OVERVIEW

- *Toxocara vitulorum* infection in calves
- Bovine viral diarrhoea virus infection in bovine foetuses
- Jaundice and hydronephrosis associated with border disease in lambs
- Virulent *Escherichia coli* isolated from cases of oedema disease in weaned pigs
- Outbreaks of erysipelas in pigs and turkeys

GENERAL INTRODUCTION

April began rather unsettled and showery, but high pressure then brought a more settled period. The provisional mean temperature for the month was 0.2 °C above the long-term average. Rainfall was near average for many places, but slightly drier towards the east and south, giving an overall figure of 87 per cent. It was the sunniest April since 1942, with an overall total of 144 per cent of average.

CATTLE

Nutritional and metabolic disorders

Perth examined two beef cows from a farm where four were found dead on the same afternoon. They were from a group of 40, housed in an old dairy shed, that calved five months previously and were fed straw and drafh with access to two mineral tubs. The vitreous humour magnesium value in one animal was considered consistent with clinical hypomagnesaemia at 0.45 mmol/l and borderline in the other at 0.6 mmol/l (reference range greater than 1.0 mmol/l). A review of the diet and provision of minerals was advised.

Parasitic diseases

Ayr examined a faecal sample from a two-month-old suckled calf with muco-haemorrhagic diarrhoea, abdominal discomfort and tenesmus. Screening for *Salmonella* species was negative, but 600 coccidial oocysts per gram were detected with 60 per cent being *Eimeria zuernii* and 40 per cent *Eimeria ellipsoidalis*. While it was considered that coccidiosis may have been responsible for the clinical disease observed, 1100 eggs per gram (epg) with a morphology consistent with *Toxocara* species were also detected. Although this is an unusual finding, *Toxocara vitulorum* infections have been confirmed in cattle in the UK in recent years (Jones and others 2009). A further two faecal samples were submitted from other calves in the cohort, but no coccidial oocysts or nematode eggs were detected. The most important source of *T. vitulorum* infection for calves is milk from their dam.

Aberdeen diagnosed severe, chronic ostertagiosis in an ill thriveen 27-month-old Holstein-Friesian bullock that was not wormed. Approximately 50 per cent of the abomasal wall was grossly thickened with a ‘Moroccan leather’ appearance (Fig 1). A strongyle egg count of 800 epg was detected in caecal contents and histological examination of the abomasum confirmed hyperplastic mucosa with encysted worms evident in the mucosal glands, which would have been present since the autumn. In addition there were chronic pneumonia lesions with multiple abscesses and pleurisy.

DISEASE ALERTS

The following conditions were reported by SAC C VS disease surveillance centres in August 2014. Given similar climatic and production conditions, they could also be important this year.

- Parasitic pneumonia in cattle
- Fog fever in cows
- Blackleg in cattle
- Ill thrift in lambs associated with selenium deficiency
- Parasitic gastroenteritis in lambs

Fig 1 – ‘Moroccan leather’ appearance of the abomasal wall in a bullock with chronic ostertagiosis

Generalised and systemic conditions

Congenital heart defects were diagnosed in three 10 to 14-day-old suckled calves from different farms. One calf had a patent foramen ovale with evidence of secondary right sided heart failure. Another calf with a patent ductus
arteriosus became dyspnoeic and cyanotic when handled for feeding. Pulmonary oedema was evident at necropsy and the heart was globular in shape due to hypertrophy of the right atrial and ventricular walls. An enlarged heart due to right-sided hypertrophy was also present in the third calf in which a ventricular septal defect was detected along with a patent foramen ovale. This calf also had signs of respiratory distress prior to death.

Eleven cases of bovine neonatal pancytopaenia (BNP) were diagnosed across Scotland this month, the same number as were diagnosed in April 2014. Affected calves were aged nine to 21 days and all had evidence of generalised petechial and ecchymotic haemorrhages. Aberdeen investigated one case that had dramatic haemorrhage into the small intestine (Fig 2). In all cases the diagnosis was confirmed by histological examination of the sternal bone marrow.

