OVERVIEW

- Hypomagnesaemia in calves
- Hyperplastic goitre in a stillborn calf
- Abortion storm in a beef herd due to *Salmonella* Montevideo
- Excess dietary iodine linked to failure of maternal colostral antibody transfer in lambs
- Rickets in hogg lambs
- *Staphylococcus hyicus* was isolated from joint ill in piglets

GENERAL INTRODUCTION

March began unsettled and quite cold, with some snow in places. It settled mid-month, but unsettled conditions returned during the last week. The mean temperature was 0.4°C above the long-term average. It was a dry month with 62 per cent of average rainfall and 113 per cent of average sunshine overall.

An investigation concluded that indirect contact with wild birds was the most likely cause of the avian influenza outbreak on a poultry farm near Dunfermline earlier this year.

DISEASE ALERTS

The following conditions were reported by SAC C VS disease surveillance centres in July 2015. Given similar climatic and production conditions, they could also be important this year.

- Parasitic bronchitis in cattle
- Enterotoxaemia in cattle
- *Clostridium sordellii* abomasitis in lambs
- Cerebrocortical necrosis in sheep
- Louping ill in sheep and grouse

Parasitic diseases

Ayr diagnosed coccidiosis in a 12-month-old stirk that presented with haemorrhagic diarrhoea, the only animal to be affected in a bought-in batch. A coccidial oocyst count of 118,200 *Eimeria zuernii* oocysts per gram was detected in the submitted faecal sample, which grossly resembled blood and shreds of mucosa. Screening for *Salmonella* species was negative.

Generalised and systemic conditions

Ayr diagnosed hyperplastic goitre in a stillborn calf from a dairy herd that had three stillbirths over a two day period from heifers in good condition. The first two cases required assistance at calving, but the submitted calf was unassisted. At postmortem examination the thyroid gland was grossly enlarged weighing 54.7 g. Histological examination identified severe congestion, absence of colloid and the epithelial lining of the follicles was composed of columnar rather than cuboidal cells. Thyroid iodine value was 344 mg/kg dry matter (DM) (reference range greater than 1200 mg/kg DM). Pooled blood samples from five heifers in the cohort had a plasma inorganic iodine value of 9 µg/l (reference range 100 to 300 µg/l).

Ayr diagnosed two cases of blackleg. In the first case, three sudden deaths occurred over a period of three weeks in a group of housed ten-month-old stirs. Postmortem examination of one carcase revealed typical blackleg lesions in the right foreleg and left hindquarter muscles. Fluorescent antibody testing (FAT) confirmed the presence of *Clostridium chauvoei*. The second case was in an 18-month-old dairy heifer from a batch of 25 fed silage through head yokes. The animal died shortly after being found recumbent in a cubicle unable to maintain sternal recumbency and with a large swelling on one side of its neck. At postmortem examination the right neck muscles were blackened and emphysematous, while those on the left side were darkened and oedematous. There was no evidence of fracture or instability of the neck. Clostridial FAT was negative, but histological changes were consistent with peracute clostridial myositis.

CATTLE

Nutritional and metabolic disorders

Both Dumfries and Edinburgh diagnosed hypomagnesaemia in calves. On one farm two three-month-old calves, from a group of six cows with calves at foot, died suddenly. The calves were still suckling their dams and had access to silage, but not creep feed. Rib calcium to magnesium ratio was 87:1 (reference range less than 70:1). On the other farm four large Charolais-cross calves, aged two to four months, died from a group of 22. These calves were also suckling their dams, but they had access to creep feed. No significant gross pathology was noted at postmortem examination, but calcium to magnesium ratios in rib were elevated at 87:1 and 104:1.

