SRUC Veterinary Services Monthly Report for September 2021

OVERVIEW

- ***Eimeria alabamensis* as a cause of diarrhoea in adult dairy cows**
- **Fatal intestinal torsion in ewes following routine embryo collection**
- **Poor injection technique leading to the death of multiple piglets**

GENERAL INTRODUCTION

The mean temperature was 2.1 °C above the long-term average, with only September 2006 exceeding this. Scotland as a whole had 78 per cent of average rainfall and 86 per cent of average sunshine.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in December 2020. Given similar climatic and production conditions, they could also be important this year.

- **Pyelonephritis in beef cows**
  Cases of pyelonephritis are usually sporadic and often a result of ascending infection in the periparturient period. Poor water intake is a possible predisposing factor for outbreaks of pyelonephritis therefore, as cows are brought inside for the winter, it is worth checking that access to water is adequate.
- **Deaths due to *Escherichia coli* K99 infection in neonatal dairy calves**
  Only calves less than five days of age are susceptible to colonisation with *E coli* K99. The K99 fimbriae allow the bacteria to attach to receptor sites on intestinal epithelial cells and resist peristalsis. The *E coli* strains identified in colisepticaemia and enterotoxigenic *E coli* are different, but the latter can become systemic in the agonal phase of disease.

CATTLE

Nutritional and metabolic disorders
The carcase of a 13-month-old Limousin bull was submitted for investigation of sudden death. It had been housed for two months with one other bull on a diet of haylage and compound feed. Postmortem examination detected congestion, haemorrhage and oedema within the tissues of the head and neck (Fig 1). These findings suggested trauma and a vitreous humour magnesium result of 0.37 mmol/l (reference range > 0.55 mmol/l) confirmed a diagnosis of hypomagnesaemia. The trauma to the neck and head is likely to have occurred during a convulsive episode related to the hypomagnesaemia. The rumen pH was 7 and may have predisposed to tetany by decreasing magnesium solubility and therefore availability.

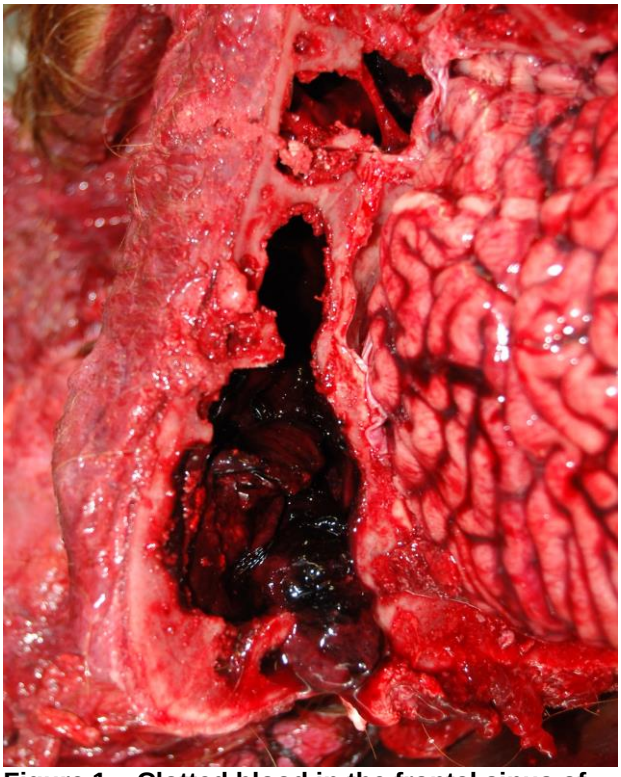

Figure 1 – Clotted blood in the frontal sinus of a bull diagnosed with hypomagnesaemia

A 200-cow dairy herd reported pyrexia, milk drop and diarrhoea affecting 25 per cent of the herd, with the milk yield in individual animals decreasing by around 30 per cent. The farmer and vet commented that the silage feed face was spoiling quickly becoming black and slimy within one day of exposure. The silage fields had been heavily fertilised, and the possibility of high nitrate levels

was raised. Excess nitrates can lead to a restricted fermentation, an elevated pH and a risk of overgrowth with bacteria and moulds. Blood and faecal samples were submitted and screening for *Salmonella, Yersinia* and *Listeria* spp proved negative. No evidence of Schmallenberg virus infection was detected by PCR. Paired serology was not required as clinical signs resolved following a reduction in the amount of silage fed combined with the addition of straw pellets to the ration.

