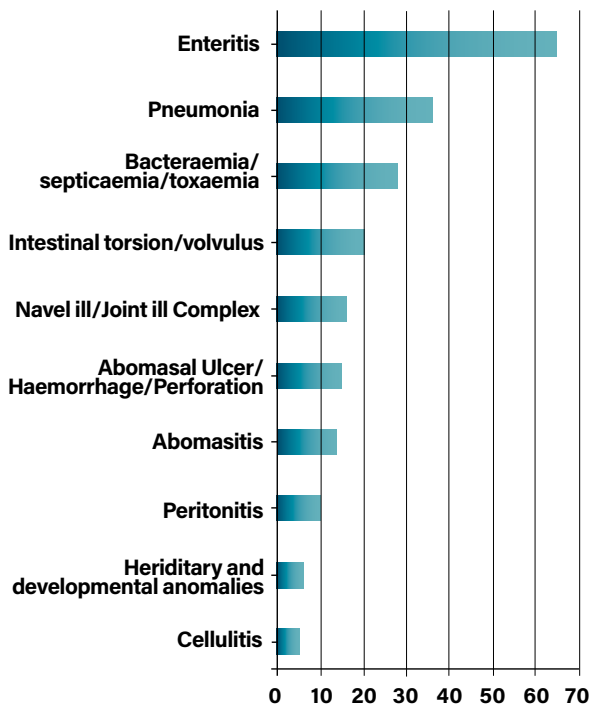


Table 1: The most common causes of death diagnosed in bovine carcasses submitted to DAFM RVLs during March 2021.

GASTROINTESTINAL TRACT

Rumenitis

A two-week-old calf was submitted to Kilkenny RVL, having failed to respond to antibiotic treatment for pneumonia and diarrhoea. Upon necropsy, the calf was severely dehydrated. There was cranioventrally distributed lung consolidation and congestion affecting approximately 20 per cent of the tissue. The rumen mucosal surface was extremely hyperaemic with multiple foci of necrosis. These lesions were transmural as multifocal red circular coalescing lesions were visible on the serosal surface. There were similar lesions in the reticulum and a large volume of milk in the rumen and reticulum. The

main histopathology findings included fibrinosuppurative bronchopneumonia and fibrinosuppurative necrotic rumenitis with fungal hyphae visible. *Escherichia coli* was cultured from multiple organs suggesting a bacteraemia. The intestinal contents were shown to contain *Cryptosporidium* oocysts. A *Candida* sp. was identified on the rumen. *Candida* spp. can cause mycotic rumenitis in calves; typically, yeasts like *Candida* require predisposing circumstances, such as stress, sepsis, long-term administration of antibiotics or ruminal acidosis, to invade tissues and cause disease. A diagnosis of rumenitis/enteritis and pneumonia was made. Sub-optimal zinc sulphate turbidity (ZST) results were recorded and a review of colostrum management was advised, along with a review of *Cryptosporidium* control.

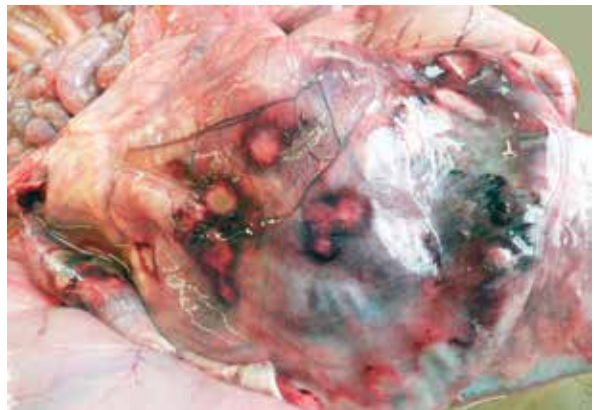


Figure 1: Lesions on the ruminal serosal surface in a case of mycotic rumenitis. Photo: Aideen Kennedy.

Abomasal ulceration

A three-week-old calf was submitted to Athlone RVL for necropsy with a history of sudden death and of calves bloating after feeding. Gastro-intestinal tract (GIT) contents were present in the abdomen due to a perforation in the abomasal wall and the abomasal mucosa was very haemorrhagic and oedematous. Histopathology of the abomasum showed the abomasal submucosa was expanded by focally extensive areas of oedema. Within the sloughed superficial mucosa were heterogenous bacterial colonies including multifocal aggregates of bacteria forming packets or tetrameres likely to be *Sarcina* sp. A diagnosis of a perforated abomasum and abomasitis was made.

