Surveillance

SAC C VS DISEASE SURVEILLANCE REPORT

Diagnoses of fasciolosis show a rise in Scotland

- Fasciolosis widespread in cattle and sheep
- Hypomagnesaemia causes deaths in housed suckler cows
- Thrombotic meningoencephalitis confirmed in a six-month-old calf
- Plant poisoning causes ewe deaths
- Acid-alcohol-fast bacilli of unknown aetiology identified in faecal samples from diarrhoeic camelids

These are among matters discussed in the disease surveillance report for December 2012 from SAC Consulting: Veterinary Services (SAC C VS)

The start of December 2012 was cold with wintry showers as well as some snow across the mountains. However, the second half of the month was mild and wet, with eastern Scotland experiencing the wettest December since 1929.

A joint press release from the Scottish Government and several industry bodies reminded Scottish farmers to remain alert to the possibility of Schmallenberg virus (SBV) being detected in their flocks and herds. While no acute cases of SBV were recorded in Scotland, Sheila Voas, Chief Veterinary Officer, advised that any farmers who encountered fetal abnormalities, stillbirths or newborns showing signs of nervous disease should contact their vet or local SAC Consulting: Veterinary Services (SAC C VS) Disease Surveillance Centre.

Cattle
Nutritional and metabolic disorders
Perth diagnosed hypomagnesaemia in a beef suckler herd in which two housed adult cattle died suddenly. The affected animals received ammonia-treated straw with pot ale syrup and were still suckling their spring calves. The aqueous humour of the two dead cows showed suspicious magnesium values of 0.5 mmol/l and 0.6 mmol/l. Further screening of four blood samples from the clinically normal cohort revealed markedly low serum magnesium values of 0.3, 0.5, 0.2 and 0.2 mmol/l (reference range 0.8 to 2.0 mmol/l). SAC C VS recommended group supplementation with magnesium.

Parasitic diseases
Fasciolosis was diagnosed 44 times in cattle in December, compared with 29 in November. The number of outbreaks expressed as a percentage of diagnosable submissions also rose. Overall, diagnoses of fasciolosis in cattle increased in 2012 compared with 2011, reversing the downward trend in diagnoses seen since a peak in 2008 (Fig 1).

Dumfries considered that liver fluke infection contributed to the deaths of calves on two farms in December. On one farm, four suckled calves aged four months died in the two weeks following housing. One calf, submitted for postmortem examination, was lean with a large number of mature fluke in the liver. A pour-on formulation of closantel and ivermectin was administered to the group six days before the calf’s death. Submission of faecal samples from the cohort three weeks after dosing suggested that this treatment had been effective.

**FIG 1:** Diagnoses of fasciolosis in cattle and sheep from 1993 to 2012 expressed as a percentage of diagnosable submissions
A nine-month-old suckled calf from a second farm was diagnosed with severe chronic fasciolosis and type I osteotagiosis. The abomasal mucosa was hyperplastic and 850 strongyle eggs per gram were detected in the faeces. No anthelmintic treatments had been administered to the group although fluke and worm treatments had been given to other groups of cattle that were housed.

**Generalised and systemic conditions**

Hypogammaglobulinaemia, cryptosporidiosis, salmonellosis due to *Salmonella Dublin*, rotavirus infection and coronavirus infection were all diagnosed on a dairy farm experiencing diarrhoea and mortalities in neonatal calves. The farm had experienced multiple cases of bovine neonatal pancytopenia (BNP) in previous years and the management decided to snatch newborn calves and administer heifer’s colostrum by stomach tube. In addition, an expansion of the herd had resulted in calving boxes being used more frequently between rebedding. SAC C VS recommended that colostrum management and calving box hygiene be reviewed. Although SAC C VS advises that calves born to cows that have previously produced a BNP calf are not given colostrum from that cow, the decision in this case to use heifer colostrum, likely of poorer quality, may have been significant. In addition the calves may not have received a sufficient volume of colostrum.

**Respiratory tract disorders**

In December, across Scotland 35 diagnoses of bovine respiratory disease (BRD) were made. This was far fewer than the same month in previous years (57 in 2011 and 61 in 2010). Bovine parainfluenza type 3 (PI-3) virus infection was diagnosed in a poorly thrive five-month-old Aberdeen Angus-cross heifer calf submitted from a suckler farm. The unit had experienced six calf deaths in the previous week. Calves and dams were housed six weeks before the deaths; no respiratory vaccines had been used and the shed was overstocked. At postmortem examination, congestion and consolidation were identified. Histopathology findings were consistent with a diagnosis of PI-3 infection. Six convalescent serum samples submitted from the cohort were all seropositive for PI-3. One was also seropositive for infectious bovine rhinotracheitis, while all were seronegative for BVDV and respiratory syncytial virus. SAC C VS recommended that housing should be reviewed and that BRD vaccination should be considered for subsequent years.

