SRUC Veterinary Services Monthly Report for May 2020

OVERVIEW

- **Valvular endocarditis as a cause of death in dairy cows**
- **Neonatal bovine herpes virus 1 infection causing significant losses in a suckler herd**
- **Swayback in Cheviot lambs.**
- **Yolk sac infections causing high mortality in pheasant chicks**

GENERAL INTRODUCTION

The mean temperature for May was 0.8 °C above the long-term average. Rainfall was 90 percent of average, and sunshine was 119 percent of average. The south had a dry sunny month, but sunshine was closer to normal in the north, and it was wetter than average in the north-west.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in August/September 2019. Given similar climatic and production conditions, they could also be important this year.

- **Rotavirus enteritis in pigs**
  Cases of rotavirus enteritis peak in piglets aged between three and five days, and in the peri-weaning period around three to five weeks-of-age. Deaths may occur and surviving pigs are often stunted. Sensitivity of the polyacrylamide gel electrophoresis (PAGE) test can be an issue as the viral load may be below the detectable limit. Where possible, individual faeces samples from several newly affected pigs should be submitted. Euthanasia, prompt postmortem examination and histopathology of the small intestine can be valuable in reaching a diagnosis.

- **Haemorrhagic liver syndrome in back yard hens**
  This condition results in the sudden death of healthy birds with postmortem examination revealing a friable liver and haemorrhage within the anterior abdomen. The syndrome is a recognised issue in backyard flocks, affecting birds that are overweight and often in active lay. Possible solutions to the problem include feeding a lower energy/high protein ration and providing more opportunities for exercise.

CATTLE

Parasitic diseases

A well grown one-month-old Limousin calf died shortly after being found moribund in the field and was submitted for postmortem examination. One other calf had been diagnosed with coccidiosis two weeks previously, but had recovered, and this was the only death from the group of 38 cows and calves. The wall of the caecum and colon were markedly thickened, and the mucosa was extensively necrotic (Fig 1). A small volume of liquid faeces was present in the rectum. The coccidial count was only 300 oocysts per gram but histopathology confirmed a severe necrotising typhlocolitis with abundant coccidial stages, including oocysts, present but mainly trapped within the necrotic exudate, together with transmural protein-rich oedema and inflammation. SRUC VS commented that the transmural pathology was unusually severe for uncomplicated coccidiosis, and a secondary bacterial infection with terminal endotoxaemia or septicaemia was indicated by the histopathology. Secondary bacterial infection was also thought to be responsible for an erosive and ulcerative typhlocolitis in a two-week-old Limousin calf that presented as a sudden death. Cryptosporidia was suspected to be the primary pathogen in this case with numerous oocysts detected in the faeces. In addition on histological examination increased numbers of *Sarcina* sp bacteria were seen throughout the intestinal lumen suggesting dysbiosis secondary to excessive luminal carbohydrate. Changes consistent with disseminated intravascular coagulation secondary to septicaemia were also detected.

Figure 1 – Severe colitis due to coccidiosis in a suckled calf

Generalised and systemic conditions

A variant of bovine neonatal pancytopaenia (BNP) was diagnosed in a two-week-old Charolais cross heifer calf which died after a period of malaise. Petechial haemorrhages were found throughout the carcase with further haemorrhage into the abomasal lumen. Histopathology detected irregular areas of near total loss of haematopoietic cell clusters within the sternal bone marrow. The depletion was not considered sufficiently extensive for a diagnosis of trilineage hypoplasia and confirmation of BNP. However, similar irregular depletion of haematopoietic cells has been seen in calves experimentally given colostrum from Pregsure-vaccinated dams, and in calves with multisystemic haemorrhage from herds in which cases of BNP with trilineage hypoplasia occurred within the same calving period. The dam was 14 years old and considered likely to have been vaccinated with Pregsure at some point.

