

OVERVIEW

- **Multiple lead poisoning incidents in cattle**
- **Enzootic abortion in a ewe associated with the vaccine strain of *Chlamydia abortus***
- **Losses due to broiler ascites/pulmonary hypertension syndrome**

GENERAL INTRODUCTION

June was a warm month with parts of western Scotland recording mean maximum temperatures up to 4° C above average. Overall, an average mean temperature of 14.3°C (2.7°C above the 1991 to 2020 average) made it the warmest June in a 140-year series. Rainfall and sunshine figures were 74 and 158 per cent of their thirty-year averages respectively.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in September 2022. Given similar climatic and production conditions, they could also be important this year.

- **Trace element deficiency and parasitic gastroenteritis in weaned lambs**
Hyposelanososis was a common finding in lambs examined postmortem last September. Most were submitted in order to investigate ill thrift and had concurrent high nematode burdens. Cobalt deficiency was also identified in some. Regular weighing of a subset of lambs would have detected poor liveweight gains at an earlier stage prompting investigation before wasting occurred. Autumn is a useful time of year to monitor worm egg counts and check trace element status

CATTLE

Toxic conditions

Lead poisoning was confirmed as the cause of death of cattle on four farms during June. Found dead was the most common presenting sign with all farmers also reporting blindness in other affected animals. Multiple cattle were involved in each outbreak all of which occurred in beef herds. One group had recently been moved to a new farm and had access to a disused quarry containing old pipes that were considered the likely source of lead. In the second case a disused dump in the field was suspected to contain lead paint. A discarded car battery was discovered in the third incident while on the fourth holding a battery used to power an electric fence was known to have been removed eight years earlier. The field had been grazed without any problems since however inspection of the site found metal parts in the soil and a metal plate where the battery had been sitting. Subsequent testing of soil from the area found high leads levels of over 1000 mg/kg. All cases were reported to Food Standards Scotland.

Respiratory tract diseases

A Charolais heifer calf got to its feet following a caesarean and was tube fed with colostrum. The next morning it was found recumbent and tachypnoeic and died soon after treatment with corticosteroids and bicarbonate. Postmortem examination found excess pleural fluid with strands of fibrin on the visceral pleura. There was interlobular lung oedema, fluid oozed from the cut surface and sections of tissue sank when placed in formalin. Histopathology found changes consistent with acute viral interstitial pneumonia, however PCR testing failed to detect any respiratory pathogens. An issue with lung maturation and/or surfactant production leading to acute neonatal respiratory distress syndrome was proposed as the most likely diagnosis. The possibility of aspiration pneumonia causing localised suppurative inflammation triggering more widespread secondary interstitial changes could not be excluded.

Reproductive tract conditions

Five animals from a group of 23 beef cows in late gestation either aborted or gave birth to stillborn or live but non-viable full-term calves within a two-week period. They had been on good quality pasture for a month with no supplementary feeding. Two calves that had died in the perinatal period were submitted and a marked placentitis was visible in both cases (Fig 1). Placental cultures produced very mixed growths due to environmental contamination, however *Bacillus licheniformis* was isolated in pure growth from the

stomach contents of one calf. The second calf had received milk making stomach contents unsuitable for bacteriology, but histopathology confirmed a placentitis which was likely to have a bacterial aetiology. *Bacillus licheniformis* abortion is most commonly diagnosed in housed, silage fed spring calving beef cows in the last two months of gestation. The scale of losses suggests that there had been a significant challenge, but it was not clear whether this had occurred before or after turn-out. Only this group were affected therefore there may have been a field specific risk such as a dirty water trough. The case illustrates the importance of submitting placenta when investigating perinatal deaths.



Figure 1 – Placentitis due to infection with *Bacillus licheniformis*

A 14-year-old Aberdeen Angus cow in her third trimester was the only animal from a herd of 120 to abort. A 15 kg foetus was submitted along with two tissue masses weighing approximately 7kg each. These had been expelled with the aborted calf and appeared pink with variably sized firm protrusions and some areas that resembled malformed internal organs. No evidence of infectious disease was detected and a diagnosis of amorphous globosus was made. This condition is seen in cattle carrying twins or triplets when one or more foetuses fail to develop normally. They consist of unorganised tissues including fat, vessels or bone and are more usually covered in hair.

