SRUC Veterinary Services Monthly Report for February 2020

OVERVIEW

- **Congenital lymphoma as a cause of bovine abortion.**
- **Abomasal tympany and mural emphysema associated with *Sarcina* sp. colonisation in Suffolk lambs.**
- **Multiple abortions due to PRRSV in an outdoor pig herd.**
- **Ongoing losses due to avian tuberculosis in a backyard poultry flock.**

GENERAL INTRODUCTION

The mean temperature for February was 0.4 °C above the long-term average and it was the second wettest February in a series from 1862. Rainfall was near average in the north-east but most other parts of the country had well over twice the normal amount. Sunshine was 104% of average but generally below average in the west, and well above normal in Aberdeenshire.

DISEASE ALERTS

The following conditions were reported by SRUC VS disease surveillance centres in May 2020. Given similar climatic and production conditions, they could also be important this year.

- **Frothy bloat in weaned dairy calves**
  The risk factors for frothy bloat include strip grazing of heavily fertilised ground. Delaying turn out until calves are older and providing supplementary feeding can reduce the risk. The onset of frothy bloat is often rapid, therefore providing access to fresh grazing in the morning will allow calves to be monitored during daylight hours.
- **Mineral drench inhalation in young lambs**
  This is an increasingly recognised complication of dosing young lambs and highlights the importance of assessing the need for supplementation, and using the correct technique. In many of these cases lambs have undergone multiple procedures at the same handling suggesting that this increases the risk of inhalation occurring. Deaths often occur in the immediate post-drenching period but may continue for several days. Histopathological examination of lung from fresh carcases reveals multifocal airway necrosis typical of acute chemical injury, and unfixed samples of lung are useful for detecting elevated levels of copper. Consideration should be given to planning management tasks carefully.

Alimentary tract disorders

Two calves, born to heifers following assisted calvings, died within six hours of birth. The second calf failed to stand and was tubed with colostrum, but then deteriorated and died. Postmortem examination detected evidence of dystocia, with petechiation in the conjunctiva and sclera, and bruising of the muscles over the shoulders and ribcage. A large volume of colostrum was found within the thorax as a result of a linear tear in the oesophagus at the level of the heart base (Fig 1). SRUC VS advised checking the end of the stomach tubes that have been used previously, as chewing can create sharp edges.

A four-year-old Shetland cow from a herd of 36 spring calving cows lost weight over a period of three months despite maintaining a good appetite. It was euthanased and submitted for postmortem examination after becoming recumbent. Body fat stores were negligible, the intestinal contents were liquid, and the terminal ileum appeared thickened with dark red congested mucosa. Acid/alcohol-fast bacilli forming typical clumps consistent with *Mycobacterium avium subspecies paratuberculosis* were observed on microscopy, confirming a diagnosis of Johne's disease. This was the first diagnosis of Johne's disease recorded by SRUC VS in this herd, which had bred its own replacements for three years.

Figure 1 – Iatrogenic oesophageal tear in a neonatal calf

Respiratory tract diseases

An outbreak of respiratory disease affecting 30 animals from a group of 70 weaned calves in a 200- cow spring calving herd was investigated by submission of an eight-month-old Aberdeen Angus cross calf for postmortem examination. The main findings included a necrotising tracheitis and consolidation of the cranioventral lungs with interlobular oedema and purulent exudate in the

large airways. A moderate pure growth of *Mannheimia haemolytica* was isolated from the lungs and the trachea proved PCR positive for bovine herpes virus 1 (BoHV1). While the animals had been vaccinated against several agents of the bovine respiratory disease complex, the programme did not provide cover against BoHV1.

