Neosporosis in lambs

APHA Disease Surveillance Report
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- Idiopathic arterial aneurysm in adult dairy cows
- Yersiniosis in goats
- Ethylene glycol poisoning in lambs
- PRRS causes blue ears in pigs

CATTLE

Alimentary disease

Bloat: A diagnosis of frothy bloat was made at Shrewsbury as the cause of death of four dairy heifers aged nine months on an organic farm. Two of the group of 75 heifers were initially found dead and were submitted for postmortem examination. For the preceding 6 weeks the heifers had been on a field from which barley was harvested in August, and then had kale and turnips ‘drilled’ for strip grazing in autumn. The kale was considered by the farmer to be the ‘best crop ever’ and the contents of the stomachs of the animals examined postmortem reflected this with frothy rumen contents. Straw was made available to the heifers: however, two more animals were found dead a week later and were again examined postmortem, with similarly, rich leafy frothy rumen contents present consistent with frothy bloat.

Additional testing for alternative causes of death ruled out persistent BVDv infection but surprisingly identified increased kidney lead concentrations of 53.6 and 59.2 µmol/kg DM (values < 2.5 µmol/kg DM are accepted as unavoidable background level environmental exposure and does not pose a risk to the food chain or animal health). The farm is an old estate where shooting took place in the past. The ingestion of lead directly in lead shot, or in the kale as brassicas can assimilate lead, was suspected. Blood sampling of 40 of the animals in the group identified increased blood lead concentrations of up to 0.44 µmol/l in 10 of the animals (blood ‘background/unavoidable’ environmental concentrations in animals are < 0.15 µmol/l). These findings were considered most likely to indicate ‘random’ uptake of small amounts of lead shot by some of the heifers rather than the kale being the source. The animals were moved off the field and it was advised that...
cereals or grass, which assimilate very little lead, could be grown there in future.

Systemic disease

Idiopathic arterial aneurysm: Postmortem examination of a four year old Holstein-Friesian cow at Carmarthen confirmed an idiopathic arterial aneurysm which had ruptured resulting in fatal internal haemorrhage. The cow, which was in good body condition, had been due to be dried off and was unexpectedly found dead. An extensive retroperitoneal blood clot was present to the left of the midline and medial to the left kidney. This surrounded an artery of approximately 1 cm diameter which was dilated over a length of about 20cms. When opened, the dilated artery showed roughening and thickening of the intima, and tears in the intima. The aneurysm was examined histologically which confirmed severe distortion and attempted fibrotic repair of the transmural tears. Discontinuity, splitting and duplication of the internal elastic lamina with irregular elastic fibre deposition were confirmed using special stains. The changes were consistent with those previously described in dairy cattle with arterial aneurysm. A report on 52 cows examined postmortem at APHA VI Centres was published in 2011, and comparison was made with 74 cases examined in the Netherlands, three in Scotland, one in Northern Ireland and two in the Irish Republic (Crawshaw and others, 2011). This condition typically affects young adult Holstein-Friesian cows with a mean age of 4.1 years (range two years 10 months to nine years four months). Most of the animals were found dead without previous signs of illness, although some exhibited colic, a sudden reduction in milk yield with rapid onset recumbency leading to death. Different arteries have been affected, including the cranial mesenteric/coeliac artery, thoracic and abdominal aorta, femoral artery and uterine artery. The underlying aetiology has not been confirmed, and it is hoped that ongoing surveillance on cases such as this will establish the cause. APHA comments that sudden death in cattle should have anthrax ruled out as a statutory requirement.

Fig 1. Arterial aneurysm in a four year old Holstein-Friesian cow.

