SAC C VS Monthly Report for December 2014

OVERVIEW

- Bronchointerstitial pneumonia in a beef finishing unit
- Abortions due to *Salmonella* Dublin in heifers
- Braxy in Scottish blackface lambs
- Salt poisoning/water deprivation in pigs
- Respiratory cryptosporidiosis ("bulgy-eye") in red grouse

GENERAL INTRODUCTION

December was largely unsettled, with some heavy rain at times, especially in the west. There was a brief spell of colder, more settled weather toward the end of the month. The mean temperature for the month was 0.3°C above the 1981 to 2010 average. Rainfall overall was 133 per cent of average, with a contrast between approaching double the long-term average in a few locations in the north and west, but only half the normal for Aberdeen. Sunshine amounts were 125 per cent of average overall.

DISEASE ALERTS

The following conditions were reported by SAC C VS disease surveillance centres in April 2014. Given similar climatic and production conditions, they could also be important this year.

- Hypomagnesaemia in cows
- Infectious bovine rhinotracheitis in a dairy herd
- Rickets in ewe lambs
- Chronic fasciolosis in sheep
- Tick-borne fever in lambs

CATTLE

Nutritional and metabolic disorders

Perth diagnosed hyposelenosis in a group of yearling, mixed-breed beef cattle that were ill-thriven, despite an unusual abundance of grass and regular worming. Five blood samples from the group identified a mean glutathione peroxidase of 4.89 U/ml RBC (reference range >30 U/ml RBC) with individual values ranging from 1.6 U/ml RBC to 10.6 U/ml RBC. Liver parameters, copper and pepsinogen values were unremarkable. SAC C VS advised prompt supplementation of the group with selenium.

Respiratory tract diseases

Outbreaks of viral pneumonia were diagnosed across Scotland. Dumfries investigated an outbreak of pneumonia in a group of 30 calves that were formed four weeks earlier by mixing two groups. The cattle were housed two weeks before mixing and received the second dose of their multivalent pneumonia vaccination one week after mixing. Two deaths occurred and all animals showed signs of respiratory disease. On postmortem examination of a five-month-old calf there was extensive lung consolidation and histological examination identified marked acute bronchointerstitial pneumonia with moderate overlying suppurative pneumonia. Parainfluenza type 3 virus (PI3V) was detected by PCR on lung tissue and *Mycoplasma bovis* was cultured from the lung.

St. Boswells diagnosed infectious bovine rhinotracheitis in a group of 21 pedigree British blue calves. A nasal swab submitted from a nine-month-old calf with pyrexia and clear nasal discharge revealed bovine Herpes virus 1 (BoHV1) by PCR and *Pasteurella multocida* on culture. SAC C VS commented that animals such as these in the acute stages of infection (with clear nasal discharge) are the ideal candidates for detecting the presence of respiratory virus in nasal secretions; however, it is considered that BoHV1 can be detected by PCR for up to 14 days post-infection.

Ayr investigated an outbreak of respiratory disease on a beef finishing unit, where nine calves from a group of 120 nine-month-old bull calves died over a five week period. The group were vaccinated against respiratory syncytial virus (RSV), PI3V and BoHV1. On postmortem examination of eight calves, there was consolidation in the cranial lung lobes and six of the animals also had evidence of interstitial pneumonia with emphysematous bullae. Bacteria recovered from consolidated lung tissues included *P. multocida*, *Histophilus somni* and *M. bovis*. PCR testing proved negative for RSV, PI3V and BoHV1 in all animals. Coronavirus was not detected in additional testing of samples from two animals. Histopathological examination of the tissues revealed severe, subacute bronchointerstitial pneumonia. Potential causes include respiratory viruses and toxic damage such as dietary-derived 3-methylindole. In two animals there was evidence of collapse of the intestinal lymphoid deposits and lack of lymphocytes in the spleen and intestinal mucosa. These findings are considered consistent with recent bovine viral diarrhoea virus (BVDV) infection; however, all animals tested were BVDV antibody and antigen negative. In addition to the eight submitted carcases, a further 15 animals from the group were screened for BVDV and no evidence of exposure was found. Investigations are continuing into the outbreak.

In addition to the cases described above SAC C VS identified a further 15 cases of bronchointerstitial pneumonia from 15 separate farms. Eight cases were submitted in December; and the remainder in September to November, as well as January. One animal with bronchointerstitial pneumonia was positive by PCR for BoHV1; SAC C VS considered that this was an incidental finding. All other animals were negative by PCR for RSV, PI3V and BoHV1. Bacteria isolated included *Trueperella pyogenes, Bibersteinia trehalosi, H. somni* and *P. multocida,* although in many cases cultures were sterile due to antibiotic therapy. *M. bovis* was isolated or detected by DGGE PCR in three animals.

