

# REGIONAL VETERINARY LABORATORIES REPORT

October 2023

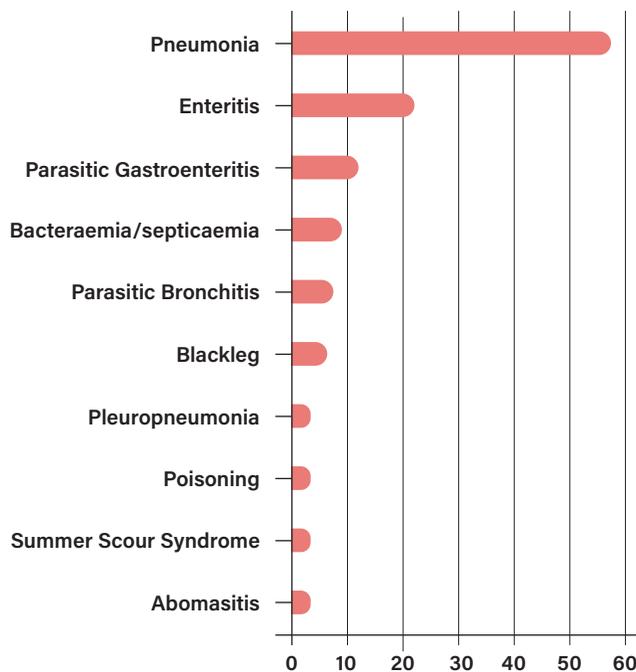
Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 683 carcasses and 85 fetuses during October 2023. Additionally, 2,429 diagnostic samples were tested to assist private veterinary practitioners with the diagnosis and control of disease in food-producing animals. This report describes a selection of cases investigated by the Department of Agriculture, Food and the Marine's (DAFM) veterinary laboratories in October 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.

In addition, this month's report contains advice on using laboratory diagnostics to investigate bovine neonatal enteritis.

## Cattle

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



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

## Gastrointestinal Tract

### Parasitic gastroenteritis

Two six-month-old weanlings were submitted to Kilkenny RVL as 'summer scour syndrome' suspects. Both were severely dehydrated. There was mild-to-moderate oedema and a 'cobblestone' appearance to the abomasum mucosa in both animals. The intestinal contents were very fluid, and the walls were more transparent than normal. There were no visible lesions in the oral cavity or on the oesophagus. Strongyle counts of 12,900 and 1,500 eggs per gram (EPG) were recorded respectively. A diagnosis of parasitic gastroenteritis (PGE) was made, and a review of parasite control was recommended.



**Figure 1:** Abomasal mucosa of a weanling with parasitic gastroenteritis. Photo: Aideen Kennedy.

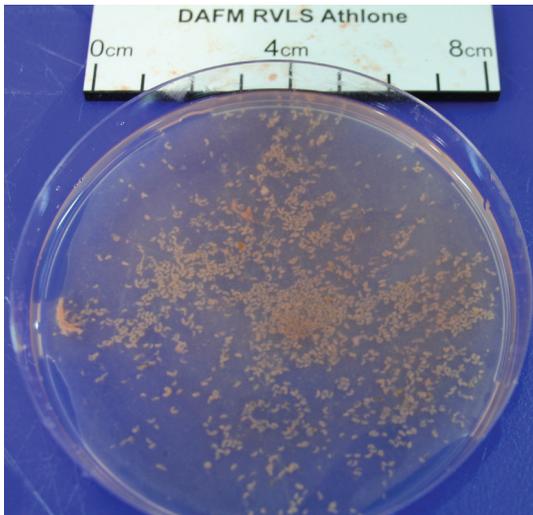
### Acute paramphistomosis

An 18-month-old bullock was submitted to Athlone RVL with a history of being 'off form' for three days with a severe watery scour. Eight out of 20 animals in the group were badly affected while the other 12 were affected to a lesser degree. On necropsy, there was a haemorrhagic enteritis affecting part of the upper small intestine. On examination of the small intestine contents, some small, rice-grain-sized organisms – immature rumen fluke (*Calicophoron daubneyi*) – were seen. Histopathology showed acute, severe atrophic and interstitial enteritis with multiple intralesional paramphistome larvae. A diagnosis of acute larval paramphistomosis (acute immature rumen fluke infection) was made.