Respiratory tract diseases

Perth considered enterotoxaemia as a possible cause of unusual lung pathology in a ten-month-old Aberdeen Angus bullock, the second to die in a large shed of bullocks where 18 were showing signs of respiratory disease. The first animal to die had acute pneumonia due to respiratory syncytial virus (RSV) infection. Similar gross findings were found at postmortem examination of the second animal with congestion of tracheal mucosa, generalised and severe interstitial and interlobular emphysema and interlobular oedema. No bacteria were
recovered from the lung and screening for bovine herpesvirus type 1, parainfluenza virus type 3 and RSV were negative by PCR. Despite the similar gross pathology, histological lesions were significantly different. Lymphohistiocytic, bronchointerstitial pneumonia was not present in the second case, but extensive haemorrhage and fibrinous exudation were noted raising the possibility of vascular injury. Further histological staining indicated that the pulmonary haemorrhage seen was not agonal, but was present for only a few days prior to death. This would support a role for vascular injury, such as mediated by bacterial toxins, in the pathogenesis of the lesions. The pattern of haemosiderin staining was also not consistent with longer-standing pattern that is seen secondary to cardiac failure.

**Reproductive tract conditions**
St Boswells isolated *Salmonella* Montevideo from a cluster of abortions in a 200-cow beef herd. Twelve abortions occurred in a group of 38 cows and a group of 20 heifers over a six week period. Four weak calves were also born, two of which subsequently died. The organism was isolated in the foetal stomach content of six out of eight foetuses submitted. The source of infection was unclear and is under investigation.

**Small Ruminants**

**Parasitic diseases**
Edinburgh examined a two-year-old Suffolk from a group of tups in which parasitic gastroenteritis was diagnosed. All the other animals had improved following anthelmintic treatment. A 20 kg weight loss was recorded in the previous two months and the tup was now diarrhoeic, but with no evidence of patent worm infection. No evidence of Johne's disease was seen on histopathology, but a lymphocytic-plasmacytic enteritis was present along with deposits of Amyloid protein in the kidneys and intestinal wall. The Amyloid deposits led to protein loss at both sites and together with the lymphocytic-plasmacytic enteritis were considered to be an unusual response to parasitism.

**Generalised and systemic conditions**
Edinburgh investigated multiple deaths in two- to three-day-old pedigree, embryo transfer lambs. Hygiene and ewe milk supply was good, colostrum quality was monitored and stored, chilled ewe colostrum was given if required. Spectinomycin was also administered prophylactically. At postmortem examination of four representative lambs all were found to have good abomasal milk clots. Colisepticaemia was diagnosed in three lambs with each *E. coli* isolate having the same antibiotic sensitivity pattern of in vitro resistance to ampicillin, tetracycline, trimethoprim-sulphonamide and spectinomycin. This antibiotic sensitivity pattern may explain the failure of prophylactic spectinomycin treatment. The most significant finding was hypogammaglobulinaemia with zinc sulphate turbidity (ZST) test results of 0, 3, 4 and 5 units (target greater than 15 units), indicating failure of maternal colostral antibody transfer. Mineral deficiencies were flagged up previously in this flock and the ewes were fed a diet high in selenium and iodine. Boland and others (2005) reported that supplemental iodine reduced colostral immunoglobulin G (IgG) absorption efficiency and lamb serum IgG concentrations. Further work by Rose and others (2007) suggested that diets for pregnant ewes should contain not more than 9.9 mg I/kg DM. In practice, this level could be exceeded if ewes have access to more...
than one mineral source. All supplementation was withdrawn but analysis of blood samples from five lambs born more than three weeks later gave similar results with ZST values between 0 to 5 units.

Aberdeen investigated failure of maternal colostral antibody transfer in a flock where 40 lambs died from the first 100 ewes to lamb. The ewes had access to high energy licks containing 100 mg/kg of calcium iodate, which is approximately 65 per cent iodine. Estimated daily iodine intake from the mineral lick was approximately 4 mg per ewe, but it is known that intakes can be very variable between ewes. A mineralised compound feed was also being fed. Probably some ewes ingested sufficient iodine to cause a reduction in colostrum absorption by their lambs.

Inverness diagnosed systemic listeriosis in a Cheviot ewe lamb, which was the third to die from a group of 43. A haemorrhagic scour, abomasitis, typhlitis and colitis were seen at postmortem examination. *Listeria monocytogenes* was cultured from the liver, spleen and brain. The histological characteristics of the colitis were considered typical of listeriosis and the presence of interstitial purulent nephritis was consistent with bacteraemia.

