

### OVERVIEW

- **Congenital hepatic fibrosis in stillborn calves**
- **Beef calf deaths due to idiopathic necrotic enteritis**
- **Microphthalmia and retinal dysplasia in shorthorn calves**
- **Maedi visna causing ill thrift in commercial ewes**

### GENERAL INTRODUCTION

Monthly mean temperatures were 0.9 °C above average. Rainfall was 81 per cent of average but there were regional differences with parts of the east and south experiencing only half the average rainfall for July. In contrast rainfall figures for the north-west were slightly above average. Sunshine was just above average in parts of the south but below average in the north-west, giving 92 per cent of average overall.

### DISEASE ALERTS

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

- **Oak (*Quercus* sp.) toxicity in cattle following stormy weather.**

Acorns and oak leaves contain nephrotoxic tannins that cause renal injury when consumed in large quantities. Affected cattle commonly exhibit clinical signs such as anorexia, abdominal pain, and constipation or diarrhoea for a number of days before death.

- **Parasitic gastroenteritis and lungworm in dairy heifers at grass.**

The combination of grazing and anthelmintic strategies employed over the course of the summer will influence the level of infectious larval challenge in autumn. If dry weather allows the grazing season to be extended the possibility of clinical cases of parasitic gastroenteritis or lungworm should be borne in mind. Monitoring serum pepsinogen levels can indicate whether or not first season grazing animals have been exposed to *Ostertagia ostertagi* larvae.

- **Rumen acidosis in lambs following stocking on barley stubble fields.**

Fields should be risk assessed to check for spillage from the combine or areas where grain is still plentiful. If it is not practical to introduce the sheep gradually then waiting for a few weeks until the grains have sprouted will reduce the acidosis risk.

### CATTLE

#### Alimentary tract disorders

Fixed tissues from an ascitic dairy calf that died during parturition were submitted for histopathology. Excessive hepatic fibrosis was the only significant finding and both infectious and myocardial disease were ruled out as possible explanations. Congenital hepatic fibrosis in calves is a rare, sporadic condition<sup>1</sup> and ascites occurs as a result of changes in hydrostatic and osmotic pressures secondary to the liver pathology. This was likely to be a one-off case although a hereditary basis couldn't be excluded. Congenital hepatic fibrosis was also diagnosed in a stillborn Shetland calf from a small herd of five cows. This was the second calf to be born dead and despite appearing small, was thought to be full term. An abnormal liver was noted on postmortem examination and histopathology confirmed severe, extensive fibrosis and biliary proliferation surrounding isolated islands of hepatocytes. The kidneys were also abnormal with cortical collapse and interstitial fibrosis. Ascites was not reported in the history that accompanied this case.

A three-month-old Limousin heifer developed pneumonia and was treated with antibiotics but found dead a few days later. It was the fifth calf to die from a group of 40 at grass with their dams. Postmortem examination detected two small black foci on the effacing surfaces of the arytenoid cartilages, bronchopneumonia involving around 40 per cent of the lung parenchyma and mucosal necrosis around the ileo-caecal valve. *Pasteurella multocida* was cultured from lung tissue and liver selenium levels were low at 0.49 mg/kg dry matter (DM) (reference range 0.9 – 1.75 mg/kg DM). Histopathology confirmed ileal ulceration and bone marrow depletion which together were consistent with a diagnosis of idiopathic necrotising enteritis (INE). Two further cases of INE were diagnosed in two to three-month-old suckled calves from different farms during July. Postmortem examination confirmed laryngeal ulceration and pneumonia in both. In calf one there was also evidence of ulceration and necrosis along the length of the gastrointestinal tract and histopathology confirmed acute to subacute ulceration and necrosis of the tongue, larynx, abomasum, ileum and large intestine. In calf two ulcerative lesions in the ileum were only detectable on histopathology. These cases illustrate the spectrum of pathology that can be found in calves with INE. It should not be excluded based on an absence of intestinal pathology and should be considered a differential diagnosis in one to three-month-old suckled calves with laryngeal ulceration and pneumonia.