Reproductive disease

Chlamyphila abortus infection was demonstrated as the cause of an abortion in a Cumbrian dairy herd of 200 adult cows. A series of six abortions had occurred in the herd over the previous six weeks with Salmonella Dublin infection confirmed at Penrith VI Centre. Submission of placenta from the most recently aborted cow revealed a severe suppurative diffuse placentitis. Examination of a modified Ziehl-Neelsen stained smear identified intracellular inclusions which were confirmed as C. abortus by PCR testing and immunohistochemistry. This is a rarely reported cause of bovine abortion which was first identified in UK farms in 1993 (Daniel and others 1993). Its exact epidemiology is poorly understood, as the organism is clearly widespread on many farms, and recognised as a common cause of ovine abortion. In the last 10 years C. abortus has only been identified as a cause of bovine abortion on seven occasions, in most cases on farms where there is
a close association between cattle and sheep; however, on this Cumbrian farm there was no known sheep contact.

SMALL RUMINANT

Systemic disease

**Yersiniosis in goats:** Depression, anorexia, enteritis and significant milk drop were seen in a large commercial dairy goat herd investigated by Penrith. After 3 weeks nearly all 1000 milking goats had been affected. Some developed conjunctivitis with associated lymph node enlargement. Thankfully both enteritis and conjunctivitis responded to penicillin injections. Only groups receiving a total mixed ration (TMR) were affected suggesting that the disease was feed mediated. A flock of several hundred starlings were known to feed and defaecate on the TMR silage. Histopathology suggested bacterial enteritis and Yersiniosis was suspected. *Yersinia pseudotuberculosis* was isolated from faecal samples and conjunctival swabs. Wild birds and rodents can carry *Yersinia* in their faeces. A farm visit was undertaken, highlighting the zoonotic implications. It was strongly advised to prevent wildlife access to the feedstuffs. Concurrent *Yersinia* conjunctivitis and enteritis has been described before in UK goat herds (Wessels and others 2010).

**Ethylene glycol poisoning:** Ten out of a group of 26 ewe lambs had died following signs that included pyrexia, blindness, head pressing, recumbency and opisthotonus before death. They had been let into an area with long grass and contained old machinery sheds with disused tractors and farm implements. Lead poisoning was suspected as broken batteries were present, however blood samples were tested for lead and were <0.15 µmol/l (background level). A postmortem examination at Shrewsbury revealed marked pallor of the renal cortex and darkening of the medulla; aqueous humour urea levels were 192.99mmol/l (ref range serum 2.6-6.6 mmol/l) suggesting a nephropathy. Histological examination of the kidney revealed crystal nephropathy raising the possibility of oxalate toxicity. A farm visit was conducted and several anti-freeze/ethylene glycol containers containing liquid were present in the grazed field. A food safety report was made. Oxalate toxicity can occur as a consequence of exposure to ethylene glycol, or to oxalate containing plants such as *Chenopodium, Oxalis, Rumex* and *Rheum* species. As far as APHA is aware ethylene glycol toxicity has not previously been reported in sheep in the UK.

**Neurological disease**

**Gid or Sturdy:** Thirty lambs were reported to have died from a batch of 800 within a few months. Affected lambs were unilaterally blind, circled or walked to one side before recumbency and death up to six weeks later. An 18-month old-ram was submitted to Shrewsbury for postmortem examination following a period of recumbency. Removal of the brain revealed a 2cm diameter gid cyst occupying the majority of the left cerebellum (Fig 2). Gid was also thought the likely cause of the signs seen in the lambs. Control of *Taenia*
*multiceps* is dependent on appropriate dog worming and removal of dead livestock. Concerns were raised about the large number of lambs affected and the prolonged disease without euthanasia in some cases.