**Figure 2:** Congested duodenal mucosa in a case of acute paramphistomosis. Photo: Denise Murphy.

A number of cases of acute paramphistomosis were also diagnosed in Limerick RVL. A cow was submitted from a herd with an outbreak of severe diarrhoea in first calving cows, older cows were not affected. Extremely high numbers of paramphistome larvae were found in the very liquid, blood-tinged small intestinal contents, and adhered to the duodenal mucosa. Large intestinal contents were also very fluid. A diagnosis of acute rumen fluke infection was made.



**Figure 3:** Larval paramphistomes (rumen fluke) discovered in the intestinal contents of scouring animals. Photo: Denise Murphy.

Two weanlings were submitted to Limerick RVL with a history of diarrhoea. Necropsy disclosed extremely high numbers of larval paramphistomes (rumen fluke) in the intestinal contents of both animals. Both were dehydrated and intestinal contents were extremely liquid. Fermented milk was present in the rumens of both animals; though weaned, they had been put back on milk when they were observed to be weak. A diagnosis of acute paramphistomosis was made in both cases.



**Figure 4:** Larval paramphistomes outlined with a methylene blue stain. Photo: Brian Toland.

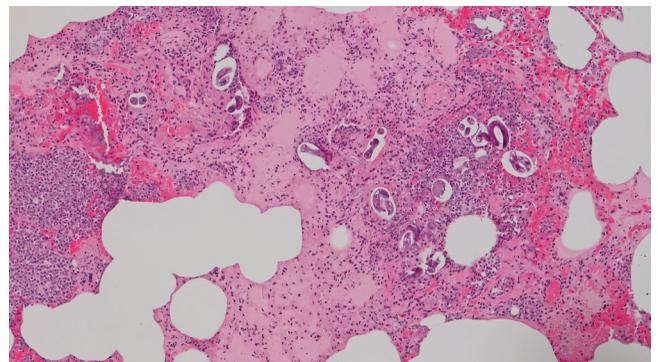
### Septicaemia

An eight-month-old weanling was presented to Kilkenny RVL with a history of diarrhoea prior to death. On post-mortem examination, the small intestinal mucosa appeared

hyperaemic, and the large intestinal contents were very fluid. Modified McMaster faecal egg counts were less than 50EPG. On histopathology, the liver had mild biliary stasis and multifocal areas of necrosis and non-suppurative inflammation, also known as paratyphoid nodules. These changes are commonly associated with septicaemia caused by Gram-negative organisms including *Salmonella*. Histopathology of the intestines revealed multifocal, severe, crypt abscessation, expansion of the lamina propria – primarily with lymphocytes – and invasion of inflammatory cells into the submucosa. Salmonellosis and yersiniosis were key differentials for the gross and histopathological changes seen. Culture of these bacteria can be difficult as they are often overgrown by other enteric organisms, and frequently antimicrobials administered to the animal prior to death may impair growth of these organisms in culture. Further faecal samples and bloods from cohorts were requested to aid in reaching a definitive aetiology.

### Respiratory Tract Parasitic bronchitis

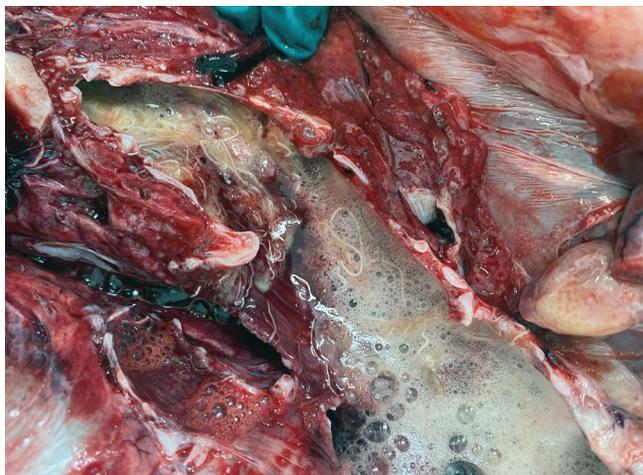
A section of lung was submitted to Kilkenny RVL from a cow showing respiratory signs prior to death. A swab submitted for respiratory viral polymerase chain reaction (PCR) analysis revealed positive results for *Histophilus somni* and *Pasteurella multocida*. On histopathology, multiple cross sections of nematode parasites were seen, associated with *Dictyocaulus viviparus*, i.e., lungworm infection. Lungworm is usually a problem in first-season grazers and cattle usually develop immunity by the time they are adults. However, this immunity can wane over time if animals are not periodically re-exposed to the worms, or if the burden of parasites on the pasture is sufficiently high to overcome the animals' immunity. Lungworm infection can be complicated by secondary bacterial infections, as in this case. Faecal sample examination is not usually helpful in diagnosing acute lungworm infection as it takes some weeks for the immature larvae to develop into adults that produce eggs. A bronchoalveolar lavage is more useful in diagnosing acute cases.