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Edinburgh diagnosed mycotic abomasitis in a two-week-old Charolais heifer calf that had concurrent pneumonia. The calf was treated with antibiotics four times in the previous week and received oral fluid therapy. A further five calves died on the farm, with affected animals appearing lethargic with nasal discharge and coughing prior to death. Inadequate transfer of colostral antibodies was suspected on this unit. At postmortem examination there was consolidation of the cranial lung lobes and the abomasal mucosa was covered in irregular, dark-red plaques two to 20 mm in diameter. No other gross pathology was detected in the intestines. Yeasts and Gram-positive bacilli were seen on microscopy of the abomasal mucosa, but no significant organisms were recovered from abomasal or lung lesions. Histopathology of the abomasum revealed thrombosis with large fungal hyphae, inflammation and haemorrhage. There was evidence of inflammation in the lung, but the changes were predominantly vascular and considered to be secondary to the abomasitis. There was no evidence of circulating bovine viral diarrhoea virus (BVDV). SAC C VS considered that the fungi were opportunistic pathogens secondary to previous antibacterial therapy and suspected hypogammaglobulinaemia.

Dumfries diagnosed omasal and abomasal impaction as the cause of death in two adult Holstein-Friesian dry cows, whose dietary forage predominantly consisted of six kg per head of oat husks. Both cows were recumbent, with rumen content being passed from their noses pre-mortem, before death twenty-four hours later. At postmortem examination the omasum and abomasum were markedly enlarged in both cows and were impacted with very dry content (Fig 3). SAC C VS considered predisposing factors in this case could include late pregnancy and a high energy demand. Cold weather, ingestion of abnormal material such as sand, low protein and or energy and reduced water intake can also predispose to abomasal impactions. A review of the dry cow ration was advised.

![Fig 2](image) – Haemorrhage into the small intestine in a calf with bovine neonatal pancytopaenia

**Alimentary tract disorders**

Four centres reported finding abomasal pathology in calves. St. Boswells diagnosed a ruptured abomasal ulcer in a two-month-old suckled calf that resulted in peritonitis. As is common in suckled calves, no predisposing cause for the ulceration was determined. Perth considered a large hairball to have predisposed to abomasal ulceration in a six-month-old Limousin heifer calf. Unusually the hairball also caused an intestinal obstruction in the proximal jejunum. This calf also had a concurrent pneumonia. Dumfries diagnosed abomasitis due to *Sarcina ventriculi* in two six-day-old Holstein-Friesian calves that died suddenly. Grossly the abomasal mucosa was oedematous with gaseous mucosal folds. Histopathology identified multiple clumps of bacteria consistent with *Sarcina ventriculi* in both calves. SAC C VS commented that this can occur due to alterations in the abomasal environment, such as a change in feeding regime or temperature. Interestingly on this farm there had been a change of personnel responsible for calf feeding during the previous week.
Reproductive tract conditions
Dumfries detected BVDV in two aborted foetuses of six months gestation from the same farm. The dams of both were from a batch of 70 in-calf heifers, imported from The Netherlands three weeks previously. Both dams were negative for BVDV and tissue sampling of calves born from this cohort is ongoing.

A stillborn deformed calf, weighing just 14 Kg, from an eight-year-old belted Galloway cow in a small pedigree herd was examined. Calving was assisted but there was no recent history of other abortions or stillbirths. Severe malformation of the spine was evident with all vertebrae fused and a kink was present in the thoracic region. Arthrogryposis of all four limbs was evident and the right hind leg was fractured close to the hip joint. A cleft palate was noted and both testicles were intra-abdominal. The lungs were not expanded and neither inhalation nor ingestion of meconium was noted. No infectious agents, including Schmallenberg virus, were detected. A diagnosis of congenital malformation was made (Fig 4).

Fig 3 – Abomasal impaction in a cow

Nutritional and metabolic disorders
Aberdeen diagnosed pregnancy toxæmia in two ewes from a group of 197 recently housed ewes that were purchased two to three months earlier and had access to silage, molasses and energy licks. Around 30 per cent of the group developed neurological signs including blindness, tremors, circling, seizures and death before lambing. There was no response to treatment with propylene glycol, vitamin B1 or oxytetracycline. At postmortem examination both ewes were in poor to moderate body condition with poor rumen fill and signs of hepatic lipidosis. Tripel lambs were present in utero. Aqueous humour beta-hydroxy butyrate of 5.3 mmol/l and 3.4 mmol/l (reference range less than 2.5 mmol/l) were consistent with a diagnosis of pregnancy toxæmia (Edwards and Foster, 2009). Once lambing commenced there was high neonatal mortality associated with hypogammaglobulinaemia secondary to poor milk yield. As response to treatment of pregnancy toxæmia may be poor, forage analysis and or metabolic screening of ewes four weeks pre lambing can avert significant losses.