**Fig 2 Gid cyst in sheep brain**

![Gid cyst in sheep brain](image)

**Neuraxonal dystrophy:** Three Zwartbles ewe lambs were submitted over a period of one month for investigation of unusual progressive neurological signs. The clinical signs reported included ataxia, with forelimbs more severely affected, slight flexion in the fetlock joints, recumbency and appearing to strain to pass urine. One lamb was presented live and was reluctant to walk, with arching of the back, head tremor, wide based stance and intermittent weight bearing on the points of the claws of the hind limbs. Gross postmortem examination was unremarkable in all cases and brain and spinal cord were examined histologically. Neuroaxonal dystrophy (NAD), characterised by intense spheroid formation with variable astrogliosis was detected particularly in medullary nuclei and also in spinal grey matter, together with sparse Wallerian degeneration and sparse spheroid formation in white matter mainly in thoracic spinal segments. A review of submissions to APHA in the previous 10 years revealed two further cases of NAD in sheep with Zwartbles breeding, in addition to the two cases recorded earlier in the year. Interestingly further cases were also identified at Thirsk. NAD has been reported as a familial or suspected familial disease in several sheep breeds and is likely to have a genetic basis. Examination of the breeding records by the owner is ongoing.
Reproductive disease

**Neosporosis:** A new-born lamb with deformities initially suspected to be due to *in-utero* Schmallenberg virus (SBV) infection was submitted to Carmarthen for postmortem examination. The cervical spine was twisted so that the head pointed back over the shoulders and there was arthrogryposis of both shoulder joints and all hind limb joints, which also were elongated. The cervical spinal cord appeared to be smaller than normal. SBV RNA was not detected in brain by RT-PCR. Histological examination revealed a severe protozoal panmyelitis and encephalitis with intralesional protozoa. There was also a multifocal non-suppurative myositis with occasional associated protozoal forms. Immunohistochemistry detected *Neospora caninum* with extensive intense labelling of intralesional tachyzoites and tissue cysts in the brain and spinal cord. There was no histological evidence of any virally induced changes and the dam was seronegative for SBV. *N. caninum* infection in sheep is rare and investigations are ongoing on this farm. There are many possible causes of arthrogryposis in sheep and this case illustrates the limitations of diagnosis of SBV-induced abnormalities by gross examination alone.

**Campylobacter abortion:** Bristol investigated the cause of 8 abortions in a flock which had vaccinated against EAE and toxoplasmosis. Ewes had been purchased in September. Two fetuses and placenta were submitted; the abdomen in one of these was swollen and on post mortem examination both fetuses had markedly enlarged livers, one of which had split (fig 3). These findings were suggestive of Campylobacter abortion and *Campylobacter fetus fetus* was isolated from the stomach contents of both fetuses. This type is most likely to have been introduced by carrier ewes whereas *Campylobacter jejuni* can also be excreted by wild birds (both types can be carried in the intestines of asymptomatic sheep). There is little evidence that antibiotic flock treatment reduces the number of abortions due to Campylobacter. Providing there is no evidence of EAE, it may be useful to mix aborted ewes with ewes which have already lambed as a control measure, or mix replacement ewes with the main flock at least six weeks prior to tupping. There is no UK licensed vaccine.
PIGS

Reproductive disease

Stillbirths and poor viability piglets due to porcine reproductive and respiratory syndrome: Porcine reproductive and respiratory syndrome (PRRS) was diagnosed as the cause of stillbirths, birth of low viability piglets and increased preweaning mortality on an indoor breeding unit on which sows were vaccinated for PRRSv. Sows of affected litters did not appear unwell. Eight full-term foetuses were submitted, two of which had uninflated lungs and were true stillbirths. Three were tested for PRRS and one was PCR-positive, confirming the diagnosis.

