OVERVIEW

- Intestinal atresia in beef calves from three holdings.
- Ill thrift due to *Lawsonia intracellularis* infection in weaner pigs.
- Multiple deaths due to lead poisoning in whooper swans (*Cygnus cygnus*).

GENERAL INTRODUCTION

The mean temperature for March was 1.7 °C below the long-term average due to easterly winds which brought significant snowfall to some areas at the start of the month. Rainfall was 70% of average with a marked east west split. Counties in the east recorded above average rainfall while central and western areas experienced below average rainfall. Sunshine hours were typical for the time of year.

DISEASE ALERTS

The following conditions were reported by SAC C VS disease surveillance centres in July 2017. Given similar climatic and production conditions, they could also be important this year.

- Lead poisoning in young cattle following turn out.
- Parasitic pneumonia in cattle.
- Laryngeal chondritis in tups at grass during warm weather.

CATTLE

Nutritional and metabolic disorders

Inverness diagnosed hypomagnesaemia in a two-month-old Limousin cross bull calf that was found dead. The rib calcium:magnesium ratio was elevated at 100 (reference range 30 to 70). While this diagnosis is more commonly made in adult cattle, milk tetany is also reported in suckling beef calves that are growing rapidly without access to supplementary feeding.

Dumfries examined the carcase of a three-week-old Holstein calf that died suddenly. Extensive areas of pallor were found within the myocardium (Fig 1) and the liver was swollen. Liver vitamin E and selenium results were low at 1.79 µmol/kg fresh tissue (FT) (reference range >5 umol/kg FT) and 0.75 mg/kg dry matter (DM) (reference range 0.9 to 1.75 mg/kg DM). Histological examination of the heart identified multifocal to coalescent areas of polyphasic cardiomyocyte necrosis and mineralisation. The distribution and nature of the lesions was considered to be most consistent with nutritional cardiomyopathy, however the skeletal muscle degeneration which would have supported this diagnosis was not detected. SAC C VS commented that this was an unusual diagnosis in a dairy calf. Assessment of the heifer and dry cow ration was advised along with blood sampling of similarly managed calves to assess glutathione peroxidase and vitamin E levels.

Figure 1 Pale lesions within the myocardium of a Holstein calf with suspected nutritional cardiomyopathy

Generalised and systemic conditions

Salmonellosis due to *Salmonella enterica* serovar Dublin was diagnosed in fourteen one to four-week-old calves from three dairy and two suckler herds in the south west of Scotland during March. The most common clinical sign was diarrhoea, which was reported in eleven animals. One presented with pneumonia, another showed signs of abdominal pain, and one was dull and hypothermic.

Alimentary tract disorders

Aberdeen diagnosed three cases of intestinal atresia in calves born in three different suckler herds. Affected calves were either Limousin cross or Simmental cross and the oldest was four days of age. In each case the proximal small intestine was dilated with fluid content and the distal small intestine was empty and narrow.
Membrane atresia was present in each case. One calf, which had been born three weeks early, had multiple malformations including microphthalmia. No additional congenital defects were detected in the other cases. SAC C VS commented that intestinal atresia is usually considered a sporadic event although there may be a hereditary aetiology in some dairy calves. An ischaemic event affecting intestinal vasculature is considered to be the most likely explanation for sporadic cases.

Respiratory tract diseases
An outbreak of respiratory disease occurred in a shed containing 320 Friesian x Jersey calves under six weeks of age. Morbidity was high, with around 10 new cases daily over a one to two week period. Mortality was low but the affected calves failed to recover fully. The carcase of the only calf to die was submitted to Dumfries for postmortem examination. The cranial and middle lung lobes were firm, and the caudal lobes emphysematous. Cultures remained sterile, perhaps as a result of antibiotic treatment administered prior to death. Respiratory syncytial virus (RSV) was detected by PCR testing carried out on lung tissue, and histopathology confirmed changes consistent with severe, active RSV infection. Low grade secondary bacterial infection was also detected. Changing calf vaccination protocols was advised as currently only intranasal bovine herpesvirus type 1 vaccine was administered.

