

OVERVIEW

- **Schmallenberg virus as a cause of congenital deformities in cattle and sheep**
- **An outbreak of septic arthritis due to *Erysipelas rhusiopathie* in housed lambs**
- **Losses due to lungworm infection in red deer calves.**

GENERAL INTRODUCTION

The mean temperature in February was 0.7°C above the thirty-year average at 3.8°C. It was a dry month in comparison to the 1991 to 2020 period with 73 per cent of average rainfall and particularly dry in Sutherland. Skye was the only area recording a wetter than average month. Sunny conditions in the Highlands contributed to sunshine hours 4 per cent above average with a dull February in the rest of Scotland.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in May 2024. Given similar climatic and production conditions, they could also be important this year.

Bovine infectious keratoconjunctivitis (IBK)

Both *Moraxella bovis* and *Moraxella bovoculi* can be isolated from healthy eyes. *Moraxella bovis* has been proven to cause IBK following experimental infection but the same is not true for *M bovoculi*. The former secretes damaging toxins and enzymes and possesses pili that allow it to attach to the cornea. A small number of equivalent virulence factors have been confirmed in *M bovoculi* but it has significantly different pili and strains vary in their pathogenicity. Whole genome sequencing has shown that *M bovis* and *bovoculi* can undergo genetic recombination with each other.¹

DISEASE ALERTS

Nephrosis in lambs

Nephrosis is sometimes referred to as “drunken lamb syndrome” as lambs can appear ataxic prior to death. Usually only small numbers of lambs are affected with an age-range of between one and twelve weeks. On postmortem examination the kidneys are typically pale and swollen, the carcass may smell uraemic, and aqueous humour urea can be very high – often over 100 mmol/l. One hypothesis suggests that the renal tubules are damaged by unknown toxins absorbed through compromised intestinal mucosa following an episode of enteritis. Pathogens involved could include cryptosporidia in neonatal lambs or coccidiosis/nematodirus in older lambs. The initiating agent is not always evident by the time of death. D lactic acidosis has been shown to be involved in the pathophysiology of the condition in younger lambs.²

CATTLE

Generalised and systemic conditions

A six-month-old Limousin cross calf weighing 250kg was noted to be unsteady on its feet and was treated for possible ruminal acidosis. Antibiotics and corticosteroids were also administered but it subsequently died. Four other calves, from the herd of 390 cows and calves, had died recently with a diagnosis of pneumonia, pleuritis, and pericarditis due to *Histophilus somni* in the previous case submitted for investigation. Postmortem examination of the current calf revealed bronchopneumonia from which *Pasteurella multocida* was cultured. There was also evidence of endocarditis affecting the left ventricular wall and extending into the papillary muscle. Renal infarcts and suspected embolic pneumonia were also identified.



Histopathology confirmed bacterial colonies in association with the endocarditis and within emboli in the kidney. Lesions within the papillary muscle can be a feature of *H somni* infection but the bacteria observed were not characteristic. However, examination of the lung revealed biphasic pathology with a chronic bronchopneumonia and evidence of acute septicaemia. It was suggested that septic embolism from the earlier episode of pneumonia could have resulted in both the heart and kidney lesions.

More straightforward cases of *H somni* infection were diagnosed in two separate herds during February. A seven-month-old Aberdeen Angus cross suckled calf presented acutely with pyrexia, unilateral ear droop and lameness. It died despite treatment and was submitted for investigation. It was the third death since weaning three weeks earlier, with ten of 120 animals treated for suspected pneumonia during this time. Postmortem examination detected two lesions in the larynx, a shallow ulcer over the right arytenoid process and a deep abscess adjacent to the cartilage on the left. There was interlobular oedema in the lungs with some evidence of fibrinous pleuritis. There were areas of necrosis and cavitation within the left papillary muscle with similar lesions in the myocardium adjacent to the aortic valve which had thickened cusps. A 5mm diameter nodule was noted on the *chordae tendinae* of the right atrioventricular valve. PCR testing detected *Histophilus somni* DNA in the heart and histopathology confirmed chronic myocarditis.

A pluck was submitted from a pneumonia outbreak on a second holding. The group of 70 had been purchased one month before from two separate holdings and around 20 per cent had been treated for pneumonia since arriving. A cavitating abscess was found with the papillary muscle which tested PCR positive for *H somni*.