Respiratory tract diseases

A one-year-old dairy cross heifer became the third animal to die in a group of cattle purchased one month previously. It was at grass and had shown respiratory signs prior to death. Unusually for its age, the umbilical vein was found to be approximately 3.5 cm in diameter and contained liquid pus. There was an extensive peritonitis involving the liver, rumen, spleen and umbilical abscess. In addition two splenic abscesses were discharging into the abdomen. There was marked pulmonary emphysema and multiple small abscesses throughout the lung parenchyma. The right caudal lobe had a larger area of coalesced abscesses and haemorrhage. Lung histopathology also detected multifocal expansion and occlusion of microvasculature by dense colonies of long slender bacilli, sometimes associated with leucocytoclastic debris and fibrin. This was consistent with bacterial thromboembolism, suggesting vascular mural erosion associated with an abscess and release of bacteria into the systemic circulation similar to peracute caval syndrome which explained its sudden demise.

A twelve-day-old Aberdeen Angus cross calf was submitted to investigate extensive calf losses in a herd where 170 of 400 cows had calved. Twenty calves had died and another fifteen were ill. Low birth weights and poor growth rates were reported. Some were unable to stand at birth and stillbirths had also occurred. The majority of affected calves were born to heifers. Postmortem examination findings included diphtheresis and ulceration in the trachea, lung consolidation and purulent exudate in the lower airways. Neonatal infectious bovine rhinotracheitis (IBR) was suspected and BoHV1 DNA was detected by PCR in samples of both the trachea and lung. Outbreaks of neonatal IBR occur when calves born to naïve, unvaccinated dams are exposed to the virus. Losses can be high due to the absence of protective colostral antibodies. The farm had experienced an outbreak of IBR in young bulls two months earlier and none of the cows were vaccinated.

Circulatory system disorders

Endocarditis was diagnosed in three dairy cows from two farms in south-west Scotland during May. The first farm submitted two four-year-old Holstein Friesian cows that had presented with haematomas on their right ventral abdomens one month previously. Blood samples taken at the time identified hyperglobulinaemia and hypoalbuminaemia, consistent with a chronic inflammatory focus. They deteriorated and lost condition over the subsequent month and were euthanased for welfare reasons. Both cows had multiple areas of bilateral renal infarction and multiple thrombi and necrotic foci within the lung parenchyma. Extensive endocarditis lesions were found on the right and left atrio-ventricular valves of both cows, with the aortic and pulmonary valves also affected in one. There was no evidence of a primary foci of infection in either cow at the time of submission. A previous episode of ruminal acidosis was considered unlikely, as there were no liver lesions. The farm reported an increase in adult cow mortality, and some rejection of kidneys at the abattoir due to renal infarctions, suggesting that the problem may be more widespread in the herd. *Salmonella enterica* serovar Mbandaka was cultured from the intestines of one cow, which did have diarrhoea, but was considered likely to be an opportunistic infection in a debilitated animal. The second farm submitted a six-year-old Holstein Friesian cow that had developed mastitis and stiff joints after calving three months previously but had subsequently recovered. Milk drop, anorexia, weight loss and recumbency were reported in the week prior to death. Endocarditis lesions were noted on the right atrioventricular valve and there was a cranioventral pneumonia, from which *Pasteurella multocida* and *Trueperella pyogenes* were isolated. SRUC VS suggested that the endocarditis may have been a consequence of bacteraemic spread from either the earlier mastitis or arthritis.

SMALL RUMINANTS

Nutritional and metabolic disorders

The carcases of two neonatal Cheviot lambs were presented to investigate an ongoing problem with lambs that appeared normal at birth but became weak on their hind quarters and died within the first 12 hours. The ewes were reported to be in good condition and were

housed on a diet of hay and ewe rolls. Sixteen lambs from 60 ewes were affected in 2019 and five lambs from 40 ewes were affected at the time of presentation in 2020. Liver copper levels in the submitted lambs were 88.8 µmol/kg and 67.8 µmol/kg (reference range 314-7850 µmol/kg), and histopathology findings of motor neurone degeneration and long fibre tract leukoencephalopathy were supportive of a diagnosis of swayback as a consequence of in utero copper deficiency. The farmer had changed from mineral supplementation by bolus to mineral buckets two years previously and it was suggested that this alteration had resulted in insufficient copper intake by the ewes during the earlier stages of pregnancy.

