OVERVIEW

- Hypovitaminosis A responsible for ocular deformities in suckler calves
- A review of type D clostridial enterotoxaemia in cattle
- Nitrate/nitrite poisoning in kale fed lambs
- Louping ill in sheep in mid-winter
- Rhodococcus equi abscessation identified at meat inspection of fattening pigs

GENERAL INTRODUCTION

December was an unsettled month of wet and windy weather. Temperatures were well above normal with very few air frosts experienced. Much of the country experienced around twice the monthly average rainfall making it probably the wettest December since 1910. SAC C VS considered that the wet and mild weather presented an increased risk of respiratory disease for housed cattle.

CATTLE

Nutritional and metabolic disorders

Hypovitaminosis A

Aberdeen considered hypovitaminosis A cause congenital ocular deformities in five, three-month-old, Simmental-cross calves. The calves presented with a range of ocular deformities including cataract formation, lens luxation, microphthalmia and reduction in the size of the optic nerve head. One calf was completely blind while the others showed varying degrees of sight impairment. Blood sampling identified deficiencies in vitamins A and E; the mean vitamin A value for the group was 0.47 µmol/l (reference range 0.87 to 1.75 µmol/l) and the mean vitamin E value was 2.28 µmol/l (reference range 3.0 to 18 µmol/l).

Generalised and systemic conditions

Salmonella Mbandaka

Dumfries recovered *Salmonella* Mbandaka for the second time in recent months (see previous surveillance report), this time from a faecal sample from an adult dairy cow with pyrexia and diarrhoea. *Salmonella* Mbandaka is considered a contaminant of cattle feed, particularly rapeseed products and soya bean meal. Samples of feed from the affected farm were screened for *Salmonella* spp. with negative results.

Black disease

Four diagnoses of necrotising hepatitis due to *Clostridium novyi* (Black disease) were made this month. This compared with none in December 2012 and only one in December 2011. Perth diagnosed the condition in an unvaccinated, ten-month-old Aberdeen Angus-cross bullock which presented in recumbency with respiratory distress and submandibular oedema. At necropsy,
conjunctival, brisket and ventral oedema were evident and there was a large volume of clear, straw-coloured pleural and pericardial effusion. Hepatic scarring was present and liver fluke eggs were detected in bile. Histological examination of the liver identified coagulative necrosis considered consistent with *Clostridium novyi* infection. In addition a severe, chronic hepatopathy was evident although the aetiology of this condition was unclear. SAC C VS considered that both the fasciolosis and the hepatopathy likely predisposed to *C. novyi* infection.

**Respiratory tract diseases**

**Bacterial pneumonia in dairy cows**

Lung tissue was submitted to Ayr following an on-farm postmortem examination of a seven-year-old Holstein Friesian cow. Treatment for severe respiratory disease was unsuccessful. The apical and middle lung lobes were consolidated with yellow fibrinous material over the visceral pleura. *Mannheimia haemolytica* and *Pasteurella multocida* were recovered from the lung tissue submitted while screening for respiratory viruses by both fluorescent antibody testing and PCR proved negative. Herd vaccination against infectious bovine rhinotracheitis was in place however the herd had experienced in increase in cases of pneumonia in adult cows. In 2013 12 deaths were recorded as due to pneumonia compared with just three adult cow mortalities in 2012. The rise in pneumonia began after a machine was purchased to blast sawdust into the cubicles to bed them. SAC C VS postulated that the dust created by the bedding process may have resulted in deterioration of air quality thereby predisposing the cattle to respiratory disease.

**Seasonal rise in calf pneumonia**

The seasonal rise in cases of calf pneumonia was seen across the country with the number of outbreaks diagnosed being similar to previous years. Bacterial aetiologies have predominated with *Mannheimia* spp being the most commonly diagnosed cause followed by *Pasteurella multocida*.

