OVERVIEW

- Lead poisoning in cattle
- Coccidiosis in suckled calves
- Suspect *Ureaplasma* species infection in a day-old calf
- Lamb dysentery in a five-week-old lamb
- Oedema disease in pigs

GENERAL INTRODUCTION

June in Scotland began unsettled and wet, with strong winds. It was also a cool month; the provisional mean temperature for the month was 0.7°C below the long-term average. The overall rainfall figure for Scotland was average but it was a dull month and sunshine totals were 92 per cent of average.

CATTLE

Nutritional and metabolic disorders

Aberdeen diagnosed ruminal acidosis with early fungal invasion at postmortem examination of a 27-month-old Salers-cross stirk, from a group of fattening animals with anorexia, diarrhoea and malaise of which five were treated for suspected acidosis. The group had ad lib access to a concentrate blend with straw and silage being fed every other day.

Congestion and haemorrhage were evident on the mucosal surfaces of the forestomachs and in the pyloric region of the abomasum. Ruminal fluid pH was 5 (pH of 5 or less is considered consistent with acidosis). Histological examination of the rumen wall revealed vacuolar degeneration and oedema, intraepithelial purulent rumenitis with multifocal fungal hyphal invasion of the epithelium, which occasionally extended into the lamina propria.

Toxic conditions

Lead poisoning was diagnosed at postmortem examination in cattle between two months and two years of age on one dairy and two beef farms. Animals on each farm either presented as sudden deaths or showed neurological signs. Kidney tissue had lead values ranging from 20.4 to 36.1 mg/kg in fresh tissue (FT) (greater than 2.07 mg/kg FT is consistent with lead poisoning). The source of lead on two of the farms was an old battery. On the third farm, debris that had been dumped in the field and subsequently removed was suspected to be the source. The Food Standards Agency were informed in each case.

Generalised and systemic conditions

Two cases of sporadic bovine leucosis were diagnosed in calves from different farms. The first case was in an eight-month-old Limousin-cross heifer that died suddenly. At postmortem examination generalised lymphadenopathy was evident. Histological appearance of the enlarged lymph nodes was considered consistent with lymphoma. The second case, in a six-week-old suckled calf, was diagnosed by cytological examination of a fine needle aspirate from a peripheral lymph node.

Alimentary tract disorders

Coccidiosis was diagnosed predominantly in suckled calves at grass. Clinical history often indicated that affected groups had been on the same pasture from shortly after birth. Dumfries confirmed coccidiosis a five-week-old calf that developed haemorrhagic diarrhoea the day before it died. At postmortem examination the colon content was dark with petechiation of the colonic mucosa and some blood present. Histological examination of intestines demonstrated extensive hyperplastic and exfoliative colitis with large numbers of intra-epithelial coccidial forms (Fig 1), although only 550 coccidial oocysts per gram were detected in caecal contents. SAC C VS commented that it is important to consider the potential for a greater pre-patent burden to be present in calves with a relatively low coccidial oocyst count.

DISEASE ALERTS

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

- Bracken (*Pteridium aquilinum*) poisoning in cattle
- Hypomagnesaemia in cows
- Louping ill in sheep and cattle
- Copper toxicity in sheep
- *Pieris* species plant poisoning in sheep

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Respiratory tract diseases
Dumfries suspected *Ureaplasma* species infection in a one-day-old south Devon-cross heifer calf. The calf was weak at birth, dyspnoeic and appeared in pain. At postmortem examination there was no evidence of fractures or bruising to suggest dystocia. The lungs were dark, with haemorrhage and oedema and histological examination revealed a moderate to severe necrotising and lymphocytic bronchointerstitial pneumonia with extensive necrosis and atypia of bronchiolar epithelium with occasional hyaline membrane formation. In addition bronchial associated lymphoid hyperplasia indicated that the antigenic stimulation had occurred in utero. Although no pathogens were isolated SAC C VS considered that the pathology was consistent with *Ureaplasma* species infection. Although chronic bacterial pneumonia secondary to a placentitis would be another possibility, it would be considered unusual for a calf to survive a placentitis for long enough for this degree of pathology to develop.