**Figure 5:** *Dictyocaulus viviparus* lungworms seen in the lungs of a cow with associated inflammatory reaction. Photo: Lisa Buckley.

Parasitic bronchitis or 'hoose' was a regular diagnosis during October, with or without bacterial pneumonia. One case involved two eight-month-old weanlings submitted to Limerick for necropsy. Both were bought-in animals and were at grass. There was poor thrive in the group. The two examined had presented clinically with respiratory

distress and were euthanised by the treating veterinary practitioner. Four deaths had previously occurred. Pulmonary emphysema was obvious on gross examination of the lungs. Large numbers of lungworm larvae were visible in the airways of both animals. The intestinal contents were fluid in consistency, and despite that, the strongyle egg counts were 1,700 and 3,800EPG, suggesting a concurrent PGE.



**Figure 6:** *Dictyocaulus viviparus* lungworms seen in the bronchus of a cow. Photo: Alan Johnson.

A separate Kilkenny case involved a 22-month-old heifer with a history of having been found dead at grass. The group size was ten and two other animals had also died. On gross post-mortem examination, there was a severe diffuse pneumonia with emphysema. A large number of lungworm larvae were found in the airways. PCR tests were positive for *H. somni* and *Mannheimia haemolytica*, either or both of which are likely to have contributed to the death of the animal.

### Pneumonia

Sligo RVL examined the carcass of a six-month-old calf which had presented with respiratory signs over the previous month but did not improve after treatment and died suddenly. On gross post-mortem examination, the lung was diffusely oedematous with areas of 'ground glass' emphysema. There was white to yellow debris present in the airways and the right cranioventral lobe was consolidated. On histopathology, there was chronic, severe, suppurative bronchopneumonia with pleuritis, emphysema, and oedema. Bovine herpesvirus 1 (BHV-1) as well as *H. somni* were detected by PCR in the lung. Viral pneumonia with secondary bacterial infection was diagnosed in this case.

### Cardiovascular System

#### Pulmonary thromboembolism

A three-year-old dairy cow was submitted to Athlone RVL with a history of sudden onset of bleeding from mouth, death soon after. On gross necropsy, there were several abscesses in the liver and a large thrombus/abscess in the caudal vena cava. There were multifocal septic pulmonary thromboemboli with haemorrhage and abscesses in the lung lobes, and there was a very large blood clot in the rumen (likely to be swallowed, coughed up blood). Rumen pH was low; values < 5.2 are suggestive of rumen acidosis.



**Figure 7:** A hepatic abscess thought to be the source of a posterior vena caval thrombosis. Photo: Denise Murphy.

Hepatic abscesses are commonly associated with high-energy, limited-roughage diets, leading to increased lactic acid production and lower ruminal pH, potentially causing ruminal lactic acidosis. Ruminal lesions may be caused by repeated bouts of lactic acidosis. Bacterial emboli from the lesions invade the hepatic portal venous system and are transported to the liver, where they can develop into abscesses. In this case, the hepatic abscesses extended into the caudal vena cava causing a septic thrombus with septic thrombo-emboli in the lungs and erosion of pulmonary blood vessels and severe haemorrhage.