Parasitic diseases

A group of dry cows developed diarrhoea after being turned out to grass. Second calvers that hadn't previously grazed were the most severely affected. The farm had owned the land for three years and prior to that it was used by a calf rearing enterprise. A faecal sample was submitted and found to contain 450 strongyle eggs and 60,600 coccidial oocysts per gram. Coccidial oocyst speciation was carried out and *Eimeria alabamensis* accounted for 100 per cent of the oocysts detected. The clinical signs resolved without treatment, and it was assumed that the cows had not previously encountered *E alabamensis* which is most often reported as a cause of coccidiosis in youngstock at grass. It was suggested that the calf rearing unit may have been the original source of infection, with a subsequent annual increase in oocyst challenge.

A beef cow on rough grazing with a calf at foot was found recumbent and trembling and died the same day. Pallor, large numbers of ticks and dark red urine were noted by the farmer. A second cow was dull, trembling and appeared slightly jaundiced. Ticks were evident and a packed cell volume of 0.08 l/l (reference range 0.25 to 0.45 l/l) confirmed severe anaemia. Examination of a blood smear suggested a diagnosis of babesiosis and infection with *Babesia divergens* was confirmed by PCR. Babesiosis had not previously been diagnosed on this farm. Heifers were purchased annually from an area where babesiosis cases had been identified in the past. None of these animals were affected and it was suggested that the disease may have been introduced via cattle movements.

Alimentary tract disorders

Salmonella enterica serovar Kottbus was isolated from a faecal sample submitted from a dairy cow with diarrhoea and pyrexia. *S* Kottbus is isolated infrequently from cattle in the UK with only 2 or 3 cases identified each year. It is typically associated with abortion and diarrhoea.

Musculo-Skeletal conditions

An eight-year-old wagyu bull arrived on farm and was immediately introduced to a group of heifers at grass. It became recumbent 48 hours later and a swelling mid-way down its back was noted. It was euthanased after failing to respond to treatment with NSAIDs. Postmortem examination revealed fracture of the dorsal spinal process in the caudal thoracic/cranial lumbar region and a comminuted fracture of the vertebral body of T12 confirming significant trauma.

Bovine herpes virus-1 (BoHV1) vaccine was administered to a group of 60 first lactation Holstein heifers after six animals developed respiratory signs and pyrexia. The vaccine was injected into the caudal thigh and swelling was subsequently noted in two animals. One animal died and was submitted for postmortem examination. The right hind leg was visibly swollen proximal to the hock but no abnormalities were detected in the joints. Areas of necrosis tracking towards the pelvis were found within the muscles of the caudal thigh (Fig 2). Small bilateral areas of necrosis were present in the soft tissue between the epiglottis and the arytenoid cartilages, and extensive bilateral yellow interlobular lung oedema was most severe in the diaphragmatic lobes. Histopathology confirmed a severe, acute to subacute myositis characterised by necrosis and fibrinopurulent inflammation. The findings ruled out clostridial myositis and examination of spleen, lung and liver revealed changes consistent with septicaemia secondary to the myositis. A subacute laryngitis with ulceration, atypical of BoHV1, was also detected and negative PCR results ruled out *Histophilus somni* as the cause. The most likely explanation was suggested to be repeated trauma associated with dyspnoea and this animal had been treated for suspected respiratory disease. The final diagnosis was bacterial myositis and septicaemia secondary to unhygienic injection technique.

Figure 2 – Whole thigh in cross section. Myositis following unhygienic administration of vaccine

SMALL RUMINANTS

Parasitic diseases

The carcase of a six-month-old Texel cross lamb was submitted for postmortem examination to investigate a problem with scour and deaths in a group of weaned lambs. They had been treated with a benzimidazole drench eight weeks earlier. The lamb was in average body condition with liquid abomasal and intestinal contents. A total of 43800 *Nematodirus battus* worms were recovered from the small intestines confirming autumn nematodirosis. 1850 *N battus* eggs per gram were detected in faeces. The diagnosis indicates that the lambs had not been sufficiently exposed to *N battus* earlier in the year to develop immunity and suggests that an autumn hatch of *N battus* eggs had occurred on the pasture.

Generalised and systemic conditions

700 Scottish blackface lambs were weaned off the hill onto silage aftermath. Large numbers of ticks were noted, and a pour-on product was applied. Eight lambs were found dead over an eight-day period, and one was submitted for investigation of the losses. No ticks remained and postmortem examination revealed peritonitis with sheets of fibrin on the diaphragm, liver and spleen. A 1 cm diameter firm pale lesion was found extending into the liver parenchyma. This was considered suspicious of black disease, however there was no haemorrhagic rim and the lambs had received two doses of a multivalent clostridial vaccine. Fluorescent antibody testing was positive for *Clostridium novyi* but histopathology proved that this was an incidental finding. *Bibersteinia trehalosi* was isolated from the liver, lung and spleen. Histopathology showed that the liver lesion was a result of necrotising hepatitis and was associated with large numbers of coccobacilli typical of *Bibersteinia trehalosi*. Fibrinopurulent exudate admixed with coccobacilli was adhered to the liver, spleen and diaphragm and a few dense colonies of coccobacilli were found in the alveolar septal capillaries confirming systemic pasteurellosis as the cause of death. It was suggested that the liver lesion may have resulted from bacterial colonies obstructing a portal vein. A similar case has been described in a suckler cow.[1]

