Regional Veterinary Laboratories Report

November 2020

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 500 carcases and 259 foetuses during November 2020. Additionally, 1,817 diagnostic samples were tested to assist private veterinary practitioners (PVPs) 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 November 2020.
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 causes of death in bovine carcases submitted to the RVLs in November 2020.

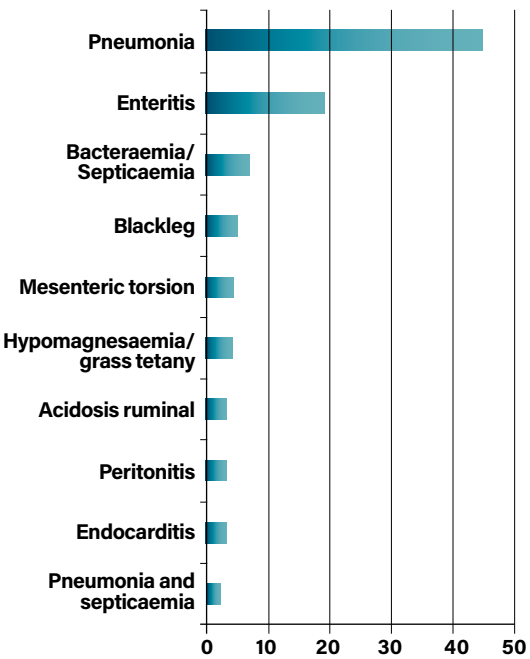

Table 1: The most common causes of death diagnosed in bovine carcases submitted to DAFM RVLs in November 2020.

GASTROINTESTINAL TRACT

Bacteraemia/Septicaemia

Sligo RVL received a three-month-old calf which had been noticed with ill-thrift and grey faeces. Despite treatment efforts, the animal deteriorated with progressive weight loss. On necropsy, there was severe enteritis with extensive ecchymosae and haemorrhage over the intestinal serosa and mucosa. The kidney capsule was fibrosed and adhered to the cortex. The kidney cortex was light brown and appeared marbled with clearly demarcated areas of multifocal infarction. The abomasum presented with diffuse, shallow ulceration. The rumen contained large amounts of light-gauge black polythene film (silage bale wrapping). While bacterial cultures were unrewarding, histopathology revealed a diffuse, chronic, severe, transmural, necrotising neutrophilic and eosinophilic enteritis with vasculitis, hyaline changes in vessel walls and thrombosis. In the kidney there was acute tubular injury, dystrophic calcification and infarction. Bacterial enteritis with likely bacteraemia and sepsis was diagnosed as the cause of death. The kidney damage was considered likely to be a sequel. The most likely aetiology was considered to be salmonellosis. *Salmonella spp.* can be very challenging to culture *in vitro* if antimicrobial treatment is administered before death as occurred in this case.

Figure 1: Enteritis with ecchymotic haemorrhage in a calf. Photo: Rebecca Froehlich-Kelly.

Abomasal perforated ulcer

A Limousin weanling was submitted to Limerick RVL for necropsy with a history of snoring. The animal had been treated but had developed respiratory signs. Necropsy disclosed a perforated abomasal ulcer.

Figure 2: A perforated abomasal ulcer in a weanling. Photo: Alan Johnson.

Salmonellosis

A faecal sample was submitted to Limerick RVL from a three-year-old Friesian cow with reported signs of haemorrhagic diphtheritic enteritis. *Salmonella enterica* serovar Newport was isolated. Salmonella Newport is not a common isolate from RVL submissions but is regarded as a pathogen of significant public health concern, not least because of the existence of multi-drug-resistant isolates. It has been associated with large outbreaks of food-borne disease in humans worldwide.

Traumatic reticulopericarditis

Athlone RVL examined an 18-month-old Limousin-cross heifer. She had been purchased two weeks previously and was noticed off form one week later with mild respiratory distress and excess salivation. Treatment was unsuccessful. There was a fibrinous adhesion between the reticulum and the diaphragm and an 8cm screw was found penetrating through the reticulum and diaphragm into the thoracic cavity. There was a moderate fibrinous pericarditis and pulmonary congestion. A diagnosis of traumatic reticulopericarditis or 'hardware disease' was made.