Contributory factors believed to be associated with the development of abomasal bloat in young calves include delayed abomasal transit time, the presence of microbes capable of fermentation (including *Saracen spp*) and the availability of an easily fermentable substrate. Some of the risk factors believed to delay abomasal emptying, thereby facilitating exuberant fermentation, potential toxin elaboration and gaseous production, include feeding either hypo- or hyper-osmolar solutions, large volume feeds (>2.5-3L), incorrect temperatures, erratic feeding schedules, poor water availability and inconsistent mixing. The importance of methodical, regular and effective cleaning protocols for feeding equipment is also paramount.

Athlone RVL examined a six-year-old Friesian cow with a history of sudden death 35 days post-partum. There had been three other similar cases in the herd in recent weeks. On necropsy, the carcass was diffusely pale. The abomasum was filled with large blood clots and there were two circular ulcers of the abomasal mucosa in the fundic region, each measuring approximately 1-2cm in diameter. The intestinal contents were liquid and very dark in colour. A diagnosis was made of haemorrhage secondary to bleeding abomasal ulcers.

Peritonitis

An eight-year-old cow was submitted to Kilkenny with a history of anorexia, milk drop and decreased rumen/intestinal movement. Upon necropsy, there was diffuse fibrinous peritonitis with approximately 20-30L of fluid in the peritoneal cavity. There were multifocal fibrinous adhesions between the intestines. The reticulum was adherent to the liver and the serosal surface was covered in fibrin. There were multifocal infarcts on the kidneys. Culture proved unrewarding; there had been prolonged antibiotic use. A diagnosis of diffuse fibrinous peritonitis was made and, although no foreign body was identified on necropsy, the involvement of a penetrating wire ('hardware disease') could not be ruled out.



Figure 2: Fibrinous peritonitis in an eight-year-old cow. Photo: Aideen Kennedy.

Enteric pathogens in calves

As the 2021 calving season progressed, enteritis became the most common diagnosis in bovines. *Cryptosporidium parvum* and rotavirus were the most commonly identified enteric pathogens in both carcass and diagnostic testing of calves during March 2021. Coccidial enteritis was found in older calves.

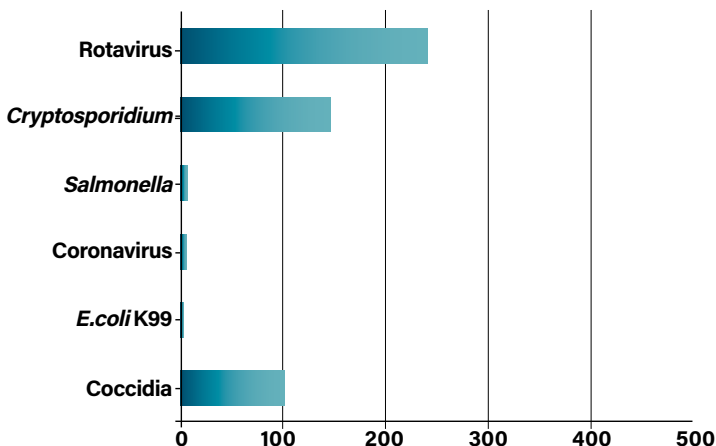


Table 2: The most common enteric pathogens detected in calves in March 2021.

RESPIRATORY TRACT

Pneumonia

A four-year-old lactating Friesian cow was submitted to Limerick RVL two weeks after calving with a history of three days signs of respiratory distress. The animal was treated for pneumonia but deteriorated and was euthanised. Necropsy disclosed fibrinous pleuropneumonia, the cranial lobes were mostly affected. A large volume of straw-coloured fluid was found in the thoracic and peritoneal cavities. *Mannheimia haemolytica* was isolated from the lungs; polymerase chain reaction (PCR) testing was positive for Bovine Herpesvirus type 4 (BHV4). Histopathology disclosed a suppurative bronchopneumonia, with diffuse fatty change in the liver. Outbreaks of *Mannheimia* pneumonia have been recorded recently in dairy cows in Ireland, the UK and the Netherlands.



