

Regional Veterinary Laboratories Report

December 2021

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 440 carcasses and 325 fetuses during December 2021. Additionally, 1,778 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 December 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 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 from necropsy in cattle in the RVLs during December 2021.

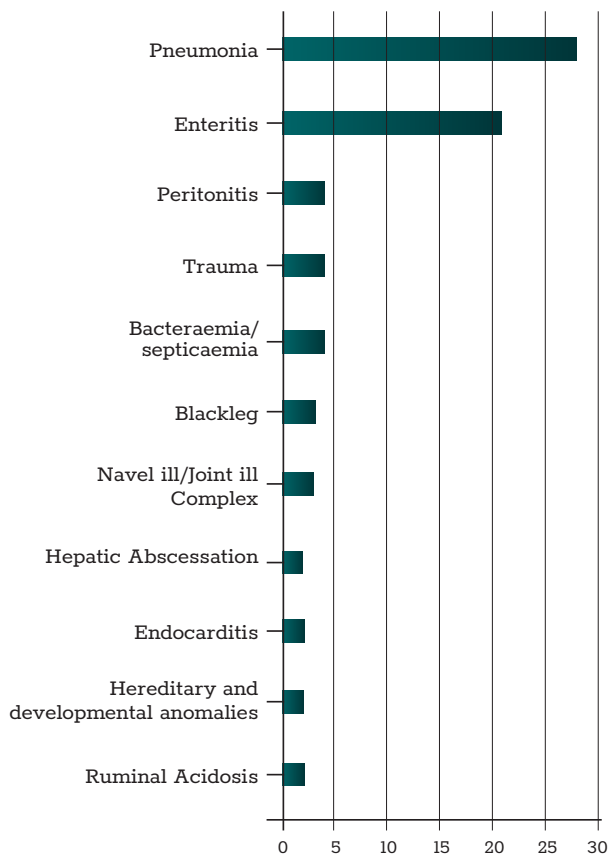


Table 1: The most common diagnoses in cattle submitted for necropsy in December 2021.

GASTROINTESTINAL TRACT

Ruminal acidosis

A ten-month-old weanling was submitted to Athlone RVL with a history of suspected summer scour syndrome earlier in the year, followed by recovery and improved performance, until found dead. Its body condition was poor with a bodyweight of 139kg. There were ample concentrates in soft, liquid ruminal contents and there was an acidic smell. The intestinal

contents and faeces were soft. The rumen pH was 5.1; values <5.2 are suggestive of ruminal acidosis, and pH rises post-mortem. Rumen histopathology disclosed multifocal areas of vacuolation and neutrophil infiltration of the superficial epithelial layer, consistent with a chemical rumenitis. A diagnosis of grain overload resulting in ruminal acidosis was made.

Peritonitis

A five-year-old Limousin cow was found dead with no prior signs and submitted to Kilkenny RVL. On necropsy, there was diffuse fibrinous peritonitis, with approximately 10 litres of liquid pus free in the abdominal cavity. The peritonitis appeared more severe on the left side of the abdominal cavity. The reticulum was adhered to the diaphragm, but no foreign body was identified, however. There were extensive adhesions between the intestines. The chronicity of the lesions prevented identification of the source. Both *Trueperella pyogenes* and *Histophilus somni* were identified on culture.



Figure 1: Fibrinous peritonitis. Photo: Aideen Kennedy.

Johne's disease

A two-year-old bullock was submitted for necropsy from a 400-cattle beef herd. This bullock had been in good condition but developed diarrhoea and lost a lot of condition. There was no response to treatment, one other animal was also

affected but had improved. Necropsy disclosed gross signs of enteritis with some thickening of the mucosa of the caecum. A Johne's serology test was positive and *Mycobacterium avium* subspecies *paratuberculosis*, the causative organism of Johne's disease, was detected by culture in intestinal contents. A diagnosis of Johne's Disease was made.

RESPIRATORY TRACT

Pneumonia

Viral pneumonia was diagnosed in a submission of three four-month-old calves to Sligo RVL. The calves had presented with dullness and mild respiratory distress in the days prior to death, and all expired on the night prior to necropsy. All calves presented with very similar gross findings. There was cranioventral, well-demarcated, pulmonary consolidation affecting 40-60 per cent of the lung parenchyma. Two of the calves presented with haemorrhagic tracheitis. Bacterial involvement was considered likely in the observed bronchopneumonia but could not be proven in ancillary tests; ante-mortem treatment is likely to have inhibited culture of any bacteria present. The pattern of necrotising tracheitis indicated viral involvement. Bovine respiratory syncytial virus (BRSV) was identified in all three animals by polymerase chain reaction (PCR) and is likely to be highly significant in terms of this outbreak.