Nervous system disorders

An Aberdeen Angus heifer calf was born at grass and appeared clinically normal until around two weeks of age. It then developed hind limb ataxia but remained bright. Videos recorded by the private veterinary surgeon showed a tendency to sway the pelvis to the side when walking with the tail held out from the perineum. On tight

circling there was delayed retraction of the inside pivotal hind limb and circumduction of the outside limb. The calf was euthanased for further investigation with no gross abnormalities detected on postmortem examination. Histopathology identified mild to moderate segmental degeneration of purkinje cells consistent with a diagnosis of cerebellar abiotrophy. This condition is characterised by normal development of the cerebellum in utero followed by post-natal degeneration of cerebellar neurones. It has previously been reported in a number of breeds including Aberdeen Angus. A familial component has been identified in some cases but in others the cause remains unknown. No other cattle from the farm have been affected to date, however clinical signs can take months to years to become apparent. Monitoring for further cases was advised.

SMALL RUMINANTS

Respiratory tract diseases

A 600 ewe heavily stocked lowland flock reported increased lamb losses with around 50 deaths since lambing in March. An 11-week-old Texel cross lamb was submitted after it was found dead two weeks after administration of a benzimidazole drench and the first dose of a multivalent clostridial/pasteurella vaccine. Postmortem examination revealed consolidation affecting almost all of the right lung and around 50 per cent of the left lung. Pasteurella pneumonia was suspected however bacterial cultures remained sterile. Histopathology detected a severe bronchointerstitial pneumonia with atelectasis, alveolar congestion, haemorrhage, oedema and proliferation of type II pneumocytes. Numerous macrophages and degranulating eosinophils were noted in the perivascular tissue and there was widespread degeneration and necrosis of the bronchiolar epithelium without a neutrophil response. These findings were considered to represent a hypersensitivity reaction, but the trigger remained unknown. As this was likely to be an individual issue unrelated to the other losses investigation of any ongoing deaths was recommended. This case showed that lung consolidation in sheep is not always a result of pasteurella pneumonia. *Pasteurellaceae* can be challenging to culture and representative sections of lung should be fixed in formalin to allow further testing should bacteriology prove unrewarding.

Reproductive tract conditions

Two abortions occurred in a group of twin-bearing ewes at grass and placenta, foetal fluids and foetal stomach contents were submitted from both. Inclusion bodies consistent with *Chlamydia abortus* elementary bodies were observed in a modified Ziehl-Neelsen placental smear in one case and histopathology confirmed a necrotising placentitis. The flock had been vaccinating

against enzootic abortion of ewes for ten years and a sample of placenta was submitted to the Moredun Research Institute for further investigation by PCR/RFLP (restriction fragment length polymorphism) which detected only the vaccine strain of *Chlamydia abortus*. It is known that this is capable of causing abortion in a small minority of vaccinated ewes and produces placental pathology indistinguishable from a wild type infection.¹

Musculo-Skeletal conditions

A ten-week-old south down ewe lamb in good body condition was found in lateral recumbency with opisthotonos and hyperextended limbs. It was euthanased prior to postmortem examination and was the fourth loss in a week from a group of 150 lambs. Tetanus was suspected and testing was carried out to exclude focal symmetrical encephalomalacia, meningitis and cerebrocortical necrosis as the cause of the clinical signs. Two of the mesenteric lymph nodes were very reactive with oedema and some haemorrhages. Histopathology revealed an incidental granulomatous lymphadenitis and multifocal granulomas within the mesenteric lymph node associated with protozoal schizonts consistent with *Eimeria gilruthi*. *E. gilruthi* is usually found within the abomasum where it can cause a granulomatous abomasitis resulting in diarrhoea, ill thrift and death in some cases.²

Nervous system disorders

An eighteen-month-old beltex tup was submitted following a two-month period of mild paresis and possible incoordination of the hind limbs. It had been observed to occasionally fall over when walking and had a poor appetite with an apparent inability to ruminate. There was a slight dorsal arching of the spine in the thoracolumbar area, but no spinal cord pathology was visible. Histopathology detected a focal lesion at the level of C7 composed of numerous dilated myelin sheaths in the dorsal and ventral funiculi, occasionally accompanied by Gitter cells and rare swollen axons (Wallerian degeneration). The findings were consistent with cervical spinal cord compression explaining the clinical signs. They were similar to the changes described in cases of compressive cervical myelopathy in young Texel and beltex sheep (wobbler syndrome)³ and explained the hind limb ataxia. Penny *et al* showed that spinal cord compression was due to nodules of adipose tissue prolapsing into the spinal canal. No obvious abnormalities were found in the spinal canal in this case, but subtle lesions could easily be missed due to the process of spinal cord removal and the nature of the nodules. Visualisation of lesions in affected sheep can require CT or MRI imaging.