**Musculo-skeletal conditions**

**Atlanto-occipital osteomyelitis**

Perth diagnosed severe atlanto-occipital osteomyelitis in a three-month-old Charolais calf. The calf had developed respiratory signs at three weeks of age that were refractory to repeated treatment. The clinical presentation worsened to include ventroflexion of the neck and seizures prior to death. At necropsy, the navel was swollen and contained inspissated purulent material and serous fluid. Lung pathology was limited to moderate, patchy consolidation in the cranial half of the right lung. Incision into the atlanto-occipital joint revealed a severe osteomyelitis that had almost completely eroded the atlas. *Streptococcus pluranimalium* was recovered from the purulent debris around the spinal cord and within the foramen magnum. Histopathology of bone marrow revealed trilineage hypoplasia; around 90 per cent of the total haematopoietic cell numbers in the bone marrow were lost. Although trilineage hypoplasia is most commonly associated with bovine neonatal pancytopenia, in this case SAC C VS considered chronic septic disease the most likely cause of the bone marrow depression.

**Review**

**Clostridium perfringens** type D disease in cattle

The diagnosis of enterotoxaemia due to *Clostridium perfringens* type D in cattle involves the detection of epsilon toxin in the intestinal content and the demonstration of characteristic changes on histological examination of the brain. However the diagnosis of the condition in cattle is often not straightforward; gross changes at necropsy are mostly non-specific and can...
easily be mistaken for agonal changes, epsilon toxin may be produced in the gut after death (Naylor, 1987), and the absence of toxin does not rule out disease as the toxin may be degraded in the gut before it can be detected (Hartley, 1956). It is also suspected that in some cases that neurological damage and death may occur before histological brain changes are detectable. Recently SAC C VS and the AHVLA reviewed the cases of Clostridium perfringens type D enterotoxaemia from the last ten years, focusing in particular on the gross changes seen. An aim was to highlight any typical gross features described that could assist with diagnosis in future. Many cases reported pulmonary interlobular oedema and the presence of stable froth in the airways, matching the changes described in experimental infection. Many cases had an excess of fluid in the body cavities sometimes with fibrin clots and haemorrhages on the heart. Mottled haemorrhagic kidneys were also described. Cases showed a seasonal distribution, with most seen in early summer and a peak in May. Cases were recorded in all ages but with peaks in neonatal calves and calves aged three to six months old.

**Age distribution of cases of Clostridial enterotoxaemia type D in cattle**


**SMALL RUMINANTS**

**Nutritional and metabolic disorders**

**Ruminal acidosis in lambs**

Aberdeen diagnosed rumen acidosis as the likely cause of six sudden deaths in a group of 120 fattening lambs. The diet was recently changed from forage rape to oats. SAC C VS observed that dietary change is a common trigger for lamb deaths and any alterations should be carried out gradually. Losses are best investigated by postmortem examination as deaths can occur due to metabolic, toxic or infectious causes.

**Ovine white liver disease**

Perth diagnosed ovine white liver disease and copper deficiency in a five-month-old lleyn lamb from a group in which ten per cent showed signs of weakness and ill-thrift. The lamb was submitted live but dull and in poor body condition. The liver was pale and cobalt levels were below the lower detection limit of the test at <0.1mg/kg DM. Liver copper levels were 297 umol/kg DM, (reference range 314-7850 umol/kg DM). Histopathology revealed hepatic changes consistent with ovine white liver disease. The clinical signs are explained by failure of metabolism of propionate to glucose due to deficiency of the cobalt-containing enzyme deoxyadenosylcobalamin.

**Parasitic diseases**

**Acute fasciolosis**

Acute fasciolosis was diagnosed on only two occasions in Scotland during December, compared with 33 cases reported during the same period in 2012. Ayr confirmed the diagnosis in a mule gimmer submitted after seven deaths over a two week period. Necropsy revealed a large volume of serosanguinous fluid in the abdomen and a friable liver which contained a large haematoma. The lesions were caused by the migration of very large numbers of immature fluke through the liver. Numerous immature liver fluke were also found in the severely damaged liver of a seven-month-old cheviot lamb submitted to Edinburgh. Twelve lambs from a group of 1,000 had died over a three day period. The finding suggested a treatment failure as the group had been dosed with triclabendazole four weeks earlier. SAC C VS recommended further investigation into the possibility of triclabendazole resistance together with treatment of the rest of the group. It is recommended that all flocks should check the efficacy of triclabendazole using faecal fluke egg counts or coproantigen testing.