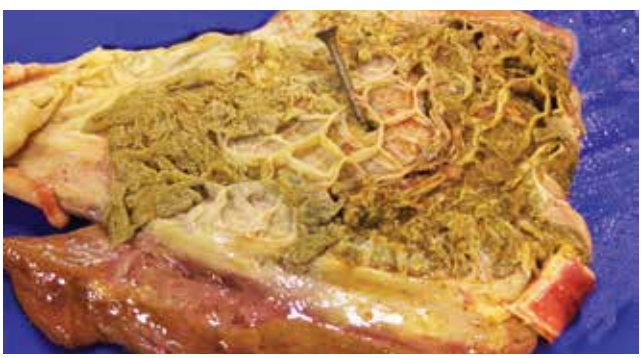

Figure 3: A screw found penetrating the reticulum wall in a case of traumatic reticulopericarditis. Photo: Denise Murphy.

RESPIRATORY TRACT

Bronchopneumonia

Athlone RVL examined a nine-month-old weanling with a history of pyrexia and foaming from the mouth. It was the fifth weanling in the group to present with similar signs. On necropsy, there was severe, bilateral, cranioventral pulmonary congestion and consolidation affecting 60% of the lungs. There were fibrinous adhesions to the costal pleura and pus in the airways. *Mannheimia haemolytica, Histophilus somni, Bibersteinia trehalosi, Pasteurella multocida* and bovine respiratory syncytial virus (BRSV) were all detected in the lung by polymerase chain reaction (PCR) analysis. On histopathology of the lung, there was a severe, diffuse, fibrinosuppurative bronchopneumonia with streaming oat cells and multifocal areas of necrosis. A diagnosis of bronchopneumonia caused by bacterial infection was made.

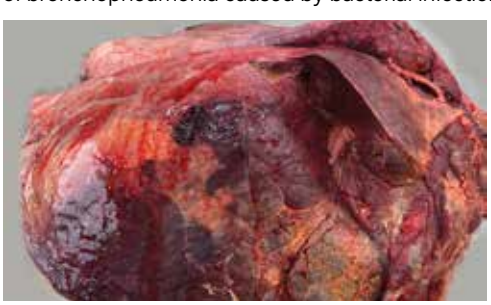

Figure 4: Fibrinous pneumonia in a bovine lung. Mannheimia haemolytica was detected by culture. Photo: Alan Johnson.

A weanling was submitted to Limerick RVL with a history of respiratory distress. One other sudden death had occurred in the group. Necropsy disclosed pneumonia with the cranial lobes more severely affected and some localised lesions of emphysema with a 'ground glass' appearance to the pleura. PCR testing returned a positive result for *Pasteurella multocida*, BRSV, *Histophilus somni* and *Mycoplasma bovis.* A high strongyle egg count was also detected in a faecal sample.

An eight-month-old Angus-cross heifer was submitted to Limerick RVL with a history of sudden death, from a herd that had a notable issue with respiratory disease in October 2020. Necropsy revealed a fresh carcase and examination of the lungs revealed bilateral pulmonary congestion, haemorrhage and oedema. Grossly, both lungs were haemorrhagic, dark purple in colour, heavy to lift and fluid-filled with some evidence of consolidation in the cranioventral lobes. Visually, a mere 10% of both lungs appeared unaffected. There was also omental congestion and haemorrhage within the abdominal cavity suggestive of a potential sepsis. Laboratory findings revealed *H. somni* on culture and PCR with *P. multocida* shown to be present on PCR. A diagnosis of severe acute bacterial bronchopneumonia, likely caused by *H. somni*, was made.

Two four-month-old weanlings with pneumonia symptoms were submitted to Kilkenny RVL. Five had died from a group of 16 in two days. Emphysema was disclosed on necropsy in both animals, both focal bullae and ground glass emphysema. Cranioventral pulmonary consolidation was also found. There were moderate numbers of lungworm in the airways of one of the weanlings. In addition to the lungworm observed, multiple respiratory agents were identified on PCR including *BRSV, Histophilus somni, Pasteurella multocida* and *Biberstinia trehalohsi.* A review of control of respiratory disease on the farm was advised including a review of lungworm control.

