SRUC Veterinary Services Monthly Report for May 2024

OVERVIEW

- **Outbreak of septic arthritis in fattening cattle due to concurrent infection with *Mycoplasma bovis and Histophilus somni***
- ***Staphylococcus aureus* as a cause of suppurative conditions in sheep**
- ***Actinobacillus equuli* septicaemia in a weaned pig**

GENERAL INTRODUCTION

The mean temperature for May was 3.2˚C above the 30-year average making it the warmest since records began in 1883. The south-east experienced high rainfall while the north-west was significantly drier than usual with Scotland as a whole having 93 per cent of average rainfall. It was a dull month with only 80 per cent of sunshine compared to the 1991 to 2020 period.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in August 2023. Given similar climatic and production conditions, they could also be important this year.

- **Rumen acidosis following stocking on stubble fields**
  Outbreaks of rumen acidosis are a risk if sufficient grain remains following combining. Animals should be monitored carefully for a few days after being turned onto stubble fields. Postmortem examination findings of whole grains within the rumen contents and a pH of less than 5 are indicative of acidosis. Bear in mind that the rumen pH will increase after death and that introduction to a carbohydrate rich diet could also trigger outbreaks of clostridial enterotoxaemia type D (pulpy kidney) in unvaccinated sheep.

- **Haemonchosis**
  Haemonchus contortus worms will be present in low numbers as part of a mixed nematode burden in many flocks. However, it can be responsible for significant losses due to ill thrift, anaemia and deaths. Reviewing the diagnoses of haemonchosis from Scottish holdings over the last five years shows that August and September are the highest risk months. Almost all diagnoses were made in lambs some of which had been recently purchased. Diarrhoea is not a feature of haemonchosis but was reported in most cases due to significant concurrent burdens of *Teladorsagia* or *Trichostrongylus* spp.

CATTLE

Generalised and systemic conditions

A group of 260 housed fattening cattle reported few health issues all winter. The group had been stable throughout and although 30 cattle had been purchased in mid-March there had been no direct contact with these and no signs of disease in the added animals. A pneumonia outbreak in 100kg spring born suckled calves resulted in two deaths and PCR testing identified four respiratory pathogens with *Mannheimia haemolytica* and *Pasteurella multocida* in both, *Histophilus somni* in one and *Mycoplasma bovis* in the other. In early May a small number of the fattening cattle were treated for suspected pneumonia, removed from the shed and made a full recovery. Following this approximately 30 of the remaining animals became severely lame with visible joint swelling and a poor response to antibiotic treatment. A Limousin cross yearling heifer showing obvious signs of pain and having difficulty rising was euthanased and submitted for investigation of the problem. Septic arthritis was found bilaterally in the stifle and carpal joints plus the left elbow, right hock and atlanto-occipital joints. Bilateral necrotic lesions were noted in the larynx (Fig 1) and localised areas of consolidation and necrosis were present in both diaphragmatic lung lobes. The liver was swollen. Routine cultures of synovial fluid were sterile but *Mycoplasma bovis* was detected by PCR. Lung tissue tested PCR positive for *M bovis, H somni* and IBR with histopathology confirming severe *M bovis* lesions alongside areas of necrosis, fibrin deposition and vascular thrombosis associated with bacterial colonies consistent with *H somni*. Similar colonies were noted in the laryngeal lesions, but no evidence of active IBR infection was detected at either site. Examination of synovial membrane found biphasic subacute to chronic elements underlying acute fibrinosuppurative lesions and necrosis. It was suggested that *M bovis* may have been responsible for the original synovial lesion followed by secondary invasion of *H somni.* The severity of the outbreak was presumed to be a result of the cattle being naïve to both bacteria.

Figure 1 – Laryngeal necrosis associated with *Histophilus somni infection*

Alimentary tract disorders
A group of 20 cows and calves were turned out and the following morning a one-month-old Limousin cross heifer was found bloated, recumbent, hypothermic and moribund. It was euthanased and submitted for postmortem examination which identified severe peritonitis focussed on the small intestine. The initiating cause was a clean transverse split in the intestine one third of the way along the jejunum (Fig 2). There was localised blood clot associated with this and intestinal contents had leaked into the abdomen. The mesenteric lymph nodes were very reactive and the jejunal loops were adhered together with fibrin. Histopathology failed to detect any pathology in the small intestine that could explain the rupture with no evidence of vascular compromise or a pre-existing infection.