Figure 3: Acute fibrinous pleuropneumonia in a dairy cow. Photo: Alan Johnson.

Two fortnight-old calves with signs of pneumonia were submitted to Kilkenny RVL; a mycoplasma aetiology was suspected. 12 calves had died on the farm with respiratory signs. Examination of the first calf showed consolidation of the lungs in a cranioventral distribution. There was oedema in the walls of the intestine and the intestinal content was liquid. There were multifocal pinpoint lesions in the kidneys. The second calf had fibrinous pleuritis and pneumonia. The intestine was autolysed but there were multifocal areas of necrosis in the caecal mucosa. *M. haemolytica* was cultured from the lungs and PCR tests were positive for *Mycoplasma bovis*. In addition, *Salmonella* Dublin was identified on culture from the intestinal contents of both calves. Salmonellosis is a potential zoonosis and appropriate control measures were recommended. Sub-optimal ZST results were recorded in both animals and a review of colostrum management was indicated along with a review of control of respiratory and enteric pathogens on farm.

Athlone RVL examined a four-month-old calf with a history of chronic ill-thrift and increased respiratory rate over the previous two months since it had been purchased. On necropsy, there was severe, bilateral, focally extensive, cranioventrally distributed congestion and consolidation affecting approximately 60 per cent of the lung parenchyma, with multifocal microabscessation and diffuse fibrinous adhesions to the costal pleura. The tracheal mucosa was diffusely haemorrhagic and oedematous. *M. haemolytica* was cultured from lung tissue and PCR was positive for *M. haemolytica*, *Pasteurella multocida* and *Mycoplasma bovis*. Histopathological examination of the lung revealed a severe, chronic-active, multifocal to coalescing, suppurative bronchopneumonia. A diagnosis of bacterial bronchopneumonia was made.

Sligo RVL received a three-month-old calf with a history of sudden death. On necropsy, there was ventral consolidation of the lungs affecting approximately 70 per cent of the parenchyma with multifocal abscessation approximately 0.5cm-3cm in size. *Trueperella pyogenes* was cultured from lung tissue. *Mycoplasma bovis* was detected by PCR in lung tissue. On histopathology there was diffuse, chronic severe necrotising pneumonia, with alveolar septae mildly expanded with mixed inflammatory cells highly suggestive of *M. bovis* involvement. Pneumonia due to *M. bovis* with secondary involvement of *T. pyogenes* was diagnosed.



Figure 4: Well-demarcated pulmonary consolidation with multifocal abscessation in a case of *Mycoplasma bovis* infection in a calf. Photo: Rebecca Froehlich-Kelly.

CARDIOVASCULAR SYSTEM

Myocardial abscess

A three-year-old cow with a history of sudden death was submitted to Kilkenny RVL. On examination, the pericardial sac was filled with blood (haemopericardium). There were multifocal strands of fibrin within the pericardial sac also. There was an abscess, approximately 10cm in diameter, extending from the myocardium. *T. pyogenes* was cultured from this abscess. This opportunistic bacterium is linked to miscellaneous pyogenic infections in animals. Clinical manifestations of *T. pyogenes* include mastitis, pneumonia, metritis, endocarditis and organ abscessation. It was theorised the heart abscessation likely led to erosion of a vessel and subsequent haemopericardium.

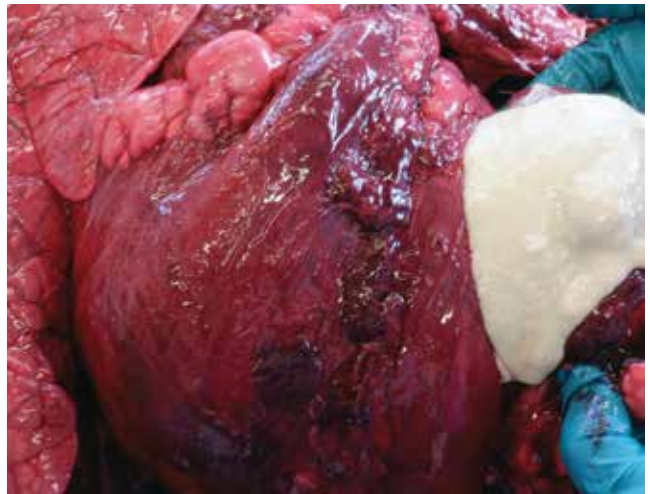


Figure 5: Pus leaking from an incision into a myocardial abscess. Photo: Aideen Kennedy.