A seven-month-old weanling with a history of respiratory disease was submitted to Kilkenny RVL for post-mortem examination. On gross examination, there was a severe pneumonia affecting nearly 100 per cent of the lungs. There were multifocal areas of emphysema and bulla formation and diffuse consolidation of lung tissue. The gross findings were consistent with a broncho-interstitial pattern of pneumonia. There were sparse dry contents in the intestines and the bile was thickened and viscous, findings suggestive of a period of inappetence. On histopathological examination, there was a severe, necrotising, broncho-interstitial pneumonia with hyaline membrane formation and type II hyperplasia; and a fibrino-suppurative pleuropneumonia. The necrotising broncho-interstitial pneumonia is likely to be associated with the BHV-1 detected. The other findings are suggestive of bacterial involvement. A review of vaccination and other respiratory control measures was recommended.

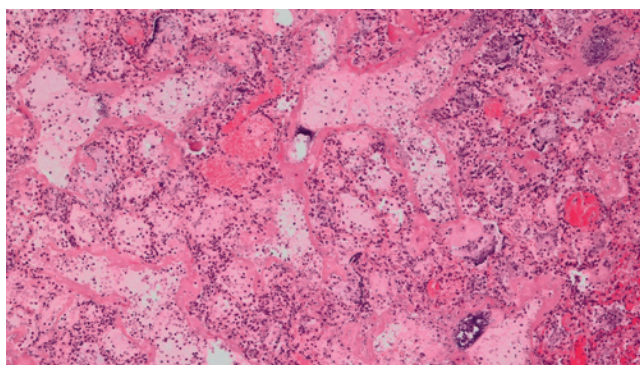


Figure 2: Severe broncho-interstitial pneumonia with diffuse hyaline membrane formation and necrosis and fibrino-suppurative bronchopneumonia. Photo: Maresa Sheehan.

Sligo RVL examined a six-month-old calf which had presented with a mild cough and pyrexia before death. It was the third recent death in the management group and two further animals were reported sick with similar signs. On necropsy, there was severe, cranioventral pulmonary consolidation with ground glass emphysema and multifocal abscesses. Multifocal lobular consolidation and interlobular emphysema were present throughout affecting 80 per cent of the lung parenchyma. There was a severe haemorrhagic tracheitis. The cause of death in this animal was multifactorial acute pneumonia. There was evidence of bacterial involvement, however tracheitis as well as involvement of the entire lung would suggest a viral aetiology. *Mycoplasma bovis* and BRSV were detected by PCR. Lesions were considered severe; it was considered likely that other animals were affected and might be subclinical. Advice on vaccination, monitoring and treatment of clinical cases, and ensuring adequate ventilation with minimum stress would be essential to controlling what could be a severe respiratory disease outbreak.

Pleuropneumonia

A three-month-old bovine was submitted to Kilkenny RVL with a history of respiratory disease. There had been two further losses on the farm. On gross examination, there were adhesions in the pleural cavity between the lungs and the diaphragm, and there was a pleuritis with associated consolidation and severe pleuropneumonia. *Mannheimia haemolytica* was isolated from the lungs; this is a primary respiratory pathogen and is associated with pleuropneumonia like that seen in this case. It was recommended that an immediate review of respiratory disease control be carried out.



Figure 3: Fibrinous pleuropneumonia. Photo: Maresa Sheehan.

A weanling was found dead and submitted to Kilkenny RVL. Post-mortem revealed large fibrin clots in the thoracic cavity and fibrinous adhesions between the pleura and the thoracic wall. There was fibrinous pericarditis with adhesions to pleura also. There was fibrinous pneumonia with cranioventral consolidation affecting approximately 40-50 per cent of tissue. Caudally, the lungs were rubbery in texture. PCR positive results were obtained for *M. haemolytica*, *Mycoplasma bovis*, bovine corona virus (BCoV) and BRSV. A review of pneumonia control on-farm was recommended.



Figure 4: Fibrin in the thoracic cavity. Photo: Aideen Kennedy.

