

OVERVIEW

- **Hypomagnesaemia in cattle and sheep**
- **Congenital intestinal atresia in beef calves**
- **Abortion associated with *Anaplasma phagocytophilum* in sheep**
- **Malignant catarrhal fever in farmed red deer**

GENERAL INTRODUCTION

The mean temperature for the month was 1.5 °C below the long-term average, with overnight temperatures being lowest relative to average. Scotland overall had 39 per cent of average rainfall, though parts of northern Scotland received relatively close to their average rainfall totals. Sunshine totals were 160 per cent of average, making it the sunniest April since 1919.

DISEASE ALERTS

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

- **Lead poisoning in cattle**
Diagnoses of lead poisoning peak during the grazing season and youngstock aged under two years account for the majority of cases. Discarded lead batteries are a common source of exposure and farmers should be encouraged to inspect fields before they are grazed.
- **Pulpy kidney in lambs**
Any passive immunity acquired by lambs from colostrum as a result of pre-lambing clostridial vaccination of ewes will have waned by July. Lambs are not fully protected until two weeks after their second vaccination. An “immunity gap” leading to losses can occur unless lamb vaccination is initiated when they are aged 6 weeks or less.

CATTLE

Nutritional and metabolic disorders

Hypomagnesaemia was diagnosed in a 170-cow spring calving herd that had been outwintered on grass, straw and Himalayan salt licks. The latter consists largely of sodium chloride, but no magnesium supplementation was provided. One cow was found dead, a second was recumbent and others appeared lethargic. Four animals were blood sampled and magnesium results between 0.5 and 0.59 mmol/l (reference range > 0.8 mmol/l) confirmed the diagnosis.

Musculoskeletal disorders

Ten per cent of a group of 40 to 50 ten-month-old Holstein cross finishing cattle became lame involving multiple limbs. The animals had been purchased at three to four months of age and were initially fed a proprietary starter pellet before transitioning onto a home mix of 80 per cent barley, 5 per cent soya and 15 per cent sugar beet pulp. Salt licks were available but there was no additional mineral supplementation. Hay and straw were provided initially and replaced with silage from eight months of age. One animal with bilateral swelling of its stifle and elbow joints was euthanased for investigation of the problem. Postmortem examination detected excess yellow synovial fluid and extensive defects of the articular cartilage affecting the distal humeri and femurs (Fig 1). Histopathology confirmed severe osteochondrosis lesions of the femur and humerus, and microscopic lesions in the rib. SRUC VS commented that osteochondritis dissecans (OCD) lesions in the rib are unusual and were likely to reflect the severity of the condition. No significant abnormality was detected on biochemical analysis of bone. The primary lesion in osteochondrosis is considered to be focal failure of blood supply to the growing cartilage. The development of osteochondrosis in cattle is likely to be similar to pigs and horses in which multiple factors are involved including conformation and trauma associated with exercise in predisposed very rapidly growing animals. Diets based on barley and soya are low in calcium and advice on mineral supplementation was provided.



Figure 1 – Osteochondrosis lesion on the articular surface of the distal humerus of a ten-month-old Holstein cross stirk

Generalised and systemic conditions

An on-farm postmortem examination was carried out following euthanasia of a three-week-old Limousin calf that had failed to respond to treatment for lameness. The left fore and right hind fetlocks were reported to be swollen and there was a clear demarcation between normal tissue and the distal limbs which had a necrotic appearance and were cold and insensitive to touch. Histopathology revealed nephritis consistent with a sequel to bacteraemic localisation and chronic fibrosing pneumonia and abscessation consistent with descending bacterial infection with the characteristics of the collagen indicating a duration of at least three weeks. The limb lesions were confirmed to be a result of distal limb ischaemia, most likely associated with disseminated intravascular coagulation, for which the commonest underlying cause is bacterial septicaemia. The overall findings suggested that the lung lesions had occurred in utero, most likely secondary to bacterial placentitis, however it was unclear if the limb lesions related to the *in utero* infection or were associated with postnatal septicaemia.

Tissues from a two-month-old Limousin cross calf were submitted for investigation of diarrhoea and pneumonia. A bacterial pneumonia was identified, and *Mannheimia haemolytica* was isolated. Histopathology of intestinal tissue detected widespread mucosal damage focused on the crypts and glands with collapse into the Peyer's patches of the ileum. This was considered to be consistent with transient BVDV infection although no BVD virus was detected in this case, but the herd had recently shown evidence of BVDV infection.

Alimentary tract disorders

Three cases of congenital intestinal atresia were diagnosed in beef suckler calves during April. Two had

atresia jejuni (Fig 2) which caused abdominal distension due to accumulation of fluid and gas within the stomachs and proximal small intestines. One calf was delivered by caesarean as a result. The third calf died at two days-of-age and in this case the small intestine and particularly the caecum were distended by fluid and gas, and there was no connection to the colon which was empty of content. Possible explanations for congenital intestinal atresia include failure of blood supply leading to localised ischaemia and abnormal intestinal development; or more plausibly, failure of the gut lumen to recanalise in early development, possibly due to aberrant genetic regulation of molecular pathways.