**Alimentary tract disorders**

Edinburgh diagnosed abomasal emptying defect in a two-year-old Texel-cross tup that died unexpectedly. Emaciation and a massively distended abomasum which weighed 8.57 kg were seen at postmortem examination (Fig 2). Abomasal impaction due to an emptying defect is most common in Suffolk sheep, but is seen in other breeds (Pruden and others 2004). Histopathology found no evidence of parasympathetic or enteric neuropathy or enteric ganglionitis. Despite this, SACCVS considered that the impaction was a consequence of alterations to enteric neural control that could not be detected histologically.

**Musculo-Skeletal conditions**

Dumfries suspected rickets in 15 of 250 homebred highlander hoggs that were noticed lame at the beginning of March. The group were wintered on a dairy farm from October to January and were due to lamb from the beginning of April. There was no response to foot bathing and one animal was submitted live for investigation. Prior to euthanasia the animal was walking stiffly on all four legs. No lesions were found in the feet, joints, muscles or tendons. The growth plates were considered to be abnormally expanded, particularly the distal radial and proximal tibial plates that had diameters of 3.5 and 3.0 mm respectively. A provisional diagnosis of rickets was made and histopathology will be carried out following decalcification of bones. A second case of suspected rickets involved Scottish blackface hoggs that returned from wintering in the second week of March. Ten per cent of the group were stiff and a recumbent animal was submitted for postmortem investigation. In this case the femoral, humeral, radial and ulnar growth plates were wide. Both groups were treated with a Vitamin D drench. Drenching with Vitamin D before moving to wintering was advised in order to prevent future problems.
**Nervous system disorders**

St Boswells examined two ewes from a group of Berrichon du Cher sheep that developed masses on the eyelids following an outbreak of conjunctivitis and keratitis that had appeared to be successfully treated with topical antibiotics. In one case both eyelids of one eye were affected with a large mass on the inner aspect of the upper eyelid pressing onto the eye. Euthanasia was carried out on welfare grounds and histological examination of biopsy samples confirmed squamous cell carcinoma. Poor skin pigmentation and exposure to ultraviolet radiation are predisposing factors for squamous cell carcinoma in this breed (Méndez and others, 1997).

Dumfries diagnosed congenital abnormalities in two lambs from a flock of 40 Texel ewes, where the flock owner reported that approximately six lambs were born without eyes. One lamb was anophthalmic with a cleft lip and palate (Fig 3), while the second was microphthalmic. Microphthalmia is hereditary in Texel sheep with an autosomal recessive inheritance (van der Linde-Sipman and others, 2003). In addition neuropathology revealed hypoplasia of the corpus callosum and hippocampus and absence of the septum pellucidum in both cases. A genetic defect, rather than a viral or toxic aetiology, was suspected. The farmer thought that the affected lambs were all sired by one tup, but further investigations were declined.

**Renal diseases**

The deaths of three lambs aged two, three and four weeks was reported in a flock of 15 zwartbles ewes. The older two lambs were found dead but the youngest, which appeared to be stiff, later convulsed and died. At postmortem examination the kidneys were pale with cavitated centres (Fig 4) and the aqueous humour urea was 124 mmol/l (serum reference range 4 to 8 mmol/l). Large numbers of oxalate crystals, in addition to tubular dilatation consistent with “drunken lamb syndrome”, were seen histologically. Congenital oxalate associated nephropathy was suspected, despite the young age of the lamb (Strugnell and others 2011; Barley and others 2015).
PIGS

Alimentary tract disorders
Rotavirus was diagnosed in 10-day-old pigs housed on a rearing to finishing house, where there was an increased incidence of scour (25 per cent of litters were affected) and high mortality in affected litters. Gilt litters were predominately affected and there was no response to antibiotic treatment. Three live, ten-day-old piglets were submitted from an affected litter for further investigation. One animal was passing bright-yellow liquid faeces. At postmortem examination there was oedema of the serosal surface of the colon, which was particularly apparent between the loops of the spiral colon. Rotavirus polyacrylamide gel electrophoresis (PAGE) testing was positive for type A in one piglet. Histopathology demonstrated widespread changes affecting the small intestine in all three piglets, comprising acute degenerative changes to the epithelium of the villi, oedema of the villi, separation of villus epithelium from the lamina propria, loss of epithelium and villus atrophy. Early inflammatory changes were also present in areas. The changes were consistent with a viral-type enteropathy in all three piglets and typical of rotavirus infection. There was no evidence of involvement of other enteropathogens.