Athlone RVL examined a four-year-old dairy cow with a history of sudden death three days after drying off. There had been two other losses in the herd. On gross post-mortem examination, there was severe, diffuse, fibrinous pleuritis. There was severe, bilateral, cranioventral congestion, consolidation and hepatisation of approximately 80-90 per cent lung parenchyma with severe interlobular and subpleural oedema. There was also a moderate, multifocal fibrinous pericarditis. The liver was enlarged and haemorrhagic and there was a focal area of peritonitis cranially. *Pasteurella multocida* was isolated on culture from lung tissue, while both *P. multocida* and *M. haemolytica* were detected by PCR. Histopathological examination revealed a severe, acute, multifocal-to-coalescing fibrinosuppurative bronchopneumonia and pleuritis with intralesional bacteria, streaming 'oat cells' and diffuse oedema and congestion. There was also a moderate, multifocal, acute fibrinosuppurative peritonitis. A diagnosis of pleuropneumonia caused by *M. haemolytica* and *P. multocida* was made.



Figure 5: Fibrinous pleuritis. Photo: Sarah Delaney.

Pulmonary abscessation

Athlone RVL examined a six-year-old cow with history of lethargy, increased respiratory rate and pyrexia over a 24-hour period, with no response to treatment. On gross post-mortem examination, there was multifocal-to-coalescing abscessation of the left cranial lung lobe, with abscesses of varying size up to 3cm in diameter, and there was bilateral cranioventral congestion and consolidation. *Escherichia coli*, *Micrococcus sp.*, and *Bacillus cereus* were isolated from the lung abscesses. Significance of these pathogens are uncertain and may represent contamination or PM growth as the animal had received treatment that may have inhibited growth of other bacteria. Histopathological examination revealed a chronic marked, multifocal, necro-suppurative bronchopneumonia with intralesional bacterial colonies. A diagnosis of pulmonary abscessation was made.

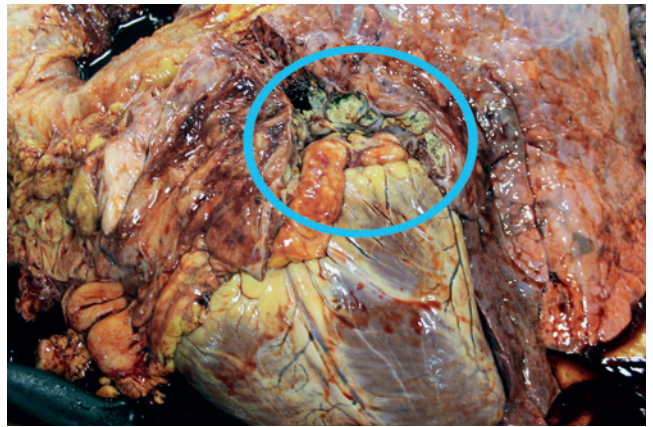


Figure 6: Pulmonary abscessation. Photo: Sarah Delaney.

Parasitic bronchitis

A nine-month-old weanling with a history of dyspnoea and other respiratory signs was submitted to Sligo RVL. On necropsy, there was cranioventral pneumonia and interlobular 'ground-glass' emphysema affecting approximately 50 per cent of the lung parenchyma. There was multifocal pulmonary abscessation present in the cranial lobes. Multiple bacterial pathogens were detected by PCR: *H. somni*, *M. haemolytica* and *P. multocida*. Moreover, lungworm larvae (*Dictyocaulus viviparus*) were detected in the faeces. The changes observed were classed as chronic with likely recent exacerbation. A nine-month-old weanling with respiratory signs was submitted to Kilkenny RVL. It was the third case from 40 animals. On examination, there was a volume of white froth in the trachea with small numbers of lungworm visible. Approximately 40 per cent of lung tissue was consolidated cranioventrally and there was fibrin on the pleura. Large numbers of lungworm were visible in the lower airways. *M. haemolytica* and *Bibersteinia trehalosi* were both cultured on lung tissue. A review of respiratory disease control including a review of dosing was recommended. The timing of these cases was very atypical. Lungworm typically occurs in summer and autumn months; given the mild weather in winter this year, it is likely the grazing period was extended leading to exposure to lungworm.

CARDIOVASCULAR SYSTEM

Valvular endocarditis

A Simmental cow from a 90-cow suckler herd was submitted to Limerick RVL. This cow was seen initially to be unsteady on her feet, was treated by the PVP, but deteriorated and died within two days. Necropsy disclosed a large verrucous lesion attached to the right atrio-ventricular heart valve. Pulmonary oedema was present. A diagnosis of valvular endocarditis was made.