**Reproductive tract conditions**

A suspected case of SBV infection was investigated by Aberdeen following the submission of a Limousin-cross fetus of approximately six months’ gestation. This was the second abortion from a group of 28 heifers in one week. Examination of the fetus revealed mild arthrogryposis, scoliosis of the thoracic spine (Fig 2), a severe cleft palate and severe hydranencephaly (Fig 3). The fetus and dam were seronegative for antibodies to SBV and PCR screening of the fetal brain was also negative. Neuropathology confirmed that the cerebrum consisted of a very thin layer of neural tissue, there was agenesis of the cerebellum and the spinal cord was underdeveloped. SAC C VS considered that the findings were likely of genetic origin rather than an infectious cause.

**Nervous system disorders**

St Boswells diagnosed thrombotic meningoencephalitis on postmortem examination of a six-month-old Luing-cross calf. The submitted calf was stiff, weak, dyspnoeic and pyrexic, progressing to lateral recumbency and neurological signs before death. Another two animals in the group responded to oxytetracycline after showing initial signs of stiffness. At postmortem examination the total protein content of the cerebrospinal fluid was markedly increased at 7.6 g/l (reference range 0.23 to 0.66 g/l) and cytology revealed a large number of neutrophils, lymphocytes and coccoid bacteria indicating the presence of an inflammatory process. Histological examination of the brain confirmed the diagnosis. SAC C VS suspected that the failure to isolate *Histophilus somni* from bacterial cultures was due to antibiotic therapy before death.

**Small ruminants**

**Toxic conditions**

Two instances of plant poisoning were diagnosed. Inverness found leaves from *Euonymus fortunei* and *Pieris japonica* ‘Minor’ in the rumen contents of a ewe submitted after seven ewes died and a further seven displayed clinical signs including excessive salivation, dyspnoea, bloating, weakness and recumbency. All of the affected ewes had escaped into a garden shortly before the onset of signs. Leaves from both *Euonymus* and *Pieris* species are highly toxic to sheep when ingested.

Perth confirmed rhododendron poisoning in three blackface hoggs that died after eating leaves from branches overhanging the field boundary. Recent snowfall and a lack of supplementary feeding were considered likely to have prompted the ingestion of the leaves, which ruminants usually find bitter.

Hepatic pathology of unknown aetiology was seen at postmortem examination in an overfat, Beltex gimmer that died two weeks after being flushed. The ewe was dull before flushing and displayed signs of poor blood clotting after the procedure. Blood samples collected at this time showed raised levels of liver enzymes, while plasma copper was within the reference range. The ewe’s appetite and demeanour improved and it was turned out, but later found dead. At
postmortem examination, the abdominal wound had healed and there was no evidence of infection. A large amount of free blood was found in the abdomen originating from a 3 cm tear in the diaphragmatic surface of the liver. The liver was orange in colour with no evidence of fasciolsis, jaundice or haemoglobinuria. Assay of liver and kidney copper levels were increased above the reference ranges being 17,400 µmol/kg and 1490 µmol/kg, respectively, (reference ranges: liver 514 to 7850 µmol/kg; kidney <787 µmol/kg). Although there was evidence of excess copper loading, the pathological findings were not typical of chronic toxicity and the reason for the liver damage was not clear. Histopathology was not carried out due to tissue autolysis.

**Parasitic diseases**
Cases of fasciolsis continued to dominate the postmortem rooms in many centres. VIDA data showed that, as a percentage of diagnosable submissions, fasciolsis was diagnosed in sheep more than twice as often during 2012 compared to 2011 and well in excess of any of the preceding 20 years (Fig 1). Levels were particularly high during the last three months of 2012. In December, SAC C VS issued a press release highlighting the problem and advising farmers of steps that could be taken to mitigate losses at lambing and later in 2013.

**Reproductive tract conditions**
Edinburgh diagnosed septic peritonitis secondary to metritis and salpingitis, following postmortem examination of a two-year-old cross-breed ewe. Although the flock history suggested acute fasciolsis as the most likely diagnosis, the liver appeared normal. Purulent material was found in the uterus with associated inflammation throughout the caudal abdomen. In addition, multifocal, military abscesses were present in the wall of the left cardiac ventricle. Culture of the uterus produced a mixed growth of *Escherichia coli* and other commensal bacteria. SAC C VS considered that these findings were consistent with a bacteraemia subsequent to the metritis.