Alimentary tract disorders

A dairy herd reported the loss of six calves in their first week of life over the course of six weeks. A number had presented with mild diarrhoea, and one had suspected meningitis. Affected calves were off colour in the morning, collapsed later in the day and dead within 24 hours. The carcass of a six-week-old Jersey cross calf was submitted. It was not typical of the other cases and had a history of intermittent diarrhoea since one week of age. It was euthanased after being tube fed for four days with no improvement. Despite the chronic history body condition was reasonable and some fat remained. A large amount of clotted milk was found in the rumen, there were numerous superficial ulcers on the abomasal mucosa and the intestines were slightly oedematous. Chronic rumen drinking was suspected, and histopathology confirmed a suppurative rumenitis associated with large numbers of bacteria and yeasts. It also identified a chronic typhlocolitis with frequent embedded coccidial oocysts. Coccidiosis plus dysbiosis secondary to the rumen lesions were both considered to be contributing to the clinical signs. A more typical case was examined at a later date following submission of a four-day-old Holstein cross heifer that had rapidly deteriorated and died within 24 hours. Faeces tested positive for *E coli* K99 confirming this as the primary issue.

Reproductive tract conditions

A 250-head dairy herd reported that three heifers had given birth to undersized, full-term calves with arthrogryposis. Umbilicus was received from the third case and tested PCR positive for Schmallenberg virus confirming the suspected aetiology. The risk period when *in utero* infection can result in foetal deformities extends from 62 to 180 days gestation in cattle.

SMALL RUMINANTS

Alimentary tract disorders

Around 500 Scottish blackface hogs were treated with closantel and given a trace element bolus plus a 10 in 1 clostridial vaccine. Deaths began one week later with a total of 12 animals in multiple groups dying over the next seven days. Some were found dead while others were suspected to have pneumonia. Four carcasses were submitted, and a bolus was found within the tissues of the upper neck in all cases. Cellulitis extended along the length of the neck in two with clotted blood proximally and a circular hole in the pharyngeal wall dorsal to the larynx. Infection had tracked through the thoracic inlet resulting in bilateral pyothorax in the third, while the fourth had a fibronecrotic pericarditis with involvement of the adjacent pleura and lung. Poor rumen fill with wet content and variable amounts of clotted blood was a common finding.

Respiratory tract diseases

A flock of 140 ewes was routinely dipped and five days later a two-year-old Herdwick gimmer in good body condition died after a short illness. Postmortem examination detected necrotic ulcers in the pharynx and linear ulcerations with tightly adherent greenish exudate along the length of the oesophagus. There were adhesions between the lung and thoracic wall, associated with a purulent, fibrinous exudate and many bullae within the lung parenchyma containing aggregations of yellow, dry, purulent/necrotic material (Fig 1). *Fusobacterium necrophorum* was isolated in mixed growth and is a common finding in areas of tissue necrosis. Autolysis hampered histopathology, however the necrotic foci were identified as damaged airways full of exudate and numerous bacteria. The oesophagus and pharynx showed hyperkeratosis and epithelial necrosis with invasion of bacteria consistent in appearance with *F necrophorum*. Ingestion and inhalation of a caustic substance, most likely dip,

was suspected as the underlying cause, with faecal contamination of dip the likely source of the bacteria isolated.

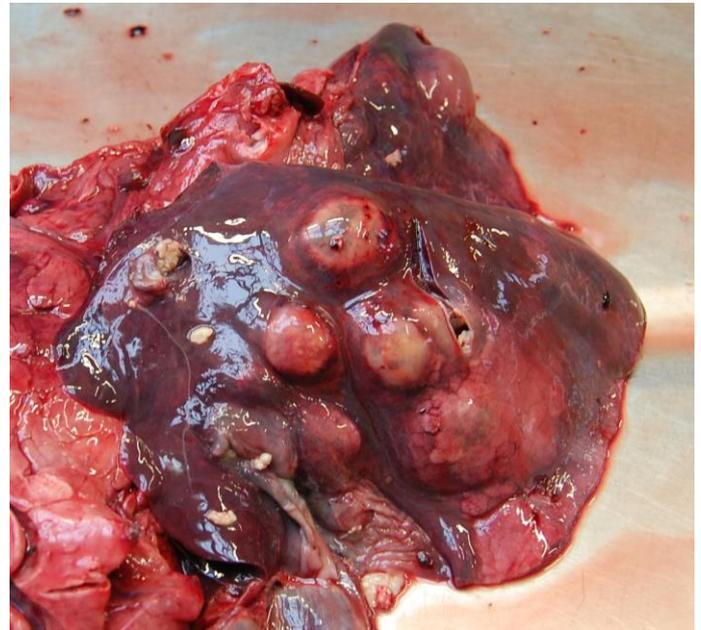


Figure 1 – Lungs from a gimmer with bullae containing aggregations of yellow, dry, purulent/necrotic material following dipping.