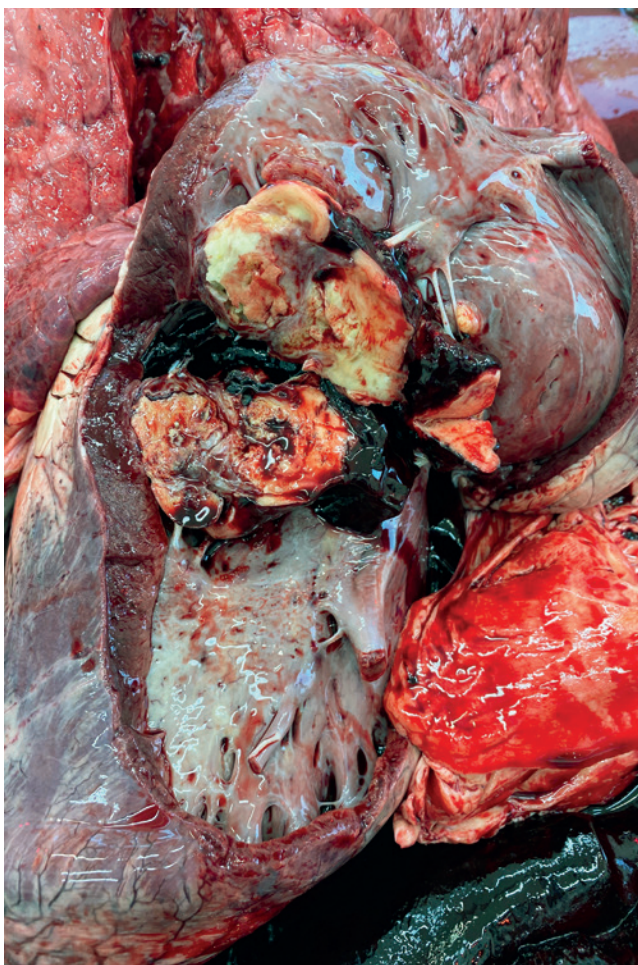


Figure 7: Vegetative endocarditis on a cow's atrio-ventricular valve. Photo: Alan Johnson.

MISCELLANEOUS

Omphalophlebitis

Athlone RVL examined a four-day-old calf with a history of having been found recumbent and moribund, and dying soon after without treatment. On gross post-mortem, the umbilicus was enlarged, and necrotic on incision, and the inflammation tracked caudally along the urachus to the urinary bladder. There was no milk in the abomasum and intestinal contents were pasty. A zinc sulphate turbidity test (ZST) on blood from the carcass returned a value of seven units, indicating a failure of passive transfer of colostral immunity. *P. multocida* was isolated from a swab of the umbilical lesion. A diagnosis of omphalophlebitis/navel ill with hypogammaglobulinaemia as a predisposing factor was made.

Hepatic abscessation



Figure 8: Hepatic abscess. Photo: Aideen Kennedy.

A weanling was submitted to Kilkenny RVL having been euthanised with a history of chronic ill thrift, unresponsive to treatment. The weanling was moderately dehydrated. There was a large, approximately 30cm in diameter, hepatic abscess filled with purulent material. In addition, there was a small pus-filled abscess at the navel. Given the umbilical abscess, it is possible the hepatic lesion originated due to umbilical infection as a calf. There were no significant findings on culture, likely due to antibiotic treatment and the chronicity of the lesions.

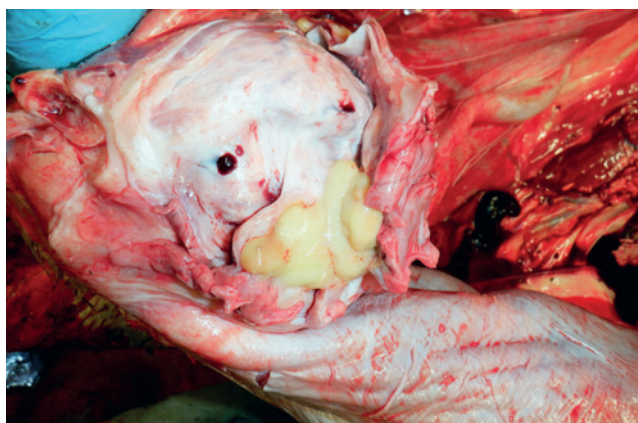


Figure 9: Navel abscess. Photo: Aideen Kennedy.