**Generalised and systemic conditions**

**Nitrate/nitrite poisoning**

Two eight-month-old lambs were examined at St. Boswells to investigate the cause of 13 deaths in a group of 500 lambs grazing on kale. The main finding at necropsy was the presence of subcutaneous petechial haemorrhages mainly over the ribs but also on the tracheal mucosa and epicardium. There were no findings in either carcass to suggest a diagnosis of “kale poisoning”; haemolytic anaemia associated with high levels of S-methyl cysteine disulphide was not apparent. Blood and tissues appeared well oxygenated with no sign of the brown discoulration that is reported in cases of nitrate toxicity due to the formation of methaemoglobin. However, neurohistopathology revealed moderate, acute,
multifocal spongiform encephalopathy which is a non-specific finding consistent with a toxic or metabolic aetiology. The diphenylamine test, which is used to detect nitrate or nitrite, was carried out on the vitreous humour of both lambs and one gave a weak positive result. After exclusion of other differentials, nitrate/nitrite poisoning was thought to be the most likely cause of the lamb deaths despite the atypical gross changes. Petechial haemorrhages have been reported in the heart and trachea of nitrate/nitrite poisoning cases and the blood may appear dark red rather than brown. Autolysis may have affected the result of the diphenylamine test and while it is more common for affected sheep to show signs of dyspnoea, tachypnoea and muscular tremors, nitrite/nitrate poisoning can cause sudden deaths. Reducing the intake of kale by offering access to grass was recommended as a way of controlling the problem.

**Respiratory tract conditions**

**Aspiration pneumonia**

Perth suspected that aspiration pneumonia was the cause of death of a three-year-old Scottish blackface ewe that died three to four days after receiving an iodine drench. Postmortem examination revealed fibrinous pleural adhesions together with lung consolidation and abscessation. Histopathology confirmed a severe, acute, necrotising bronchopneumonia associated with a large amount of coarsely granular material in the airways. The iodine drench was considered the most likely source of this material.

**Nervous system disorders**

**Louping Ill**

It was noted in the October/November report that tick borne diseases can be diagnosed in all months of the year particularly if the winter is mild. This proved to be the case in December when Ayr diagnosed louping ill as the cause of neurological signs and death of six ewes from a group of 270 over a two day period. Three carcasses were examined with no significant gross findings; louping ill was confirmed by specific immunohistochemistry.

**Renal diseases**

**Idiopathic renal disease**

A two-year-old Scottish blackface tup which had been unwell for a month developed neurological signs and ventroflexion of the neck. Biochemistry confirmed uraemia (urea 159.5 mmol/l, reference range <10 mmol/l; creatinine 3,000 mmol/l, reference range 40-150 mmol/l) and the animal was submitted to Perth for postmortem examination. The carcase had a strong uraemic smell; the kidneys contained a few moderately-sized infarcts and were generally swollen, soft and pale. Histopathology confirmed renal infarction and degeneration and the brain showed changes consistent with a renal encephalopathy. The aetiology remained unknown and a toxic cause could not be ruled out.

**Toxic conditions**

**Rhododendron poisoning**

Perth diagnosed rhododendron poisoning in a five-year-old Wiltshire horn ewe that collapsed suddenly at gathering with signs of ptyalism, abdominal pain and paddling of the limbs. Poisoning was suspected by the farmer and rhododendron leaves were found in the rumen contents during postmortem examination. Rhododendron toxicity is commonly seen after snowfall but in this case sparse grass cover was the most likely factor to explain why the ewe had been attracted to these bitter plants.