MUSCULOSKELETAL

Septic polyarthritis ('joint ill')

A three-day-old calf was submitted for necropsy to Athlone RVL with a history of sudden death, three other calves had a slight scour. There was moderate bilateral enophthalmia and a severe bilateral fibrinopurulent arthritis in the hocks and stifle joints. There was sour-smelling curdled milk in the rumen (due to rumen drinking), scant intestinal contents and faeces. There was thickened bile in the gall bladder indicative of recent inappetence. ZST testing indicated very poor colostrum-derived immunity. Rotavirus and coronavirus were detected in faeces and *E. coli* isolated from several tissues and the affected joints. A diagnosis of septic polyarthritis and enteritis resulting from hypogammaglobulinaemia was made.



Figure 6: Joint ill in a neonatal bovine. Photo: Denise Murphy.

URINARY/REPRODUCTIVE TRACT

Omphalophlebitis

A four-day-old calf which had been depressed for a day before death was submitted to Sligo RVL. Necropsy revealed a fulminant omphalophlebitis with associated peritonitis. The ZST returned a result of three. ZST results of 12 units or less are interpreted as inadequate; colostrum feeding has not been successful. *E. coli* was isolated from the lesions. Hypogammaglobulinaemia lead to subsequent omphalophlebitis which was diagnosed as the cause of death.



Figure 7: Fibrous peritonitis and omphalophlebitis in a calf. Photo: Colm Ó Muiregain.

Athlone RVL examined a one-month-old calf with a history of lethargy and pneumonia. On necropsy, there was a severe omphalophlebitis; the umbilical vein was very enlarged and contained thick, purulent material surrounded by a fibrous capsule. The liver was diffusely enlarged and haemorrhagic with a large abscess at the attachment of the umbilical vein, with multifocal microabscessation throughout the liver parenchyma and enlargement of hepatic lymph nodes. There was severe fibrinopurulent arthritis of several joints including both stifles, left hock, both elbows, left shoulder and right carpal joints. *E. coli* and *Proteus sp.* were isolated from the liver and umbilical vein. A diagnosis of omphalophlebitis and secondary hepatic abscessation and polyarthritis was made.



Figure 8: Pus flowing from an incision into a hepatic abscess in a calf with omphalophlebitis. Photo: Sarah Delaney.

POISONINGS/ MISC

Bacteraemia/septicaemia

Sligo RVL examined a three-year-old bull with ongoing lameness and a swollen back leg for three weeks before death. There was no improvement despite extensive treatment. There was gangrenous myositis extending from the left hock into the lateral abdominal musculature. Along the same leg was also extensive subcutaneous oedema. There was severe haemorrhagic peritonitis. Laboratory testing for pathogens was unrewarding; septicaemia/bacteraemia was diagnosed as the cause of death.



Figure 9: Haemorrhagic peritonitis in a bull diagnosed with septicaemia/bacteraemia. Photo: Rebecca Froehlich-Kelly.

A one-day-old Limousin suckler calf was necropsied at Limerick RVL. Necropsy disclosed fibrinous pleuritis, pericarditis and peritonitis. Splenomegaly and pulmonary congestion were present. Gross findings were considered consistent with a bacteraemia/septicaemia. Infection most likely was picked up in utero. *E. coli* was isolated from all organs cultured; a test for the K99 antigen returned a negative result.

A ten-day-old Charolais calf with a history of sudden death was submitted to Limerick RVL. Necropsy disclosed an enlarged, pale liver suggestive of hepatitis; the urachus was inflamed suggesting a history of navel infection. Liquid intestinal contents and inflamed intestinal mucosa were observed as was diffuse moderate pulmonary congestion. *Listeria sp.* was cultured from multiple organs; this growth was confirmed as *Listeria monocytogenes* by a matrix-assisted laser desorption ionisation/time of flight (MALDI/TOF) mass spectrometer. The diagnosis was listerial septicaemia.