Testing of stored material to screen for RSV and PI3V by alternative methods, for the involvement of other viruses and for possible toxic insults is planned and future cases will be identified for investigation.

Reproductive tract conditions
Dumfries diagnosed four abortions due to *Salmonella* Dublin. In three of the cases the affected dams were heifers. Cows, but not heifers, were vaccinated against *Salmonella* spp. on one of the affected farms and this herd experienced four abortions in a group of 35 heifers over the course of one week. Another farm experienced 20 abortions from a group of 300 heifers. The third affected farm had three stillbirths in one month. One calf was submitted from this farm and a fibrinous pleurisy and pericarditis were evident at necropsy. In all cases *S.* Dublin was recovered from both foetal stomach contents and placenta.

Ayr diagnosed abortion due to *Campylobacter fetus* in both a dairy herd and a suckler herd. The dairy herd of 150 Holstein Friesian cows used natural service and had recorded six abortions in the previous six months. The suckler herd had a history of several *C. fetus* abortions being diagnosed over the previous six years and venereal infection in the herd was suspected. In both cases pure growths of *C. fetus* were recovered from foetal stomach contents.

Ayr diagnosed abortion due to *Neospora caninum* in a six-month-old foetus from a dairy herd that experienced a large outbreak of neosporosis two years previously. Histological examination of the brain identified a severe mononuclear meningoencephalitis characterised by glial foci some with central necrosis. These findings are considered consistent with a protozoal infection. In addition dam blood tested positive for antibodies to *N. caninum*.

Musculo-skeletal conditions
Perth diagnosed a congenital skeletal defect in a 20-month-old shorthorn-cross bullock that presented with sudden onset blindness, rapidly became moribund and died shortly after mixing of groups of cattle. On postmortem examination a 7 cm by 2 cm defect was found in the frontal bone, well above eye level on the dome of the cranium, to the left of midline. The bone edges were smooth and no fragments were present. A blood clot occupied the defect, under which the dura mater and the brain were visible (Figure 1).

Figure 1. Congenital skeletal defect in the frontal bone of a bullock.

Further large clots occupied the sinuses and cranial cavity on the left side. Histopathology showed multiple large areas of acute haemorrhage in the thalamus, midbrain and cerebellum, consistent with a traumatic cause. SAC C VS considered that mixing of the groups may have lead to fighting, thus inducing trauma at the site of previously undetected weakness.

SMALL RUMINANTS

Toxic conditions
Dumfries suspected an adverse drug reaction in a group of 160 seven-month-old lambs that were treated for diarrhoea with an oxyclozanide/levamisole drench. Three days later approximately one third of the lambs had swollen heads and ears, with white faced lambs most severely affected (Figure 2).

Figure 2. Swollen heads and ears in lambs following a suspect drug reaction (photo: Sarah Matthews, Nithsdale Vets).

Head shaking was common, swollen eyelids affected vision and some animals attempted to seek shaded areas. The whole group was treated with antibiotics and 20 of the most severely affected were also injected with corticosteroids and multivitamins. On postmortem examination of one of the two lambs to die the ears were swollen due to subcutaneous oedema and there was pulmonary oedema and yellow tinged pericardial fluid. The liver was pale and slightly swollen with an enlarged gall bladder. Histopathology confirmed changes consistent with photosensitisation and revealed toxic damage in the lung and heart with the latter being the likely cause of death. Changes in the liver were mild and hepatogenous photosensitisation could not be confirmed at this stage. Blood samples from seven lambs, collected 13 days after the original treatment, confirmed a hepatopathy with gamma glutamyl transferase (GGT) levels increased in all seven samples, with a mean of 158.7 iu/l and a range of 52 to 219 iu/l (reference range <50 iu/l). Glutamate dehydrogenase (GLDH) levels were also elevated in six lambs with a mean of 288 iu/l and a range of 11 to 805 iu/l (reference range <25 iu/l). The field was inspected and plants known to cause photosensitisation were not found. The dosing gun was checked and there was no evidence of overdosing, assuming the product had been adequately mixed. It is not clear why the reaction occurred, but the addition of a cobalt/selenium supplement to the drench was a confounding factor. Mixing of products prior to administration is not recommended under any circumstances; however, mixed drench was also administered during the summer with no untoward consequences. The product data sheet states that “rarely sheep may show an anaphylactic reaction with swelling of the head”. In the absence of any other explanation the incident was reported to the Veterinary Medicines Directorate as a suspected adverse reaction. The Animal and Plant Health Agency (APHA) reported a similar case where six of 140 ewes developed oedematous heads three days after treatment with the same product (APHA, 2015) and there is an similar, earlier report from New Zealand (Surveillance, 1980).

