

OVERVIEW

- **Bacterial meningitis in a seven-month-old beef calf.**
- **Detection of Schmallenberg virus (SBV) in a lamb with arthrogryposis.**
- **Acute enteritis due to *Yersinia enterocolitica* in farmed red deer calves.**

GENERAL INTRODUCTION

The provisional mean temperature for January was 1.8 °C above the long-term average, and it was especially mild relative to average in the north-west. Scotland overall had 62 per cent of average rainfall and it was particularly dry in parts of the east where precipitation was a third of average. Sunshine varied by region and was well above average in the south-east but well below average in the north-west, with 108 per cent of average overall.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in April 2021. Given similar climatic and production conditions, they could also be important this year.

- **Nutritional osteodystrophies in housed growing/finishing cattle**
Animals that have been housed for weeks to months on low calcium diets (e.g. cereal/soya based rations) without appropriate mineral supplementation are at risk of osteodystrophies. Affected cattle present as lame on one or more limbs, may be recumbent and reluctant to rise and are susceptible to fractures. Multiple animals in a group are often affected.
- **Hypomagnesaemia in lambed ewes at grass**
Risk factors for hypomagnesaemia at this time of year include peak lactation, decreased dry matter intakes during bad weather, a reduction in supplementary feeding when sward length exceeds 4 cm and grazing fields that have been heavily fertilised. Outbreaks have also been reported in association with low sodium pasture.¹

CATTLE

Generalised and systemic conditions

A seven-month-old Limousin cross calf from a group of 150 was found dead. The calves had been weaned at housing one month earlier and were fed silage, barley and concentrates. One other animal was recumbent, salivating and suspected to be blind. A fibrin clot in the atlanto-occipital joint and an increased volume of cloudy cerebrospinal fluid particularly around the brain stem were the most significant postmortem examination findings. Salmonellosis and *Histophilus somni* were possible differential diagnoses for bacterial meningitis but neither were detected. *Escherichia coli* was isolated from the lung, spleen and kidney however brain cultures were overgrown by contaminant species. Histopathology revealed a subacute purulent meningoencephalitis characterised by variously sized scattered purulent foci associated with haemorrhage, necrosis and fibrinous vasculopathy. This was consistent with bacterial meningitis and *E coli* was considered to be the most likely cause. This is an uncommon diagnosis in a calf of this age, but this presentation has occurred on several farms in south-west Scotland in the last few years.

Renal diseases

An eight-year-old spring calving suckler cow became increasingly anorexic and lost weight over a three-week period. Dark red urine was noted latterly, and it became recumbent and died 48 hours later. The carcass was thin and both kidneys were pale with a strong uraemic smell. The capsules were adhered to the renal surface and there were white streaks within the cortex. Some lobules were cystic and contained thick purulent material mixed with blood. This was also present in the renal pelvis and ureters, but the bladder was empty. An aqueous humour urea result of 17.6 mmol/l (serum reference range 4 to 8 mmol/l) confirmed renal insufficiency. Bilateral pyelonephritis was recorded as the final diagnosis, and it was suggested that a terminal bacteraemia may have been the ultimate cause of death. *Corynebacterium renale* was not isolated and there were no significant findings on bacteriology. A review of the water supply was advised as pyelonephritis in housed cattle can be associated with inadequate access to fresh water. For example, unpalatable water or a large number of cows and one small trough that takes a long time to refill. Ascending infection following parturition can be one explanation for sporadic cases but there was no history of a difficult calving or a dead calf in this case.

SMALL RUMINANTS

Generalised and systemic conditions

Twenty ewes from a group of 38 became dull and aborted their lambs over the course of one week. The flock of Texel and Suffolk ewes and tups had recently been relocated from the borders to the Highlands and was due to start lambing in four weeks. They were noted to have a heavy tick burden. Abortion investigation was limited as only one placenta was submitted for examination and no diagnosis was reached. *Anaplasma phagocytophilum* DNA was detected by PCR in EDTA blood samples collected from three animals and, in conjunction with the history, tick borne fever (TBF) was considered to be the most likely cause of the abortion storm. Exposure of naïve pregnant animals to *A. phagocytophilum* can cause significant losses that could be limited by application of an ectoparasiticide and forward planning to ensure acclimatisation to TBF prior to tupping. Four tups from a group of 15 also died and a three-year-old and yearling Texel were examined postmortem. Tick burdens were noted and neuropathology detected a severe polioencephalitis particularly orientated on the caudal brainstem and cerebellar cortex typical of neurotropic viral infection and indicative of louping ill. Both animals also had an unusual non-suppurative splenitis. The histopathology findings of severe TBF in sheep have not been well documented but this was considered the most likely cause. Subsequent PCR testing confirmed the presence of *A. phagocytophilum* DNA in the spleen and louping ill virus RNA in the brain of both tups.

