

OVERVIEW

- **Mortality due to acute lungworm in dairy heifers**
- **Outbreak of CCN following pasture application of liquid gypsum**
- **Ewe deaths associated with embryo transfer procedures**

GENERAL INTRODUCTION

October 2024 proved to be warmer, drier and duller than average. The mean temperature of 8.9°C was 0.8°C above the 1991 to 2020 average and 70.1 sunshine hours represented 94 per cent of the thirty-year average. Rainfall equated to 72 per cent of average.

DISEASE ALERTS

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

- **Enteric listeriosis**

Listeria monocytogenes is ubiquitous in soil and can also be found in the gastrointestinal tract of healthy animals. Exposure to the bacteria occurs following contamination of feed with soil or faeces. Poor quality silage is a known risk factor for disease; however, outbreaks can be associated with other forage types. Localisation of ingested *Listeria* sp. in the abomasal or intestinal wall can result in clinical signs within two days of ingestion. Subsequent septicaemia can lead to the development of small necrotic foci in parenchymatous organs, particularly the liver. Gross pathology coupled with culture of the organism from affected areas of the gastrointestinal mucosa and/or other tissues, plus histopathology to demonstrate the characteristic features confirms the diagnosis.

- **Abomasal ulceration in alpacas**

Gastric ulcers are challenging to diagnose in the live animal and are most commonly located in the acid secreting distal portion of C3. Clinical signs can be non-specific and haematology and biochemistry results ambiguous. Death as a result of perforation followed by peritonitis can occur. The pathogenesis is likely to be multifactorial but avoiding stressors is advised. For more information see: Neubert S, Puff C, Kleinschmidt S. *et al.* Gastric ulcers in alpacas – clinical, laboratory and pathological findings. *Front Vet Sci* 2022; 9: doi:10.3389/fvets.2022.877257

CATTLE

Toxic conditions

The carcass of a 17-month-old Charolais heifer was submitted to investigate the sudden death of three animals from the group of 18 over the course of 10 days. There had been two earlier deaths in the previous six weeks with a total of three carcasses being found in the river. A small amount of concentrates were being fed every second day. Postmortem examination revealed generalised lymph node enlargement, pulmonary oedema and a markedly firm liver. Clostridial enterotoxaemia was a differential diagnosis, and small intestinal contents tested positive for epsilon toxin. However, this possibility was negated on histopathology which did detect severe hepatic fibrosis and atrophy consistent with liver cirrhosis. Neuropathology found extensive vacuolation affecting the white matter. This was considered a result of hepatic encephalopathy associated with hyperammonaemia secondary to liver failure. The farmer confirmed that the animals had previously grazed a pasture containing large quantities of ragwort (*Senecio jacobaea*) which was also known to be present in the forage fed during winter 2023/24. The fresh plant is unpalatable but loses its bitterness during preservation while retaining its hepatotoxicity.

Parasitic diseases

A group of yearling Holstein heifers in their first grazing season were set stocked on an area of newly purchased ground from turn out. One animal became dyspnoeic in early October and was euthanased the following day for postmortem examination. Emphysema was detected within the tissues of the head/neck and mediastinum. Moderate numbers of 3.5 to 4cm long nematode worms were visible on the tracheal mucosa with small numbers in the bronchi. Washing a section of trachea revealed that significant numbers of 1cm worms were also present. There was extensive bilateral interlobular emphysema (Fig 1) with a small number of larger bullae in the caudal lobes. The mediastinal lymph nodes were enlarged. Lungworm deaths can occur from 15 days post infection with *Dictyocaulus viviparus* due to the development of severe interstitial pneumonia and pulmonary oedema while disease is in the pre-patent phase. Baermann examination for larvae proved negative in this case and lung cultures were sterile. Histopathology findings were consistent with pre-patent disease with most pathology within the alveoli and interlobular septae. Emphysema and granulomatous inflammation within the mesenteric lymph nodes may have been associated with migration of L4 larvae. The findings suggested that there had been a sudden increase in the number of infectious *D viviparus* larvae on the grass.



Figure 1 – Interlobular emphysema in a case of pre-patent lungworm infection

Generalised and systemic conditions

The carcase of a five-month-old Limousin cross calf was submitted following two sudden deaths in four days from a group of 12 suckled calves at grass. Postmortem examination identified an area of black muscle overlying the sternum and a left sided fibrinous pleurisy and pericarditis accompanied by a serosanguinous pleural effusion. Blackleg was suspected and *Clostridium chauvoei* was detected on both fluorescent antibody test and anaerobic culture. Histopathology confirmed a necrotising and emphysematous myositis associated with large bacterial rods consistent with clostridial myositis.