SHEEP

Bacteraemia/septicaemia and enteritis were the most common causes of death in ovine carcasses submitted to the RVLs in March 2021.

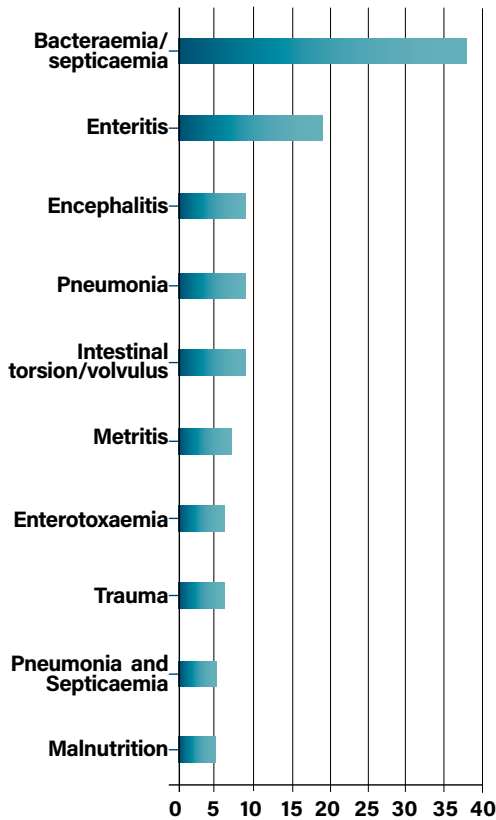


Table 3: The most common causes of death diagnosed in ovine carcasses submitted to DAFM RVLs in March 2021.

GASTROINTESTINAL TRACT

Enteritis and septicaemia

Athlone RVL examined three two-day-old lambs with a history of weakness, diarrhoea and death within hours of symptom onset. There had been 12 similar losses in the flock. On necropsy, the findings were similar for all three lambs; there was a mild to moderate dehydration, the intestines were dilated and both small and large intestinal contents were very soft. The livers were diffusely haemorrhagic and enlarged. Faecal samples from all three lambs were positive for *E. coli* K99 and *E. coli* was also isolated from the livers. A diagnosis of colisepticaemia was made. Factors which may predispose young lambs to infection with pathogenic *E. coli* strains include insufficient or no colostral immunity, build-up of pathogenic *E. coli* strains, overcrowding and poor hygiene (facilitating increased transmission of organisms) and stress factors e.g., cold temperatures or mixing of animals.

Rumen acidosis

Dublin RVL conducted a necropsy on a three-year-old pure bred Kerry Hill ewe, which had received a drench the previous day and was found dead the following morning. The rumen fill was good with abundant grain present and a fermentative smell, while the rumen papillae and mucosa were intact. The rumen pH was 4.5. The lungs were diffusely dark red and heavy. The main gross findings were ruminal grain content and acidic pH. These findings are consistent with ruminal acidosis.



Figure 10: Ruminal contents of a ewe with abundant grain visible in a case of ruminal acidosis. Photo: Margaret Wilson.

URINARY/REPRODUCTIVE TRACT

Bacteraemia

Sligo RVL received a six-year-old ewe which had been observed with pneumonia-like signs of blowing and frothing, as well as anorexia. On necropsy, the ewe appeared severely dehydrated; the uterus was blue/grey discoloured and contained two putrefied, emphysematous lambs and large amounts of fibrin. *T. pyogenes* was cultured from the uterus and the dead aborted lambs. Bacteraemia and toxæmia due to bacterial abortion was diagnosed as the cause of death. *T. pyogenes* has been reported as sporadic cause of intrauterine death and abortion.



Figure 11: Blue-grey discoloured uterus in a case of bacteraemia and toxæmia due to intrauterine infection and foetal death. Photo: Colm Ó Muireagáin.

CARDIOVASCULAR SYSTEM

Vegetative endocarditis

A one-year-old hogget was submitted to Athlone RVL for necropsy with a history of sudden death. The hogget had been treated for pneumonia six months earlier and had responded. There was a large vegetative endocarditis lesion on the

right atrio-ventricular (A-V) valve and smaller ones in the pulmonary valve and on the left A-V valve. The lungs remained uniformly inflated and the airways were very prominent on cross section. A single septic embolus was observed in the lungs. Histopathology of the lungs disclosed a diffuse interstitial pneumonia pattern suggestive of bacteraemia/septicaemia and a single focal area of abscessation, likely due to embolic spread. PCR for Maedi-Visna virus and ovine pulmonary adenocarcinoma were negative. A diagnosis of vegetative endocarditis was made.



