OVERVIEW

- Evidence of Schmallenberg virus activity in Scotland during 2012
- Marked rise in ovine abortions due to *Campylobacter* species
- Early *Lawsonia intracellularis* infection reduces pigs’ growth rates
- Sea-bird wrecks on the east coast of Scotland
- Unusual presentation of MCF in a Pere David’s deer

GENERAL INTRODUCTION

This month the first evidence emerged that Schmallenberg Virus (SBV) was circulating in Scotland in 2012. Scottish Government announced that eight cows in a dairy herd at the Barony campus of Scotland’s Rural College in Dumfries and Galloway had tested positive for SBV antibodies. The animals were homebred and no animals had been added to the herd from outside Scotland. Rural Affairs Secretary Richard Lochhead said, “Since Schmallenberg was first detected in the south of England we have watched it spread slowly northwards. Confirmation of its arrival in Scotland is, therefore, no surprise but is nonetheless disappointing and undoubtedly a headache which farmers could do without at the moment. Following this confirmation, farmers should continue to exercise vigilance, particularly when moving animals onto their farm and should consider testing breeding stock for the SBV antibody.”

In contrast with March 2012, when Scotland saw its highest temperatures of the year, March 2013 was the coldest since 1962. It was also unusually dry, and this combination of conditions resulted in a potentially significant delay in grass growth. Many stock keepers had to feed poor quality silage to cattle and sheep as no other feedstuffs were available. SAC C VS suspect that this may have resulted in an increased incidence of diseases associated with feeding of spoiled conserved forage.

CATTELE

Respiratory tract diseases

In-utero infection with *Mannheimia haemolytica* was suspected to be the cause of pneumonia in a two-day-old Limousin-cross bull calf. Three neonatal calves on the same farm had died suddenly over a period of ten days. The affected calves were from a batch of 22 cows that had no history of dystocia. All calves appeared well at birth and had suckled their dam. Examination of the pluck from one of these calves revealed a fibrinous pleurisy and pericarditis along with consolidation of lung tissue and interlobular oedema.

No respiratory viruses were detected by fluorescent antibody testing (FAT) but *M. haemolytica* was recovered from lung lesions. In-utero infection was considered most likely due to the severity of the pathology in such a young calf.

Reproductive tract conditions

Bovine abortion material dominated submissions to disease surveillance centres across Scotland. Ayr investigated an abortion storm in a suckler herd of 290 cows. Ten cows aborted their calves or had stillborn calves over a seven-week-period. This was shortly after the cows had access to poor quality silage when a new pit of second cut silage was opened. Profuse pure growths of *Bacillus licheniformis* were recovered from the stomach contents of two of the three calves submitted for postmortem examination. Other abortifacient agents identified by SAC C VS that were considered to be linked to spoiled silage included *Listeria monocytogenes* and *Aspergillus fumigatus*.

Unusual bacterial abortions were diagnosed at Perth. A profuse pure growth of *Pseudomonas aeruginosa* was recovered from the stomach contents of a foetus of eight months gestation. Histological examination of the lung showed a suppurrative bronchopneumonia consistent with a bacterial cause. In a separate case, samples were submitted from an on-farm postmortem examination of a foetus of eight months gestation. *Bacillus polymyx* was...
recovered from the stomach contents and no other cause of abortion was identified. SAC C VS considered that although *Bacillus polymyxa* is not a recognised cause of abortion in cattle, the presence of the organism in foetal stomach contents was unusual and may be of significance in this case.

Dumfries identified *Mycoplasma bovis* and *Streptococcus bovis* as abortifacient agents involved in abortions in a 220 cow suckler herd. Foetal examination of the first abortion revealed a dramatic purulent peritonitis, with a thick fibrin layer on the liver and a large volume of cloudy ascitic fluid.

A pure growth of *M. bovis* was recovered from foetal liver, lung and stomach contents. A further two abortions occurred the following week and the foetal examinations revealed *Streptococcus bovis* infection in one case and mummification in the other. The cows on this farm were lean and SAC C VS considered that poor silage quality/poor protein nutrition could have increased susceptibility to infection.

**Nutritional and metabolic disorders**

Dumfries identified malnutrition as the cause of calf mortality in a dairy herd that had lost approximately 20 per cent of their calves at one month of age. New born calves stayed with their dams for one day and were then group housed and fed waste milk. Concentrates had been removed in order to encourage poor drinkers. There were no clinical signs of diarrhoea or respiratory disease. A typical calf was submitted for postmortem examination. It had appeared well for the first week but then became dull for three weeks before death. The carcase was very thin with no body fat and weighed only 36kg; the rumen and abomasum contained only a firm mass of partly digested straw. No gross pathology was evident. SAC C VS advised the re-introduction of concentrates in order to stimulate rumen development, as well as the use of milk replacer instead of waste milk in order to improve milk hygiene and achieve consistency in quality and temperature.