**PIGS**

**Respiratory tract conditions**

**Bordetella bronchiseptica pleurisy**

Respiratory disease, lameness and increased mortality in a group of 320 weaners prompted the submission of four two-week-old piglets for postmortem examination. Around 20 per cent of the group were affected. The submitted piglets were bright and active prior to euthanasia although one had a swollen metatarsal joint. Necropsy revealed a fibrinous pleurisy in two animals with additional cranio-ventral consolidation of the lung lobes in one of them. There was a mild fibrinous peritonitis in the other two piglets, one of which had an abscess associated with the metatarsal joint swelling seen on clinical examination. *Streptococcus dysgalatiae* subspecies *dysgalactiae* was isolated as a pure profuse growth from the swollen metatarsal joint while *Bordetella bronchiseptica* was isolated in pure growth from the lungs of three of the piglets. The investigation confirmed the presence of two concurrent conditions rather than a single disease as suspected by the farmer.

**Reproductive tract conditions**

**Idiopathic abortion**

No cause of abortion was definitively identified for an abortion occurring at 69 days of gestation in a litter submitted from indoor breeding to finishing unit. Vaccination against parvovirus, *Erysipelias*, PCV2 and PRRS was part of the herd health plan. Routine examination found all the submitted piglets were small and not fully developed. Bacteriology of foetal stomach content was unremarkable and PRRS PCR on pooled foetal tissue was negative. Two piglets still had their placenta attached and one of these was within an intact amniotic sac. *Staphylococcus chromogenes* was isolated in a heavy or moderate mixed growth as the predominant organism from the placenta of these two animals. However, histopathology did not reveal any evidence of
placentitis, so SAC C VS were uncertain about the significance of the *S. chromogènes* isolate.

**Alimentary tract disorders**

**Rhodococcus equi abscessation**

Meat hygiene inspection identified tuberculosis-like lesions in submaxillary lymph nodes from two five-month-old finishing pigs. The carcases were condemned on account of the lesions and the source unit placed under restriction. Bacterial cultures from the affected tissues yielded *Rhodococcus equi* from both pigs. No acid/alcohol-fast bacilli were seen on impression smears from cut surfaces of the lymph nodes; neither were any apparent on histopathological examination of the tissues. The results of Mycobacterium species culture and PCR are still awaited. *Rhodococcus equi* is a recognised cause of abscesses in the head/lymph nodes of pigs that are macroscopically indistinguishable from lesions caused by Mycobacterium species.

Lymph node abscessation in a pig caused by *Rhodococcus equi* infection.

*R. equi* is commonly found in dust and soil so pigs can be exposed to the agent very readily. As was demonstrated in this case, the infection has meat hygiene implications on account of the similarity of lesions to TB, as well as economic penalties for farmers if such lesions result in total carcase condemnations and movement restrictions.

**BIRDS**

**Marek’s disease**

Marek’s disease was diagnosed in birds from three small flocks, each with different presenting signs. A 19-week-old buff Orpington cockerel was submitted to investigate the cause of a single sudden death on a small holding. At necropsy the liver was enlarged with multiple cream-coloured nodules throughout the organ. The wall of the proventriculus was also thickened with similar nodules to those present in the liver; the spleen and kidneys were enlarged. Histopathology revealed widespread hepatic infiltration by immature lymphocytes, and similar cells had also infiltrated the intestinal mucosa, submucosa and subserosal areas of the gut wall. The lesions and cell characteristics were consistent with a diagnosis of Marek’s disease.

A layer from another small flock developed drooping of the wings, progressing to recumbency and euthanasia. Postmortem examination by the veterinary practice revealed multiple grey foci up to 5mm in diameter in the liver and gross enlargement of one brachial plexus. Fixed tissues were submitted and histopathology confirmed the diagnosis of Marek’s disease.