Reproductive tract conditions

A batch of 89 pure and crossbred Suffolk ewes in lamb to embryo transfer gave birth between 28/12/24 and 3/1/25. Ninety-three lambs died or were euthanased with only 41 surviving. A range of presentations was described including under-sized lambs and arthrogryposis (Fig 2). Other lambs appeared normal at birth but rapidly faded and died. Affected and unaffected lambs were reported in the same litter. Four of the submitted lambs (1,2,3 and 6) had inflated lungs indicating that they had lived for a short time. Lamb 1 had no evidence of congenital deformity but PCR testing of brainstem was positive for Schmallenberg virus (SBV). Lamb 2 had contracted metacarpophalangeal joints and cerebellar hypoplasia. Its brainstem was also PCR positive for SBV. Lamb 3 also had contracted metacarpophalangeal joints but its brainstem was PCR negative for SBV. Lamb 4 had arthrogryposis,

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scoliosis and brachygnathia inferior typical of SBV. It tested PCR positive on umbilicus and negative on brainstem. Lamb 5 was similar in appearance to lamb 3 but brainstem was SBV PCR positive. Lamb 6 had no evidence of deformity and its brainstem was PCR negative for SBV. The umbilicus of lamb 3 and 6 was not tested as they had been dipped in Iodine. The brain and spinal cord of lamb 4 were examined histologically and changes associated with SBV infection were found in the medulla, cerebellum, mid brain, thalamus and cerebral cortex. By chance 104 blood samples had recently been collected from the flock for routine health scheme testing. 39.4 per cent tested positive for antibodies to SBV, 15.4 per cent were inconclusive and 45.2 per cent were negative. The severe impact of SBV in this flock is due to the early, tight lambing period with all the ewes being in the second month of gestation when infection occurred at a time of high midge activity. Congenital deformities are the most recognisable signs of SBV infection but were not always present in this case. Lambs infected in utero have also been reported to present as “dummy lambs” or weak lambs with poor suck reflex and non-specific neurological signs which is consistent with this case.



Figure 2 – Lamb showing limb and spinal deformities due to *in utero* Schmallenberg virus infection.

A single set of deformed lambs were born after 75 of 600 ewes had lambed. The Cheviot dam had originally been purchased but had lambed normally in 2024 and had not been grazed away from home. The lambs were sired by a Suffolk tup that had been used previously. The first lamb showed arthrogryposis of its stifle, hock and metatarsal joints. The cerebellum had a slightly triangular shape but the cerebral hemispheres and spinal cord were normal on visual inspection. It had not sucked and had lived long enough to metabolise its brown fat. All four limbs of the second lamb showed arthrogryposis. It also had kyphosis and scoliosis of the vertebral column in addition to brachygnathia. The cerebral hemispheres and particularly the cerebellum were very small and the diameter of the spinal cord was reduced. SBV was suspected and confirmed on PCR testing of brainstem. Foetal fluids also tested SBV antibody positive in both cases suggesting that infection had occurred at the end of the second month of gestation at a time when the foetuses were becoming immunocompetent.

A deformed aborted lamb was submitted under suspicion of Schmallenberg disease. It was one of a set of triplets, the others being born alive. At the time of submission it was the only abnormal lamb born. The spine was inverted and the head and all four limbs extended cranially, whilst the caudal aspect of the trunk and abdomen was devoid of skin, leaving exposed everted thoracic and abdominal viscera (Fig 3). One of the hindlimbs had duplicated fused long bones and hoof distal to the stifle. The scrotum was bifurcated, the cerebellar vermis was displaced caudally through the foramen magnum, and there was some fusion of the cerebral hemispheres.



Figure 3 – Schistosomus reflexus lamb.

PCR testing for Schallenberg virus was negative. The findings were consistent with schistosomus reflexus which is more commonly observed in cattle. A recent paper reported that the condition in cattle is most likely caused by independent mutations in several genes important for normal embryo development³ which may explain the sporadic occurrence of the condition in cattle. It's unknown if the same applies in sheep.

Musculo-Skeletal conditions

Two seven-month-old Dorset lambs were submitted to investigate an outbreak of lameness in a group of 200 that had been housed since November. Around five animals were affected and a general loss of condition, lameness of one or more limbs and dog sitting reported. The two lambs submitted exhibited unilateral hind limb lameness with enlargement of stifle joints. Lesions were confined to one stifle joint in lamb one (Fig 4) while the second was more severely affected with septic arthritis in both elbows, carpi and stifles. Findings included copious thin, grey, cloudy synovial fluid, cartilage erosions and thickened joint capsules. *Erysipelothrix rhusiopathiae* was isolated from the elbow joint of lamb two confirming the cause of lameness.



