SRUC Veterinary Services Monthly Report for March 2023

OVERVIEW

- **Hypomagnesaemia in a four-month-old suckled calf**
- **Osteogenesis imperfecta in Valais blacknose lambs**
- **Listerial meningoencephalitis in pre-weaned Suffolk lambs**

GENERAL INTRODUCTION

The climate in March was unremarkable for the time of year with sunshine and rainfall figures equating to 97 and 104 per cent of their respective 1991 to 2020 averages. The mean temperature was -0.8 degrees below the average for the same period.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in June 2022. Given similar climatic and production conditions, they could also be important this year.

- **Lungworm infection in beef youngstock**
  Dictyocaulus viviparus worms will overwinter in small numbers within carrier animals, with some larvae also surviving on pasture. Early infection of naïve cattle post turn-out (e.g. unvaccinated animals in their first grazing season) may not be sufficient to initiate an outbreak but will increase the level of challenge with a risk of clinical disease by June.

- **Nematodirosis in lambs**
  Outbreaks of nematodirosis on Scottish holdings peak in June with a higher number of diagnoses following a long, cold spring. A nematodirus forecast is available on the SCOPS (Sustainable Control of Parasites in Sheep) website (https://www.scops.org.uk/forecasts/nematodirus-forecast/). Fields grazed by six to twelve-week-old lambs every year are highest risk particularly if nematodirosis was confirmed in 2021 or 2022.

CATTLE

Nutritional and metabolic disorders

A four-month-old Limousin cross beef calf with a two month history of intermittent diarrhoea was found dead unexpectedly. It had appeared bright and active the previous day although it was noted to be scouring again. It was the only animal affected and was reported to be noticeably smaller than the other five calves in the group. Postmortem examination identified myocardial pallor raising suspicions of white muscle disease. However, the rib calcium:magnesium ratio of 117.9 (reference range 30-70) was consistent with a diagnosis of hypomagnesaemia as the cause of death. Liver trace element analysis did reveal a low selenium result of 0.32 mg/kg dry matter (DM) (reference range 0.9-1.75 mg/kg DM). Magnesium absorption efficiency in milk-fed calves falls from almost 90 per cent at two to three weeks-of-age to around 30 per cent by seven to eight weeks.[1] As a result, milk tetany occurs most commonly in two to four-month-old calves fed only milk. Chronic diarrhoea can further reduce magnesium absorption and may have been a predisposing factor in this case. Poor intake of creep feed could also have played a role. Histopathology was carried out to investigate the possibility of concurrent nutritional myopathy. Limited, localised evidence of muscle cell degeneration and necrosis was detected however it was not considered to have contributed to the death of the calf. Monitoring GSHPX levels in the remaining calves was advised.

Alimentary tract disorders

A 22-month-old Limousin-cross on a beef finishing unit was reported to have lost 150 kg in ten days after becoming anorexic and diarrhoeic. It failed to respond to treatment and was euthanased and submitted for postmortem examination. There were multiple findings including focal haemorrhages on the gingiva, coalescing ulcerative lesions on the laryngeal mucosa (Fig 1), fibrinous pleurisy and lung consolidation. Numerous raised oval foci were present on the abomasal mucosa, and the mucosae of the ileum, caecum and colon had a corrugated appearance (Fig 2). Johne's disease was confirmed on serology and Ziehl-Neelsen smear of ileum with a granulomatous enteritis featuring intracellular acid-fast bacteria confirmed on histopathology. The abomasal lesions were shown to be a result of fungal abomasitis. Histopathology also revealed a multifocal necrotising laryngitis with the presence of epithelial syncytia typical of IBR. Bovine herpes virus-1 was detected on PCR and *Pasteurella multocida* was cultured from the lung. There was no evidence of tracheitis and it was suggested that the IBR infection was in the early stages with Johne's disease the main reason for the rapid weight loss in this case.