Reproductive tract conditions

A heifer aborted and the foetus was submitted for investigation. This was the first loss from a herd of 100 cows that were due to start calving in two months. Postmortem examination revealed hepatomegaly and enlargement of all carcase lymph nodes (Fig 2). Histopathology identified infiltrative sheets of neoplastic round cells in the lymph nodes, lung, heart, liver and choroid plexus confirming a diagnosis of multicentric congenital lymphoma. This has previously been reported sporadically in both aborted and neonatal calves and is the most common form of lymphoma in these age groups.[1]

Two abortions, three days apart, in a group of 42 suckler cows prompted submission of a foetus for postmortem examination. Calving was due to start in three months and the cows were reported to be in good condition with no clinical signs noted. Replacements were homebred and no vaccinations were used in the herd of 130. No gross pathology was evident in the foetus, but histopathology identified multifocal hepatocellular necrosis suggestive of infection with BoHV1. This was confirmed by PCR screening of liver tissue. It is useful to freeze samples of liver and spleen in virus transport medium at the time of carcase examination. They are then available if routine screening suggests that further testing is required to achieve a diagnosis.

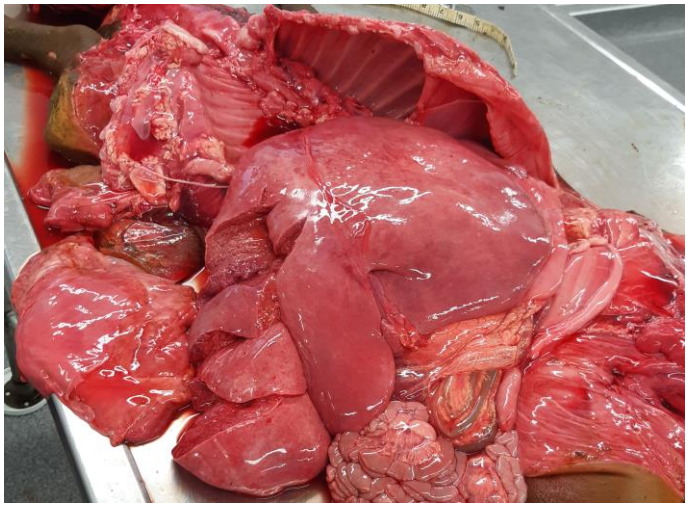

Figure 2 – Hepatomegaly in a bovine foetus with congenital lymphoma

SMALL RUMINANTS

Parasitic diseases

A hobby flock of 18 Ryeland and Kerry hill sheep reported the death of nine animals between September and February. Deaths had occurred in both adults and immature animals and some affected individuals were noted to exhibit neurological signs prior to death. A Ryeland hogg was found paddling in lateral recumbency and euthanased for investigation of the problem. The carcase was emaciated with no body fat and weighed only 18 kg. Intestinal contents were liquid, and the hindquarters were faecal stained. A total of 67,800 worms of mixed species were recovered from the abomasum and small intestine. *Haemonchus contortus* worms were not detected. Parasitic gastroenteritis was considered to be the cause of the clinical signs. Liver analysis confirmed concurrent copper and selenium deficiency with results of 278 umol/kg dry matter (DM) (reference range 314 to 7850 umol/kg DM) and 0.27 mg/kg DM (reference range 0.9 to 3.5 mg/kg DM) respectively. Prompt anthelmintic treatment and trace element supplementation was recommended.

Alimentary tract disorders

Two, well-grown six-week-old Suffolk lambs were found dead and submitted for postmortem examination. The ewes had received a clostridial vaccine booster prior to lambing, and the lambs had access to creep feed. The carcases were significantly autolysed but despite this extensive emphysema was apparent within the abomasal wall. The abomasal contents were black and the caecal contents were liquid and black. Neither Mannheimia haemolytica nor *Clostridium sordellii* were detected on culture. Histopathology revealed groups of large coccoid bacteria arranged in tetrad clusters within the abomasal lumen consistent with *Sarcina* sp. Prominent submucosal emphysema and protein rich oedema were also confirmed. These findings suggested bacterial proliferation and gas production secondary to the presence of excess fermentable carbohydrate within the abomasum, resulting in chemical and hypoxic injury to the mucosa, similar to that occurring in calves.[2] A nutritional, rather than an infectious, aetiology was suspected, and a review of nutrition and hygiene was advised.