Reproductive tract conditions

A lowland flock due to start lambing in three weeks reported six abortions and submitted six fetuses and placentas from four ewes for investigation of the problem. All ewes had received *Toxoplasma gondii* and *Chlamydia abortus* vaccines. Postmortem examination showed variable evidence of dystocia and foetal distress including swelling of the head, subcutaneous oedema and liver rupture plus meconium staining and ingestion. *Salmonella enterica* serovar Montevideo was isolated from the foetal stomach contents in all cases illustrating that the possibility of infectious disease should not be dismissed based on postmortem findings alone. When salmonella abortions occur in indoor flocks the environmental contamination can be significant and stringent lambing shed hygiene is paramount for control and to prevent zoonotic infection. S Montevideo was the fourth most commonly isolated serovar isolated from sheep in 2020 and does not typically cause ill-health in the ewe. It is considered endemic in sheep in Great Britain and is also a regular contaminant of animal feed.²

A north country Cheviot gimmer from a flock of 16 ewes suffered a vaginal prolapse and aborted triplet lambs one

week later. The group were due to start lambing in two weeks. One of the lambs had a slightly domed cranium and arthrogryposis of all four limbs. Neuropathological examination confirmed cerebellar hypoplasia, dilation of the lateral ventricles and porencephaly of the cerebral cortex consistent with in utero teratogenic viral infection. Foetal fluids tested negative for SBV antibodies however SBV RNA was detected in the brain. The ewe had been purchased in 2021 but had been in north-east Scotland from conception until parturition. This confirms viral transmission by SBV infected midges in this location during autumn. A farm visit was made by SRUC Veterinary Services 17 days after the malformed lamb was submitted and blood samples were collected from 10 ewes for SBV serology. Antibody against SBV was detected in three samples and one gave an inconclusive result. The positive results were from the dam of the malformed lamb submitted for examination, the dam of twins where one was alive and one was dead with fixed limbs and a barren ewe. The inconclusive result was from a ewe that produced one live and one dead lamb without obvious limb abnormality. Of the ewes that tested negative, one had aborted dead malformed lambs, two were barren and three had produced normal, live singles or twins.

Two Dutch spotted ewes from an English flock aborted over the course of one week and foetal stomach contents, foetal fluids and spleen were submitted. BVD virus was detected on PCR testing of spleen and further typing at the Moredun Research Institute confirmed it to be BVDV type 1a. Sequencing suggested that it was likely to have originated from cattle, rather than from circulation in sheep, as it was highly homologous to BVDV isolates from cattle. No breeding cattle were present on the farm and the sheep had no direct contact with cattle. The most likely source of virus was considered to be batches of store cattle that were purchased and housed until finished. Transmission via fomites was suggested as the route of cross species infection in this case.

Nervous system disorders

A four-year-old mule ewe was found recumbent three months after purchase. Its back legs were extended behind, and the withdrawal reflex was absent. It was euthanased for postmortem examination which detected an abscess in the mid thoracic vertebral column (Fig 1). Twenty-five per cent of the right lung was consolidated with areas of abscessation and adhesions to the pericardium. The spinal abscess was not cultured but *Trueperella pyogenes* was isolated from a lung abscess and it was suggested that both lesions had arisen following an episode of systemic bacteraemia.



Figure 1 – Spinal abscess in a mule ewe

PIGS

Alimentary tract disorders

Three, four-month-old fattening pigs were submitted to investigate ongoing deaths and poor growth rates in two batches of pigs totalling 800 animals. Both groups were housed on straw in a converted cattle shed and approximately half had received a porcine circovirus vaccine. Previous submissions had identified intestinal torsions and the same diagnosis was reached in one pig. The second pig was thin and diarrhoeic with lesions of necrotic enteritis affecting the jejunum, ileum and caecum. *Lawsonia intracellularis* was detected by PCR testing and histopathology confirmed well established proliferative enteropathy. The third pig was in good body condition but the kidneys had a mottled appearance with occasional areas of haemorrhage. Histopathology revealed chronic active exudative glomerulonephropathy with widespread tubular hyaline cast formation and vasculitis typical of porcine dermatitis and nephropathy syndrome (PDNS). Although lymph node was not available for histological examination, histiocytic enteritis orientated on the gut associated lymphoid tissue involving dense aggregates of epithelioid and occasional multinucleated macrophages occupying the germinal centres was typical of recent porcine circovirus 2 (PCV2) associated disease (PCVAD). Detection of PCV2 DNA and antigen and histological evidence of chronic PCVAD lesions are common in cases of PDNS, although the factors resulting in this relatively rare presentation of PCV2 infection remain to be elucidated.

MISCELLANEOUS

Deer

Seven red deer from a group of 240 hinds and their calves died within 24 hours and two, five-month-old calves were submitted to investigate the cause. The group was stocked on kale with access to silage in ring feeders. Both carcasses were faecal stained and the fresher of the two had evidence of inflammation and slight thickening of the jejunal mucosa plus watery large intestinal contents. Histopathology findings of dense colonies of small stout bacilli adherent to the intestinal mucosa with an associated neutrophilic response were consistent with severe acute yersiniosis. Examination of the mesenteric lymph node from the second deer revealed similar bacilli present within foci of purulent lymphadenitis consistent with spread from yersinia enterocolitis. Initial bacteriology had been unrewarding but as a result of these findings further cultures were initiated and *Yersinia enterocolitica* was successfully isolated from the caecal content of both animals. *Yersinia* spp are found in soil and in the intestinal tracts of carrier animals which include both livestock and wildlife. Yersiniosis typically occurs in winter and involves groups of four to eight-month-old deer with up to 20 per cent morbidity. Outbreaks are usually precipitated by stressors such as weaning, transport, bad weather or under feeding. In this case the deer had been handled for anthelmintic treatment eight days before losses began.