Bovine respiratory syncytial virus

Bovine respiratory syncytial virus (BRSV) infects the epithelial cells lining the respiratory tract mucosa. This damages the mucociliary apparatus that clears pathogens and particulate matter from the airways. This process leaves underlying tissue vulnerable to viral infection and secondary bacterial infection. The spectrum of clinical signs in susceptible cattle can range from mild to life-threatening. Initial exposure to BRSV can produce acute respiratory disease, with subsequent exposure typically resulting in mild or subclinical disease.

URINARY/REPRODUCTIVE TRACT

Protozoal abortion

A bovine foetus was submitted to Limerick RVL as the eighth abortion in an 85-cow dairy herd. No significant abortifacient pathogen was detected on routine culture. Histopathology revealed a focal non-suppurative encephalitis, a strong indication of protozoal abortion. In cattle, *Neospora caninum* is the most likely aetiological agent.

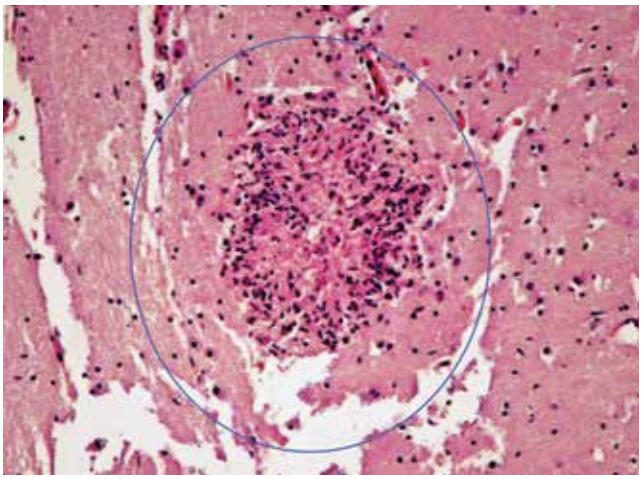

Figure 5: A focus of non-suppurative encephalitis in a bovine foetus, suggestive of protozoal abortion. Photo: William Fitzgerald.

Thyroid hyperplasia

A stillborn calf from one of 15 imported in-calf heifers was necropsied at Limerick RVL. The heifer had calved slightly prematurely and the calf was born dead. There was some meconium staining of the carcass suggesting foetal distress before delivery. The trachea was clear of fluid. and the lungs were not inflated; no significant bacterial or fungal pathogens were isolated. The thyroid appeared to be somewhat enlarged and histopathology showed lesions in the thyroid gland consistent with thyroid hyperplasia. Iodine deficiency was suspected.

CARDIOVASCULAR SYSTEM

Thrombophlebitis of the caudal vena cava

Athlone RVL examined a five-year-old cow with a history of sudden death. On necropsy, there was a large abscess in the cranial peritoneal cavity, surrounding and extending into the caudal vena cava, which was enlarged and contained thick, purulent material. The liver was enlarged, dark and hard with a nutmeg pattern to the cut surface. There were multifocal abscesses in the liver parenchyma and the hepatic vessels were enlarged. The heart was enlarged and there were small multifocal abscesses in the lungs. *Escherichia coli* was cultured from the peritoneal abscess. A diagnosis of thrombophlebitis of the caudal vena cava was made. Thrombosis of the caudal vena cava in cattle can occur as a sequel to hepatic abscessation.

Haemorrhage

Athlone RVL examined a two-week-old suckler calf, which was observed with a head tilt two days after dehorning and died shortly after. There was marked blood staining around the right dehorning wound and down the right side of the face. Mucous membranes were white, and the carcase was very pale; liver, lungs, heart, kidneys, musculature and brain were all affected. The blood had a 'watery' appearance. There were no significant findings on histopathology of the bone marrow and a diagnosis of haemorrhage secondary to dehorning wound was made.