### Respiratory tract diseases

A 20-month-old bull was shot after becoming severely dyspnoeic. It was housed on a finishing unit with mixed age cattle from a range of sources. History was limited but several other animals were reported to have died. Postmortem examination revealed a thick purulent catarrhal exudate lining the length of the trachea. The laryngeal lumen was narrowed due to thickening of the folds and the presence of thick yellow exudate (Fig 1). The cranial lungs were congested with marked emphysema in the caudal lobes. *Fusobacterium necrophorum* was isolated from the trachea but not considered to be the primary pathogen. Histopathology described an acute-subacute, ulcerative and fibrinopurulent tracheitis with mineralisation and rare syncytia, consistent with a diagnosis of infectious bovine rhinotracheitis and secondary acute bacterial pneumonia. PCR testing of trachea and lung tissue proved positive for bovine herpes virus 1.



**Figure 1 – Narrowing of the laryngeal lumen due to infection with bovine herpes virus 1**

### Nervous system disorders

Two shorthorn calves suspected to have been blind since birth were euthanased and submitted for postmortem examination at 46 and 19 days of age. The older calf had microphthalmia of the right eye. The younger calf had an opacity in the left lens and a 2cm x 2cm, fluid filled cavity in the left cerebral hemisphere which communicated with the lateral ventricle. Histopathology confirmed the presence of a cataract in calf 2 and detected severe retinal dysplasia in both. Severe dysplasia of some cerebellar lobules was also reported. Screening for BVD virus and antibody was negative in both cases. Microphthalmia, retinal dysplasia and hydrocephalus was reported as a likely genetic issue in shorthorn cattle in the 1970s.<sup>2,3</sup> The dams of both calves had been purchased in calf from the same source.

### Circulatory system disorders

A four-year-old Charolais cow was submitted with a history of weight loss of several weeks duration prior to death. Pre-mortem testing had ruled out Johne's disease but biochemistry results of hypoalbuminaemia (22g/l, reference range (RR) 30 -40 g/l), hyperglobulinaemia (83 g/l, RR 30 – 50 g/l) and elevated liver enzyme activity (GLDH 73 iu/l, RR <25 iu/l; GGT 171 iu/l, RR <50 iu/l) suggested an inflammatory process affecting the liver. Postmortem examination revealed peritonitis with extensive adhesions between the liver, reticulum, spleen, and diaphragm. The liver was enlarged with abscesses throughout the parenchyma and fibrinous pericarditis and lung abscessation were also detected. A thin wire 6 cm in length was found in the reticulum and traumatic reticulopericarditis was recorded as the cause of death. Two other cows from the group of 30 had died with a similar history of weight loss. Herds can experience multiple cases of traumatic reticulopericarditis but as no investigation of the other two deaths had been carried out, they could not be linked.

A ten-week-old Charolais cross calf with a history of respiratory problems since birth was examined and found to be slightly jaundiced with a nutmeg liver and pulmonary oedema. The heart weighed 1.3 kg which is heavy compared to an average figure of 500 to 530 g for similarly aged calves. The right ventricle was dilated, and it was clear that the valve cusps would have been unable to create a seal during systole. The final diagnosis was cardiac failure secondary to dilated cardiomyopathy. Laryngeal abscessation was also detected and will have contributed to the respiratory signs reported.

### SHEEP

#### Generalised and systemic conditions

Postmortem examinations were carried out on four six-year-old Texel mule ewes that had failed to gain body condition after weaning. A mild increase in respiratory rate was noted on clinical examination in two cases and lung pathology was detected in three. Two animals had palpably firm lungs while the lungs of a third were heavier than average. Coalescing grey to white nodules were evident within the lung parenchyma of all three. Histopathology revealed lesions of extensive interstitial pneumonia consistent with maedia visna (MV) in two. Findings included smooth muscle hyperplasia causing expansion of the alveolar septae and multifocal variable lymphoplasmacytic and histiocytic septal infiltrates. Extensive interstitial fibrosis considered to be a result of co-infection with lungworm and MV was found in the third. All four ewes proved seropositive for antibodies to MV. The appearance of the lungs suggested the possibility of ovine pulmonary adenocarcinoma (OPA) but



this was ruled out on histopathology emphasising the importance of confirming suspected diagnoses with follow up testing.