A thin three-year-old Scottish blackface ewe was presented to investigate the possibility of caseous lymphadenitis. Multiple abscesses with yellow stringy contents were present in the superficial and deep structures of the face and neck, including lymph nodes. The lungs were also affected with multiple well-defined abscesses disseminated throughout the parenchyma. A*ctinobacillus lignieresii* was isolated from a lymph node and a lung abscess. *A lignieresii* is a commensal of the oral cavity and pharynx and disease occurs following infection of abrasions caused by feed or other objects.[2] The entry point for infection was not identified in this case.

Alimentary tract disorders

Three pedigree Texel ewes from a group of 18 were found dead following routine embryo collection the previous afternoon. Access to food and water had been restricted for just over 24 hours prior to the procedure. Afterwards the sheep recovered in a pen with access to hay and were then allowed to walk back to the field in their own time. Clockwise 360-degree mesenteric torsions were found in all three cases. It was suggested that a combination of reduced rumen size, introduction of gas into the abdomen and manoeuvring into dorsal recumbency had predisposed to the torsions. Post-operative ileus may also have contributed.

Nervous system disorders

Approximately 10 Scottish blackface ewes were found dead or recumbent one week after the flock were gathered from the hill. Postmortem examination of three carcases was unrewarding but brain histopathology identified severe non-suppurative encephalitis, characterised by perivascular mononuclear infiltrates, glial foci, neuronal necrosis and neuronophagia. A diagnosis of louping ill was confirmed on immunohistochemistry and the farmer commented that tick numbers had appeared to have increased in recent years. Louping ill was diagnosed as a cause of ewe deaths in two further blackface flocks during September. In the absence of vaccination tick control is the mainstay of prevention.

PIGS

Alimentary tract disorders

A weaned pig was submitted to investigate the cause of four deaths in the course of one week. Postmortem examination found a 180-degree torsion at the root of the mesentery with intense reddening of the intestines from approximately 10cm distal to the pylorus to 30cm proximal to the anus. The animals were housed in large straw bedded pens and it was advised that placing bales in the pens to prevent the pigs picking up speed when running around may reduce the risk of intestinal torsion.

Nervous system disorders

A 550-sow breeding and finishing unit reported clinical signs of hypersalivation, ataxia, hypermetria and recumbency in a number of neonatal piglets from several litters with 30 affected in one week. The signs developed immediately after an intramuscular injection of iron into the upper neck behind the ear. An injection of penicillin was given at the same time. Some piglets died and

others were euthanased. Four piglets from different litters were examined and in three cases marked muscle darkening at the injection site and widespread yellow/brown discolouration of the meningeal and ventricular surfaces of the brain and focal moderately defined yellow-brown and blackish discolouration of the medulla oblongata was observed (Fig 3). Histopathology confirmed necrosis, haemorrhage and deposition of brown material within the neuroparenchyma of the medulla oblongata consistent with injection of an iron compound into the caudal brainstem. In the fourth piglet, a white deposit was observed overlying the caudal medulla oblongata consistent with injection of penicillin into the cranial cavity (Fig 4). For welfare reasons it was advised that injections into the neck should cease until training could be given to resolve the issue.

Figure 3 – Focal discolouration of the brainstem following injection of iron through the atlanto-occipital joint

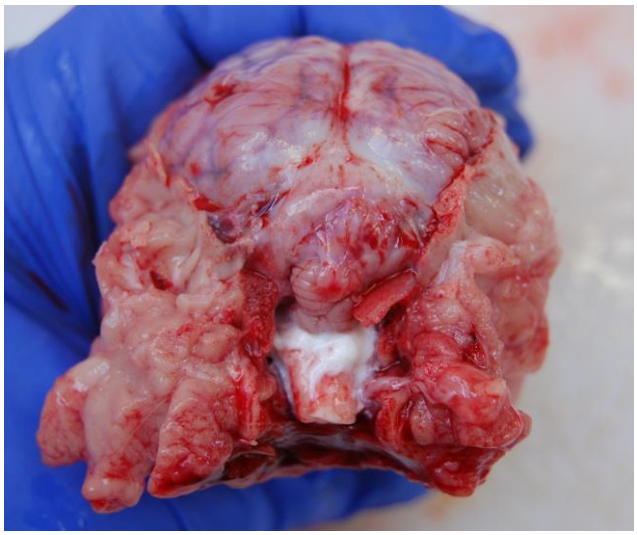

Figure 4 – White penicillin overlying the caudal medulla oblongata following antibiotic injection of a piglet

BIRDS

Poultry

A backyard flock of 15 birds found three hens dead over the course of two weeks. A noticeable drop in egg production was also reported. The carcase of a three-year-old hen was submitted and found to be pale with a heavy *Dermanysuss gallinae* (poultry red mite) burden. The cause of death was confirmed as anaemia secondary to this infestation.