Parasitic diseases

Ayr diagnosed sheep scab in a bluefaced Leicester ram lamb, which was the second to die in a week. A large area of wool loss and crusting was found over the left shoulder and large numbers of *Psoroptes ovis* mites were detected on a skin scrape. There was extensive faecal staining over the hindquarters and a faecal egg count revealed 1500 *Strongyle* species eggs per gram supporting a diagnosis of parasitic gastroenteritis. The lungs were consolidated, *Dictyocaulus filaria* worms were visible and *Mannheimia haemolytica* was cultured from the consolidated lung tissue. Bacterial pneumonia was considered to be the terminal event in an animal that was compromised by multiple parasite burdens.

Parasitic gastroenteritis was diagnosed on 27 occasions during December, which is approximately 70 per cent more than during the same month in the preceding three years. This was attributed to the generally mild weather during November.

Generalised and systemic conditions

Dumfries diagnosed black disease in a three-year-old ewe, one of four sudden deaths in an organic flock over a three day period. There were pleural and peritoneal effusions and petechial haemorrhages in many tissues. There were two pale necrotic areas suggestive of black disease in the liver parenchyma; however, no fluke were seen. The fluorescent antibody test was negative for *Clostridium novyi* and anaerobic cultures were sterile. However, histopathology revealed cavitated tracts and eosinophilic inflammation consistent with fluke infection and areas of coagulative necrosis consistent with black disease. The group had been treated with triclabendazole 26 days previously, but clostridial vaccination was not carried out.

St. Boswells diagnosed braxy in two seven-month-old Scottish blackface lambs from a group of 1,100 grass-fed lambs, in which 38 animals had died since weaning. Both carcases had mild generalised peritonitis with fresh fibrin causing adhesion of the abomasal wall to the rumen. Areas of necrosis affected the abomasal mucosa with submucosal oedema extending into the rumen wall. Fluorescent antibody preparations were positive for *Clostridium septicum*, which was also isolated on anaerobic culture. Histopathology revealed a marked clostridial abomasitis confirming a diagnosis of braxy. The ewes had received a clostridial booster pre-lambing, but the lambs were not vaccinated. Braxy is reported to be associated with the ingestion of frosted forage, which

precipitates an abomasitis allowing colonisation by *C. septicum*.

Reproductive tract conditions
St. Boswells made the first diagnosis of chlamydial abortion this lambing season in a Zwartble ewe, one of three from a group of 40, that aborted three weeks before lambing. A placentitis was evident grossly and *Chlamydophila abortus* inclusion bodies were seen on modified Ziehl-Neelsen smears. Over the last ten years chlamydial abortion and toxoplasmosis have together accounted annually for between 50 and 65 per cent of all ovine abortion diagnoses, despite being preventable by vaccination.

Nervous system disorders
Two weeks after purchase a seven-month-old Scottish blackface tup developed pyrexia, a head tilt and circling. There was a temporary improvement following treatment with antibiotics and corticosteroids, but euthanasia was carried out following the development of head pressing. On postmortem examination Perth found three small abscesses in the liver and an abscess on the ventral aspect of the brain from which *T. pyogenes* was isolated.

PIGS

Generalised and systemic conditions
Aberdeen diagnosed salt poisoning/water deprivation in two ten-week-old pigs from a group in a breeding and rearing unit, in which six animals developed neurological signs. Two pigs that were submitted live for euthanasia were reasonably bright, alert and able to walk, but were having intermittent fits. Neuropathology revealed widespread eosinophilic vasculitis affecting the cerebrum and eosinophilic infiltration of the meninges in both pigs, changes consistent with salt poisoning/water deprivation.
Edinburgh diagnosed oedema disease in a 12-week-old Gloucester old spot gilt from a group of 15 outdoor pigs. This gilt was seen the previous day staggering, with a very swollen head and submandibular area, along with puffy eyes, and was treated unsuccessfully with tylosin and meloxicam. On postmortem examination the front of the head was obviously swollen, with jelly-like, oedematous subcutaneous tissues. The ventrum and inside of all four legs were covered in pinpoint haemorrhages. There was pulmonary oedema, ascites and oedema of the mesentery and colon. Histopathological examination of the intestines revealed degeneration of the small arteries and arterioles in association with oedema of the submucosa. In the worst affected section fibrin thrombi were present in mucosal and submucosal blood vessels. The F18 strain of *Escherichia coli* was confirmed by PCR.