Figure 12: A vegetative endocarditis (arrowhead) on the atrio-ventricular valve of a one-year-old hogget. Photo: Denise Murphy.

NERVOUS SYSTEM

Listeriosis

Two ewes with neurological symptoms were submitted to Sligo RVL for necropsy. The farmer had lost four animals in total, all displaying similar signs. The first ewe had no visible lesion, but ruminal acidosis was detected at necropsy. The second ewe presented with bilateral pneumonia. *Bibersteinia trehalosi* was cultured from the pneumonia. Histopathology of both animals revealed severe acute suppurative meningoencephalitis with microabscessation and perivascular cuffing highly suggestive of encephalitis caused by *Listeria monocytogenes*. Listeriosis was diagnosed as cause of death in both animals; ruminal acidosis and pneumonia were likely to have been secondary.

POISONINGS/ MISCELLANEOUS

Poisoning

A four-year-old ewe which had been found dead after breaking into a garden was examined by Sligo RVL. Chewed cherry laurel (*Prunus laurocerasus*) leaves were detected in the rumen. Cherry laurel is toxic to ruminants, as it contains cyanide, and the most likely cause of death in this case. A pregnant hogget, found dead at grass, was submitted to Limerick RVL. Another similar death had occurred in the group and a third hogget was displaying clinical signs of frothing at the mouth and distress. Necropsy disclosed pulmonary congestion and oedema. Rumen contents

contained some grain and some leaves which were not easily identified. There was no evidence of acidosis; some rumen flukes were also visible. No significant bacterial pathogens were isolated on routine culture. Shrubs identified as *Pieris* sp. (including *Pieris japonica*) were found in a fenced-off part of the field being grazed by the sheep. The leaves found in the rumen resembled *Pieris* leaves. *Pieris* is known to be toxic to sheep as the foliage contains cardiotoxic polyhydroxylated diterpenes (also called grayanotoxins). It was considered likely that this was a case of plant poisoning. It was recommended that access to these shrubs be eliminated immediately.

Clostridial disease

Sligo RVL received several submissions of lambs with a history of sudden death caused by *Clostridium perfringens* enterotoxaemia. The most common post-mortem findings were haemorrhagic jejunal contents, acute fibrinous pericarditis and cerebellar coning. However, often changes can be very subtle in cases of peracute disease. On histopathology, the brain, especially hindbrain and medulla, presents with serum lakes around mid-sized vessels, a change which is considered pathognomonic and signifies damage to blood vessel integrity caused by epsilon toxin. Clostridial enterotoxaemia occurs especially in flocks without clostridial vaccination.

A three-year-old ewe with a history of lameness over a period of one day was submitted to Sligo RVL. The carcass was autolysed and dehydrated. There was a locally extensive gangrenous myositis. *Clostridium novyii* was demonstrated in the lesions by fluorescent antibody technique (FAT).

Trauma

Sligo RVL examined a two-day-old lamb with a history of sudden death after being turned out. On post-mortem examination, the lamb appeared dehydrated and anaemic. The abdomen contained a large amount of haemorrhage originating from a ruptured hepatic lobe. Trauma leading to hepatic rupture was diagnosed as the cause of death.

PIGS

Three pigs were submitted to Limerick RVL at 10-12 weeks of age; they had been found dead. Higher mortality had occurred than expected in this age group in recent months. Necropsy findings in all three pigs included fibrinous peritonitis; two pigs had pneumonia, pleuritis and pericarditis while the third had pulmonary congestion and oedema. One of the pneumonic pigs displayed fibrin on the surface of the cerebellum and brain stem, the other had an abscess in the brain stem. *T. pyogenes* was cultured from both of these brain lesions; *Streptococcus dysgalactiae*, *Streptococcus suis* type 1, *Escherichia fergusonii* and *E. coli* were all cultured from various organs. PCR testing for Porcine Reproductive and Respiratory Syndrome virus (PRRS) returned a positive result. These pigs had multifactorial chronic illness presenting as polyserositis, brain abscessation and pneumonia indicating a herd health issue. The positive PRRS result is significant in terms of herd health and will be investigated further. Advice was given to

review vaccination programmes and herd health programmes to minimise opportunity for bacterial and viral disease in vulnerable, young, rapidly-growing pigs.