Reproductive tract conditions

A Texel ewe gave birth to one dead and two live lambs but then became dull, anorexic and recumbent over the next 48 hours. Euthanasia and postmortem examination were carried out on farm and metritis was suspected. *Clostridium sordellii* was isolated from the uterus and is potentially significant as a secondary cause of metritis.

Histopathology confirmed a severe, acute, necrotising and fibrinopurulent metritis but there was no evidence of clostridial involvement suggesting that *C sordellii* proliferated postmortem. Histopathology can be invaluable in clarifying the possible significance of bacterial isolates, and tissues should be routinely fixed in formalin.

Nervous system disorders

A four-year-old, Scottish blackface ewe was treated with oxytetracycline after being found standing listless in the field. It failed to improve and was presented for postmortem examination two days later when it became the third ewe to die from a group of 470. The most significant gross finding was herniation of the cerebellar vermis through the foramen magnum with haemorrhage in the surrounding meninges (Fig 3). Clostridial perfringens type D enterotoxaemia was suspected but epsilon toxin was not detected in the ileal content. Histopathology revealed mid-deep laminar to full thickness cerebrocortical necrosis and oedema of tips of white matter cores. Bilateral neuronal necrosis in subcortical sites including lateral and medial geniculate bodies together with medioventral Purkinje neuronal and internal granule cell necrosis in the cerebellar vermis were also seen. The latter lesions were consistent with cerebral oedema resulting in the herniation of the cerebellar vermis. The characteristics and distribution of the cerebral and subcortical lesions were typical of thiamine-dependent encephalopathy / sulphate intoxication complex. Thiamine deficiency can be associated with disruption of the rumen microflora and the introduction of concentrates four days earlier could have been a predisposing factor in this ewe.

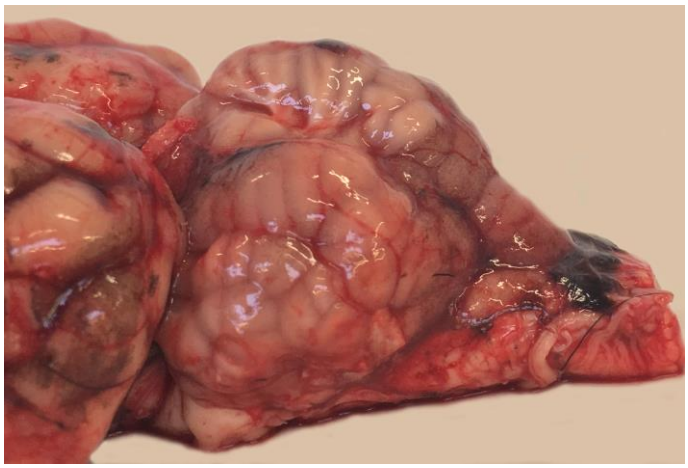

Figure 3 – Elongation of the cerebellar vermis due to herniation through the foramen magnum

Circulatory system disorders

Three hundred ewes stocked on stubble turnips, and due to lamb in one month, were gathered for administration of a clostridial vaccine booster. Three ewes were found dead in the following 72 hours and one was submitted for postmortem examination. The ewe was very fat, had triplet foetuses in utero, and weighed 113 kg. A large volume of clotted blood, mainly contained within the omentum, was present in the abdomen. There was no evidence of haemorrhage from the liver, kidneys or uterus. The omentum was heavily infiltrated with fat and it was suggested that this was the most likely source of bleeding. It was not possible to prove if trauma, perhaps associated with gathering, was the cause of the haemorrhage; and the possibility of underlying vascular pathology was not investigated. The death of this ewe may have been unrelated to the other two, and it was advised that further carcases should be examined if losses continued.