PIGS

Eleven, two-week-old piglets, from a litter of 14 died unexpectedly. It was the only litter affected on a 650-sow outdoor unit with 95 sows batch farrowing every three weeks. Swelling of the neck (Fig 2) was reported and two piglets were submitted. Anthrax was considered but excluded based on the history. Postmortem examination revealed extensive subcutaneous blood-stained oedema in the ventral necks, enlarged haemorrhagic lymph nodes and petechial haemorrhages in multiple organs. Marked blood-stained interlobular oedema was found in the lungs of piglet two. Histopathology of tissues from this animal identified suppurative inflammation in the pharyngeal and tonsillar area accompanied by large colonies of Gram-positive bacilli. Anaerobic cultures and fluorescent antibody testing confirmed these to be *Clostridium septicum*, and toxæmia following *C septicum* infection of the pharyngeal and tonsillar area was considered to be the cause of death. This is an unusual presentation and the reason for infection via this route was unclear. A muddy outdoor environment leading to contamination of the teats was considered a possibility.



Figure 2 – Swelling of the ventral neck in a case of malignant oedema due to *Clostridium septicum*

BIRDS

Poultry

A commercial broiler unit reported that 20 birds from a batch of 160 had been found dead within a few days of each other. The birds had been purchased as day-old chicks and were kept in moveable outdoor pens measuring 3 x 4 metres, with 60 birds per pen. Postmortem examination of six, 10-week-old birds revealed ascites with fibrin formation (Fig 3), hydropericardium, pulmonary congestion and oedema in all, with evidence of dilated hearts and enlarged livers in some. These findings were consistent with right sided

heart failure due to broiler ascites/pulmonary hypertension syndrome. This results from increased oxygen demand in rapidly growing birds coupled with insufficient pulmonary capillary capacity and decreased respiratory efficiency. Preventive strategies can include selecting stock which are bred for cardiovascular fitness or decreasing growth rates through modification of the diet. The broilers were fed pellets, which can increase feed efficiency and thus metabolic demands.



Figure 3 – Ascites as a result of right sided heart failure in a case of broiler ascites/pulmonary hypertension syndrome

A backyard flock of 28 hens reported the death of five over a nine-month period. The affected birds had all presented as off colour and diarrhoeic. They continued to eat and drink but wasted and died within two to four weeks. All were over a year of age at the time of death. The most recently affected bird had not received any treatment and was submitted for postmortem examination after death. The owner reported that it had not laid any eggs for some time. The carcass was emaciated, but the abdomen was distended due to the presence of three large (up to 10 cm diameter) abnormal egg masses within the oviduct (Fig 4). Three smaller, 2 to 3 cm diameter egg remnants were also found. There was evidence of mild peritonitis with fibrin tags on the intestinal viscera. *Gallibacterium anatis* was cultured from an egg and considered to be significant. This bacteria can be isolated from the respiratory and reproductive tracts of healthy hens but it is also an opportunistic pathogen and a recognised cause of salpingoperitonitis which is a common cause of mortality in mature laying hens. Affected birds cease laying but do not necessarily stop ovulating leading to a build-up of caseous material within the oviduct. Antibiotic treatment is not curative with surgery or euthanasia the only other options.



Figure 4 – Salpingoperitonitis due to *Gallibacterium anatis* in a chicken from a back yard flock

Game birds

Six live 13-day-old pheasant chicks were submitted from an estate with 20,000 stock. There were 12,000 birds in the affected age-group, housed in groups of 1,000. Approximately 40 per cent were showing non-specific clinical signs of malaise and just over 10 per cent had died. Disease presented in a few birds at four-days-of-age and by day five numerous birds were affected and antibiotics were introduced. The mortality rate peaked within 24 hours, but ongoing lower-level losses prompted investigation. The submitted chicks were listless and weak ranging in weight from 24 to 60 g. The yolk sacs were filled with dry, firm yellow material in all cases and there was evidence of septicaemia with pericarditis and peritonitis variably present. *Salmonella enterica* serotype *typhimurium* was isolated from multiple sites including lung, liver, heart blood, pericardial fluid, caecal content and yolk sac. *Salmonella* infections in gamebirds typically cause high mortality, especially in the first two to three weeks of life. Advice was given regarding the zoonotic risk.

References:

- 1 Caspe SG, Livingstone M, Frew D *et al.* The 1B vaccine strain of *Chlamydia abortus* produces placental pathology indistinguishable from a wild type infection. *PLoS ONE*, 2020; 15(11): e0242526. <https://doi.org/10.1371/journal.pone.0242526>
- 2 Hermosilla C, Diakou A, Psychas V *et al.* Fatal *Eimeria gilruthi*-induced abomasal coccidiosis: a still neglected parasitosis. *J Vet Med Res* 2016; 3(4):1055-9
- 3 Penny C, Macrae A, Hagen R *et al.* (2007). Compressive cervical myelopathy in young Texel and beltex sheep. *J Vet Int Med*, 2007; 21(2): 322-7