Myocarditis

A seven-month-old weanling with a history of sudden death was submitted to Sligo RVL. One further animal in the group was reported sick with signs of pneumonia. On post-mortem examination there was severe pericarditis, myocarditis and endocarditis at the base of the papillary muscle. *H. somni* was detected from the lesion by PCR. Thrombotic meningoencephalitis (TME), bronchopneumonia and myocarditis with myocardial abscesses are all features of *H. somni* infection.

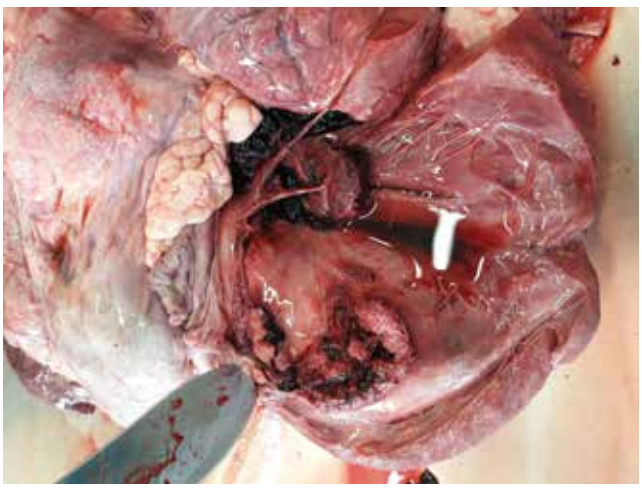

Figure 6: Myocarditis in a seven-month-old weanling. Photo: Rebecca Froehlich-Kelly.

NERVOUS SYSTEM

Sinusitis

A five-year-old cow was submitted to Athlone RVL as a suspect case of bovine spongiform encephalopathy (BSE). It had occasional ataxic episodes for the previous three months with mild weight loss. When the skull was opened to remove the brain, the frontal sinus on the right side contained a large amount of pus enlarging the sinus cavity and causing erosion of surrounding trabecular bone. It was negative for BSE. A diagnosis of chronic sinusitis was made.

Figure 7: Pus in the sinus of a cow causing erosion of surrounding trabecular bone. Photo: Seamus Fagan.

Septicaemia/meningitis

A seven-day-old Charolais suckler calf was submitted to Limerick RVL with a history of dullness and abnormal head carriage. Necropsy disclosed hepatomegaly, pulmonary, splenic and hepatic congestion. There was a cloudy and haemorrhagic appearance to the meninges. *E. coli* was isolated from the brain, liver and lung. Severe suppurative meningitis was found upon histopathology. A diagnosis of bacteraemia/septicaemia and meningitis associated with *E. coli* infection was made.

Listerial encephalitis

A three-year-old suckler cow was found dead having displayed no previous signs and was submitted to Kilkenny RVL. The carcase was autolysed and displayed no specific findings on gross necropsy. Histopathology of the medulla oblongata showed lymphocytic perivascular cuffing and multifocal foci of suppurative encephalitis. The lesions were suggestive of listeriosis. *Listeria monocytogenes* is a ubiquitous organism and a potential zoonosis. Poorly conserved silage is typically a risk factor for disease.

MUSCULOSKELETAL

Blackleg

Sligo RVL diagnosed blackleg in a five-month-old calf, which had been found recumbent and kicking before death. On necropsy, there was dry myositis in the right pectoral and neck musculature. *Clostridium chauvoei* was confirmed by fluorescent antibody technique (FAT) in the lesion.