PIGS

Generalised systemic diseases

A breeding – finishing unit found five, six to ten-week-old Hampshire cross pigs dead one morning and submitted the carcases for postmortem examination. A vaccinal strain of porcine reproductive and respiratory syndrome virus (PRRSV) had previously been identified as pathogenic on the unit, and there was concern that this may have contributed to the deaths. A range of diagnoses including mulberry heart disease, septicaemia secondary to bacterial enteritis and proliferative haemorrhagic enteropathy were made. Only one of the five pigs tested PCR positive for PRRSV, and immunohistochemistry did not detect PRRSV antigen in the lung, suggesting lack of clinical significance. It was concluded that PRRS had not contributed directly to the deaths of the submitted animals.

Reproductive tract conditions

Four sows from a batch of 135 on an 850-sow outdoor unit farrowed four to five days early and between 50 to 100 percent of each litter was born dead. Small numbers of mummified piglets were also reported. Other piglets died soon after birth and only four ultimately survived. Twenty-six carcases were presented for investigation of the problem and ten of these had both breathed and sucked. The remaining foetuses had haemorrhagic subcutaneous oedema and excessive volumes of straw-coloured thoracic and peritoneal fluid. Three of four pools of foetal lung tissue tested positive for PRRSV on real time PCR. Genetic sequencing of the virus isolated from the piglets showed sequences consistent with wild-type virus as opposed to reverted vaccinal strain.

Genetic sequencing was important in this case as pigs were vaccinated against PRRSV at weaning, and it is known that modified live vaccine strains can both revert to virulence and recombine with wild type virus.[3] (P504160)

Nervous system disorders

A non-suppurative polioencephalomyelitis typical of a neuronotropic viral infection together with variable brainstem neuroparenchymal necrosis was identified in three of five growing pigs submitted from a breeding unit. Bacterial bronchopneumonia and pleuritis were present in the other two pigs, one of which also had a mild non-suppurative encephalitis. In the two weeks prior to the first submission 12 pigs, aged around eight weeks, from a group of 720 had presented with sudden onset lateral recumbency, paddling and twitching. The main differentials for polioencephalomyelitis comprise sapelovirus, teschovirus and astroviral infections and further testing of stored tissue is planned. Multifocal neuroparenchymal necrosis has been previously detected in pigs with concurrent sapelovirus and PRRSV infections and whilst PRRSV was not detected, the pigs in the unit tested positive for SIV.

BIRDS

Poultry

Two chickens with a history of weight loss prior to death were submitted from a flock of 60 birds over the course of one week. In both cases multiple granulomas measuring up to 0.5 cm in diameter were found within the parenchyma of the liver and spleen. Further lesions were located on the mesentery, gizzard and within the intestinal wall. The second bird had died as a result of haemorrhage from the liver. ZN smears proved positive for acid-fast organisms consistent with a diagnosis of avian tuberculosis in both cases. This brought the number of recent avian tuberculosis diagnoses for the flock to four. *Mycobacterium avium* subspecies *avium* can survive for extended periods in the environment and wild birds, rodents and mites can act as carriers. It was advised that the area used by the flock was likely to be contaminated with *M avium*, posing a risk of infection to the remaining birds. Establishing a new, clean flock on ground not used by the existing flock was suggested but was not practical.

Game birds

A gamekeeper reported that a number of his red-legged partridge breeding stock were dull with a hunched-up appearance. Two birds from a group of 100 in a grass enclosure had died. Faecal staining around the vent was noted in the five birds examined and a worm egg count was carried out on two. This revealed high coccidial counts of 17,800 and 399,600 oocysts per gram, and a burden of *Capillaria* sp. (15,100 and 9,600 eggs per gram). Both were considered likely to be contributing to the problem and anticoccidial and anthelmintic treatment was recommended.