Toxic conditions

A three-month-old Hebridean cross lamb was found recumbent and frothing at the mouth shortly before death. The flock of 42 sheep had been set stocked and the lamb was well grown. The rumen was well filled and large numbers of oval, pointed variegated leaves were mixed throughout the content. These were identified as *Pieris* sp. an ornamental shrub from south east Asia, which is a recognised cause of plant poisoning in sheep. The leaves contain grayanotoxins that bind to the sodium channels of the heart, skeletal muscle and nerve cells. The flock owner had moved the shrub from its previous location where it was not thriving, and re-planted it in the field not realising the risk.

Generalised and systemic conditions

Infection with *Anaplasma phagocytophilum* (tick borne fever) was thought to have contributed to the death of a three-week-old lamb. An on-farm postmortem examination was carried out after four lambs were found dead in a five-day period. Tissues were submitted and histopathology revealed an acute necrotising pneumonia and hepatitis with intravascular colonies of small bacilli detected in the lung, liver and kidney. These findings were typical of bacterial septicaemia with a *Pasteurella* sp. the most likely cause. The spleen tested PCR positive for *A. phagocytophilum* and liver selenium content was low at 0.51 mg/kg DM (reference 0.9-3.5 mg/kg DM). Both may have predisposed to septicaemia.

Nervous system disorders

A one-week-old Soay lamb that had been unable to bear weight on its hind legs since birth was euthanased for investigation of the problem. Subcutaneous haemorrhage was detected in the region of the caudal thoracic and cranial lumbar vertebrae with some reddening of the adjacent muscle. Transverse linear red and purple discolouration and compression of the spinal cord (Fig 2). was found at the level of the first lumbar vertebra, which was fractured with associated haemorrhage. Trauma, such as being stood on by the ewe, was thought to be the most likely explanation for the injury.

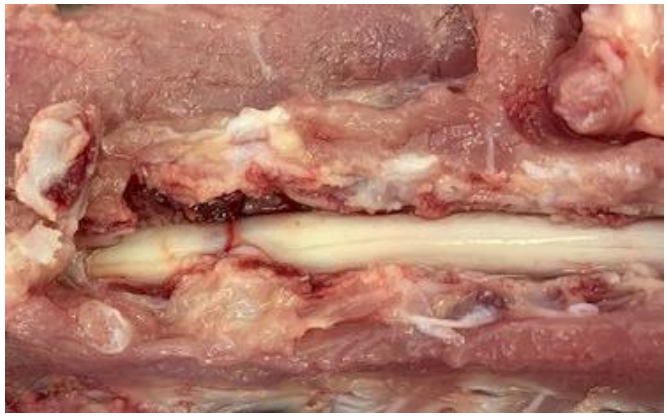

Figure 2 – Traumatic spinal cord lesion in a neonatal lamb

Respiratory tract diseases

Seven cases of ovine pulmonary adenocarcinoma (OPA) were confirmed in an upland flock during May. Most cases originated from a group of 200 ewes, which were three to four years of age. A range of presentations were recorded including sudden death, ill thrift, lethargy and exercise intolerance. Evidence of secondary bacterial pneumonia was identified in six of the seven cases. Lactation, weather, and management procedures were thought to have precipitated the onset of clinical signs and death.