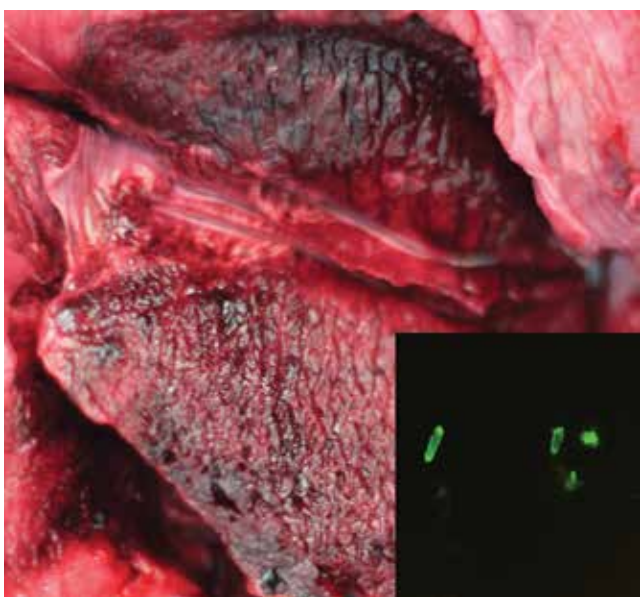

Figure 8: A lesion of dry myositis in a case of blackleg. Inset: Clostridium chauvoei fluorescing during a FAT. Photo: Rebecca Froehlich-Kelly/Anne-Marie Flaherty.

SHEEP

Parasitic gastroenteritis and pneumonia were the most commonly diagnosed causes of death in sheep carcases submitted to the RVLs in November 2020.

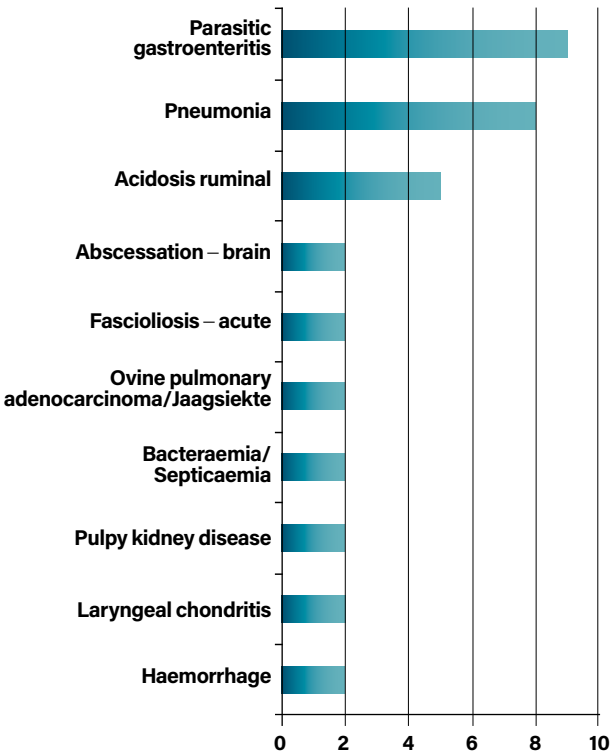

Table 2: The most common causes of death diagnosed in ovine carcases submitted to DAFM RVLs in November 2020.

GASTROINTESTINAL TRACT

Acute fascioliosis/parasitic gastroenteritis

Athlone RVL examined a three-year-old ewe that had been found dying and had no previous history of illness. On necropsy, there was haemorrhagic fluid in the abdomen and tiny haemorrhagic tracts throughout the liver. There was a large fibrin clot in the pericardial sac and consolidation of the tips of the cranial and middle lung lobes bilaterally. A high strongyle egg count was detected in the faeces but liver fluke eggs were not detected. Histopathology of the liver showed multifocal eosinophilic haemorrhagic necrotic lesions throughout, these were deemed to be migratory tracts of larval *Fasciola hepatica*. There were also lymphocytic infiltrates in lamina propria of the abomasum and hyperplastic glands consistent with parasitic gastroenteritis. A diagnosis of acute fascioliosis and parasitic gastroenteritis was made.

RESPIRATORY TRACT

Pneumonia

Sligo RVL examined a six-month-old lamb, which had been found dead. The farmer lost approximately 17 animals of that management group previously. On necropsy, there was severe pleurisy and consolidation of approximately 80% of the lung parenchyma. There was purulent pleural effusion. *M. haemolytica* and *Mycoplasma ovipneumonia* were detected by PCR in the lung tissue. On histopathology, there was diffuse, chronic, severe, suppurative pleuropneumonia. Bacterial pleuropneumonia was diagnosed as cause of death.