Reproductive tract conditions
Ayr diagnosed clostridial metritis in a five-year-old Holstein cow that died three days after calving twins. The affected animal had been treated for retained foetal membranes with intra-uterine and intravenous antibiotics. Two other cows had died in recent weeks with similar clinical histories. At postmortem examination, peritonitis and foul smelling metritis were evident. The uterine wall appeared friable and the placenta was still retained. *Clostridium sordellii* was recovered from the uterus along with coliforms, *Streptococcus uberis* and *Fusobacterium necrophorum*. On histological examination there was advanced loss of cytological detail in the uterus compared with the small intestine. Widespread Gram-positive bacilli, some of which were sporulated, were evident in association with areas of protein-rich oedema and presumptive emphysema. These findings, together with the recovery of *C. sordellii*, were considered consistent with clostridial metritis.

Musculoskeletal conditions
Dumfries investigated an outbreak of lameness in calves that developed one week after a herd test for tuberculosis. Five autumn-born calves aged approximately two months and older were affected. Some calves had multiple limb lameness, others had just one limb affected but in all cases the coronary band was hot and swollen with blood oozing. One calf deteriorated, became recumbent with opisthotonos and was euthanased. Swelling of the coronary band of both hind feet was evident with the hoof separating and pus extruding at this point. In addition toe abscessation and pedal bone necrosis were noted. Further pathology included lung abcessation consistent with haematogenous spread of infection and cloudy meninges. *Trueperella pyogenes* was recovered from lung lesions and *F. necrophorum*, *Bacteriodes* species and *Prevotella* species were recovered from foot lesions. SAC C VS considered that damage to the toes could have occurred during handling, particularly if the calves were scrabbling in the race or crush. This injury could have allowed bacterial invasion and haematogenous spread of infection. SAC C VS advised examining the floor of the race and crush for rough surfaces.

SMALL RUMINANTS

Nutritional and metabolic disorders
Nine April-born pet lambs that were turned out to grass in mid May failed to thrive and were re-housed and treated with a benzimidazole drench, antibiotics and a coccidiostat. The first death occurred at grass with another three following re-housing. The five surviving lambs remained poor despite the treatments given. The group were straw bedded and fed silage, hay and concentrates. One lamb was submitted to Dumfries for postmortem examination. This revealed abscesses in the lungs and an extensive peritonitis with rumen content free in the abdomen. The rumen mucosa was eroded, ulcerated and was perforated at one point. The rumen pH was 6.6 and, while there was no concurrent acidosis, a previous acidosis with bacterial seeding to the lungs was considered to have been the initial problem. Despite the history of treatment 840 strongyle eggs per gram (epg) and 641,000 coccidial oocysts per gram, 99 per cent of which were the pathogenic species *Eimeria crandallis* and *E. ovinoidalis*, were detected in the faeces. Re-infection with coccidia could have occurred after the lambs were...
Parasitic diseases
Perth diagnosed two outbreaks of nematodirosis during June. In one case an eight-week-old Scottish blackface lamb was submitted after being found dead. Body condition was good but there was perirenal faecal staining and an intestinal wash recovered uncountable numbers of Nematodirus battus worms. A faecal egg count detected 2,100 Nematodirus epg and 1,900 strongyle epg. A benzimidazole drench remains the treatment of choice for the treatment of nematodirosis, but where strongyle eggs are also detected, particularly in large numbers, the possibility of white drench resistance should be considered in anthelmintic selection.

Generalised and systemic conditions
Perth examined a five-week-old Texel-cross lamb that became unwell and died shortly afterwards. At postmortem examination a section of jejunum was found to be congested and emphysematous with haemorrhagic contents. Both beta and epsilon toxin were detected in small intestinal contents, consistent with a diagnosis of clostridial enterotoxaemia type B, which was supported by histopathology. Lamb dysentery is typically reported in lambs aged three weeks or less. This age distribution is due to colostrum inhibition of trypsin, which inactivates beta toxin. Some evidence of coccidial infection was detected on histopathology and it was postulated that this could have been a predisposing factor.