Part-funded by the Scottish Government as part of its Public Good Veterinary Advice Services

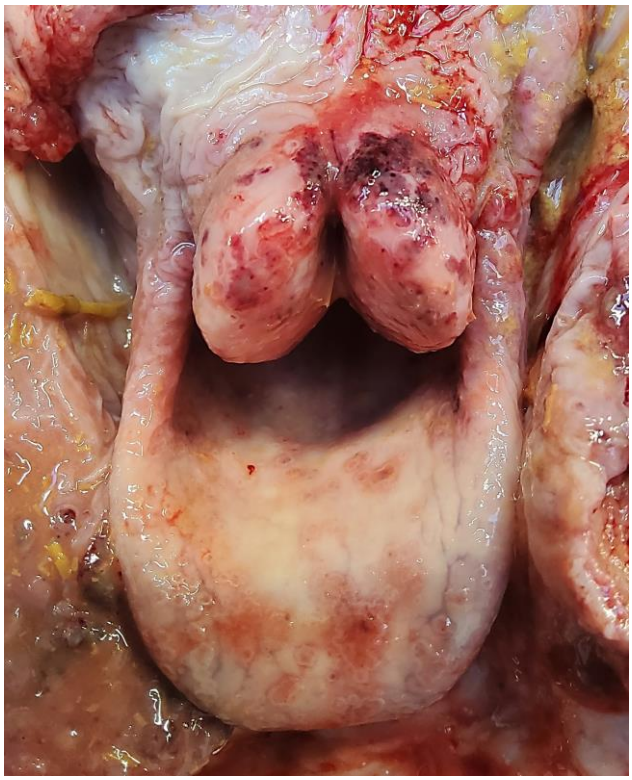

Figure 1 – Coalescing ulcerative lesions on the arytenoid cartilages due to infection with bovine herpes virus-1

Figure 2 – Granulomatous colitis in a finishing animal with Johnes disease

Circulatory system disorders

The carcase of a five-year-old Holstein cow was submitted for postmortem examination after it became the second animal from a group of 18 dry cows to die following a short period of weight loss. It had been lame, but this was resolving with treatment when it unexpectedly became recumbent and died rapidly two weeks before it was due to calve. Postmortem examination found a 6 to 7 cm length of tyre wire penetrating through the diaphragm and pericardium (Fig 3). A roughened area was visible on the adjacent left ventricular epicardium, but a significant pericarditis had not yet developed. No lesions were noted in the reticulum. It was postulated that contact between the wire and the epicardium could have triggered a fatal cardiac arrhythmia. Possible precipitating factors for penetration of the pericardium included changes in abdominal pressure during late gestation or difficulty rising and abnormal gait as a consequence of lameness.

Figure 3 - Tyre wire pentrating through the pericardium

SMALL RUMINANTS

Toxic conditions

Five ewes from a group of 36 were found to be ataxic and weak the day after straying into a neighbouring garden. Two became terminally recumbent with dyspnoea in one prior to death. Postmortem examination detected haemorrhages within the connective tissues of the neck and on the epicardium, endocardium, and pancreas. The lungs were markedly congested. *Pieris* sp leaves were found within the rumen confirming plant toxicity as the cause of death. *Pieris* sp contain grayanotoxins which bind to cell membrane sodium channels in the heart, skeletal muscles and nerves leading to a state of depolarisation. The toxic dose of plant material in cattle and goats is 0.2-0.6 per cent of body weight[2], and there was sufficient leaf material within the rumen to suggest that the ewe had

ingested a significant amount. The prognosis for the clinically affected sheep was considered to be poor but supportive treatment such as administration of activated charcoal and intravenous fluids was suggested. Monitoring for signs of aspiration pneumonia was also advised.

Reproductive tract conditions

A foetus and placenta were submitted to investigate the cause of four abortions in a group of 50 EAE vaccinated ewes that had been purchased in January. Circular lesions with a slightly depressed centre were noted on the liver surface (Fig 4) and there was evidence of a placentitis. Curved rods typical of *Campylobacter* sp were observed on a Gram-stained smear of foetal stomach contents (FSC). C*ampylobacter jejuni* was isolated from the FSC confirming the diagnosis. The client was reminded of the zoonotic potential of this organism.