Figure 2 – Jejunal rupture in a suckled calf

Respiratory tract diseases
A 140 cow suckler herd, with ongoing pneumonia issues in pre-weaned spring born calves submitted the carcase of a two-month-old shorthorn cross bull calf. Postmortem examination detected flaccid collapse of the cranioventral lung lobes with petechial haemorrhages noted throughout the parenchyma of the caudal lobes. The heart was large and weighed 850g which was equivalent to 1.1 per cent of bodyweight compared to an expected <0.48 per cent for calves between one and 12 months-of-age. The ventricles were dilated but otherwise structurally normal. Histopathology of the lung revealed acute fibrin accumulation and haemorrhage, consistent with acute interstitial pneumonia (AIP) but no evidence of myocardial abnormalities or evidence of cardiac failure. Multiple infectious and non-infectious conditions have been linked to AIP such as ingestion of plant-derived pneumotoxins (e.g. 3-methylindole from lush forages), inhalation of irritants (e.g. smoke or dust), viral infection (particularly bovine respiratory syncytial virus), septicaemia, disseminated intravascular coagulation, left sided cardiac failure, and *Dictyocaulus viviparus*. All trigger the release of inflammatory mediators which together with infiltration of inflammatory cells result in diffuse alveolar damage. The cause often remains unknown, and no predisposing factors were identified in this case. Enlarged hearts had previously been recorded on examination of two calves from the herd submitted in 2022 and 2023. All three had been sired by the same bull and while this may be co-incidental, ongoing investigation of youngstock mortality was recommended.

Skin diseases
A 10 cm long solid pigmented growth was removed from the flank of an eight-week-old suckled calf after the farmer observed that the mass had rapidly increased in size over a two-week period. Histopathology confirmed it to be a relatively well differentiated melanoma with a low mitotic count. However, there was evidence of infiltrative growth with neoplastic cells present at the surgical margin raising the possibility of local recurrence. Melanomas can develop at any age but are more commonly diagnosed in cattle under two years-of-age with congenital cases also reported.[1]

Three conjunctival swabs were submitted from housed Holstein heifers in order to investigate an ongoing problem with infectious bovine keratoconjunctivitis (IBK) affecting half of the group of twenty. *Moraxella bovoculi* was isolated from two and *Moraxella bovis* from the third with both organisms considered potentially significant. *Trueperella pyogenes* was also cultured in one case and will have been contributing to the disease process as a secondary invader. Both *Moraxella* spp can be isolated from healthy eyes and while *M bovis* has been proven to cause IBK following experimental infection the same is not true for *M bovoculi. M bovis* 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.[2]

SMALL RUMINANTS

Parasitic diseases
Two diagnoses of nematodirosis were confirmed in the south-west during the last week of May. In the first case two, two-month-old Texel lambs from a group of 17 were found dead with no premonitory clinical signs observed. The submitted carcase was well grown but faecal stained with liquid contents throughout the intestinal tract. A total of 16,700 *Nematodirus battus* worms were recovered from the small intestine with no evidence of a concurrent strongyle burden. Only 250 *N battus* eggs per gram (epg) were detected indicating that infection was mainly pre-

patent. The second flock reported the death of four March born lambs that had received a benzimidazole drench at the end of April. In this case 26,700 *N battus* worms were recovered from the small intestines with a further 12,100 *Teladorsagia* spp worms from the abomasum, and worm egg count results of 150 *N battus* and 4,900 strongyle epg. The presence of a mixed worm burden should be taken into account when selecting an anthelmintic as a benzimidazole product (aimed at treating *N battus)* may not be appropriate due to the high prevalence of anthelmintic resistance in *Teladorsagia* spp worms.

Generalised and systemic conditions

A well-grown ten-week-old Texel lamb was submitted for investigation of sudden death. It was the only loss from a group of 20 ewes and 30 lambs. The lungs failed to collapse on postmortem examination and had a rubbery texture. The mesenteric lymph nodes were prominent and the faeces soft however the cause of death was not clear. Histopathology revealed bone marrow hyperplasia due to a massive increase in myeloid production with huge numbers of eosinophils present. Eosinophil infiltrates were confirmed in the lung, heart, diaphragm, liver, kidney and abomasum. This was considered most likely to be an idiosyncratic, exaggerated response to parasites. Intestines were too autolysed for histopathology and no worms were recovered on abomasal and small intestinal washes. A worm egg count detected 83,600 coccidial oocysts per gram with the most pathogenic species, *Eimeria crandallis* and *E. ovinoidalis,* accounting for 25 and 5 per cent of oocysts respectively. This was considered potentially significant for younger lambs in the group but any relevance to the hypereosinophilic syndrome was not clear. It was not possible to exclude the possibility of eosinophilic leukaemia. Cases of hypereosinophilic syndrome have been described in man, horses, dogs and cats and the aetiology is often obscure.