A 10-week-old, male, Texel lamb was found dead without any previous signs of ill health. A large abscess was found causing marked swelling of the laryngeal wall and obstruction of the lumen. A raised white plaque was noted contralaterally (Fig 3). The lungs were pale and overinflated and there was widespread haemorrhaging on the epicardium. These findings were considered to be consistent with hypoxia secondary to airway obstruction. Histopathological examination confirmed a well-established necrotic and purulent inflammatory process centred on the cartilage consistent with a diagnosis of laryngeal chondritis. *Trueperella pyogenes* was isolated on culture. Laryngeal chondritis is a common diagnosis in Texel sheep however this animal was unusually young. A break in the mucosa allowing bacterial entry is necessary in order to establish infection. For example, following trauma or an episode of laryngeal inflammation and oedema leading to ulceration. A recent study by Waine *et al* supports the hypothesis that breed differences in the anatomy of the upper airways could predispose Texel sheep to laryngeal chondritis.[1]

Figure 3 – Laryngeal chondritis in a ten-week-old Texel lamb

Renal diseases

A four-year-old female Bagot goat with a long history of lethargy and inappetence was euthanased and submitted for postmortem examination. This revealed an increased volume of straw coloured pericardial, pleural and peritoneal fluid plus marked oedema of the abomasal mucosa and omentum. The renal glomeruli were prominent (Fig 4) and histopathology identified a severe chronic active protein losing glomerulonephropathy with extensive distension of glomerular spaces and tubules throughout the cortex and medulla by protein rich hyaline, and occasionally cellular, casts. Glomerular tuft and capsular distortion, increased cellularity and synechial formation progressing in some to obsolescence was also noted. Immune mediated glomerulonephropathy was considered the most likely aetiology. This condition is uncommon in adult ruminants and the underlying trigger is rarely identified. The doe had been treated for toxic mastitis a year earlier and the possibility that this was the underlying factor could not be excluded.

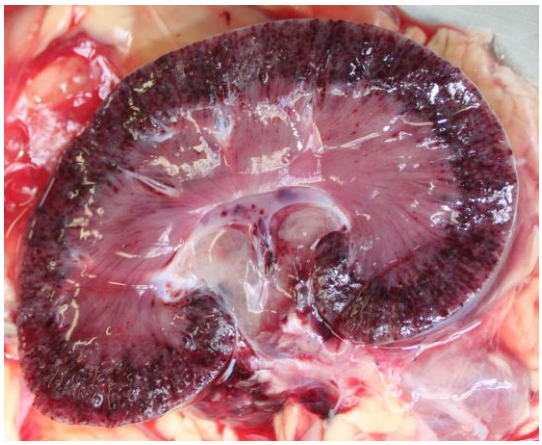

Figure 4 – Prominent glomeruli and renal congestion in a case of caprine glomerulonephropathy

CAMELIDS

Inflammatory bowel disease was diagnosed in a nine-year-old alpaca that had a six-month history of weight loss. Earlier investigations for endoparasite infection and Johne's disease had proved unrewarding. Thickening and ridging of the distal intestinal mucosa was found on postmortem examination (Fig 5). Histopathology detected lymphoplasmacytic enteritis and probable villous shortening indicative of inflammatory bowel disease which is thought to result from abnormal mucosal immune response to various environmental antigens, most likely parasitic or dietary in origin.

Figure 5 – Thickening and ridging of the distal intestinal mucosa in an alpaca with inflammatory bowel disease

BIRDS

Game birds

Five thousand day-old pheasant chicks were transported to the rearing site and appeared healthy on arrival. Ten percent of the birds went on to die between three and five days of age, and ten were submitted for postmortem examination. Affected birds appeared weak and were unable to hold up their heads, but neither diarrhoea nor huddling was reported. In all cases the liver was pale and the gall bladder distended with dark content consistent with poor food intakes. A small amount of food was present in the crop of two, and the gizzard of four birds. In nine birds the yolk sac measured between 0.5 and 1 cm in diameter and had green contents. *Escherichia coli* was isolated in pure growth and final diagnoses of starve outs and yolk sac infections were made.