### Nervous system disorders

A six-year-old Cheviot ewe was euthanased after being found recumbent and failing to respond to treatment with calcium and magnesium. It was the third loss in five days from a group of 200 ewes with lambs at foot. No issues had been noted when they were gathered for administration of an ivermectin drench two weeks earlier. No evidence of facial paralysis or nystagmus was reported on clinical examination prior to euthanasia. Postmortem examination was generally unremarkable however neuropathology detected cortical laminar necrosis with spongy change in the white matter cores and pons. These findings were consistent with a diagnosis of cerebrocortical necrosis (CCN). Diagnoses of CCN in sheep peak in the summer and autumn and are most common in youngstock aged between four and seven months.

Three, two-month-old Scottish blackface lambs were submitted live for investigation of hindlimb paresis, ataxia and recumbency. The farmer reported that five lambs were affected. The 900-ewe flock had been gathered for administration of moxidectin 1 per cent injection three weeks earlier and small numbers of ticks were seen at this time. Two of the submitted lambs had a lack of proprioception in all four legs while only the hind legs were affected in the third. Vertebral body abscesses with associated osteomyelitis were found at the atlanto-occipital joint, C5 and T7/8 respectively (Fig 2). Ticks were present on two of the carcasses and PCR testing of spleen proved positive for *Anaplasma phagocytophilum* in all three cases. *Staphylococcus aureus* was isolated in one case suggesting tick pyaemia as a possibility. Unhygienic injection technique was suggested as a possible source of bacteraemia.



**Figure 2 – Abscessation at the level of T7/8 in a two-month-old lamb**

## PIGS

### Alimentary tract disorders

The owner of a small outdoor herd of four unvaccinated, crossbred sows complained of ill thrift in a litter of 12 piglets. The piglets had been healthy until around three weeks-of-age when six started to lose weight and three died. Two live piglets were euthanased for postmortem examination which confirmed diarrhoea and white-spot kidneys in both plus thickening of the small intestinal mucosa in one (Fig 3). Histopathology confirmed interstitial nephritis in both and a granulomatous enteritis in the second piglet. PCR testing carried out on pooled lymph nodes was positive for porcine circovirus type 2 (PCV-2) confirming a diagnosis of multisystemic wasting syndrome associated with PCV-2.

Immunohistochemistry revealed positive labelling for PCV-2 in the lymph node, spleen, stomach, small and large intestine of piglet 1, and the small intestine of piglet 2.



**Figure 3 – Thickening of the small intestinal mucosa in a case of PMWS**

## BIRDS

### Poultry

Colisepticaemia proved to be the cause of death in a three-week-old chicken from a group of 100 where six had died since purchase as day-old chicks. Unilateral hypopyon (Fig 4), peritonitis, pericarditis and pulmonary oedema were noted on postmortem examination. *Escherichia coli* was isolated in profuse pure growth from the liver, spleen and heart. A mild cough was noted in the larger group and attributed to environmental factors after screening for respiratory pathogens returned negative results.



**Figure 4 – Hypopyon associated with colisepticaemia in a three-week-old chicken**

#### References:

- 1 Bourque AC, Fuentealba IC, Bildfull R *et al.* Congenital hepatic fibrosis in calves. *Can Vet J* 2001; 42(2):145-6
- 2 Leipold HW, Mills JHL, Huston K. Retinal dysplasia and internal hydrocephalus in a shorthorn calf. *Can Vet J* 1974; 15(2): 34-8
3. Greene HJ and Leipold HW. Hereditary internal hydrocephalus and retinal dysplasia in shorthorn calves. *The Cornell Vet* 1974; 64-367-375

#### MISCELLANEOUS

Blood samples and a skin biopsy were received to investigate crusting lesions, alopecia and pruritis of the ears, perineum and axilla of two pet alpacas. Zinc levels were found to be low at 2.25 and 1.45  $\mu\text{mol/l}$  (RR 3-4.6  $\mu\text{mol/l}$ ). Histopathology described epidermal hyperplasia, hyperkeratosis and perivascular dermatitis which is consistent with zinc deficient dermatitis in alpacas.