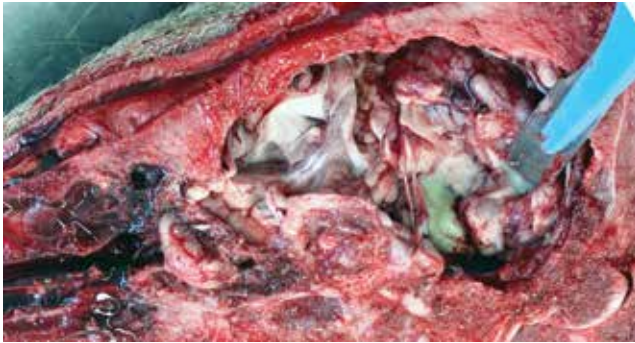


Figure 13: An abscess in the brain of a pig from which *Truperella pyogenes* was cultured. Photo: Alan Johnson.

Dublin RVL conducted a post-mortem investigation on two finisher stage pigs with an ongoing herd problem of ill-thrift. The animals examined weighed 25.6 and 28.5kg and were in reasonable body condition and fresh. The thorax of the first pig was diffusely expanded and filled with abundant fibrinosuppurative effusion, often in pockets, which compressed the right lung. The rib cage on the right was adherent to the pleura. Within the thoracic cavity of the second pig, the pleural aspect of the right lung was markedly covered by lacy fibrin. Fibrin tags and extensive flocculant fluid was present in the pericardial sac; a few fibrin tags were present in the abdominal cavity. The caudal aspect of the right lung contained a focally extensive firm nodule area (approximately 5cm in diameter), which, on incision, was composed of compressed lung tissue and multiple smaller areas of abscessation. The ileocaecal, mesentric, popliteal, prescapular and submandibular lymph nodes were enlarged (generalised lymphadenopathy). *Actinobacillus pleuropneumoniae* was isolated from the lungs of both animals and Porcine Circovirus type 2 (PCV2) was also detected in both animals.

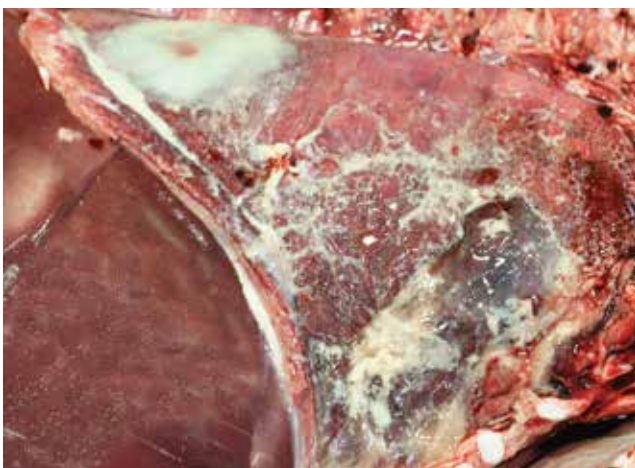


Figure 14: Marked, focally extensive fibrinous pleurisy and pulmonary abscessation in a finisher pig. Photo: Margaret Wilson.

OTHER SPECIES

Fasciolosis

Athlone RVL examined a four-year-old Alpaca with a history of sudden death. On necropsy, the liver was diffusely nodular

and fibrosed with a firm consistency; there were multifocal haemorrhagic tracts throughout – typical of liver fluke – and multifocal areas of calcification. Adult liver fluke (*Fasciola hepatica*) were present in bile ducts. Parasitological examination of faeces detected *F. hepatica* eggs. Due to advanced autolysis, the liver was not suitable for histological examination. A diagnosis of chronic fasciolosis was made. Advice was given regarding a review of parasite control in cohorts.