A failure to feed and yolk sac infections also contributed to a 10 to 15 per cent mortality rate in a consignment of 38,000 partridge chicks. Nine, three-day-old chicks were

examined and yolk sac contents from four were cultured. *Salmonella enterica* serovar Senftenberg ST14 was isolated from two and *E coli* from a third. It was noted from the history that there had been a change in the way chick crumb was being offered to the birds and it was suggested that this could have resulted in poor food intakes.

References:

1 Waine K, Strugnell B, Remnant J *et al*. Anatomy and pathology of the Texel sheep larynx. *Vet Sci* 2019; 6(1): 21-40

Marek's Disease

Marek's disease occurs in poultry populations worldwide and is a significant disease concern in both commercial and backyard flocks. Chickens are the most important host however infection and outbreaks can occur in other poultry species such as turkeys, quail, geese, ducks and gamebirds. It is a herpes virus and as such can result in latent lifelong infections with the potential to shed virus at any time. Following exposure, the virus completes its final replication in the feather follicle epithelium and the fully infective form is shed in feather dander. This combined with the ability of the virus to survive for long periods in the environment, means that most flocks are exposed. Young chicks are infected via inhalation of contaminated feather dander and clinical disease typically occurs at two to five months of age.

There are several recognised syndromes of Marek's disease with the classical form being asymmetrical limb paralysis and formation of tumours in visceral organs, which can develop as early as three weeks post infection. Clinical signs with visceral tumours are nonspecific and include diarrhoea, weight loss, anorexia, starvation and death. Neurological signs are more recognisable and as well as limb paralysis involvement of the vagal nerve can result in dilation of the crop and gasping. Other syndromes that may be clinical recognisable include ocular, resulting in greying/distortion of the iris, and cutaneous, with tumours of feather follicles. There is also an acute form resulting in rapid death in young birds, a chronic form leading to ongoing immunosuppression, as well as a syndrome of transient paralysis.
The diagnosis can be suspected on a combination of clinical signs, age of bird and post-mortem findings including pale tumours in visceral organs and swelling of nerves. Histopathology can confirm a diagnosis and is useful for differentiating it from other tumour forming viruses.

SRUC VS diagnoses Marek's disease in small numbers each year (Fig B) usually in birds from backyard flocks, some of which have originated from commercial units.

Prevention of exposure to Marek's disease for backyard flocks is impractical due to the ubiquitous nature of the virus. The focus should be on prevention of disease and the only effective method for this is vaccination. To be effective this should be done at hatching before exposure to the virus. Immunity can take up to ten days to develop so young birds should be kept separate from older birds and measures taken to reduce environmental exposure.

Figure A Grossly enlarged liver due to MD induced lymphoma

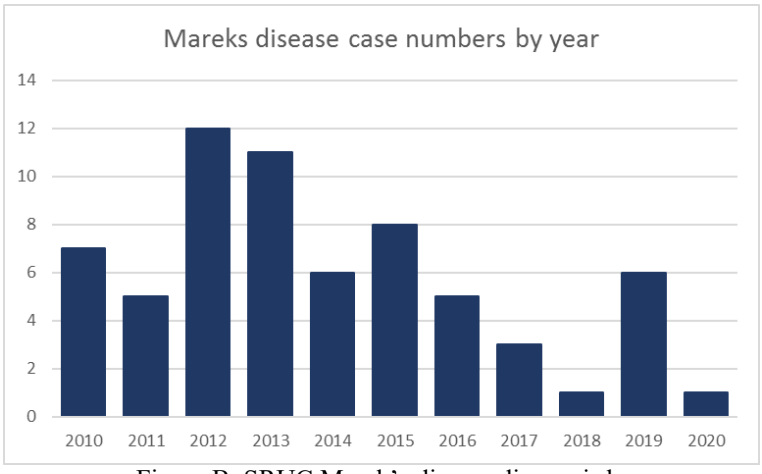

Figure B: SRUC Marek's disease diagnosis by year