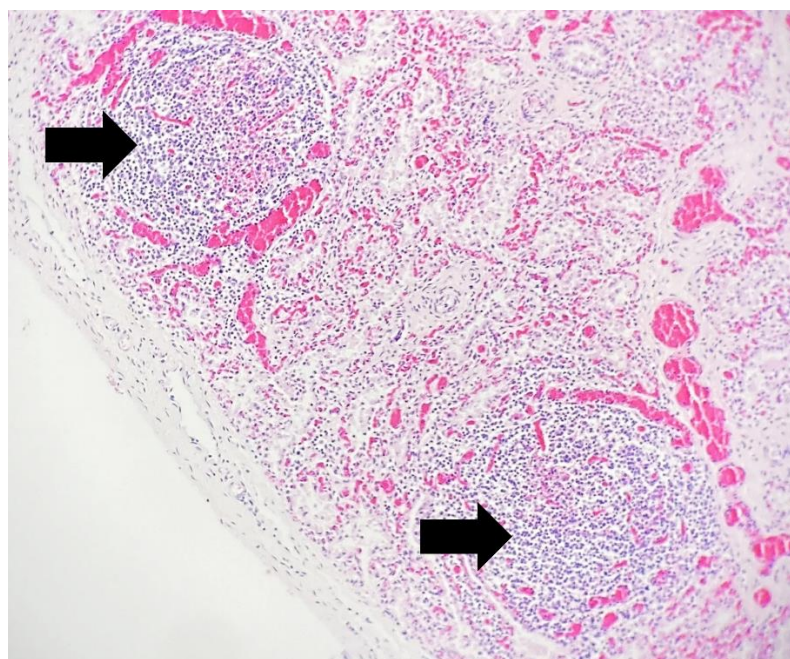
### ***Ureaplasma* Infection in Cattle**

*Ureaplasma* spp, similar to *Mycoplasma* spp, are mollicutes, a class of bacteria that lack a cell wall and are the smallest known self-replicating organisms. These bacteria are frequently present on the mucous membranes of the nasal passages, vulva and vagina of cows, and the prepuce and urethra of bulls. They can remain in these sites for long periods, acting as a source of infection to others in the herd.

The most important species in cattle is *Ureaplasma diversum* and virulent strains can cause reproductive failure. Infections may cause vulvitis, embryonic death, abortion, stillbirth, or the birth of weak/non-viable calves. Abortion usually occurs in late gestation and the most characteristic gross finding is patchy thickening, fibrosis, and mineralisation of the amnion. The chorioallantois may be similarly affected in severe cases. Infection of the amniotic fluid results in non-suppurative pneumonia with the formation of lymphoid nodules. This was seen in an aborted foetus examined recently where *Ureaplasma diversum* was identified by DGGE/PCR testing (Fig A). Erosive conjunctivitis with lymphoid nodules can also be detected in the foetus. These findings are not pathognomonic but suggest the involvement of *Ureaplasma* species. Definitive diagnosis requires demonstration of the organism by culture or molecular techniques from the lung, placenta, or foetal stomach content. The condition, granular vulvitis, characterised by papular eruptions on the vulval mucosa, has been experimentally associated with *U diversum*, however this is not exclusively caused by this organism. It can also be a cause of bovine mastitis.

Bulls harbouring the organism in the preputial mucosa and distal urethra can transmit infection to females during coitus. Semen contamination can also occur, and the organism can survive both freezing and the standard embryo washing and cleaning procedures recommended by the International Embryo Transfer Society. Transfer of infection may therefore occur during artificial insemination and embryo transfer procedures. Infection may also result in seminal vesiculitis, balanoposthitis and increased numbers of spermatozoa with abnormal morphology.

SRUC veterinary services will be screening lung from all bovine foetal submissions by PCR for *Ureaplasma diversum* from September 2022 for a period of 6 months. This is to help validate a PCR test and to investigate the prevalence of *U diversum* in aborted and stillborn fetuses in Scotland.



**Figure A: Foetal lung showing two interstitial lymphoid nodules (black arrows)**



**References:**

Santos Junior MN, Macedo Neres NSD, Campos GB *et al.* A review of *Ureaplasma diversum*: A representative of the Mollicute class associated with reproductive and respiratory disorders in cattle. *Front Vet Sci* 2021; 8: 572171. doi: 10.3389/fvets.2021.572171

Schlafer DA and Foster RA. Female Genital System. In Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, 6<sup>th</sup> edition, M. Grant Maxie (ed) 2016;3:411