Musculo-Skeletal conditions

A 20-month-old shorthorn cross heifer became lame in early August with bilateral hock swelling. It was treated with antibiotics for suspected *Mycoplasma bovis* septic arthritis with some improvement seen. This proved to be temporary, and it was euthanased two months later after continuing to deteriorate. Postmortem examination of the hocks found evidence of osteochondrosis with irregularly shaped defects of the cartilage on the lateral and medial ridges of the distal talus and the corresponding articular surfaces of the proximal centroquartal (fused central and fourth tarsal) bone (Fig 2). The exposed subchondral bone was irregular with a pitted yellow to red appearance. The articular cartilage was under-run at the periphery of the lesions and occasional osteophytes indicating early stages of degenerative joint disease were noted. Nutritional and genetic factors, disruption of blood supply and trauma can all play a role in the aetiology of osteochondrosis leading to cartilage necrosis and failure of endochondral ossification. Lesions are frequently bilateral, as in this case.

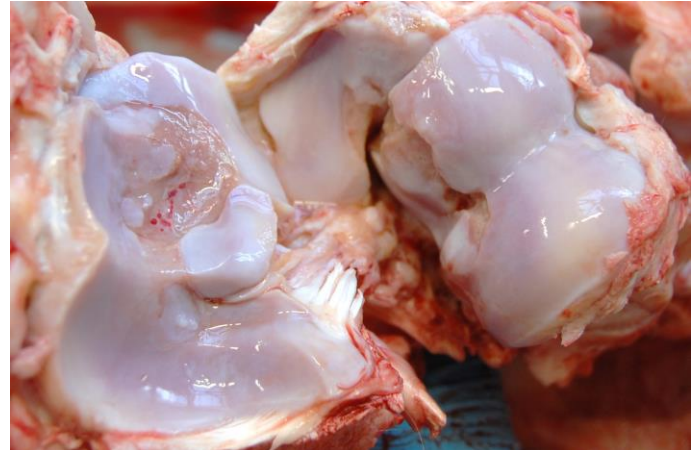


Figure 2 – Osteochondrosis lesion in the hock of a shorthorn cross heifer

Nervous system disorders

A three-day-old Holstein heifer was described as being shaky since birth and suspected to be blind. It was unable to suckle and was euthanased when it failed to improve. Six similar calves had been culled in December 2023 all of which tested positive for BVD virus. A further viraemic animal had been detected in early September 2024 and there had been six more affected calves born in the last three weeks, all of which tested negative for BVD virus. All were full term but smaller than average. Postmortem examination of the submitted calf identified a slightly abnormal appearance to the caudal cerebellum. Histopathology described cerebellar dysplasia with aberrant placement of Purkinje cells, large neurones randomly placed within the cerebellar white matter and hypercellularity of the molecular layer. PCR testing of spleen detected BVDV1 RNA confirming this calf to be persistently infected with cross placental transmission of virus having occurred in the first four months of gestation. Slightly later infection during development of the immune system can also result in cerebellar damage but affected calves are born antibody positive/virus negative. This scenario would explain the failure to detect BVD virus in the other affected calves.

A suckler herd in the Highlands reported that a seven-month-old shorthorn calf and its dam were both showing nervous signs. The cow was homebred and developed progressive hindlimb paresis over two days before becoming recumbent. The calf exhibited a marked tremor with circling and foaming at the mouth. There was no evidence of exposure to lead and serum calcium and magnesium results were within their respective reference ranges. They were grazing an area of hill that was known to have a high tick challenge. Both animals tested positive for antibodies to louping ill virus with a

predominance of IgM indicating recent infection. The cow died but the calf recovered after a few days. While it was possible that both animals had been infected contemporaneously via tick bites the possibility of lactogenic transmission of the virus was considered. Louping ill virus has been detected in the milk of experimentally infected goats and sheep but clinical signs only occurred in the kids.^{1,2}