Inverness confirmed hypogammaglobulinaemia in a one-day-old Cheviot-cross twin lamb. It was weak at birth and had received artificial colostrum by stomach tube. The lamb was submitted alive and was hypothermic. At postmortem examination milk was present in the abomasum. Mannheimia species were recovered in pure growth from the lung and liver indicating bacterial septicaemia. The zinc sulphate turbidity test result was consistent with absolute failure of passive antibody transfer. The immunoglobulin content of colostrum supplements is variable and, although a good source of energy, they cannot always be relied upon to provide protection against infection.

Respiratory tract conditions
Thurso diagnosed bacterial pneumonia in viscera submitted from Shetland. Thirty to 40 lambs died and on-farm postmortem examination revealed lung consolidation. Bacteriology produced only a mixed growth, while histopathology indicated recent descending bacterial infection, most likely due to pasteurellosis. Given the extent of the losses further postmortem examinations and trace element screens were advised in order to reach a definitive diagnosis.

Reproductive tract conditions
Ayr investigated reproductive problems on a farm that had high barren rates in ewes at scanning, followed by an abortion storm during which several ewes died. The aborted lambs were reported to be severely autolysed. Faecal culture of aborted ewes proved positive for Salmonella Arizonae. This organism may be isolated from clinically normal ewes and is occasionally isolated from foetal stomach contents, where it is considered potentially significant. Toxoplasma serology proved positive in all ewes sampled and six of sixteen bloods also tested positive for border disease antibodies. The cause of the abortion storm remains unproven as limited material was submitted during the abortion storm and autolysis hampered the investigation. Infection with either toxoplasmosis or border disease could result in increased barrenness and abortion but positive ewe serology, although indicating previous exposure, is not conclusive.

Nervous system disorders
Dumfries investigated increased mortality associated with neurological disease in both ewe and lambs from a flock. Head tilts, circling, twitching and recumbency were advised in order to reach a definitive diagnosis.

Skin diseases
Perth cultured Corynebacterium pseudotuberculosis from an abscess on a tup which had tested negative by caseous lymphadenitis (CLA) ELISA serology in May 2015. The serology was repeated in June, but was still negative despite the presence of an active lesion. SAC CVS commented that the sensitivity of the CLA ELISA is 87 per cent, so false negative results occur in some infected animals. This is due in part to the nature of the disease, whereby abscess encapsulation can shield the bacteria from the immune system. In CLA-affected flocks bacteriology should always take precedence over serology to diagnose infection.

PIGS

Generalised and systemic conditions
Three eight-week-old piglets were submitted from a relatively new unit, consisting of sows at third parity and some recently purchased gilts, with a history of deaths in
weaners associated with oedema disease. Ten pigs died in a younger age group. Affected animals became dull, sat still and did not thrive at five to six-weeks-old and, unless treated, died. Some pigs that were sold at weaning succumbed to bowel oedema on the new unit. At postmortem examination all had puffy oedematous eyelids and periorbital tissue. Mesenteric oedema and scant stomach and small intestinal content were present. Haemolytic *E. coli* isolated from two piglets were positive by the *E. coli* virulence PCR test for F18 adhesion and the shigatoxin-producing genes. These isolates are recognised causes of oedema disease. Vaccination was recommended to prevent oedema disease in subsequent batches of weaners.

Pericarditis, endocarditis and renal infarction, associated with *Streptococcus dysgalactiae* infection, were diagnosed in a fourteen-week-old male Gloucester old spot pig which showed hindlimb lameness. At postmortem examination body condition was good and a cranial lymphadenopathy, with one mandibular lymph node showing a purulent centre was present. Pleural effusion, fibrinous pericarditis and echymotic haemorrhages on the epicardium were noted, the atrioventricular and semilunar valves showed vegetative endocarditis, and the myocardium was hypertrophic. Diffuse congestion of the lungs was seen. Approximately 20 per cent of the renal surface area was light coloured and concave and some of these patches had a dark centres. The intermuscular connective tissue of the hindlimbs was oedematous. *S. dysgalactiae* was isolated from samples of the lesions. No musculoskeletal cause was found to explain the reported lameness and a circulatory failure causing reduced perfusion with general weakness was suspected.