Figure 4 - Circular areas of hepatic necrosis in a case of ovine abortion due to Campylobacter jejuni

Musculo-Skeletal conditions

A flock of 20 Valais blacknose ewes that had been established three years earlier reported at least one neonatal lamb each spring with a fractured leg. Two lambs were euthanased and submitted for investigation – a ewe lamb that was less than one week of age and had fractured both hind legs when running in the pen; and a tup lamb that was found to have fore and hind limb fractures following a gentle assisted lambing. The carcases weighed 5 and 4.5 kg and were in average body condition but the long bone cortices were very thin. Lamb 1 was found to have bilateral distal metacarpal fractures plus fractures of the left metatarsal and right femur. Haemorrhage at the fracture sites confirmed that these had occurred pre-mortem. Several ribs were also fractured but it was less clear when this had occurred. The second lamb had fractures of the right radius/ulna and left tibia/fibula. The right rib cage folded inwards as a result of double fractures of all the ribs (Fig 5) with ribs 2 to 11 on the left also fractured. Osteogenesis imperfecta was suspected and confirmed on histopathology. This condition has previously been described in Valais blacknose sheep in the UK[3] and is a result of deficiency or poor formation of type 1 collagen. Rib ash figures of 18.4 and 11.3 per cent were below the expected 20 per cent value for lambs of this age and consistent with the fragility of the bones. Osteogenesis imperfecta has been reported in a range of species where it can have either a dominant or recessive inheritance.[4]

Figure 5 - Right side of the chest showing folding of the thorax due to rib fractures in a case of osteogenesis imperfecta

A goat herd reported that 5 of 20 neonatal kids had limb fractures despite unassisted births. Two were euthanased and submitted for investigation. The right foreleg of both appeared twisted and reduced in length compared to the left (Fig 6). The elbow was fixed in one case with limited motility in the other. No fractures were detected and growth plates, bone strength and density appeared normal. More detailed dissection carried out following formalin fixation revealed radial agenesis and severe shortening of the ulna. The pathogenesis of hemimelia is not well understood and may be heritable in some cases.[5] Teratogenic injury to the neural crest is another possible explanation. In sheep the critical period for limb development is from the end of week 3 to the beginning of week 5.[6]

Figure 6 - Forearm deformity due to congenital radial hemimelia in a pygmy goat

Nervous system disorders

A seven-month-old Lleyn tup lamb presented with neurological signs, poor appetite and polydipsia. It failed to improve following treatment with antibiotics/vitamin B1 and was euthansed for investigation of the problem. Examination of the brain revealed a large mass cranial to the cerebellum with invasion of the midbrain, cerebellum and pons. Microscopically it was found to be composed of neoplastic round cells with a high number of mitotic figures and occasional areas of inflammation and mineralisation. No significant changes were found in the other tissues suggesting that this was a primary lymphoma of the central nervous system.

Three, four to six-week-old Suffolk lambs housed with their dams became recumbent with head tilts, tachypnoea and bruxism over a three-week period. There was no response to symptomatic treatment and two carcases were submitted for postmortem examination. No brain pathology was observed however histopathology identified a severe semi-suppurative meningoencephalitis consistent with a diagnosis of listeriosis in both cases. The ewes were fed silage and it was suspected that this was source of infection. Eruption of the temporary incisors in young lambs could provide a route of entry for *Listeria monocytogenes.*

References:

1 ARC (1980) The Nutrient Requirements of Ruminants. Commonwealth Agricultural Bureaux. Farnham Royal, UK. pp184-185

2 Colorada State University Guide to Poisonous Plants (2022) https://csuvth.colostate.edu/poisonous_plants/Plants/Details/113

3 Anon. Disease surveillance in England and Wales. *Vet Rec* 2020; 186(18):592-596

4 Gold R, Pool RR, Edwards EE. Osteogenesis and dentinogenesis imperfecta in a four-month-old English mastiff *Vet Rec Case Rep* 2019; 7:e000835.doi:10.1136/vetreccr-2019-000835

5 Oviawe EI, Yakubu AS, Kene ROC *et al.* Radiographic finding of redial hemimelia in a 6 day old West African dwarf goat with a fractured ulna. *Austin J of Radiol* 2017; 4(1):1062

6 Green WW, Winters IM Prenatal development of the sheep. University of Minnesota Agricultural Experimental Station Technical Bulletin 1945, 169