Blood samples were submitted to Aberdeen from a suckler herd that had experienced three uterine prolapses and two sudden deaths in five days. Despite the cows receiving treatment with calcium and magnesium prior to blood sampling, one out of six had a calcium value below reference range at 1.7mmol/l (reference range 2.0 – 3.0 mmol/l). Five out of six samples had non-esterified fatty acid (NEFA) values above reference range at between 1150 and 1879 µmol/l (reference range < = 700 µmol/l). SAC C VS considered this to be consistent with significant mobilisation of fat suggesting a dietary energy problem.

**SMALL RUMINANTS**

**Generalised and systemic conditions**

A beltex cross zwartble lamb was submitted to Aberdeen following the death of six 14-day-old lambs in a week. The flock of 200 ewes was vaccinated against clostridial disease and pasteurellosis. The ewes were in poorer body condition than usual and two lambs examined on-farm appeared to have died from starvation. The submitted lamb was in poor body condition, weighing only four kilograms. There was no milk in the abomasum and the rumen was filled with fibre. The lungs were congested and oedematous. *Mannheimia haemolytica* septicaemia was diagnosed following its isolation from both lung and liver however SAC C VS suspected that inadequate nutrition may have predisposed to the problem.

**Reproductive tract conditions**

Abortion investigations during March are usually dominated by diagnoses of *Chlamydia abortus* infection (EAE) but this was not the case in 2013 when a marked increase in the number of abortions due to *Campylobacter* species, resulted in it becoming the most frequently diagnosed cause of abortion. A rise in the number of diagnoses of abortion due to *Salmonella* species was also seen. St. Boswells diagnosed abortion due to *C. fetus* on twelve occasions and *S. montevideo*
four times. The latter organism was also isolated by Edinburgh, reflecting its usual geographic distribution in the south east of Scotland.

The third gimmer to die from a group of 220 in a 630 ewe flock was submitted to St. Boswells for necropsy. The previous two gimmers had appeared to be in the early stages of labour at the time of death. An increased incidence of vaginal prolapses was reported in the gimmer group. Postmortem examination revealed the presence of a putrid, foul-smelling foetus in the uterus, compromise of the uterine wall and a secondary peritonitis. Another gimmer presented three days later with the same findings. No abortion agents were detected and there was no evidence to suggest a dietary cause. SAC C VS believed the condition to be the consequence of ascending infection in females that experienced a partial or complete vaginal prolapse. Vaginal prolapses are more common in older ewes bearing twins and triplets, so it was considered unusual that the gimmer group was affected. The most likely predisposing factor in this case was considered to be over-condition.

Nervous system disorders

A live, neonatal lamb was submitted to Dumfries for investigation of a single case of congenital deformity. The lamb was unable to stand, with a hare lip and cleft palate on the left side. There did not appear to be an eye on this side. Scoliosis was evident in the thoracic spine but the limbs were normal. The right brain was grossly normal however the left cerebrum was absent (see below). The lens and retina of the left eye were found within the cranial cavity. Testing for Border Disease proved negative. The pathological findings were not consistent with Schmallenberg virus infection.

Musculo-Skeletal conditions

St. Boswells diagnosed arthritis due to Streptococcus dysgalactiae as the cause of hindlimb paresis in a 10-day-old texel cross lamb. An increased volume of brown-coloured synovial fluid was present in the stifle joints and S. dysgalactiae was isolated from the stifle joints and cerebrospinal fluid. Another two, slightly older, lambs developed similar hindlimb weakness. Lambing occurred indoors and the farm routinely treated all lambs with oxytetracycline at birth and at five days of age. SAC C VS noted that isolates of S. dysgalactiae from cases of joint ill in lambs are invariably resistant to oxytetracycline in vitro.

Respiratory tract conditions

Ayr attributed the sudden death of a three-week-old housed lamb to pneumonia caused by Mannhaemia glucosida. Consolidation of the apical and cardiac lung lobes was noted and histopathology of affected lung revealed a sub-acute purulent exudative bronchopneumonia consistent with a bacterial infection. A pure and profuse growth of M. glucosida was obtained from lung cultures.