In the third case an adult chicken from a small flock was euthanased after demonstrating an inability to swallow followed by weight loss and death. A firm mass at the thoracic inlet was suspected to be the thymus, which would be unusual in an adult bird. This was confirmed on histopathology which also showed that multiple tissues were infiltrated with immature, pleomorphic lymphocytes consistent with a diagnosis of Marek’s disease.

**Erysipelas**

Erysipelas was the cause of increased mortality in a flock of 2000 free-range laying hens where 27 birds had died in the previous week. The birds were 43 weeks of age and just past peak lay. Three birds were examined with similar findings in each case: an enlarged congested spleen and enlarged mottled kidneys with petechial haemorrhages on the surface. *Erysipelothrix rhhusiopathiae* was isolated from multiple tissues from all three birds. This organism usually enters the bird through breaks in the skin or mucous membranes but no route of entry was identified on this occasion.

**Histomonosis**

An adult peahen died after a short period of ill-health and was submitted for postmortem examination. Necropsy showed that both caeca were distended by semi-solid contents, with diffuse yellow thickening of the mucosa and confluent raised focal areas of necrosis. Histopathology demonstrated a necrotising typhilitis associated with large numbers of structures consistent with histomonads. The liver appeared normal grossly but histopathology revealed occasional histomonad-like organisms in the parenchyma. A diagnosis of histomonosis (blackhead) was made with SAC C VS commenting that peafowl appear to be highly susceptible to histomonosis.
Salmonella Typhimurium in garden birds
Malicious poisoning was initially suspected when six dead house sparrows (Passer domesticus) were observed close to some discarded bread. Dogs in the same area were reported to have been ill after gaining access to the bread. However when two of the dead sparrows were submitted for postmortem examination, lesions consistent with infectious disease were found. The mucosa of the oesophagus of one bird was thickened, grey and necrotic, and the liver was enlarged. The mucosa of the oesophagus of the second bird was thickened and yellow. Bacterial cultures yielded heavy growths of Salmonella Typhimurium from both birds, confirming a diagnosis of salmonellosis. Phage typing gave an inconclusive RDNC (reacts, does not conform) identification, but pulsed field gel electrophoresis typing showed a pattern typical of that seen in phage type 56 variant, one of the commonest types found in wild birds.

MISCELLANEOUS

Dogs
Canine herpes virus in puppies
Canine herpesvirus – 1 (CHV-1) infection was diagnosed as the cause of morbidity and mortality in three litters of three-week-old Labrador retriever and labradoodle pups from a breeding kennel. Pooled tissues from pups from two of the litters returned positive results on screening for canine herpesvirus – 1 and histopathological changes were consistent with CHV-1 infection. Further investigation revealed that although an external biosecurity policy was in place for the breeding premises, there was a policy of spreading faeces between kennels in order to expose all bitches to any endemic pathogens on the premises. SAC C VS considered that the bitches involved were latently infected and the incidence of the infection in several litters at once was explained by this practice.

Exotic Animals
Actinomyces species pyoderma in a porcupine
Deep pyoderma associated with Actinomyces species was diagnosed in a 17-year-old male Old World porcupine with quill loss and progressive deep, crusting pyoderma of four months duration. Candida glabrata and an Actinomyces species were isolated from the skin lesions. Histopathology revealed that the yeast bodies in the lesions were very superficial and likely to be opportunistic. Organisms consistent with Actinomyces species were found to extend much deeper throughout the lesion and were likely to be the most significant organisms. The Actinomyces species was thought likely to be novel, as members of this species are often host specific and can be commensal flora.

Disease Alerts
The following conditions were reported by SAC C VS disease surveillance centres in March 2013. Given similar climatic and production conditions, they could also be important this year:

- Hypogammaglobulinaemia and neonatal calf disease and in early spring calving herds
- Abortions due to various infectious causes in later spring calving herds
- Hypomagnesaemia in cattle at grass
- Pregnancy toxaemia in ewes approaching lambing
- Fasciolosis and PGE in sheep of various ages