BIRDS

Poultry
Edinburgh diagnosed Marek's disease on postmortem examination of a euthanased six-month-old serama bantam hen, the only bird affected from a small hobby flock. The serama is the smallest breed of chicken in the world. Lameness had progressed to paralysis over the course of a week, despite treatment with non-steroidal anti-inflammatories. On postmortem examination the bird was in good body condition, both kidneys were enlarged and the large active ovary was tightly adherent to the pale left kidney. The left sciatic nerve was markedly thickened. Marek's disease was confirmed by histopathology.

Perth diagnosed infectious laryngotracheitis (ILT) in a two-year-old Lincolnshire buff hen. The backyard flock of 14 mixed birds had been together for over six months with no new additions. Two hens in the group had sticky ocular discharge and respiratory disease. Plaques of debris and mucus were present in the oral cavity and pharynx, and the crop was dilated with sour-smelling feed material. The tracheal mucosa was inflamed, necrotic and there was almost complete occlusion of the lumen with yellow, inflammatory debris. There was an enlarged spleen and enlarged, pale, mottled kidneys.

Histopathology confirmed congestion and hypertrophy of the mucosa and mucus glands of the nasal passages and sinuses, with necrosis of the tracheal respiratory epithelium. Occasional syncytia of sloughed epithelial cells had intranuclear inclusion bodies consistent with ILT.

Game Birds
Perth diagnosed mycoplasmosis in a 12-week-old female red-legged partridge which had shown bulgy eyes. On postmortem examination there was a severe periorbital swelling with ocular and nasal discharge. The infra-orbital sinuses and conjunctival sacs contained thick, pale yellow exudate. The histopathological changes in the nasal passages and sinuses were consistent with mycoplasmosis.

St. Boswells diagnosed respiratory cryptosporidiosis ("bulgy-eye") in a single-affected, red grouse (*Lagopus lagopus scoticus*) that was submitted from a moor in south east Scotland. There was mucoid nasal discharge and cryptosporidial oocysts were seen on stained smears from the wall of the nasal cavity (Figure 3).

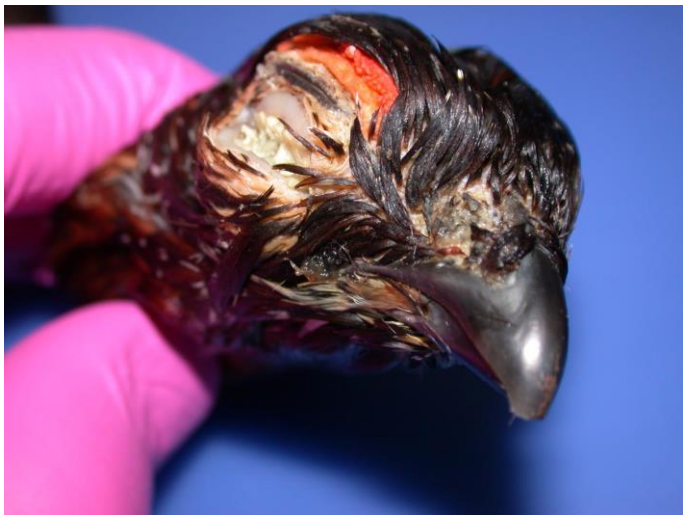

Figure 3. Respiratory cryptosporidosis ("bulgy eye") in a red grouse.

The diagnosis was confirmed by histopathology. "Bulgy eye" was first described in red grouse by Coldwell and others (2012) and the cryptosporidia were identified as *Cryptosporidium baileyi*, which is an organism associated with respiratory disease in certain other species of birds. Confirmation of respiratory cryptosporidiosis in cases of "bulgy-eye" in red grouse from southern Scottish moors is not unexpected, as the disease is present in northern England and anecdotal reports of suspicious cases in southern Scotland were received since the condition was first reported.

Currently options for control of the disease on grouse moors are limited, but they include culling obviously affected birds and reducing the opportunity for disease transmission by increasing the number of gritting areas and ceasing to use those where the ground and any adjacent water source could be heavily contaminated with cryptosporidial oocysts.