Enteric Disease

Enteric disease due to porcine circovirus 2 with Brachyspira pilosicoli

Watery-yellow diarrhoea and wasting was reported affecting about 50% of pigs in a group of 12-week-old pigs. The indoor straw-based finisher herd affected received pigs from a nursery unit which itself filled from several sources. Some respiratory disease was also present in the pigs which were vaccinated earlier in rear on the nursery unit for Mycoplasma hyopneumoniae, PRRS and PCV2. A batch of typically-affected pigs were euthanased and submitted to Bury St Edmunds for investigation. All had diarrhoea with a diffuse typhlocolitis. Brachyspira pilosicoli was detected by PCR and culture consistent with a diagnosis of spirochetal colitis. However, significantly, histopathology and PCV2 immunohistochemistry on lymph nodes and intestines also confirmed enteric PCV2-associated (PCVAD) disease in these pigs, in addition to spirochaetal disease. The vaccine schedule involved PCV2 vaccination of pigs on the nursery unit supplying the farm two weeks after weaning. Potential causes of PCVAD occurring in vaccinated pigs are being investigated. Research suggests that problems with PCVAD can occur due to variation in maternal antibody levels between piglets at the time that they are vaccinated. Thus, while PCV2 vaccination two weeks after weaning may be
suitable for some pig populations, if maternal antibody to PCV2 is low at weaning and there is significant challenge, the timing could be too late for others. A webinar on circovirus vaccination and the management of maternally-derived antibodies can be accessed at http://www.workcast.com/register?pak=8142213214869787. This case illustrates the advantage of postmortem examination (PME) and sampling in obtaining a full diagnosis rather than submitting just faecal samples. In this case, PME was prompted by the high morbidity and degree of wasting.

**Jaundice due to porcine circovirus 2-associated disease:** Mixed findings were present in three culled six-week-old pigs in poor body condition which were submitted to Bury St Edmunds to investigate a problem of wasting and diarrhoea. Disease had been ongoing in successive batches for two to three months on the indoor breeder-finisher and, in the batch from which pigs were submitted, 70 of 220 pigs were affected and three had died. One pig was jaundiced (fig 4) due to porcine circovirus 2-associated hepatitis, a second had enteric colibacillosis and the third had a polyarthritis but no pathogens were isolated, probably because the pig had been treated. Pigs were vaccinated for PCV2 at 20 days of age and the timing of vaccination merits re-evaluation given the finding of PCV2-associated disease in one of the pigs, although PCVAD was not the sole cause of the clinical disease.

![Fig 4: Yellowed ocular mucous membranes from jaundice due to PCV2-associated hepatitis](image)

**Respiratory Disease**

**Blue ears and coughing in pigs with porcine reproductive and respiratory syndrome:** PRRS was diagnosed at Bury St Edmunds as the
cause of coughing and cyanosis of the ears in a batch of 14-week-old pigs in which 20% were affected and 2% had died. Pigs were vaccinated for PRRSv, *Mycoplasma hyopneumoniae* and PCV2. Three successive batches of pigs had been affected. Two pigs were submitted and both had pneumonias which affected most of both lungs in one pig and the cranial parts in the other, lymph nodes were also enlarged. PRRSv was detected by PCR in the spleens and histopathology revealed severe bronchointerstitial pneumonias with lesions of the proliferative and necrotising pneumonia (PNP) of pigs which can be due to PRRS or combined PRRS and PCVAD. In this case, PRRSv and PCV2 immunohistochemistry confirmed involvement of PRRS but not PCVAD in this case. The PRRSv strain was sequenced and found to be very similar to that detected in a February 2014 submission under the same ownership.

**Swine influenza outbreaks in growing pigs:** A pandemic H1N1 2009 swine influenza outbreak was diagnosed at Bury St Edmunds concurrent with Glässer’s disease in five-week-old pigs on an outdoor unit. The pigs were in a group of 500 which were coughing and wasting. Three were submitted with varying degrees of pneumonia, pleurisy, pericarditis and arthritis. The patchy cranioventral pulmonary consolidation present in two pigs was suggestive of active swine influenza and this virus was detected by PCR in two pigs while *Haemophilus parasuis* was cultured from the pericardium of one pig.