**Review of ovine abortion outbreaks in 2012**
With extensive coverage in the farming press on SBV and fasciolsis as potential causes of problems at lambing this year, SAC C VS considers that the more common and less novel causes of abortion will still cause significant losses during the lambing season.

Data from 2012 shows that *Chlamydia phila abortus*, or enzootic abortion of ewes (EAE), was the most commonly diagnosed cause of abortion in sheep, as it was in seven out of the previous 10 years. The breakdown of ovine abortion diagnoses in 2012, for cases where a diagnosis was reached, is shown in Fig 4. VIDA data for Scotland demonstrate that EAE and the next most commonly diagnosed cause of abortion, toxoplasmosis, have consistently accounted for between 22 per cent and 37 per cent of all diagnosed abortion submissions each year over the past decade.

**Skin diseases**
Thurso confirmed *Mycoplasma conjunctivae* as the cause of recurrent keratoconjunctivitis in a flock that had experienced outbreaks of ocular disease since shearing in July. Two of five swabs submitted were positive by PCR for *M conjunctivae*. Four samples were also suspicious for *Chlamydia phila* species on microscopy; however, there were insufficient cells to allow a definite diagnosis. Bacteriology produced a range of isolates including *Moraxella* species, *Enterococcus faecalis* and *Mannheimia glucosida*. These were considered to be secondary pathogens or contaminant species.

**Pigs**
**Generalised and systemic conditions**
Acute clostridial-type hepatopathy was suspected in a four-year-old breeding sow that died following a 12-hour period of anorexia. Liver tissue and faecal samples were submitted following an on-farm postmortem examination. Significant findings included a peritoneal exudate and a black liver with tiny gas bubbles scattered throughout the parenchyma. Bacteriology was unrewarding; however, histopathology confirmed marked, acute tissue necrosis associated with widespread infiltration of clostridial-type organisms and the presence of early gaseous changes. The findings were considered consistent with an acute hepatopathy such as occurs with *Clostridium novyi* infection. SAC C VS advised that vaccination against clostridial disease was worth considering in the unit. The failure to isolate any clostridial organisms in liver culture was probably due to a four-day delay between death and sample reception at SAC C VS.

**Respiratory tract disorders**
Infections of *Haemophilus parassuis* (Glasser’s disease), swine influenza and enzootic pneumonia affected a 21-week-old finishing boar submitted for postmortem examination. The animal was from a group of 200 finishers of which 12 had died. Signs of coughing, illthrift and some fluid limb swellings were noted, along with an...
increased incidence of abattoir reports of pleurisy in finishers.

**Alimentary tract disorders**
Postmortem examination of a nine-week-old piglet revealed colonic lesions of proliferative enteropathy (*Lawsonia intracellularis*) combined with *Yersinia enterocolitica* infection. The farm of origin had been experiencing uneven growth in about 5 per cent of the young pigs over the previous three to four months, with evidence of loose faeces but no overt diarrhoea.

**Birds**

**Poultry**

*E coli* septicaemia was diagnosed in a batch of three-week-old broilers in which elevated mortality was reported. Postmortem examination findings included pericarditis, peritonitis, airsacculitis and splenomegaly. Cellulitis under the skin of the abdomen was noted in two birds, while one bird had a purulent tenosynovitis. Bacteriology consistently demonstrated *E coli* in affected tissues. Large numbers of litter/orange mites were found on one of the carcasses and SAC C VS suspected that an underlying problem of poor litter quality had predisposed the birds to the colisepticaemia. Improvement of the litter resolved the problem, avoiding the need for antiobiotic therapy. Further carcasses, submitted two weeks later, showed no evidence of colisepticaemia but demonstrated changes consistent with broiler ascites syndrome.

Northern fowl mite (*Ornithonyssus sylviarum*) infestation was diagnosed in an eight- to nine-month-old Pekin bantam submitted to investigate malaise and deaths. A large number of highly active mites were detected on the bird. The absence of other pathogens and the high quantity of mites was considered to be diagnostic. Treatment of the remaining birds with an appropriate acaricide was recommended.