**Figure 8:** Septic pulmonary thrombo-emboli arising from a posterior vena cava thrombosis. Photo: Denise Murphy.

### Musculoskeletal

#### Blackleg

A five-month-old weanling was found dead and submitted to Kilkenny RVL. The carcass was autolysed. There were multifocal areas of dry, black, emphysematous muscle with a 'rancid butter' smell; the muscle in the gluteal and neck area were affected. There was a mild pericarditis. *Clostridium chauvoei* was confirmed using fluorescent antibody technique (FAT). Blackleg was diagnosed. A review of vaccination protocols was advised, and the use of a multivalent clostridium vaccine recommended.



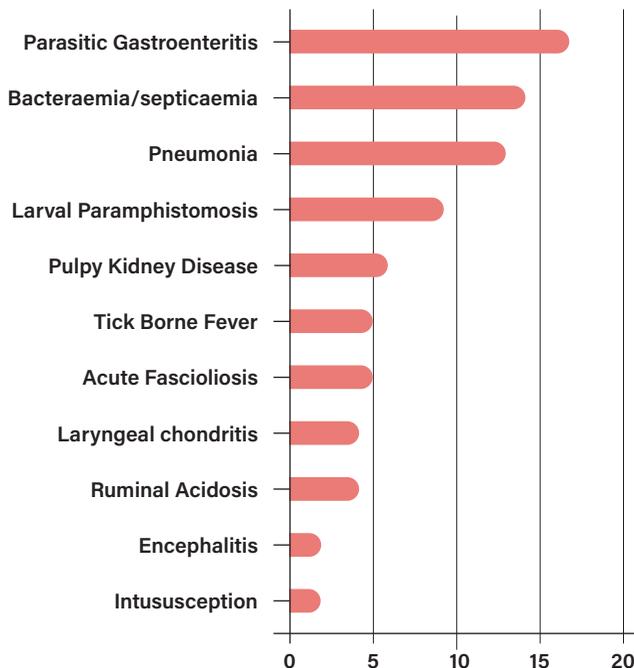
**Figure 9:** A dry, black, emphysematous lesion in the muscle in a case of blackleg. Photo: Aideen Kennedy.

**Cellulitis**

Sligo RVL examined the carcass of an eight-month-old weanling which had been noticed with a swollen head and neck as well as breathing difficulties. The onset appeared sudden. On post-mortem examination, there was diffuse, foul-smelling and necrotising cellulitis, myositis and vasculitis extending from the pharynx to the thoracic inlet. There was fibrinous pericarditis. *Bibersteinia trehalosi* was isolated from the lesions. Cellulitis with likely associated septicaemia/bacteraemia was diagnosed as the cause of death. The cause of the cellulitis could not be further elucidated.

**Sheep**

Parasitic gastroenteritis and bacteraemia/septicaemia were the most common diagnoses at necropsy in sheep in the RVLs during October 2023.



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

**Gastrointestinal Tract**

**Acute paramphistomosis**

A two-year-old ewe with a history of anorexia and scouring was submitted to Limerick RVL. Necropsy disclosed inflamed intestinal mucosa and liquid intestinal contents. An extremely high number of paramphistome (rumen fluke) larvae (*C. daubneyi*) were detected in the intestinal contents. A diagnosis of acute paramphistomosis was made. Acute Fascioliosis (liver fluke) infection had been diagnosed in another ewe from the same flock two weeks previously. Both parasites depend on the same intermediate host *Galba* (formerly *Lymnea*) *truncatula*.

**Fascioliosis**

Sligo RVL diagnosed several cases of acute ovine fascioliosis in October 2023. The typical history in these cases is sudden death. On gross post-mortem examination, the liver commonly presents with numerous haemorrhagic tracts across the surface, frail liver tissue, and often localised peritonitis. There is often haemorrhagic ascites or frank haemorrhage present in the abdomen and the gall bladder can be filled with clotted blood. Acute fascioliosis is the common presentation of a *Fasciola hepatica* infection in sheep in contrast to cattle which tend to suffer chronic fascioliosis.