A dairy herd reported neurological signs in a group of 50 heifers grazing rented ground that had been cut twice for silage. Four animals became recumbent and hyperaesthetic over a four-week period and were euthanased after failing to respond to treatment. The carcasses of a seven-month-old Flekvieh cross and a six-month-old Holstein cross were examined postmortem with no significant findings. Analysis of vitreous humour ruled out a diagnosis of hypomagnesemia (1.12 mmol/l and 0.84 mmol/l, reference range \geq 0.55 mmol/l) and kidney lead levels were within normal limits (0.09 mg/kg fresh tissue (FT) and 0.13 mg/kg FT, reference range \leq 0.2mg/kg FT). Histopathology detected polioencephalomalacia consistent with a diagnosis of cerebrocortical necrosis in both cases. A further two animals in the group developed clinical signs and improved following treatment with vitamin B1. The field had been sprayed with liquid gypsum and this was thought to be the most likely contributory factor in the outbreak. Liquid gypsum (calcium sulphate dihydrate) causes fine soil particles to flocculate improving drainage, making it easier to till and encouraging root development. Sulphate toxicity is a recognised cause of CCN and pasture sampling to measure sulphur levels was advised.

Skin diseases

A diagnosis of squamous cell carcinoma was reached on examination of a mass removed from the third eyelid of a six-year-old Limousin cow. Histopathology described a neoplastic epithelial population with marked anisocytosis and anisokaryosis and between eight to ten mitoses per high power field. The prognosis was guarded due to the potential for tumour extension to the underlying cartilage and orbital bone with subsequent metastasis to the parotid lymph node. This condition is most commonly diagnosed in cattle over three years-of-age with non-pigmented eyelids.

SMALL RUMINANTS

Nutritional and metabolic disorders

Three Texel and Suffolk cross lambs were submitted in July to investigate mobility issues within a group of three-month-old orphan lambs. They had initially been reared on milk replacer and were then weaned onto a ration of

hay plus a home mix of bruised barley and soya with no added minerals. The lambs were turned out to grass in June and over the next three weeks developed slow, stiff gaits.

On presentation one lamb was recumbent and unable to bear weight on its hind legs. The other two were able to stand but reluctant to walk. All three were in poor body condition and had suboptimal liver selenium results of 0.58, 0.68 and 0.73 mg/kg DM (reference range 0.9 – 3.5 mg/kg DM). Bone histopathology was carried out and revealed a marked reduction in the thickness of the growth plates and primary spongiosa. These findings confirmed osteoporosis to be the cause of the clinical signs. Osteoporosis is a metabolic bone disease characterised by a reduction in quantity but not quality of bone production. Osteoporosis can be caused by deficiency of a specific nutrient (e.g. calcium, phosphorus, copper) or more generalised inadequate nutrition. It was advised that appropriate minerals were introduced.

Parasitic diseases

A group of Dorset ewes lambing in October were reported to be thin with poor milk supply. A faecal sample from a single ewe was submitted and the strongyle egg count was 11,450 eggs per gram (epg). Haemonchosis was suspected and confirmed on PNA (peanut agglutinin) testing with 68 per cent of eggs found to fluoresce. This was the flocks' first season on the farm and the previous grazing history was unknown.

Generalised and systemic conditions

Clostridial/pasteurella, toxoplasma, and EAE/salmonella vaccines were administered to a group of 80 purchased ewe lambs which were also wormed at the same handling. Two lambs were found dead three days later and one carcase was submitted for postmortem examination. This detected marked haemorrhage and oedema of the right hindleg from the mid femur distally. Multiple muscle bodies in the affected limb were dark red to black with a dry appearance in some cases. The lungs were oedematous and haemorrhages were found on the parietal pleura, diaphragm and within the tissues of the neck suggesting septicaemia/toxaemia. *Clostridium chauvoei* and *Clostridium septicum* were detected in the affected muscle by fluorescent antibody test (FAT) consistent with a diagnosis of black leg/malignant oedema. The farmer confirmed that the vaccinations had been done in wet weather, which will have predisposed to the clostridial myositis.

Alimentary tract disorders

Six hundred Scottish blackface lambs received a combination worm/fluke drench and a trace element

bolus over the course of a week. Twenty-three were found dead over a 72-hour period one week later and five on-farm, postmortem examinations identified dosing gun injuries in three. A further four died three weeks later and the carcasses were submitted for further investigation. A bolus was found lodged in the longus capitis muscle of lamb one. The second showed tissue necrosis extending down the left neck, purulent material in the proximal oesophagus and multiple 1-3mm abscesses throughout the parenchyma of the lung and liver. The bolus was not detected either within the necrotic tissues or within the rumen. The third lamb was diagnosed with systemic pasteurellosis due to *Bibersteinia trehalosi*. The fourth had been predated and proved too autolysed to establish the cause of death.