Marek’s disease was diagnosed in a 15-week-old buff Sussex chicken that was found dead. Several birds had died over the previous few weeks. The carcass was in poor body condition and had multiple discreet lesions in the liver. *Listeria monocytogenes* and a group D *Streptococcus* were cultured from the liver; however, histopathology revealed the liver and lung to be diffusely infiltrated with pleomorphic neutrophilic lymphocytic cells. Within the liver, there was little residual hepatic tissue remaining. The kidney and heart showed low-grade patchy infiltrates of a similar nature. These findings were consistent with a diagnosis of acute Marek’s disease. SAC C VS considered the presence of *L monocytogenes* to be of doubtful significance as the organism is ubiquitous in the environment and can be found in healthy poultry.

**Cage and aviary Birds**

Myocarditis of unknown aetiology was diagnosed in a young Swinhoe’s pheasant (*Lophura swinhoii*), an exotic species kept as an aviary bird. The bird was several months old, in good body condition and had been found dead. Postmortem examination revealed brown discoloration of the lungs and a dark brown/red pericardial and pleural effusion. Histopathology revealed widespread myocardial mononuclear cell infiltrates consistent with a non-suppurative myocarditis. The presence of widespread myocardial fibre swelling, rounding of myocardial nuclei and granular degeneration of myocardial fibres suggested acute hypoxic-type changes secondary to the myocarditis. No aetiological organisms or agents were detected.

**Pigeons**

Pigeon paramyxovirus 1 (PPMV-1) was identified in two free-flying fancy pigeons submitted for postmortem examination. The keeper reported that 12 out of 40 birds had died over a two-week period and treatment with a range of products had been ineffective. Affected birds had very watery droppings but no obvious respiratory or central nervous signs. Postmortem examination findings were non-specific or central nervous signs. Postmortem examination findings were non-specific. Postmortem examination findings were non-specific or central nervous signs. PPMV-1 was isolated from both birds. PPMV-1 is a notifiable disease and the AHVLA was informed. The remaining birds were treated with electrolytes in the drinking water and made a good recovery. SAC C VS recommended vaccination of the birds against PPMV-1 in the future.

**Wild birds**

Avian tuberculosis was diagnosed in a thin female buzzard (*Buteo buteo*) found alive but disoriented and moribund. The crop was empty and the thoracic and abdominal cavities contained many pale yellow nodules that were 2 to 4 mm in diameter. The omentum and airsacs were particularly affected. Ziehl-Neelsen staining of the nodules revealed a large number of acid-fast bacilli consistent with *Mycobacterium avium* infection.

**Miscellaneous species**

**Exotic animals**

Moderate chronic active pneumonia and pericarditis combined with mild chronic enteritis were identified in an eight-week-old Hermann’s tortoise, recently purchased from a pet store, that was anorexic before death. *Stenotaphromas musculophila* was cultured from lung tissue, while a *Kaloschistis* species burden of 850 eggs per gram was present in a faecal worm egg count. The bladder was full of urates. Histopathology revealed a moderate, chronic, active pneumonia and pericarditis as well as mild chronic enteritis. SAC C VS was unable to definitively identify the primary aetiology in this case.

**Camelids**

Perth identified an unknown species of acid-alcohol-fast bacilli in the faeces of a llama with signs of mild enteritis. The llama had been purchased three months before from Devon for use in a trekking enterprise. Faecal examination found a moderate distribution of single acid-alcohol-fast bacilli throughout several modified Ziehl-Neelsen (MZN) smears prepared from two different faecal samples taken two weeks apart. PCR screening for Johne’s disease on the MZN-positive sample returned a negative result. Liaison with the AHVLA revealed that the source farm in Devon had recently reported mild enteric signs in one llama on the premises. This animal and two unaffected llamas were sampled. Single acid-alcohol-fast bacilli were present in MZN smears from the llama with enteritis, while the other two samples were negative. Again, the MZN-positive sample was negative by PCR for Johne’s disease. The AHVLA carried out further testing on faecal samples from both the Scottish case and the Devon case using the Flain CM kit, that detects the DNA of most common mycobacteria species as well as the tuberculosis (TB) complex. Both samples were negative for mycobacteria species and the TB complex on these tests. The mild enteric signs in both animals resolved spontaneously and the identity of the acid-alcohol-fast bacteria visible in the faeces remains unknown. *Nocardia* species and *Rhodococcus* species have been found in faeces of clinically normal animals or animals (especially pigs) that were screened on suspicion of having tuberculosis; however, there are no reports of either of these species being found in llama faeces or causing mild enteric signs in camels. SAC C VS considered that the experiences of this investigation may be of interest to anyone considering the screening of llamas and other camelids transported to Scotland from TB-endemic areas.

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