Figure 4 – Stifle joints from a lamb with unilateral *Erysipelothrix rhusiopathiae* arthritis on the right with cartilage erosion, exudate and distention of the joint capsule.

BIRDS

A four-year-old male rhea from a wildlife centre developed sudden onset weakness while incubating eggs. Clinical investigation revealed marked anaemia (packed cell volume 24 per cent) with evidence of regeneration. Initial empiric therapy with intravenous fluids and antibiotics was followed 24 hours later by a blood transfusion from a sibling however the bird died. Postmortem examination identified extensive haemorrhage in the subcutaneous tissues of the upper right thigh, extending into the fascial planes between muscles. It was not clear from the history how the trauma had occurred, and it was advised to check the enclosure for any projections that could cause injury. It was also noted that whilst rhea are sociable birds, males can become more aggressive towards each other during the breeding season.

CAMELIDS

An 18-month-old alpaca became unwell and died the following day. It was the second loss from a group of four purchased in June 2024. Postmortem examination found serous atrophy of pericardial and bone marrow fat stores, marked muscle atrophy and thinning of the long bone

cortices which is a feature of emaciation in camelids. There was marked inflammation of the glandular portion of C3, with cream coloured exudate loosely adhered to the mucosa (Fig 5). 2,300 *Trichostrongyle* spp were recovered from C3 and histopathology confirmed inflammation and necrosis in addition to parasitism. Bacteria consistent in appearance with *Fusobacterium* spp were associated with the pathology but not identified on culture. A diagnosis of emaciation and parasitic gastroenteritis with secondary necrobacillosis of C3 was made. Necrobacillosis of C3 has been described in alpacas⁴ and it is likely that the *Fusobacterium* spp infection was opportunistic in a debilitated animal. The alpacas had access to grass plus ad lib hay and were supplemented with a high fibre, low starch feed. Given the poor body condition, a review of husbandry and management was advised.

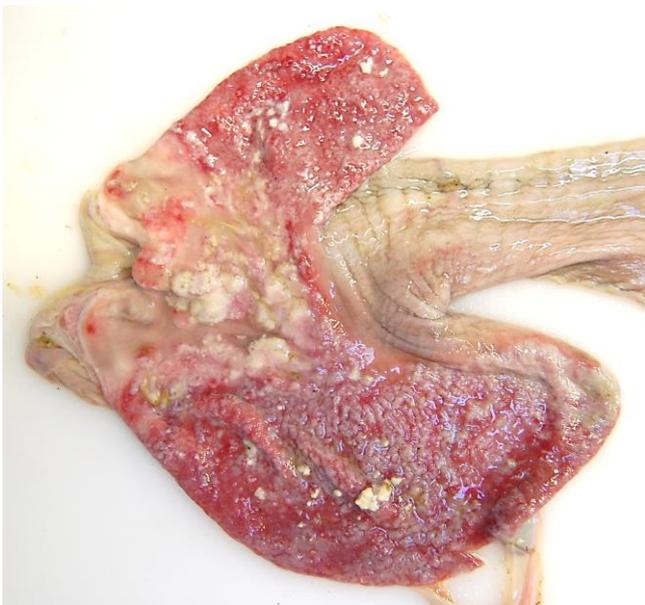


Figure 5 – Glandular portion of C3 from a juvenile alpaca showing inflammation with cream coloured exudate loosely adhered to the mucosa.

DEER

Two holdings submitted red deer calves for investigation of ill thrift and deaths. Twenty of 100 calves had died over a six-week period in the

first herd. They had been housed for one week with access to silage and concentrate feed. The second herd reported that ten calves at grass in a group of 160 calves and hinds had lost condition over the previous month. One calf was submitted from each herd and postmortem examination confirmed emaciation in both and detected numerous lungworms in the airways. Significant bilateral lung consolidation and patchy overinflation of the diaphragmatic lobes was noted in the first. Liver copper was below reference range at 181 umol/kg dry matter (DM) (reference range 200–300 umol/kg DM) and likely contributing to the ill thrift in this case. Trace element status in the second calf was good. There was evidence of limited gastrointestinal worm burdens in both, but this was not considered to be the primary issue. *Dictyocaulus* spp are the most important parasite of deer with calves in their first autumn/winter particularly at risk. In addition to ill thrift animals may cough when handled but this is not always the case. Adult deer that are well fed and not stressed are less likely to be affected. Worming of calves was advised in both cases.

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