**BIRDS**

**Broilers**

**E. coli infection:** Septicaemia, yolk sac infection and omphalitis were seen in several submissions of broiler chicks aged between one and 14 days, with histories of increased mortality. The findings of postmortem examination in the younger chicks included inflamed navels (omphalitis), enlarged livers and spleens, yolk sac infection and occasional lung congestion, peritonitis and pericarditis. In older submissions of chicks aged 12 to 14 days of age the pattern of lesions was more chronic and characterised by polyserositis affecting the hepatic capsule, pericardial sac and peritoneal serosae. Routine cultures of livers, lungs, yolk sacs and spleens yielded pure growths of *E. coli* in chicks in all the submissions. Isolations of *Enterococcus faecalis*, *E. faecium* and *E. hirae* were also obtained from spleen and yolk cultures from some individual birds. The consistent finding of *E. coli* in these submissions illustrates the importance of this organism as a cause of ill health and mortality in the broiler industry. Enterococci are also recognized as potential pathogens in young chickens.

**Commercial Layers**

**Mortality in layers:** There had been ongoing concerns about increased mortality and some fluctuations in egg production in a 4,000 bird free range layer flock aged 47 weeks. Approximately 200 birds had been reported to have died in the previous two months. Cannibalism and vent pecking were
found during previous postmortem examinations and *Pasteurella* species and *Erysipelas* species were isolated. The light intensity had been lowered to try to reduce the cannibalism. Histopathology had described a hepatitis and splenitis consistent with the effects of bacteria and their toxins. Samples had been submitted to APHA the previous month for testing for exclusion of avian notifiable disease (Gibbens and others 2014) but no Influenza A viral RNA was detected. Five birds were submitted for postmortem examination. The predominant gross findings were egg peritonitis/salpingitis, and evidence of vent pecking and cannibalism both of which are often associated with egg peritonitis. *E coli* was isolated in pure growth from the reproductive tract of one bird, as is typical with egg peritonitis, and *Pasteurella multocida* was isolated in mixed growth from another bird. No evidence was found of other underlying disease agents that could have accounted for the mortality.

*Ducks and geese*

**Avian tuberculosis** was diagnosed in an adult Mandarin duck that had been found dead in a private collection. The bird had been in poor body condition and the postmortem findings had included an enlarged friable liver and pyogranulomatous masses within the body cavity. Profuse acid-alcohol fast bacilli were observed in smears of the lesions and histopathological examination confirmed chronic diffuse granulomatous hepatitis and visceral granuloma, both associated with acid-fast bacilli and consistent with avian TB. Avian tuberculosis is commonly transmitted between birds by the ingestion of contaminated faecal material, and the organism can remain viable for long periods in a contaminated environment, thus posing a risk of infection to other birds.

*Game birds*

**Respiratory disease in partridges:** *Mycoplasma gallisepticum* was detected in caseous material from the infra-orbital sinuses of housed partridges which showed clinical signs of sinusitis. Three birds had died and a further ten were affected in a group of over 100. *M. gallisepticum* is recognised as one of the principal causes of sinusitis in game birds. It was advised that control in a group of birds is potentially difficult because of factors such as the contagious nature of the disease, the short lived immunity, the difficulty in ensuring that birds receive the intended dose of antibiotic treatment (which would require administration under the cascade), and the excretion of *M. gallisepticum* by sub-clinically affected birds which may prolong the outbreak.
References


Wessels, ME, Payne, J, Willmington, JA, Bell, SJ, Davies, IH. 2010 Yersinia pseudotuberculosis as a cause of ocular disease in goats. Veterinary Record 166 699-700.

This summary is produced by the APHA and is drawn from reports provided at the time of reporting by the APHA laboratories at Bury St Edmunds, Carmarthen, Lasswade, Penrith, Shrewsbury, Starcross, Sutton Bonington, Thirsk and Weybridge and third party external postmortem providers to APHA (University of Bristol School of Veterinary Sciences, Royal Veterinary College, SAC Consulting Veterinary Services St Boswells). APHA monthly reports are available online at https://www.gov.uk/government/publications/disease-surveillance-reports-2015