A hill flock reported lambs presenting with swollen joints from around ten days-of-age. An initial on farm postmortem examination of a month-old lamb identified additional pneumonia, pleurisy and pericarditis, however bacteriology of lung tissue and joint swabs was unrewarding possibly due to previous antibiotic treatment. Examination of a second lamb revealed a liver abscess plus further evidence of septic arthritis and resulted in the isolation of *Streptococcus dysgalactiae* from the liver and *Trueperella pyogenes* from both liver and joints. The most significant finding was detection of *Anaplasma phagocytophilum* DNA by PCR confirming a diagnosis of tick-borne fever which was considered to be the predisposing factor for the losses.

Respiratory tract diseases

A one-month-old Highlander cross lamb was submitted for investigation of acute fatal respiratory disease after it become the fourth lamb to die. The skin surrounding the ear tag was inflamed and moist (Fig 3) and there was extensive abscess formation within the left caudal and accessory lung lobes. *Staphylococcus aureus* was isolated from both the lung and the ear. The possibility of tick pyaemia was investigated however PCR testing of spleen for *A phagocytophilum* proved negative and it was presumed that the ear tagging site was the likely entry point for *S aureus.* Ear tagging in lambs is not a benign procedure and bacterial infections can negatively impact on welfare and productivity.

Figure 3 - *Staphylococcus aureus* infection at an ear tagging site

Mammary diseases

The carcase of a three-year-old aberfield cross ewe was submitted for postmortem examination. Eight ewes had died from a group of 50 and this ewe had recently lambed. It had been ill for 24 hours prio to death. The right udder was swollen and hard with several small abscesses within the mammary tissue while the left udder contained a single large abscess. *Staphylococcus aureus* was isolated from both, and histopathology of liver, spleen and lung detected areas of necrosis associated with bacterial colonies consistent with *S aureus* confirming septicaemia as the cause of death. Predisposing factors for mastitis in freshly lambed ewes can include chilling of the udder and teat lesions.

Nervous system disorders
Ten young lambs died over 48 hours with some showing neurological signs prior to death. On farm postmortem examination of two, one-month-old lambs was not diagnostic however louping ill was suspected having previously been diagnosed in ewes on the same field. This diagnosis was confirmed when louping ill virus was detected by PCR in both lambs and neuropathology revealed changes consistent with louping ill. Colostral antibodies are generally protective in this age group suggesting that either naïve ewes were present or colostrum quality or intakes were inadequate.

Renal diseases
A four-week-old Highlander tup lamb became ataxic for a few days before being found dead. It was reported to have been smaller than its twin since birth with an inferior growth rate despite the ewe having plenty of milk. Postmortem examination identified oesophagitis, localised lung abscessation and dark coloured diarrhoea. There was no milk in the abomasum and both kidneys were pale and swollen typical of nephrosis (Fig 4). The carcase smelled uraemic and the aqueous humour urea result of 128 mmol/l was consistent with renal failure. The aetiology was not clear with no evidence of a significant parasite burden at the time of death. An earlier challenge with cryptosporidia could not be ruled out.

Figure 4 – Pale enlarged kidneys in a case of nephrosis

PIGS

An eight-week-old landrace cross pig from a commercial breeding to finishing unit was found dead and submitted as part of a project investigating post weaning mortality. Postmortem examination revealed pericarditis and endocarditis affecting the left and right atrioventricular valves. *Actinobacillus equuli* was isolated from both the lung and heart valve with histopathology confirming acute bacterial septicaemia as the cause of death. There was evidence of biphasic infection with the initial endocarditis lesion containing Gram-positive cocci, typical of *Streptococcus* or *Staphylococcus* spp bacteria. The more superficial bacterial colonies, and those within the myocardium consisted of Gram-negative bacilli consistent with *A equuli. Actinobacillus equuli* is a primary infectious agent of horses but the organism has occasionally been reported as an opportunistic pathogen of pigs.

References:

1 Miller MA, Weaver AD, Stogsdill P *et al.* Cutaneous melanomas in 10 young cattle. *Vet Path* 1995: 32: 479-84

2 Loy JD, Hille M, Maier G, Clawson ML. Component causes of infectious bovine keratoconjuntivitis – The role of *Moraxella* species in the epidemiology of infectious bovine keratoconjuntivitis. *Vet Clin Food Anim* 2021; 37: 279-93