References:

1 Watson PJ, Scholes FSE. *Bibersteinia trehalosi* necrotising hepatitis associated with sudden death in an adult cow. *Vet Rec* 2010; 167:100-2

2 Rycroft AN, Garside LH. *Actinobacillus* species and their role in animal disease. *The Vet J* 2000; 159: 18-36

Salmonella Mbandaka in Scottish Cattle Herds – An Emerging Problem

Salmonella enterica serovar Mbandaka was historically an uncommon isolate in Scottish cattle herds, but it has now overtaken *Salmonella enterica* serovar Typhimurium to become the second most common *Salmonella enterica* serotype, after *Salmonella enterica serovar* Dublin.

Figure 1 shows the number of isolates of *Salmonella* Mbandaka from clinical samples between 2010 and 2020 and demonstrates a clear increase in the number of isolations.

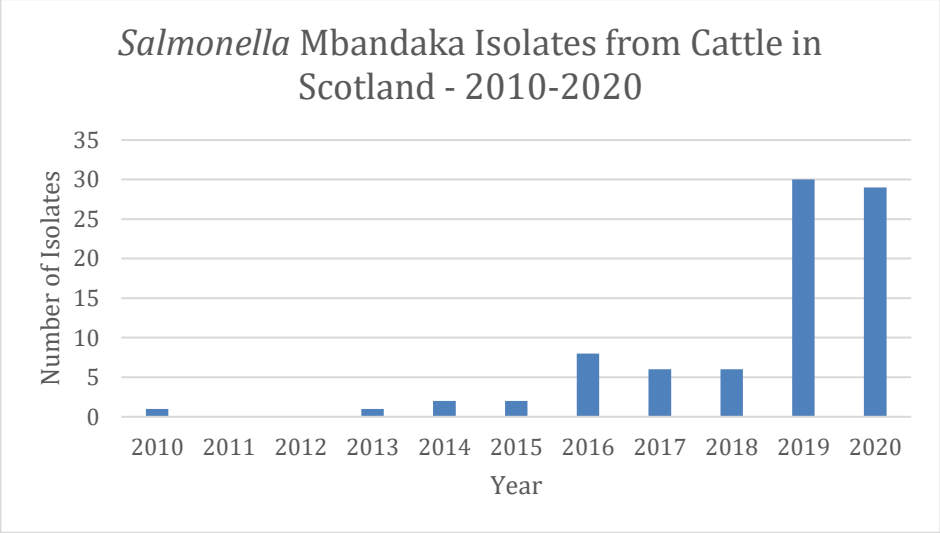

***Figure 1: Salmonella* Mbandaka isolates from Scottish cattle between 2010 and 2020**

The 85 isolates were from 37 farms, with 16 farms having repeated clinical isolates. The most common clinical presentations are shown in Table 1, with diarrhoea being the most consistent clinical finding.

Table 1: Clinical signs reported in 85 confirmed cases of salmonellosis due to *S mbandaka*

Clinical sign	Percentage of animals exhibiting clinical sign
Diarrhoea	73
Found dead	13
Milk drop	11
Pyrexia	6
Increased respiratory rate	5
Ill-thrift	5
Hypothermia	4

The most commonly affected age group was adult animals, with 58 per cent of the isolates from this age of animal. 31 per cent of isolations were from calves of less than three weeks of age.

Salmonella Mbandaka can be isolated from the faeces of clinically normal animals. When disease occurs it is often associated with another factor such a second infectious agent or a nutritional or management issue. This is particularly the case when deaths occur. Of the 85 clinical cases, 25 were known to have died and 68 per cent of these had one or more underlying factor such as coccidiosis, Johne's disease, pneumonia, endocarditis or acidosis.

Of the animals that died without obvious complicating factors, 75 per cent were less than three weeks of age, and thus were more susceptible to infectious disease.

Whole genome sequencing of *Salmonella* Mbandaka has been carried out at the Scottish *Salmonella Shigella* and *Clostridium difficile* Reference Laboratory and collaborative work linking the epidemiological data acquired from disease surveillance and the sequencing data is ongoing. It is of note that *Salmonella* Mbandaka has been shown to be zoonotic. However, human *Salmonella* Mbandaka cases in Scotland are rare, and have been linked to international travel rather than animals or animal products.