Wild birds

Inverness diagnosed chronic, non-suppurative, parasitic sinusitis in a juvenile female buzzard (*Buteo buteo*). The bird was seen alive, grounded on a beach two days previously. On postmortem examination the bird was in poor body condition, weighing 550 g (female buzzards in good condition often weigh around 900 to 1200g). There was a bald, reddened patch on the forehead, as well as putrid material in both eyes and one nostril. The mucosa of the infra-orbital sinus was reddened and the crop and gizzard were empty. There was no evidence of external trauma.

Histopathology of the spongy bone of the skull and sinus showed focal congestion and haemorrhage with occasional accumulations of mononuclear leucocytes expanding the epithelium lining the bony spaces. Clusters of nematode ova, often in association with mononuclear leucocyte infiltrations, were evident in some bony spaces.

The location and appearance of nematode ova in the bony spaces of the skull was consistent with these being *Cyathostoma* species, possibly *Cyathostoma lari*. These syngamid worms are related to the common gapeworm, *Syngamus trachea*, and are found in the nasal passages, sinuses and orbital cavity of a variety of wild birds including raptors (Simpson and Harris, 1992).

SAC C VS considered that localised pathology affecting infra-orbital sinuses and eyes may have reduced the bird's hunting and feeding efficiency by affecting its eyesight and contributing to progressive loss of condition, inanition and eventual death.

MISCELLANEOUS

Dogs

Perth diagnosed a phaeochromocytoma on postmortem examination of an eight-year-old neutered Shih Tzu bitch which died after vomiting during the previous night. On postmortem examination the lungs were congested and the liver was haemorrhagic throughout. A solid 2 cm diameter mass was found adjacent to the cranial aspect of the right kidney in close proximity to the caudal vena cava. Haemorrhage was seen within the surrounding fat around the mass. Histopathology showed the mass to be consistent with a phaeochromocytoma. SAC C VS commented that, as phaeochromocytoma is a catecholamine-producing tumour of adrenal chromaffin cells, sudden death from acute cardiac failure may be associated with a massive release of noradrenaline or adrenaline.

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Feature – Ovine caseous lymphadenitis

Caseous lymphadenitis (CLA) is an infectious disease caused by the bacterium *Corynebacterium pseudotuberculosis*. The bacterium gains entry through skin abrasions and causes abscessation of lymph nodes and viscera in both sheep and goats (Figure 4).

Figure 4. Caseous lymphadenitis in a ewe. Abscess in parotid lymph node.

A definitive diagnosis of CLA may only be reached by culturing *C. pseudotuberculosis* from suspect lesions. SAC C VS offers serological testing, but the antibody ELISA and western blot should be treated as flock tests, as they are less sensitive at the individual animal level. Serological testing is indicated to screen incoming sheep and during a flock eradication programme where CLA has been confirmed (Baird and Malone, 2010).

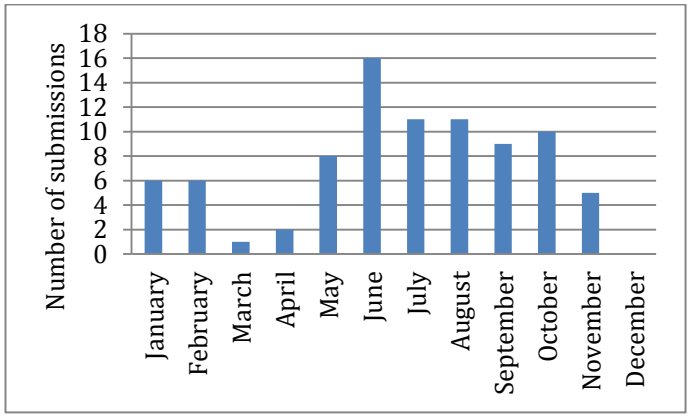
From 2010 to 2014 SAC C VS obtained 91 *C. pseudotuberculosis* isolates from 85 submissions in 69 separate sheep flocks. CLA was diagnosed in 60 males compared 18 females (in 13 cases the animal's sex was not provided).

Lesions in rams are noticed more readily and rams are more likely to be inspected and tested pre- and post-purchase, as they are generally higher value animals. Ram management may also play a role in transmission of CLA as rams tend to be kept at a higher stocking rate, are more likely to be trough fed and more prone to fighting (Baird, 2007).

In the UK CLA infection is most frequently associated with the superficial lymph nodes of the head and neck (Baird 2007) and this is mirrored by submissions to SAC C VS. Forty-seven (51.7 per cent) samples were submitted from head/neck, parotid and submandibular lymph nodes abscesses.

CLA was diagnosed in flocks in every month of the year apart from December with a peak of diagnoses in June (Figure 5), which may be related to handling at clipping and testing pre-and post-sale.

Figure 5: CLA diagnoses per month.



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