FARM INVESTIGATIONS

Sligo RVL conducted a farm investigation on a purebred Texel flock with approximately 30 ewes which had experienced a high percentage of lamb mortality in 2021-born lambs and ewes presenting in poor condition with a “hardness” in the udder pre-lambing. A significant point noted in the clinical history was that, at the end of the lambing season in 2020, the owner had observed some ewes with mastitis; however, it did not appear that the farmer had based their culling decisions on the presence of mastitis.

On farm, the premises and animals were examined, including sick and apparently healthy ewes and lambs. All examined ewes were in poor body condition and all of the ewes presented with mastitis. Milk, blood and faecal samples were taken from the flock, and necropsies were performed on any recently-dead animals.

The main findings in the ewes were chronic-active mastitis, a significant fluke burden and bacterial enteritis. Examination of lambs revealed hypogammaglobulinaemia along with mixed bacterial infections including *Salmonella* spp. It was considered that the most likely predisposing cause of these perinatal lamb infections was insufficient colostrum and poor milk availability due to mastitis, poor body condition and chronic parasitism in the ewes. The poor milk supply was considered a major factor causing lamb deaths due to insufficient passive immunity and lack of nutrition. Mastitis was confirmed by clinical examination and at necropsy with multiple pathogens identified from milk samples taken on farm and from post-mortem material. *T. pyogenes*, *Staphylococcus hyicus*, *Staphylococcus aureus* and *Streptococcus uberis* were present from various samples indicating widespread, multifactorial, contagious chronic mastitis.



Figure 15: Chronic *Staphylococcus aureus* mastitis in a ewe from a flock investigation. Photo: Shane McGettrick.

I REGIONAL VETERINARY LABORATORIES REPORT

As farm history suggests a smaller mastitis outbreak in 2020, it is considered likely that pathogens had been spread from ewe to ewe the previous year causing a further severe outbreak in the lambing season 2021. Cross-suckling of lambs in 2020 along with a poor culling policy were likely contributory factors. Findings to date from analysis of flock samples indicate that chronic parasitism was also an underlying cause of ill-thrift and low immunity in the ewes leading to a variety of bacterial infections surfacing as mastitis and enteritis. There was a significant chronic necrotising enteritis identified in a poorly-conditioned ewe from the flock. *Salmonella arizonae* was detected in intestinal contents indicating salmonellosis was also a contributory factor to poor ewe health and may have been a source of infection for the younger lambs.

Strategies to resolve and lessen the impact of disease on the farm were advised. Of paramount importance is the identification and removal of chronically-infected animals, particularly ewes with mastitis. There should be a strict focus on parasite management going forward including regular checking of ewe faeces and body condition scoring, farm hygiene at lambing time should be improved to ensure young lambs are not exposed to sick ewes. Advice was also given on the importance of identification, batching and supplementary feeding of inadequately-nourished lambs to prevent disease but also to minimise cross-suckling and potential for mastitis spread.

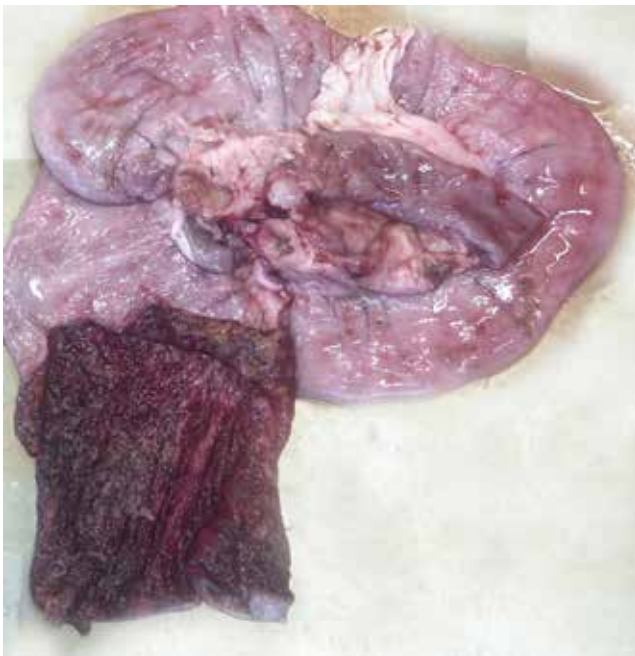


Figure 16: Severe chronic enteritis in a ewe with concurrent mastitis. Photo Shane McGettrick.