**Figure 10:** Acute fascioliosis in a lamb. Photo: Shane McGettrick.

**Respiratory Tract**

**Systemic pasteurellosis**

Two lambs were found dead and submitted to Kilkenny RVL. Both lambs had marked fibrinous pericarditis, fibrinous pleuritis and pneumonia. One lamb had a mild oesophagitis. The intestinal contents in both were soft. *B. trehalosi*, (formerly *Pasteurella trehalosi*) was cultured from multiple organs indicating a bacteraemia. PCR-positive results were also obtained for *M. haemolytica*, *P. multocida* and *Mycoplasma ovipneumoniae*. One of the lambs had a high strongyle egg count. Systemic *B. trehalosi* infections typically affect six- to nine-month-old lambs with outbreaks usually occurring between October and December, although infections can also be seen in adult animals. Control is best achieved by vaccination; however, stress, parasitic gastroenteritis, and nutrition issues can cause animals to become susceptible in spite of appropriate vaccination.



**Figure 11:** Fibrinous pleuropneumonia in a case of systemic pasteurellosis. Photo: Aideen Kennedy.

Athlone RVL saw several cases of systemic pasteurellosis in lambs. In one case, two six-month-old lambs from a bunch of 700 bought-in store lambs were submitted for post-mortem. There had been 12 similar losses. There were similar gross findings in both lambs. There were multifocal ulcers on the caudal tongue, pharynx, larynx and oesophagus; with a severe fibrinous diphtheritic membrane on the oesophagus of one lamb. There was marked pulmonary congestion and haemorrhage. *B. trehalosi* was isolated from liver and lung; this is the causative agent of systemic pasteurellosis. PCR tests confirmed *B. trehalosi*. Histopathology of the liver showed multifocal aggregates of bacterial colonies and well-scattered foci of necrosis. Similar lesions were seen in the lungs. These findings are consistent with systemic pasteurellosis.

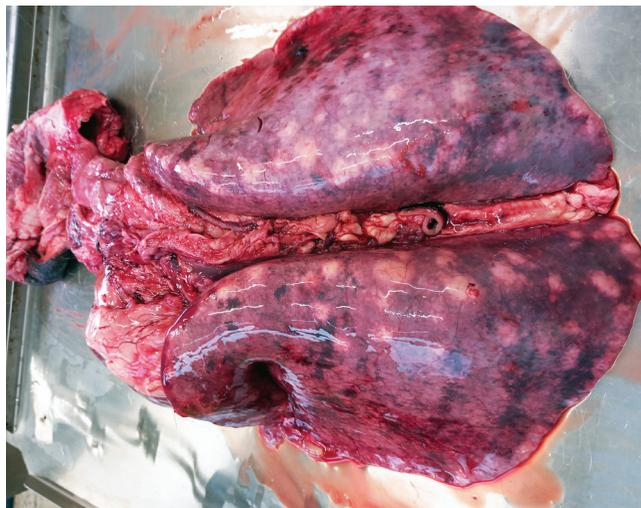


**Figure 12:** Laryngeal ulcers in a case of systemic pasteurellosis. Photo: Denise Murphy.

Sligo RVL examined the carcass of a five-year-old ram which had initially been noted as mildly lame, and then developed pneumonia and died. Upon necropsy, the lung presented with pale nodular lesions throughout the lung parenchyma. The left lung presented with chronic pleuritis. Histopathology diagnosed a diffuse, acute, mild interstitial pneumonia with moderate alveolar oedema. There was also acute, moderate parasitic pneumonia with numerous cross sections of lungworm (likely *Muellerius capillaris*). *B. trehalosi* was

detected by PCR from the lung.

Bacterial and parasitic pneumonia with likely sepsis were diagnosed as the most likely cause of death. There was also severe concurrent parasitic gastroenteritis.



**Figure 13:** Multifocal pale lesions throughout the lungs of a ram. Photo: Rebecca Froehlich-Kelly.

### Ovine pulmonary adenocarcinoma/jaagsiekte

Athlone RVL examined a three-year-old ewe with a history of 'pining' for two weeks, no diarrhoea was observed, and no treatment had been given. Her body condition was very poor, with a bodyweight of 39kg. Both the right cranial and middle lung lobes were consolidated and there were multifocal, variable-sized, firm, white, tumour-like lesions in both the right and left cranial lung lobes. *M. haemolytica* was isolated from the lung on culture and there was a strong positive PCR result for ovine pulmonary adenocarcinoma (OPA) virus. Histopathology of a sample of lung showed multifocal areas of acinar and papillary structures with columnar epithelium consistent with OPA and areas of suppurative bronchopneumonia. A conclusion of ovine pulmonary adenocarcinoma and secondary bacterial infection was made. OPA is a notifiable disease.