Sepsis

Sligo RVL examined a one-month-old calf with a history of sudden death. On necropsy, the carcass appeared congested. There were multifocal haemorrhages on the kidney cortices and segmental haemorrhages in the small intestines. The lungs presented with multifocal areas of consolidation. *Salmonella* Dublin was cultured from the liver. The most likely cause of death was sepsis caused by salmonellosis.

SHEEP

Parasitic gastroenteritis and ruminal acidosis were the most common diagnoses from necropsy in sheep in the RVLs during December 2021.

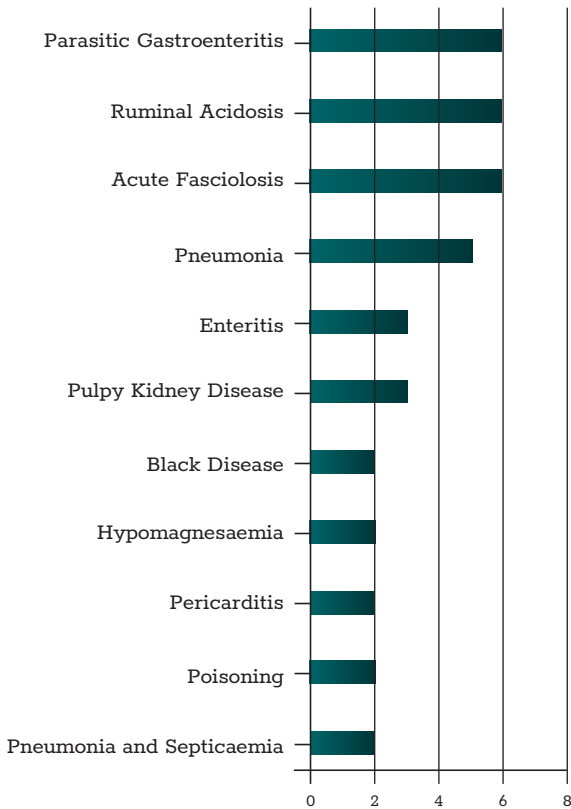


Table 2: The most common diagnoses in sheep submitted for necropsy in December 2021.

GASTROINTESTINAL TRACT

Dosing gun injury

Athlone RVL examined three ewes that had been found dead. They were all carrying twin lambs and there were similar findings in all three ewes. The carcasses were pale and there were necrotic lesions in the peri-oesophageal soft tissue extending halfway down the neck from the level of the larynx. A mineral bolus and blood clot was found at the proximal end of this lesion in each of the ewes and there were large blood clots in the rumen and in the mouths of the sheep. The livers were pale. A conclusion of necrotic cellulitis/pharyngitis due to dosing gun injury was made.

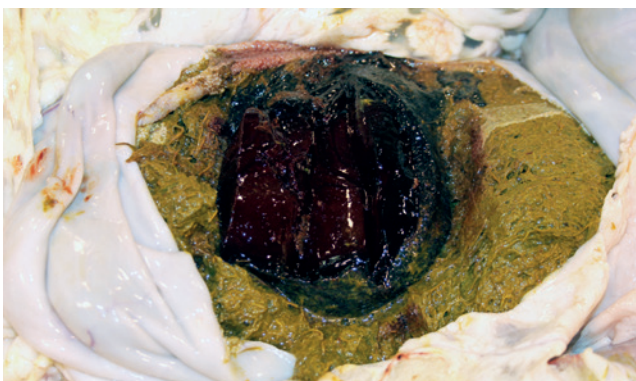


Figure 10: A large blood clot in the rumen of a ewe that had suffered an oesophageal injury at dosing. Photo: Denise Murphy.

Ruminal acidosis and clostridial enterotoxaemia

Sligo RVL diagnosed ruminal acidosis and clostridial enterotoxaemia in three nine-month-old lambs from the same holding. The lambs had a history of sudden death and the farmer had reported nine further deaths in the same group of animals. In all of the examined lambs, large amounts of corn were present in the rumen. Moreover, variable stages of pneumonia were present. Ruminal pH values were 4.9, 6.9 and 5.3. A ruminal pH below 5.5 post-mortem is considered indicative of ruminal acidosis. *Clostridium perfringens* and its epsilon toxin were also detected in the small intestinal contents of two lambs.

Fasciolosis

Several cases of acute fasciolosis were diagnosed in ewes submitted to Sligo RVL. In one case, a two-year-old ewe which had been found dead, the carcass presented with severe perineal staining and multifocal haemorrhagic tracts in the liver affecting the organ in its entirety.