References:

1 Misdorp W. Tumours in calves: Comparative aspects. *J Comp Path* 2002; 127:96-105

2 Panciera RJ, Boileau MJ, Step DL. Tympany, acidosis and mural emphysema of the stomach of calves: reports of cases and experimental induction. *J Vet Diagn Invest* 2007; 19(4):392-5

3 Nan Y, Wu C, Gu G *et al.* Improved vaccine against PRRSV: Current progress and future perspective. *Front Microbiol* 2017; 8:1635

Malignant Catarrhal Fever In Cattle

Malignant catarrhal fever (MCF) occurs sporadically in cattle and is almost invariably fatal in either acute or chronic clinical manifestations. In the UK the causal virus is ovine herpesvirus-2 (OvHV-2) and the reservoir for infection is sheep and goats that carry the virus without developing disease. Deer and pigs can also develop MCF following exposure to OvHV-2, with the clinical course in deer often similar to the peracute form in cattle. Recent evidence suggests that some cases of ovine sporadic vasculitis may represent a MCF-like syndrome associated with expression of OvHV2 in intralesional lymphocytes.[1]

Younger cattle are predominantly affected by MCF, as shown in Figure A, which compares Scottish diagnoses in animals under two years of age with those in older animals. The head and eye form is the most common presentation[2] and the lesions are frequently dramatic and progress rapidly (Fig B). Alimentary, neurological and cutaneous forms are also reported but make up a minority of diagnoses. The typical clinical signs are outlined in Table 1. The presenting signs as reported at the time of carcase or sample submission are summarised in Figure C.

Table 1: Clinical presentations of malignant catarrhal fever in cattle

Head and eye	Pyrexia, corneal opacity, oculonasal discharge, ulcerative stomatitis, lymphadenopathy
Peracute/alimentary	Pyrexia and haemorrhagic diarrhoea with death in 1 to 3 days
Nervous	Pyrexia, hindlimb ataxia, tremor, recumbency, blindness, opisthotonos, nystagmus, convulsions, tetany
Cutaneous	Generalised exudative dermatitis
Chronic	Persistent bilateral corneal oedema, remain infected with OvHV-2

Differential diagnoses to consider in the UK include mucosal disease, infectious bovine rhinotracheitis and severe cases of bovine papular stomatitis. Notifiable diseases including foot and mouth disease, bluetongue and vesicular stomatitis should also be considered.

PCR tests can be used to detect the virus in blood samples from clinically affected animals, or spleen collected post-mortem. Affected animals may also be antibody positive depending on the duration of clinical signs. The histopathological findings are characteristic; most commonly multisystemic lymphocytic inflammation particularly in the brain and liver, lymphoid hyperplasia and ulceration of mucosal surfaces associated with lymphocytic interface infiltration, and fibrinoid vasculitis. The latter is most often found in the carotid rete mirabile. It is very rare for affected animals to recover and, following confirmation of the diagnosis, they should be euthanased without delay.

Commonly only single animals are affected, but outbreaks have occurred. Cases in Scotland occur predominantly in the late spring, peaking in May. Shedding of virus has been shown to peak in lambs at six to nine months of age[3], but this is not reflected in the seasonality of cattle diagnoses, suggesting that other factors influence the occurrence of disease. Climate may affect the persistence of the virus in the environment but increased contact between cattle and sheep (when the latter are brought in from extensive areas for lambing) may also have a role. The association with sheep is emphasised by the fact that 90 percent of diagnoses were in beef cattle; with the majority of beef farms in Scotland having both cattle and sheep.

Part-funded by the Scottish Government as part of its Public Good Veterinary Advice Services

Currently no vaccine is available for MCF, so control measures should focus on management to minimise contact between sheep and cattle, particularly at times of stress such as lambing or shearing.