Locomotor problems
A herd reported an increased incidence of joint ill affecting piglets up to four weeks of age in the farrowing house. Three piglets were examined and in all cases two or more joints were found to contain yellow, turbid material with thickening of the synovial membranes and surrounding tissues. Staphylococcus hyicus was isolated from the joints. Lesions of greasy pig disease were seen and it was suggested that bacteraemia occurred secondary to the skin infection resulting in bacterial localisation in the joints.

Skin diseases
Twelve weaned pigs on a rearing unit presented with round inflamed skin lesions from which Trichophyton mentagrophytes was cultured. Ringworm is uncommon in pigs and advice on its zoonotic potential was given.

BIRDS

Poultry
Edinburgh diagnosed Marek’s disease at postmortem examination of a two-year-old Scots grey cross hen that stopped eating and showed increased respiratory effort, diarrhoea and ataxia. The spleen was enlarged (4 cm diameter), grey and friable, the kidneys were pale and the liver contained multiple yellow-brown pinpoint foci. Histopathology revealed lymphomatous infiltration of the spleen, kidney, liver, lung and heart.

Thurso diagnosed tuberculosis in an adult male turkey which was euthanased following a period of weight loss. At postmortem examination there were multiple miliary lesions in liver, lung, proventriculus and intestine. Numerous acid-alcohol fast bacilli were seen on a Ziehl-Neelsen stained smear from the liver lesions.

MISCELLANEOUS

Dogs
Perth diagnosed a grade II–III oligodendroglioma in a six-year-old working Border collie that was euthanased after presenting with sudden onset circling, head tilt and blindness in the right eye. At postmortem examination, a 2 mm diameter focal dark area was seen on the ventral aspect of the right brain stem. Examination of cut surfaces of the brain revealed an ill-defined dark haemorrhagic mass, with a maximum coronal dimension of 16 mm, which was present in the rostral medulla oblongata and extended into the fourth ventricle. There was dilation of the fourth ventricle with separation of lobules 1 and 10 of the cerebellar vermis. Histopathological examination confirmed the grade II–III oligodendroglioma.

References:


Review of causes of ovine abortion in 2016

SAC C VS received ovine abortion submissions from 499 flocks in 2016. As in previous years the more common causes of abortion contributed to significant losses during the lambing season (Fig A).

Enzootic abortion of ewes (EAE) due to *Chlamydia abortus* was the most commonly diagnosed cause of abortion in sheep in 2016, as it was in nine out of the previous ten years. EAE and the next most commonly diagnosed cause of abortion, toxoplasmosis, have together consistently accounted for between 19 per cent and 37 per cent of all diagnosable abortion submissions each year in the past decade. Should EAE or toxoplasmosis pose a risk for flocks then vaccination should be considered.

SAC C VS advises animal keepers to continue to pay attention to forage quality as listeriosis still accounts for between 0.3 and 3.5 per cent of all diagnosable ovine abortions each year.

Campylobacteriosis and salmonellosis together account for between 5 and 11 per cent of all diagnosable ovine abortions.

Given the zoonotic potential of the common abortifacients good hygiene measures should be taken when handling abortion material. In addition to avoid the possible risk of infection, pregnant women are advised that they should:

- Not assist in lambing ewes
- Avoid contact with aborted or new-born lambs, calves or kids or with the afterbirth, birthing fluids or materials (e.g. bedding) contaminated by such birth products;
- Avoid handling (including washing) clothing, boots or any materials that may have come into contact with animals that have recently given birth, their young or afterbirths.
- Ensure partners attending lambing ewes or other animals giving birth take appropriate health and hygiene precautions, including the wearing of personal protective equipment and adequate washing to remove any potential contamination.

Fig A. Causes of ovine abortion in 2016.