Musculo-Skeletal conditions
A group of 60 calves were housed over winter on a diet of silage, barley, and maize gluten with access to mineral buckets. By March more than 10 per cent of the group were reported to be stiff or lame and some had progressed to recumbency. A nine-month-old heifer was euthanased and submitted to Edinburgh for postmortem examination. The animal was in good body condition however haemorrhagic oedema was found bilaterally around the stifle, hock, and elbow joints associated with avulsion of the patellar ligament, calcanean and triceps tendons (Fig 2). Other findings included fragile ribs and reduced bone ash in samples of rib and femur indicating underlying metabolic bone disease. Analysis of blood samples from five of the group showed raised creatinine kinase levels in three (808 to 12130 iu/l, reference range <300 iu/l); hypocalcaemia in two (1.7 mmol/l, reference range 2 to 3 mmol/l); and hypomagnesaemia in one (0.7 mmol/l, reference range 0.8 to 2 mmol/l). Addition of appropriate minerals to the diet was advised as a matter of urgency.

Nutritional and metabolic disorders
Ayr considered pregnancy toxaemia to be the underlying cause of foetal deaths in a Lleyn flock. The ewes were receiving excessive quantities of bruised barley which was suspected of causing ruminal acidosis and reduced dry matter intake. A set of quads which had been born dead were submitted for investigation. Foetal neuropathology revealed changes similar to those previously described in lambs born to ketotic ewes. Forage analysis and reformulation of the ration was advised ahead of next spring. It was also noted that feeding whole barley would reduce the risk of acidosis.

Reproductive tract conditions
A flock of 800 housed ewes reported the sudden death of 10 animals in the two weeks prior to lambing. The carcases developed an unpleasant smell soon after death but there was no evidence of vaginal prolapse or abortion. Postmortem examination of one ewe revealed peritonitis in the caudal abdomen with fibrin deposits on the uterine serosa and severely autolysed twin lambs in utero. In comparison the rest of the carcase was relatively fresh with congested, oedematous lungs. A fluorescent antibody test carried out on uterus was positive for Clostridium sordellii and clostridial metritis was confirmed on histopathology. Vaccinating with a ten in one clostridial vaccine was suggested for future prevention. This case contrasts with previous descriptions of C sordellii metritis where ewe deaths occurred secondary to vaginal prolapse. Edinburgh investigated problems with intra parturition deaths in a flock of mule ewes lambing outdoors. Twin emphysematous foetuses were present within the uterus of the four-year-old ewe presented for investigation. The placenta was macerated and the uterine wall multifocally thickened and friable. Salmonella enterica serovar

Figure 2 Avulsion of the calcaneus tendon from the left hock
Montevideo was isolated from samples of uterus, spleen, and lung confirming septicaemia secondary to metritis. Concurrent abortions were reported in the gimmers but not the ewes in this flock. *S. Montevideo* is a relatively frequent cause of abortion in south east Scotland however examination of foetuses from the gimmers returned a diagnosis of *Chlamydia abortus* abortion.

**Skin diseases**
Combined infection with *Psoroptes ovis*, orf and *Staphylococcus aureus* was diagnosed in a ten-month-old Texel cross lamb which was one of a group reported to be pruritic since December. A clear break in the wool was evident over much of the body together with yellow/brown scale. Proliferative lesions were present on the ears, and around the stifles, hocks, and coronary bands. Unsurprisingly there had been little response to treatment with antibiotics.

**PIGS**

**Alimentary tract disorders**
Three pigs aged between 50 and 60 days were submitted to Aberdeen following the death of 19 animals over a nine day period. A further 20 pigs had been isolated after presenting with inappetance, sudden weight loss, and soft grey faeces. The unit operated an all in-all out system and this batch of pigs had arrived three weeks earlier. Postmortem examination revealed intestinal lesions in all three carcases with thickening of the jejunum and brown fibrinous exudate present on the mucosa of the jejunum and caecum (Fig 3). Salmonella enterica serovar typhimurium was isolated from the tissues of two of the three pigs and the client was reminded of the potential for zoonotic disease.

Perth examined a three-month-old pig which had lost condition in the two weeks prior to submission. Several other pigs had also developed ill thrift from around ten weeks of age. A marked diphtheritic typhilitis was the most significant finding on postmortem examination and similar pathology was detected in the ileum. Histopathology confirmed extensive lesions of severe proliferative enteropathy with fibrinopurulent material overlying areas of mucosal necrosis. These lesions were considered consistent with *Lawsonia intracellularis* infection.