MUSCULOSKELETAL

Spinal abscess

A two-year-old ewe with a history of progressive hind leg weakness to paresis was submitted to Sligo RVL for investigation. Post-mortem examination revealed an approximately 3cm-sized abscess in the body of a sacral vertebra compressing on the spinal cord. *Trueperella pyogenes* was cultured from the abscess.

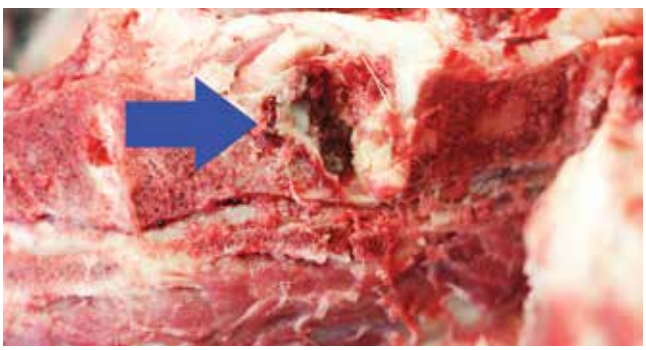

Figure 9: A spinal abscess in a ewe. Photo: Rebecca Froehlich-Kelly.

POISONING/MISCELLANEOUS

Hypomagnesaemia

Athlone RVL examined a one-year-old ewe with a history of recumbency, kicking and neurological signs. Four other ewes in the group, which were outdoors on a grass diet only, were found dead. On gross post-mortem, there were no significant lesions detected. A sample of vitreous humour was collected at post-mortem; the magnesium concentration was 0.28 mmol/L. Vitreous humour magnesium concentration in adult sheep of </= 0.65mmol/L for up to 24 hours post-mortem is associated with severe hypomagnesaemia and tetany. A strongyle egg count of 4,600 egg per gram (EPG) and *Nematodirus battus* egg count of 500 EPG were detected in faeces. Diagnoses of hypomagnesaemia and concurrent parasitic gastro-enteritis were made.

Copper poisoning

A nine-month-old lamb was submitted to Kilkenny RVL. The group of lambs had been anorexic, lethargic and displayed abnormal head carriage and respiratory signs. On necropsy, there was a jaundiced appearance to the carcase, the liver was jaundiced, and the kidneys were dark, almost black in colour. The urine was port-wine coloured. Copper toxicity was suspected and this was confirmed with elevated kidney and liver copper concentrations. A review of diet and mineral supplementation practices was recommended.

Figure 10: Jaundiced liver and dark kidney tissues from a lamb with elevated copper levels. Photo: Aideen Kennedy.

GOATS

GASTROINTESTINAL TRACT

Parasitic gastroenteritis

Athlone RVL examined a two-year-old Pygmy goat with a history of diarrhoea and swelling of the throat and jaw. Upon necropsy there was abundant pale-yellow fluid in the peritoneal cavity (ascites). The small and large intestines were very oedematous. The intestinal vessels were inflamed, and intestinal contents were liquid. Rectal contents contained blood. The abomasal wall including abomasal folds was oedematous and thickened. A strongyle egg count of 9,400 EPG was detected in faeces. On histopathology of the intestine there were multifocal areas of inflammatory infiltrate, congestion, oedema and loss of crypts, suggestive of enteritis. A diagnosis of protein losing enteropathy secondary to parasitic gastroenteritis was made.

An adult female goat was submitted to Kilkenny RVL with a history of sudden death. There was cranioventral consolidation affecting approximately 40% of the lungs with necrotic foci within the consolidated region. There were mild fibrinous adhesions between lung lobes. The abomasum had a hyperaemic mucosa with abomasal fold oedema and a mild catarrhal exudate. McMaster egg count results indicated 9,200 strongyle EPG. *B. trehalohsi, P. multocida* and *T. pyogenes* were cultured from the lung. The high strongyle count may have contributed to immunosuppression and a review of parasite control and respiratory disease control was advised.