**Figure 14:** Firm, white, tumour-like lesions of ovine pulmonary adenocarcinoma. Photo: Denise Murphy.

### Pneumonia

The carcass of a six-month-old lamb with a history of sudden death was submitted to Sligo RVL. On post-mortem examination, there was an extensive pyothorax in the left thorax, as well as pulmonary abscessation in the right cranioventral lobe of the lung. Pale areas were present on the liver surface. Histopathology showed diffuse, chronic, mild-to-moderate pleuropneumonia with severe congestion

and bacterial colonies present in alveolae. There was also multifocal acute, moderate hepatitis with multifocal single cell necrosis. *Erysipelothrix rhusiopathiae* was cultured from the lesions. This pathogen is commonly known as the cause of erysipelas in pigs but has been occasionally reported in lambs as cause of septic arthritis. This case is an unusual presentation as there was no indication of arthritis in this lamb.

## Nervous System

### Otitis



**Figure 15:** Otitis externa (left, red arrow) with abscessation and otitis interna (right) in a ewe suspected to have led to a pituitary abscess. Photo: Shane McGettrick.

The carcase of a three-year-old ewe was submitted to Sligo RVL, the animal was reported off form in the days prior to death, shaking and unstable on her feet. A swollen ear had been noticed. On necropsy, there was an abscess on the pinna which extended into the inner ear as well as the brain. There was also a large pituitary abscess. The abscess on the pinna is suspected to be the most likely source of infection leading to the pituitary abscess.



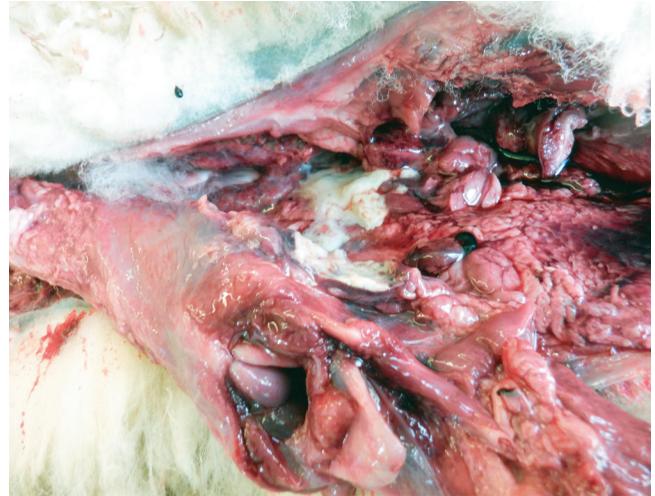
**Figure 16:** Pituitary abscess in a ewe likely caused by an ascending otitis interna. Photo: Shane McGettrick.

## Musculoskeletal

### Traumatic pharyngitis

Two lambs were submitted to Kilkenny RVL, one of which had a history of sudden death, and the other had begun to lose the use of its front limbs. Both animals had

abscessation/necrosis in the pharyngeal region adjacent to the oesophagus. In the second lamb, which had a history of lameness, this abscess was tracking dorsally towards the spinal column. The lungs were congested and oedematous. These lesions were suggestive of a dosing gun injury; a review of technique and examination of the gun for sharp edges was advised.