**Figure 3** Thick walled jejunum with serosal congestion in a pig with *Salmonella typhimurium*

**Skin disease**
Sarcoptic mange, ringworm, and greasy pig disease were diagnosed in a two-year-old Oxford sandy & black sow which was due to farrow. This was the only animal visibly affected in a herd of 20 pigs. Crusty lesions were described on the face, legs, ears, and tail and skin scrapings were submitted to Inverness for further investigation. *Sarcoptes scabiei* mites were detected on microscopy and *Staphylococcus hyicus* and *Trichophyton mentagrophytes* were isolated on bacterial and dermatophyte cultures.

**BIRDS**

**Wild birds**
St. Boswells examined 16 whooper swans (*Cygnus cygnus*) after 30 birds were found dead over a four to six week period. The mortalities occurred at a local loch which the birds had used as a winter stop off for over 30 years. Body condition varied from fair to thin and some fibrous material was found in the proventriculi and gizzards. A representative number were screened for avian influenza with negative results and no evidence of pesticide residues was found on toxicology. Small metal spheres, approximately one millimetre in diameter, and assumed to be shotgun pellets were found in the gizzards of two swans. Lead analysis, carried out on liver or kidney tissue from five birds, confirmed a diagnosis of lead poisoning with results ranging from 13.1 to 31.8 mg/kg FT. Lead levels greater than 2.07 mg/kg FT are considered consistent with lead poisoning in birds. Lead poisoning was previously reported as the cause of death of 47% of whooper swans examined in Scotland during the 1980s.  

References:
1 SCHOLES SFE, WATSON PJ. Congenital necrotising encephalopathy in lambs. Vet Rec 2004;154:32
Featured Article: Cobalt and Selenium Deficiency in Sheep

Cobalt deficiency is frequently diagnosed as a cause of ill thrift in weaned lambs. It causes anorexia, watery ocular discharge, a poor fleece, and anaemia. Cobalt deficient lambs may show increased susceptibility to other diseases and in severe cases fatty liver can develop with secondary encephalopathy. Deficient ewes may show reduced fertility and increased mortality in their lambs. Selenium deficiency in sheep, in addition to being a factor in the development of white muscle disease, has been shown to adversely affect growth rate, perinatal mortality, wool production and early embryo loss in ewes.

Cobalt is required to in order to synthesize vitamin B12 in the rumen. When fed a depleted diet, serum B12 concentration falls before liver concentration, indicating that the liver is not an active storage pool. Serum vitamin B12 reflects current intake and varies widely between individuals, however mean values based on at least 10 samples have been shown to correlate well with production response following supplementation.

Selenium is incorporated into selenoproteins (e.g. glutathione peroxidase) which have several functions, primarily controlling peroxidative tissue damage. The relationship between dietary selenium and the occurrence of selenium responsive disorders is not straightforward due to the presence of other dietary antioxidants (such as vitamin E), dietary and endogenous oxidants and toxins. Selenium status is usually assessed via red cell glutathione peroxidase concentration as this is easier and cheaper to measure than the element itself. This measurement reflects the selenium status at the time of erythropoiesis, and therefore the selenium status of the animal over the previous 2-4 months. Variation between individuals is lower than with vitamin B12.

Tables 1 and 2 illustrate diagnoses of cobalt and selenium deficiency in sheep based on analysis of either blood or liver. Table 1 shows that over the last 6 years diagnoses are recorded most frequently in the second half of the year, peaking in October for both conditions. This reflects the importance of trace element deficiencies in weaned lambs. Weaning is a good time to collect blood samples to check whether trace supplementation is required. Annual figures are shown in Table 2 for 2012 to 2017 inclusive. There has been a steady increase in diagnoses of pine over that period, however the pattern for hyposelenosis is less clear.

Bibliography:
Sargison (2008) Sheep Flock Health – a planned approach

Table 1: Mean SAC diagnoses of clinical cobalt or selenium deficiency in sheep by month, 2012-2017 (% of diagnosable submissions)

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Table 2: Annual SAC diagnoses of clinical cobalt or selenium deficiency in sheep 2012-2017 (% of diagnosable submissions)

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