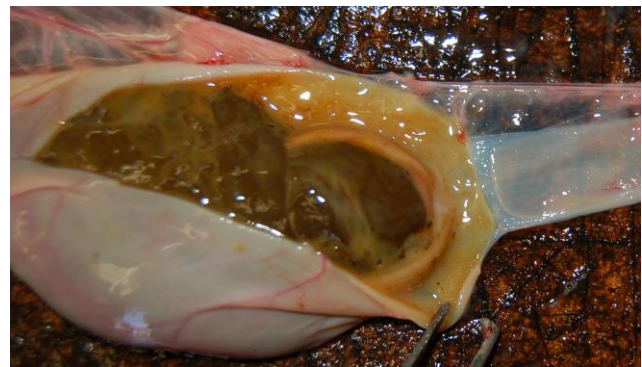


Figure 2 – Jejunal atresia in a simmental calf

Skin diseases

A 1.2 kg cutaneous mass was removed from the neck of a one-week-old suckled calf and histopathology confirmed bovine dermal melanoma (Fig 3). Congenital melanomas similar to this case have been recorded.¹ It has been reported that melanocytic tumours account for 5 to 6 per cent of bovine neoplasms. Most bovine dermal melanocytic neoplasms with benign cytological characteristics do not metastasise, but a few have been reported to do so.



Figure 3 – Congenital bovine dermal melanocytoma in a suckled calf (Douglas Swaffield, Conanvet)

SMALL RUMINANTS

Nutritional and metabolic disorders

Hypomagnesaemia was confirmed as the cause of death in lambed ewes from three flocks during April. Three or more sudden deaths involving ewes at grass rearing one- to two-week-old twin lambs were reported in each case. Vitreous humour magnesium results ranged from 0.31 mmol/l to 0.56 mmol/l (reference range > 0.65 mmol/l). Withdrawal of concentrate feed two days earlier was considered to have predisposed to the losses in one flock.

Generalised and systemic conditions

Multiple sudden deaths of lambs aged less than one week of age were reported from three flocks. Six carcasses were submitted and postmortem findings including haemorrhagic small intestinal content, mucosal reddening and haemorrhage and mural emphysema within the jejunal wall (Fig 4) suggested the possibility of enteritis associated with *Clostridium perfringens* type B. *Clostridium perfringens* beta toxin was detected in the small intestinal contents in all cases consistent with a diagnosis of lamb dysentery. All of the affected flocks were lambing outdoors, and ewes had received a multivalent clostridial vaccine pre lambing. No evidence of inadequate transfer of maternal colostral antibodies was found with all ZST results above the reference range of > 14 units. It was advised to check how the vaccine was stored, the timing of the primary course and the timing of boosters relative to lambing date.



Figure 4 – Mural emphysema within the jejunum in a case of lamb dysentery

Reproductive tract conditions

A newly established flock of 160 mixed breed gimmers purchased from multiple sources submitted two foetuses for postmortem examination after seven ewes aborted.

Lambing was due to start in ten days time and ticks had been noted on the ewes. The group had been grazed on hill ground since tupping and had been moved closer to home one week previously. Diffuse subcutaneous oedema together with pleural and peritoneal effusions were found in both foetuses. Neuropathology detected multifocal necrosis of cerebral white matter and *Anaplasma phagocytophilum* DNA was detected in foetal spleen. Transplacental transmission of *A. phagocytophilum* has been recorded in sheep, and abortion linked to *A. phagocytophilum* has been recorded in association with exposure of naïve ewes in late pregnancy to high tick burdens.^{2,3} Periventricular leucomalacia has been described in previous cases of tick borne fever abortion.⁴

Nervous system disorders

A flock reported the birth of ten shaky highlander lambs and submitted two for investigation of the issue which had recurred annually since 2018. Congenital brain malformations were confirmed including microencephaly, cerebral gyral abnormalities, hydrocephalus and brainstem dysplasia. A genetically determined defect was considered to be the most likely explanation. Other breeds on the holding were not affected, and a single tup was thought to have sired all the affected lambs. The tup had died and was not available for further investigation.

PIGS

Generalised systemic diseases

Clinical signs of enteritis, ataxia and sudden death were seen in recently weaned piglets in a high health unit. The carcasses of two, five-week-old pigs were examined and profuse watery scour with admixed yellow fibrinous strands was the main finding. *Escherichia coli* was isolated from the intestines and detection of virulence factors F18, heat stable toxin type 1 and heat stable toxin type 2 confirmed a diagnosis of enteric colibacillosis. Histopathology revealed a large number of attaching coliforms coating the villi and colonising the crypts.