- Review of ovine pulmonary adenocarcinoma diagnoses

During the last decade diagnoses of ovine pulmonary adenocarcinoma, as a percentage of diagnosable submissions, have almost doubled from 2.2 per cent to 4.15 per cent (see below).
respiratory disease and one-third because of ill thrift. At postmortem examination 60 per cent have evidence of a secondary bacterial pneumonia and where a significant isolate was cultured this proved to be Mannheimia haemolytica in almost all cases. Diagnoses peak in the first three months of the year; this may reflect the stress of poor winter nutrition and advancing pregnancy as well as the investigation of thin, empty ewes at scanning. Tups account for around 15 per cent of diagnoses and are most frequently aged between one and two years. This is in contrast to ewes which are most often three to four years old. Analysis of diagnoses by breed indicates that the condition is seen most often in Scottish blackfaces and their crosses.

There is no reliable, commercially available diagnostic test for OPA; postmortem examination and histopathology remain the only way to confirm the disease. Movement of clinically normal, infected sheep is likely to be the main way that OPA is introduced to a flock and once established, significant losses can occur over many years. For this reason SAC C VS encourages sheep owners to investigate problems with sudden deaths, respiratory disease and ill thrift in all sheep, particularly purchased animals.

PIGS

Generalised and systemic conditions

Oral abscessation and colisepticaemia were diagnosed in four-week-old pigs from an indoor breeding to finishing unit where three piglets in one litter died. Postmortem examination of two piglets revealed pronounced swelling of the proximal mandibles associated with abscesses around clipped canine teeth. Bacteriology from the mouth abscesses of both piglets revealed a mixed profuse bacterial growth including Prevotella melaninogenica. A profuse pure growth of E. coli was isolated in culture from the liver and brain of one pig and a moderate pure growth was isolated from the brain of the second animal. SAC C VS suspected that the mouth abscesses acted as a point of entry for the E. coli and that the deaths were due to a resulting septicaemia.

Alimentary tract disorders

Viral-type enteropathies, pneumonia and early Lawsonia intracellularis (proliferative enteropathy) infections were detected in a group of five-week-old weaned pigs with a history of failure to thrive after weaning, lack of appetite and scouring. Mortality was low and pigs appeared to improve from around eight-weeks-old. Pigs were vaccinated against PCV-2 and enzootic pneumonia at weaning and were receiving trimethoprim-sulfadiazine in feed. Postmortem examination of five affected pigs revealed purple, cranio-ventral consolidation of the lungs in three animals with soft or liquid grey-coloured colon contents in all five pigs. Histopathology and silver staining of intestinal sections showed small curved organisms in the crypts and also in the cytoplasm of some crypt epithelial cells. These findings were consistent with early Lawsonia intracellularis infection and it was considered that L. intracellularis could be playing a wider role in the problem of weaners failing to thrive on the unit. Histopathology of the lung lesions revealed widespread changes typical of subacute viral-type pneumonia but they were not specific for any one agent. SAC C VS considered that the presence of syncytia suggested PCV2 involvement but noted that other viruses such as PRRS virus could have been contributing to the lesions.

Reproductive tract conditions

Bacillus licheniformis infection was diagnosed as the cause of abortion in a second parity sow in an outdoor system. Three litters aborted in the previous week were about a week early in sows of mixed parities. The herd was vaccinated against PRRS, parvovirus, Erysipelas and Escherichia coli and conception and pre-weaning mortality rates were unchanged. Bacillus licheniformis was isolated in culture from the foetal stomach contents. PRRS and Influenza A virus PCRs on pooled lung were negative. There was no evidence of parvovirus exposure on foetal serology.
BIRDS

Poultry
Marek’s disease and northern fowl mite infestation were diagnosed in a pure breed cockerel submitted for postmortem examination. The liver was enlarged and mottled, the spleen was diffusely enlarged and a large white ulcerated mass was present in the wall of the duodenum. Histopathology demonstrated a heavy infiltration of affected tissues by neoplastic lymphoid cells consistent with a diagnosis of Marek’s disease.

Metastatic ovarian adenocarcinoma was diagnosed in a three-year-old layer hen. The bird was the third to die over a period of five weeks from a flock of seven birds. Affected hens were reported to be unwell for about a week before dying. The submitted hen was in poor body condition with a prominent keel bone. Postmortem examination revealed numerous granulomatous growths on the ovary, and the small intestine was markedly firm and thickened. Histopathological examination found a widespread ovarian adenocarcinoma with transcoelomic spread affecting the intestinal wall and serosa.

Wild birds
Salmonellosis caused by Salmonella Typhimurium DT40 was diagnosed in a goldfinch (Carduelis carduelis) and a siskin (Carduelis spinus) found dead in two gardens in the same neighbourhood. No gross lesions were noted in the goldfinch but the siskin had diffuse liver enlargement and nodular enlargement of the spleen.