PIGS

RESPIRATORY

Atrophic rhinitis

Dublin RVL investigated an outbreak of respiratory distress in one-to-two-week-old piglets. Two affected piglets were submitted. The piglets weighed 4.4kg and 2.4kg respectively, both were in fair body condition with milk ingesta in the stomach. In the first piglet, the nasal conchae were markedly congested and oedematous with mild asymmetry. In the second piglet, the nasal mucosa was oedematous with a frothy exudate, the nasal conchae were distorted. On histopathology, both piglets had marked-to-severe erosive suppurative rhinitis with lymphohistiocytic submucosal infiltrates and cartilage necrosis. *Bordetella bronchiseptica* was isolated from the nasal cavity. The main presenting clinical sign of respiratory distress was attributed to the rhinitis detected. The finding of rhinitis, with *B. bronchiseptica* isolated, is consistent with acute atrophic rhinitis. Atrophic rhinitis can occur from one week of age, following colonisation by toxigenic *B. bronchiseptica*, and can predispose to pneumonia development. Risk factors for atrophic rhinitis include contact with asymptomatic carriers and poor ventilation.

Figure 11: A cross-section view of nasal conchae of two piglets diagnosed with atrophic rhinitis. Photo: Margaret Wilson.

MUSCULOSKELETAL

Polyarthritis

Sligo RVL received five piglets for investigation of ongoing lameness issues in a herd. The submission consisted of two suckling piglets (approximately four weeks old) and three weaner piglets (9-15 weeks old). Both suckling piglets presented with multifocal polyarthritis and tenosynovitis with purulent exudate in carpal, stifle and tarsal joints. The weaner pigs similarly presented with polyarthritis and tenosynovitis in multiple joints affected with variable severity. The oldest pig presented additionally with small fibrin clots in the joint fluid from some joints. There were some joints in this animal with purulent exudate which was associated with severe swelling and damage to overlying skin. There were also focal areas of lung consolidation and fibrinous pleuritis in the left caudal lung lobe as well as a large abscess (8cm in diameter) in subcutaneous tissue at the thoracic inlet over the cranial sternum. A diagnosis of chronic/active polyarthritis was made in all of the submitted pigs. The focal pleuritis in the oldest pig is consistent with an *Actinobacillus pleuropneumoniae* (APP) infection. *Mycoplasma hyorhinis, Mycoplasma hyosynoviae* and *Haemophilus parasuis* were investigated as potential causative agents, but could not be confirmed. *Streptococcus suis* and *Trueperella pyogenes* were cultured from some of the lesions. It was not possible to be certain if a common agent was responsible for disease in all ages or if the lesions in the older pigs are a continuation of a process encountered in younger pigs; however, the gross appearance and distribution of the lesions (localisation in joints and tendon sheaths) in the younger pigs is similar to that in the older pigs.

Figure 12: Arthritis in a pig. Photo: Shane McGettrick.

AVIAN

GASTROINTESTINAL TRACT

Egg peritonitis

An 18-month-old, backyard, laying hen was submitted to Athlone RVL for necropsy with a history of diarrhoea about six weeks previously that had resolved without treatment but had displayed signs of lethargy since. Profuse green diarrhoea recurred one week prior to death and there was no response to treatment. All eight comrades were unaffected. On necropsy, the body condition was very poor. There was a diffuse fibrinous peritonitis with albumin-like material between loops of intestines and intestinal contents were loose and yellow. The oviduct was massively distended and contained necrotic yellow material with a 'cooked egg' smell. The liver was enlarged and friable. *E. coli* was isolated from several organs. A diagnosis of egg peritonitis was made.

EGG PERITONITIS

Egg peritonitis follows the reverse movement of albumin and *E. coli* bacteria from the oviduct into the abdomen. Antibiotic treatment of egg peritonitis caused by *E. coli* infections is usually ineffective. Management of body weight, reproductive development (ovary follicle growth and maturation), and drinking water sanitation are the best preventive strategies.