MISCELLANEOUS

Deer

Three farmed red deer aged between 9 and 12 months, died unexpectedly or following a short illness, on one holding over 3 weeks. The group of 60 had been housed on hay and concentrate feed throughout the winter. Two carcasses were submitted for postmortem examinations. The main findings were haemorrhagic content and dark

red mucosa in large intestines of both deer together with haemorrhages in the caecal mucosa in one animal. Postmortem change hampered histopathological examination of the intestines, however multisystemic angiocentric lymphocytic inflammation was detected in several organs including brain, kidney and lungs. OvHV2 DNA was detected in both animals which, together with the histological findings, was consistent with a diagnosis of malignant catarrhal fever (MCF). Sudden unexpected death or haemorrhagic enterocolitis are the most common presenting signs of MCF in deer, similar to the per acute or alimentary presentation in cattle in which vasculitis is an uncommon feature. (M214751)

References:

- 1 Miller MA, Weaver AD, Stogsdill PL. Cutaneous melanocytomas in ten young cattle. *Vet Path* 1995; 32: 479
- 2 Stuen S, Okstad W, Sagen AM. Intrauterine transmission of *Anaplasma phagocytophilum* in persistently infected lambs. *Vet Sci* 2018;5:25-32
- 3 Jones, G.L.; Davies, I.H. An ovine abortion storm caused by infection with *Cytoecetes phagocytophila*. *Vet. Rec.*1995, 136, 127
- 4 Chianini F, Buxton D, Adams C. Neuropathological changes in ovine foetuses caused by tick borne fever. *Vet Rec* 2004;155:805-6

SRUC VS Ovine Abortion Diagnoses 2021

This spring SRUC VS received 326 submissions of ovine foetal material from 289 Scottish flocks to investigate the cause of abortion. A further 202 submissions were received from 190 farms out with Scotland. A diagnosis was reached in 48% of the submissions from Scottish flocks and in 41% of the non-Scottish submissions in which the submission of postal samples was overrepresented. For 145 of 272 submissions (53%) examined in SRUC VS PM Centres a diagnosis was reached, whereas the diagnostic rate for specimens taken on farm and sent to the Central Lab for specific screening was 37%. Within these data there are submissions and farms with more than one diagnosed cause of abortion. The relative frequency of diagnoses is detailed in Table 1. As in previous years enzootic abortion of ewes (EAE) caused by *Chlamydia abortus* and *Toxoplasma gondii* were the most frequently made diagnoses in both sets of submissions, making up over 50% in the cases where a diagnosis was reached. Abortion due to *Listeria* spp was diagnosed marginally more frequently (3% of this year's submissions) than in previous years. This may reflect the cold spring and slow grass growth increasing soil ingestion and prolonging feeding of supplementary forage. The diagnosis not listed category consists predominantly of bacterial species isolated in pure growth from the foetal stomach contents and considered to be sporadic causes of abortion e.g. *Mannheimia haemolytica*, *Staphylococcus aureus*, *Streptococcus dysgalactiae*. There was no evidence of Schmallenberg virus contributing to ovine foetal loss in these submissions.

Screening for border disease virus (BDV) infection is not part of the routine abortion investigation and testing is only carried out when indicated by the case history or a failure to reach an initial diagnosis on the standard examinations. Losses due to BDV in lambs up to one week were diagnosed in 12 flocks, only one of which was Scottish. A detailed case history was provided for 11 flocks and Figure 1 summarises this information, illustrating the range of issues that BDV can cause with multiple problems reported in some flocks. The presence of bought in sheep was specifically mentioned in three cases. PCR testing confirmed that all the outbreaks were due to BDV with no evidence of infection with bovine viral diarrhoea virus detected.

Table 1: From November 2020 to May 2021 SRUC VS received 528 submissions with foetal material and reached 256 diagnoses. Submissions consisted of foetal material examined at SRUC VS PM Centres as well as samples taken by practitioners and submitted for laboratory screening. The causes of abortion are listed for submissions where a diagnosis was reached; note, up to two diagnoses can be made per submission.

	Foetal material submitted to VS Postmortem Centres		Foetal material collected on farm		Overall	
	Count	Percentage	Count	Percentage	Count	Percentage
<i>Chlamydia abortus</i>	50	32%	37	37%	87	34%
<i>Toxoplasma gondii</i>	42	27%	31	31%	73	29%
Diagnosis not listed	23	15%	7	7%	30	12%
<i>Listeria</i> spp	11	7%	6	6%	17	7%
<i>Campylobacter</i>	11	7%	4	4%	15	6%
<i>Salmonella</i> Montevideo	4	3%	7	7%	11	4%
Dystokia	8	5%	0	0%	8	3%
Other <i>Salmonella</i> spp	2	1.3%	5	5%	7	3%
<i>Trueperella pyogenes</i>	3	1.9%	2	2%	5	2%
Border disease		0.0%	1	1.0%	1	0.4%
Fungi	1	0.6%	0	0.0%	1	0.4%
<i>Yersinia</i> spp	1	0.6%	0	0%	1	1%
Total	156		100		256	

Figure 1: Reported presenting signs in cases of border disease virus infection