RESPIRATORY TRACT

Ovine pulmonary adenocarcinoma

A four-year-old ewe, that had not been observed displaying significant signs before death, was submitted to Sligo RVL. On necropsy, there were multifocal pleural adhesions on the right lung. The right lung also contained focally extensive pale areas. Jaagsiekte virus was detected in the lung tissue by PCR. Ovine pulmonary adenocarcinoma was diagnosed as the cause of death.

MISCELLANEOUS

Neoplasia

Neoplasia was diagnosed in an eight-year-old ewe submitted to Sligo RVL. The history did not provide any observed signs prior to death. On necropsy, there was metastatic neoplasia presenting as multiple round, raised, white masses involving the intestine, liver, diaphragm, spleen, mediastinum and omentum. On histopathology of the masses, multiple non-encapsulated and invading neoplastic cells arranged in bundles and packets forming acini were detected. Masses appeared variably lobulated and separated by thick strands of fibrous connective tissue. Neoplastic cells were well demarcated in a loose fibrovascular stroma with large amounts of cytoplasm and a round regular nucleus with a prominent nucleolus. There was marked anisocytosis and anisokaryosis. There was marked mitosis, with between three and five mitotic figures per high-powered field. There was multifocal necrosis. Keratin pearls were present. There were large numbers of neutrophils and inflammatory debris present multifocally. This pattern was similar in multiple metastatic sites examined. The neoplasia was considered likely to be a carcinoma.

GOATS

Pleuropneumonia

A three-month-old goat was submitted to Limerick RVL for necropsy having been found dead. Fibrinous

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pleuropneumonia was discovered in the first goat. The right cranial lung lobe was most severely affected. Some fibrin tags were also seen in the peritoneal cavity. *M. haemolytica* was isolated. *M. haemolytica* and *Mycoplasma ovipneumoniae* were detected on PCR. There was a light coccidial infection. Athlone RVL examined a six-month-old kid goat with a history of pining for two months; no treatment had been given. The animal's body condition was extremely poor with a bodyweight of 12.5kg. There was subcutaneous oedema under the chin and marked ascites and serous atrophy of fat around the heart and kidneys. The abomasal mucosa was hyperaemic and the intestinal contents were very soft with tapeworms visible to the naked eye in the intestinal contents. Faeces were firm. A high strongyle egg count of 4,900 eggs per gram (EPG) was detected in faeces. Histopathology of the intestines and abomasum confirmed a parasitic enteritis and abomasitis. A conclusion of gastrointestinal parasitism (both PGE and tapeworm infections) and emaciation was made.

WILDLIFE

Neoplasia

A badger in poor body condition and with a large tumour in its mouth was submitted to Kilkenny RVL. On histopathology, the tumour was diagnosed as an oral squamous cell carcinoma.



Figure 11: A tumour in the mouth of a badger. Photo: Aideen Kennedy.

USING LABORATORY DIAGNOSTICS TO INVESTIGATE NEONATAL ENTERITIS

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 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, untreated calves. Faecal samples should only be submitted in screw top plastic containers (Figure A).

In addition, blood samples (serum/red top) should be submitted to check adequate passive transfer of maternal antibodies from colostrum.

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.

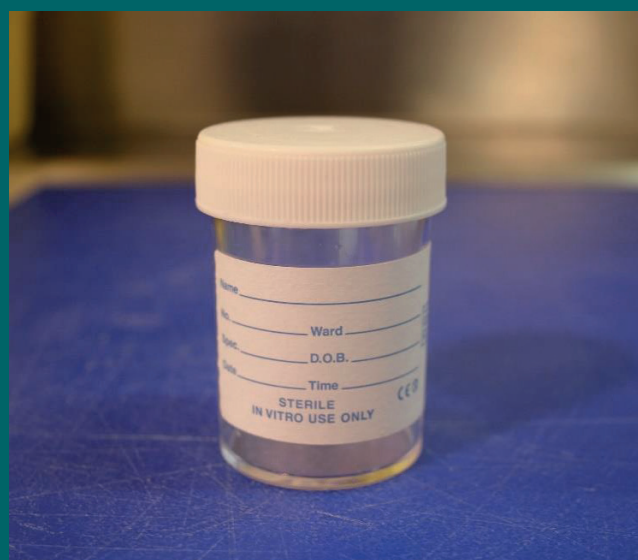


Figure A: Suitable screw top plastic container for neonatal faecal samples.

If in doubt about sample selection, contact the laboratory directly for advice.