A three-year-old pedigree Beltex ewe died three days after a laparotomy to facilitate embryo collection for embryo transfer. Subcutaneous swelling was noted associated with a 5cm long surgical wound on the caudo-ventral abdomen. A 5cm section of congested small intestine protruded between the suture material of a continuous Ford interlocking closure of the abdominal wall. There was marked distension of the small intestine, abomasum and rumen proximal to the eventrated section of intestine, with scant mucoid content distally. Death resulted from incarceration of the small intestine through the surgical wound.

Respiratory tract conditions

In an unrelated case a two-year-old Texel ewe died following the same procedure. Abnormal respiration and dark blood suggesting poor oxygenation were noted during anaesthesia and positive ventilation was initiated. The ewe died within minutes of surgery being completed and was submitted for postmortem examination. Adhesions were noted between the left cranial lung lobe and the thoracic wall and histopathology confirmed a pre-existing chronic and fibrosing pleuritis. Additional findings of prominent pulmonary oedema, congestion and haemorrhage were acute changes likely caused by alterations in cardiovascular haemodynamics in the peri-operative period precipitated by the chronic pleural pathology.

Skin diseases

A young pygmy goat appeared healthy for the first month after being introduced to a holding. Over the course of the next month crusting, pruritic skin lesions with hair loss appeared on the neck and head with extension to the ventrum (Fig 3). Histological examination of a skin biopsy revealed lesions of granulomatous mural folliculitis similar to those described in association with ovine herpesvirus-2 (OHV-2) infection.³ Skin samples tested PCR positive for OHV-2 and the goat was euthanased following continued

weight loss and the development of hindlimb paresis. A range of tissues were fixed and further histopathology identified lymphohistiocytic arteritis consistent with OHV-2 infection in the skin, kidney, small intestine and lumbar spinal cord confirming a diagnosis of malignant catarrhal fever (MCF). Cases of MCF are very uncommon in goats with the combination of granulomatous folliculitis and visceral lesions not yet reported in the literature. Given the rarity of infection in goats this is likely an isolated case. While other goats on the holding will have been exposed to the virus, development of clinical signs would be very unlikely.



Figure 3 – Dermatitis in a goat associated with OHV-2 (Westward Vets)

BIRDS

A batch of 500 ten-week-old pheasants was purchased and stocked in a release pen that had been used for several consecutive years. Four weeks later the carcass of a single bird was submitted to investigate the death of around 20 birds over a ten-day period. Other birds were reported to have a hunched-up appearance and some “clicking” was described. The carcass was very thin with pale mottled kidneys and evidence of urates indicating dehydration. Large numbers of *Syngamus trachea* were found, with a ball of worms in the proximal trachea obstructing the airway. Infection occurs via ingestion of larvated eggs, hatched larvae or larvae within earthworms. The eggs can survive in the soil for nine months and L3s within earthworms for many years. Wild birds such as corvids or blackbirds can also act as a source of infection.

PIGS

Respiratory tract conditions

A 580-sow batch farrowing indoor unit reported increased mortality in two-to-three-week-old piglets. Some were suspected to have meningitis but failed to respond to treatment with antibiotics. Others were found dead sometimes within a few hours of a previous inspection. Three carcasses were submitted and external examination detected lesions of greasy skin disease in three and navel ill in two. Internally they all showed splenomegaly, lymphadenopathy and lung congestion. One had a fibrinous pleurisy and mild jaundice. Pure growths of *Klebsiella pneumoniae* were isolated from multiple tissues including lung, liver and brain in all cases confirming septicaemia. *Staphylococcus hyicus* was isolated from the skin lesions. *Klebsiella pneumoniae* is a recognised cause of septicaemia in young piglets with outbreaks generally associated with ST25.⁴

References:

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- 3 Westermann T, Demeter EA, Diel DG, Renshaw RW, Laverack MA, Gerdes RS, Peters-Kennedy J. Granulomatous mural folliculitis in 16 domestic goats: Infection with malignant catarrhal fever viruses and colocalization with ovine herpesvirus-2 using in situ hybridization. *Vet Pathol.* 2023;60(6):876-887
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