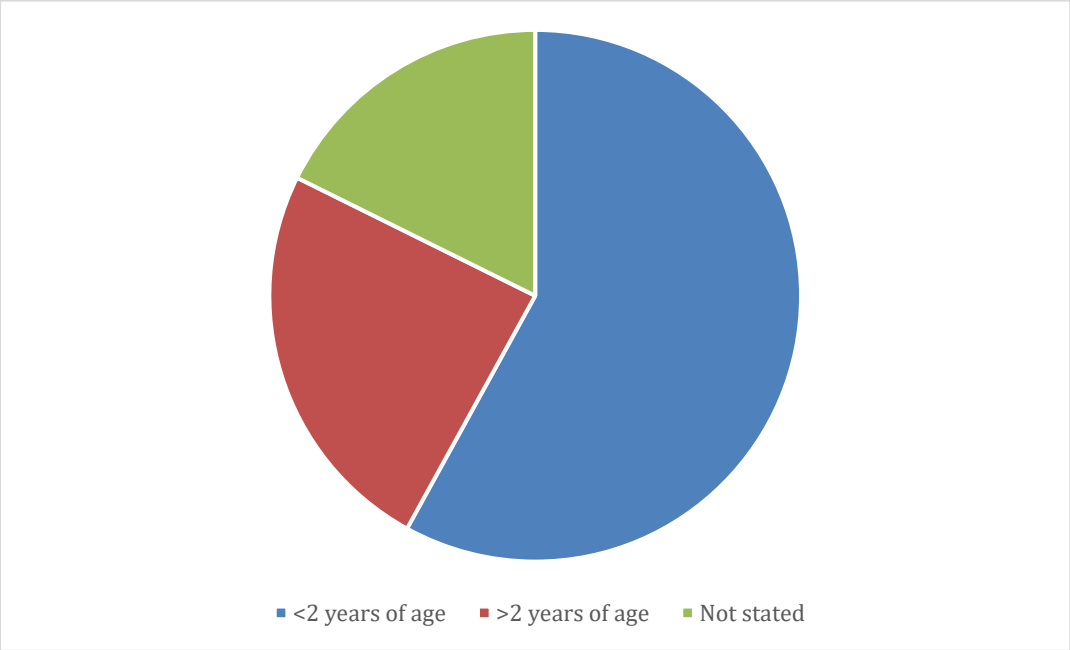

Figure A: Age at diagnosis of MCF in Scotland (2010 to 2019)

Figure B: Severe stomatitis in a stirk with MCF

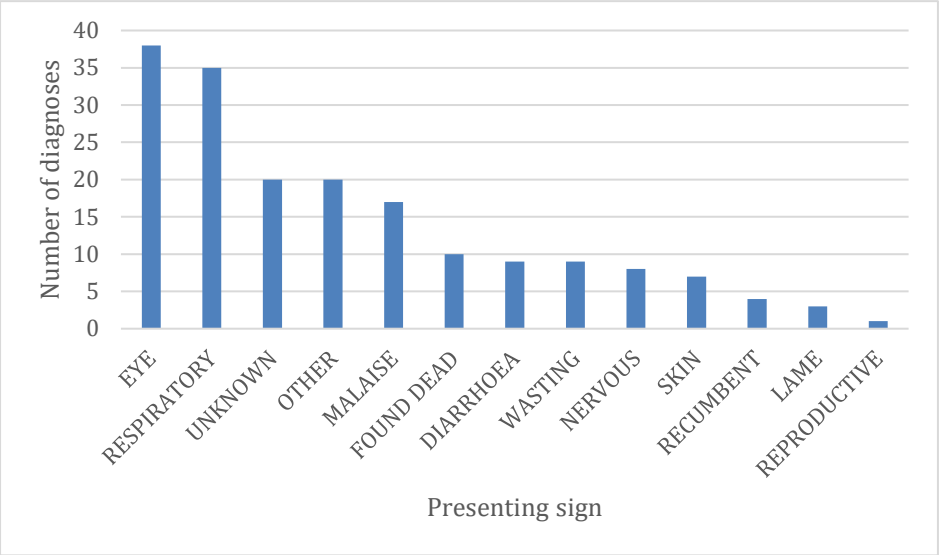

Figure C: Diagnoses of malignant catarrhal fever by presenting sign

References:

1 Pesavento PA, Dange RB, Carmen Ferreras C *et al.* Systemic necrotising vasculitis in sheep is associated with Ovine Herpesvirus 2. *Vet Path* 2019; 56(1):87-92

2 Russell GC, Stewart JP, Haig DM. Malignant catarrhal fever: A review. *Vet J* 2009; 179:324-335

3 Li H, Snowder G, O'Toole D, Crawford TB. Transmission of ovine herpesvirus 2 in lambs. *J Clin Microbiol* 1998; 36(1):223-6