References:

- 1 Sargison ND, Macrae AI, Scott PR. Hypomagesaemic tetany in lactating Cheviot gimmers associated with pasture sodium deficiency. *Vet Rec* 2005 155;21:674-76
- 2 APHA, Salmonella in Livestock Production in GB 2020. 2021; Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1018523/salm-livestock-prod-gb20.pdf (accessed 14/2/22)

Bacillus licheniformis remains the most commonly diagnosed infectious cause of bovine abortion in Scotland

Data from aborted and stillborn calves from Scottish holdings submitted to SRUC VS were reviewed for the period 2017-2021. 1549 aborted or stillborn calves were submitted to our postmortem sites and a diagnostic rate of 51.1% was achieved. 751 were known to be from suckler herds, 369 from dairy herds and in 429 cases the farm type was unknown.

108 diagnoses (7%) related to stillbirths due to dystocia. There has been a change made to the way these diagnoses are recorded. In future it will be possible to better understand the timing and causes of these losses i.e., due to traumatocia, bradytocia, malpresentation, anoxia or stillbirth during or after the second stage of labour.

112 diagnoses (7.2%) were due to hereditary or developmental abnormalities. Many of these cases were submitted due to suspicion of malformations being associated with Schmallenberg virus. Only 12 diagnoses of foetopathy due to SBV were made, all of which occurred in 2017.

An infectious cause of abortion was diagnosed in 572 submissions (36.9%). Figure 1 shows the relative proportions of the infectious causes of bovine abortion diagnosed. *Bacillus licheniformis* was the most commonly diagnosed infectious cause of abortion accounting for 17.7% of the infectious diagnoses. This was followed by *Trueperella pyogenes* (17.3%) and then *Salmonella* Dublin (10.0%).

When submissions from suckler herds were reviewed separately, 39.1% of the infectious causes of abortion were due to agents considered consistent with spoiled feed/silage (*Bacillus licheniformis*, *Listeria* spp and fungi). This compared to 19.4% in the dairy herds.

In contrast abortions due to the infectious diseases that can be spread by cattle were higher in dairy herds compared to beef herds. 34.7% of the infectious diagnoses in dairy herds were due to *Salmonella* spp or *Neospora caninum*. There were no diagnoses of abortion due to IBR, BVD or *Leptospira* Hardjo in the dairy submissions. This compared to these same five agents being responsible for 12.7% of the infectious diagnoses in suckler herds.

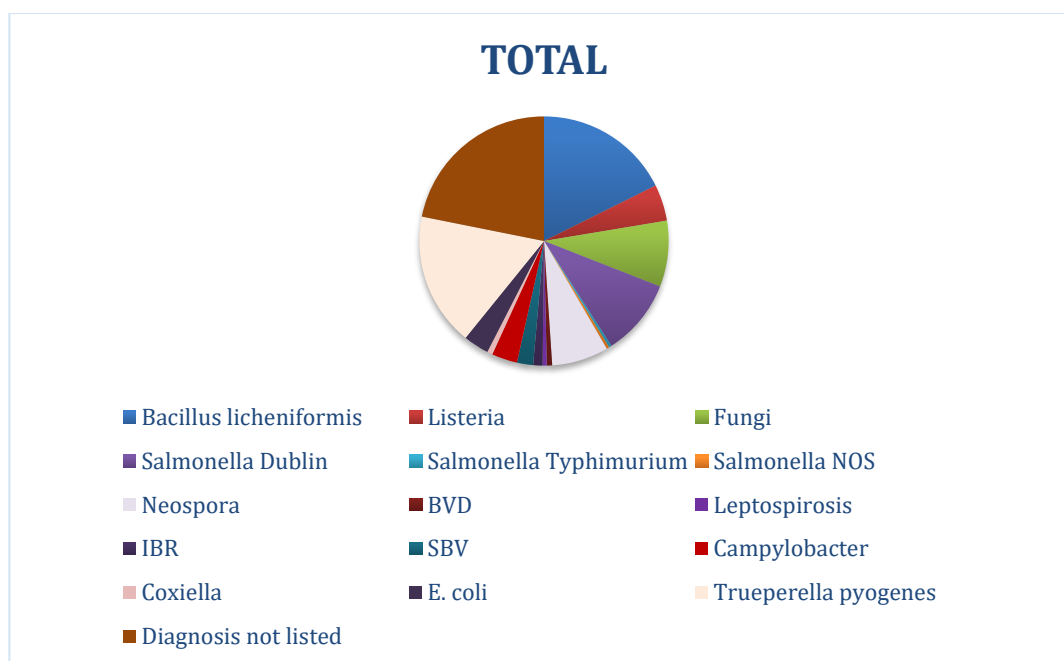


Figure 1