**Figure 17:** Pharyngitis caused by a dosing gun injury. Photo: Aideen Kennedy.

## Miscellaneous

### Black disease

Sligo RVL diagnosed black disease in a three-month-old lamb which had been noticed slightly dull with mild diarrhoea on the day prior to death. The lamb was treated with an anthelmintic three days prior to death, but no details were provided regarding the used active ingredient or dosage. On necropsy, there were diffuse haemorrhagic tracts present on the liver, indicating acute fascioliosis, and there were dead adult fluke present in the gall bladder. There was a white circumscribed lesion, with a haemorrhagic border, present on the diaphragmatic surface on the liver. There were severely raised parasitic egg counts present in the faeces containing strongyle and *Strongyloides* eggs. *Clostridium novyi* was detected by FAT in the pale liver lesion. Black disease was diagnosed as the cause of death in this case. The high parasitic egg counts indicate a concurrent parasitic gastroenteritis. In this case, the history mentioned dosing three days prior to death, so residual eggs in intestinal contents were expected and do not indicate a treatment failure. However, it was advised to examine further faecal samples a week or two weeks later, depending on the product used, to assess treatment success.

### Clostridial enterotoxaemia

A four-year-old Texel ram from a 570-ewe flock was presented to Limerick RVL. 15 rams were deployed in this breeding flock, all of which were reported as being vaccinated against clostridial disease. There was a history of condition loss in the ewes over the last few weeks. They had been treated for liver fluke and worms three weeks previously. This ram was with the ewes for the previous three weeks but was found dead unexpectedly. On necropsy, a large volume of blood-tinged fluid was present in the abdominal cavity. Both kidneys were autolysed, there was

diffuse pulmonary congestion, and the pericardium was dilated with bloody pericardial fluid and fibrin clots. There was also diffuse hepatic congestion, but no liver fluke damage was apparent. A sample of intestinal contents was positive for *Clostridium perfringens* and its epsilon toxin and glucose was detected in the urine. These results supported a diagnosis of clostridial enterotoxaemia (pulpy kidney), despite the history of vaccination.

## Poultry

### Marek's disease

A chicken was submitted to Kilkenny RVL with a history of diarrhoea. There had been three deaths from a group of 12. On necropsy, the carcass was very thin, there was faecal staining in the cloacal area. The intestinal contents were liquid. There were strands of fibrin and there was a firm mass in the abdominal cavity. On histopathology, neoplastic lymphoid cells were infiltrating multiple organs. Additional tests for Marek's disease were applied and results were positive. Marek's disease is a contagious viral disease of poultry characterised by lymphomas and peripheral nerve

enlargement. Marek's disease is readily transmitted among chickens. It may survive for months in poultry house litter or dust. Dust or dander from infected chickens is capable of transmitting the disease. There is no treatment for Marek's disease.



Figure 18: Abdominal peritonitis and a large firm abdominal mass in a chicken with Marek's disease. Photo: Aideen Kennedy.

## Using Laboratory Diagnostics to Investigate Neonatal Enteritis

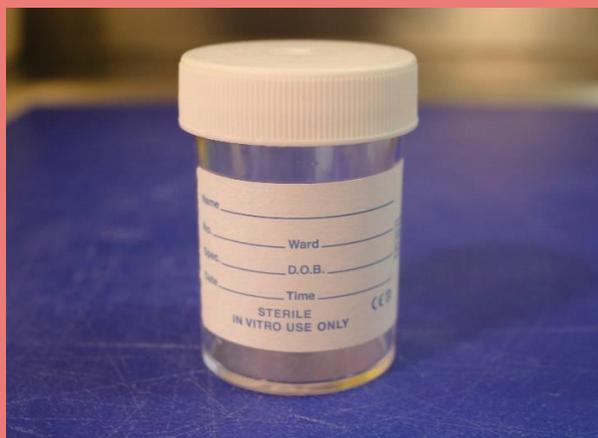


Figure 19: Suitable screw-top plastic container for neonatal faecal samples.

When performing an investigation of neonatal enteritis on farm it is advisable to submit samples from a number of affected animals. Animals that have been sick or that have received treatment for a prolonged period of time are **not** suitable candidates for sampling. Ideally three to five diarrhoea samples should be collected from **early, affected, and untreated calves**. Faecal samples should only be submitted in screw-top plastic containers (Figure 19). In addition, blood samples (serum/red top) should be submitted to check if there has been adequate passive transfer of maternal antibodies from colostrum to the calf. Five to ten blood samples should be taken from calves aged less than ten days old, and these samples should not be collected from sick animals. If in doubt about sample selection, contact the laboratory directly for advice.

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