Seven pigeons were found dead near to a block of flats where about 50 of the birds were roosting. Necropsy revealed extensive haemorrhage surrounding the liver in one bird and similar haemorrhages in the anterior half of the lung fields in another. A third had firm, pale, tan foci in the liver and a fourth had foci of crumbling brown material in the lungs. Histopathology of lung tissue demonstrated numerous branching septate fungal hyphae consistent with Aspergillus sp. No influenza virus was detected in any of the birds, but pigeon paramyxovirus-1 virus was identified in two of three birds tested. Despite suspicions of rodenticide poisoning, no coumarin derivatives or other poisons were detected. There were no signs of trauma and the aetiology of the haemorrhages was not identified.

Unusually large numbers of puffins (Fratercula arctica), guillemots (Uria aalge) and razorbills (Alca torda) were found dead at various sites along the east coast of Scotland or further inland. Similar events were described on the east coast of England. Postmortem examination of birds submitted from Kirkcaldy, Arbroath and St Andrews showed that the birds had not been eating and had died in poor condition. SAC C VS does not regard such mass mortality incidents, sometimes referred to as wrecks, as unusual; they are thought to arise due to a combination of adverse weather and inability to find sufficient food. Most commonly guillemots and razorbills are the species affected, but other species such as puffins can also be involved. A representative sample of birds was screened for avian influenza virus, with negative results.

MISCELLANEOUS

Horses
Equine herpes virus 1 (EHV-1) was diagnosed as the cause of abortion of a twelve-year-old Welsh section D mare in a livery yard. It was the second abortion to have occurred on the premises in a month. The previous aborted foal had been submitted but PCR testing for EHV-1 on tissues from it was negative. Both aborted mares were kept in the same field. The carcase appeared jaundiced and the thorax contained a large excess of clear, yellow fluid. The liver was mottled and the spleen was enlarged with haemorrhages on the serosa. EHV-1 was detected by PCR on testing of the foetal tissues and maternal serology showed evidence of recent EHV infection.

Dogs
Granulomatous meningoencephalitis was diagnosed in a three-year-old male West Highland White Terrier which had presented with a history of several days of neck pain. Hindlimb paresis with forelimb rigidity developed and the dog was anaesthetised to allow radiographic examination of the cervical vertebrae. On recovery from anaesthesia, chest expansion ceased with only slight laryngeal movement to indicate respiration. The dog was euthanased on welfare grounds. Postmortem examination was grossly unremarkable and significant histopathological findings were confined to the central nervous system. Multifocal angiocentric perivascular infiltrates of macrophages, lymphocytes and plasma cells that effaced the neuroparenchyma were present in the cerebrum, brain stem and spinal cord. The brain stem
and midbrain were most prominently involved, explaining the unusual respiratory movements. The changes were consistent with the common disseminated type of granulomatous meningoencephalitis and the extent of the damage was deemed incompatible with recovery.

**Deer**

An unusual presentation of malignant catarrhal fever (MCF) was diagnosed as the cause of morbidity in an eight-year-old Pere David deer stag. The stag had deteriorated over a period of eight weeks; loss of condition, anorexia, ataxia and eventually disorientation, blindness, circling and marked exophthalmos were all noted before the animal was euthanased. An in-contact doe had died after lethargy, wasting and neurological signs. No others in the group were affected. Necropsy identified hyphaema affecting the anterior chambers of both eyes and ulceration of the right cornea. The carcase was moderately dehydrated and generally congested. Histological changes throughout several tissues were typical of MCF and ovine herpesvirus 2 DNA was detected in liver tissue, confirming the diagnosis. SAC C VS noted that this case was unusual in its chronicity and progression, as MCF is reported to be characteristically acute to peracute and highly fatal in deer. The slow progression of the disease in this case was atypical, as was the distribution of lesions in the carcase, with no catarrhal inflammation or erosions on mucosal surfaces of the respiratory, alimentary or urinary mucosal epithelium. Pere David deer are cited as one of the species which appear to be highly susceptible to MCF infection. There was no reported contact with sheep in this case and recrudescence of an atypical latent infection was considered a possibility.

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**DISEASE ALERTS**

The following conditions featured in the SAC C VS report for June 2012. Given similar climatic and production conditions, they could also be important this year.

- Lead poisoning in young cattle at grass
- Nematodirosis in lambs at grass
- Tick-borne fever in lambs on hill ground
- Rotavirus infection in pheasant chicks