**BIRDS**

**Poultry**

Perth diagnosed infectious laryngotracheitis virus (ILT), due to gallid herpesvirus-1, in a Wyandotte hen submitted from a flock of 17 pure breed chickens. Several birds were purchased from an auction two months previously. One showed respiratory signs at purchase. An outbreak of respiratory disease in the flock followed and it lasted for two months despite a three-week course of tylosin. Two hens from the group died, one Aracuana and one Wyandotte. The changes were consistent with ILT in the Wyandotte and suggestive of ILT in the Araucana. St Boswells diagnosed adenocarcinoma of the reproductive tract in a hen that had been wasting and producing wet faeces. Grossly there were multiple white nodules over most of the proventricular surface and the pancreas. There was a large mass of this tissue in the region of the ovaries. One large tumour was present in the distal part of the oviduct. Histological examination of the tumour revealed multiple foci/nests of moderately well differentiated glandular acini on a generally light connective tissue stroma. Adenocarcinomas of reproductive tract origin are very common in older hens and often produce secondary tumours on serosal surfaces throughout the body cavity (‘transcoelomic spread’) with a marked fibrous tissue (‘scirrhous’) response. Unlike many other tumours of chickens, these are not related to oncogenic virus infection (Marek’s disease or avian leucosis/sarcoma viruses).

Game birds

Aberdeen diagnosed *Salmonella* Typhimurium phage type 193 infection as the cause of high mortality at postmortem examination of seven birds from a group of 700 two-week-old pheasant chicks, which were purchased at one-day-old. The birds were emaciated. A marked pericarditis was present in several of the chicks and some had foci of liver necrosis with firm white caecal cores (Fig 2). Salmonellosis was suspected and confirmed on cultures of the affected organs. Administration of antimicrobials in drinking water based on the in-vitro sensitivity test of the isolate and a review of hygiene practices was recommended.

![Salmonellosis in a pheasant. Necrotic caecal cores (arrow).](image-url)
Raptors
Aberdeen diagnosed visceral gout secondary to suspected nephropathy in an adult male saker falcon. It was bred in captivity by the owner and appeared dull prior to death. There had been no management changes and there was no evidence of ill health in the remaining eight falcons in this aviary. At postmortem examination the kidneys were pale and white powdery/chalky deposits, consistent with visceral gout, were present over the serosal surface of the internal organs. Visceral gout is the accumulation of urates around the organs due to failure to eliminate uric acid. It is not uncommon in caged birds and has various causes including nutritional, toxic and renal.

MISCELLANEOUS

Dogs
Perth diagnosed cardiac tamponade secondary to suppurative myocarditis in a fourteen-month-old female cocker spaniel, which presented with lethargy and pyrexia ten days after the end of a season. The pyrexia persisted despite antimicrobial and non-steroidal anti-inflammatory treatment, followed by hospitalisation. The dog suddenly collapsed two days after discharge and died within minutes. At postmortem examination pale mucous membranes were noted. The pericardium was greatly distended with blood and the heart was contracted, firm and showed scattered pale lesions on the epicardial surface. Incision revealed the lesions to be wedge-shaped and pale yellow-green, with thin red inflamed borders (Figs 3 and 4). These extended into the myocardium in the left ventricle, the right ventricle and in the left auricle. The lesions on the left ventricle and left auricle had a slightly erosive appearance, with depressions in the surface. No significant bacterial organisms were isolated on completion of aerobic and anaerobic cultures; however multiple antimicrobial drugs had been administered. Histopathology confirmed the lesions as suppurative myocarditis, which eroded blood vessels in the myocardium with consequent cardiac tamponade.

Fig 3 – Myocarditis in a dog. Pale lesion with a outline of inflamed red tissue (arrow).

Fig 4 - Myocarditis in a dog. Transverse incision showing pale lesion in right ventricle (arrow).