Generalised and systemic conditions
St. Boswells, Inverness and Aberdeen all diagnosed clostridial enterotoxaemia type D (pulpy kidney disease) as the cause of death in three- to ten-day-old lambs. Lesions of focal symmetrical encephalomalacia on brain histopathology confirmed the diagnosis in all cases. There was no history of clostridial vaccination in two of the three flocks. SAC C VS notes that pulpy kidney disease is most commonly diagnosed in lambs aged four to ten weeks, but neonatal cases have been reported (Scholes and others, 2007) and where ewes are unvaccinated there will be a disease risk particularly in rapidly growing lambs.

Cardiovascular diseases
Dumfries suspected cow colostrum anaemia in a ten-day-old lamb, one of six that stopped sucking and become jaundiced and hydronephrosis at postmortem examination of a one-day-old lamb. Border disease viraemia was confirmed in six lambs from this flock last year following the purchase of replacement gimmers from several flocks. This lamb also tested positive for virus. Jaundice and hydronephrosis are not classic signs of border disease viraemia, but have previously been reported in lambs whose dams were experimentally infected with the virus (Garcia-Pérez and others, 2009).
lethargic before death. At postmortem examination the carcase was very anaemic and the blood noticeably watery in appearance. Histopathology confirmed bone marrow hypoplasia affecting cells of the erythroid series and the farmer confirmed that some lambs had been fed colostrum from a dairy herd. Although a sample of colostrum tested negative for anti-sheep red blood cell activity, cow colostrum anaemia was considered the likely diagnosis. It was advised that in future a different donor cow should be used and colostrum from four or more cows pooled to reduce the risk of the problem recurring.

**Skin diseases**

A shepherd found a mass, suspected to be a hernia, in the inguinal region of a new tup. This proved to be an abscess, which ruptured in December 2014 after the ram finished serving ewes. In January 2015 lesions were noted in most of the other tups on the holding, but to date ewes have not been affected. These abscesses tended to rupture and discharge purulent material before healing. Two parotid lymph gland abscesses were sampled and *Corynebacterium pseudotuberculosis* was isolated, confirming a diagnosis of caseous lymphadenitis.

St. Boswells isolated *Staphylococcus aureus* from the teats and udders of gimmers that were seven to ten days post partum. PCR testing for orf virus was negative. Staphylococcal dermatitis usually presents as deep skin ulcers mostly over the face, but teats and udders can be affected with consequent mastitis and poor mothering. Abrasion of the teats by suckling lambs may have allowed the *S. aureus* to become established in this case.

**PIGS**

**Generalised and systemic conditions**

Two unrelated incidents of erysipelas were diagnosed this month; one involving four- to five-month-old finishing pigs and the other in a seven-month-old bought-in gilt.

The incident in the finishers occurred in a 1,650 place finishing unit, where pigs were housed in continuous throughput straw-bedded pens each containing approximately 120 pigs. The stockman reported that the pigs had been slower to finish recently and over the previous few weeks several developed blue-red ears, looked dull and 18 died. At post mortem examination of two pigs the hearts were grossly enlarged. The pericardium was thickened and adhered to the myocardium in a few areas. The left atrioventricular valves were diffusely and grossly thickened by vegetative masses from which *Erysipelothrix rhusiopathiae* was isolated. Additionally, the small and large intestinal content was liquid and in one animal haemorrhagic. Bacterial cultures yielded *Salmonella Typhimurium* phase type 193 in direct culture indicating that salmonellosis was contributing to the health issues.

The seven-month-old gilt had a history of dullness, anorexia and weight loss over a two week period before being found dead. Antibiotics had been administered twice with a transient clinical improvement on both occasions. The gilt was one of a group of 30 bought in two months earlier and was the only animal affected. Significant findings were confined to the thorax and consisted of oedematous lungs, pleural and pericardial effusions and cardiac enlargement. Vegetative endocarditis lesions typical of erysipelas infection were found on the aortic and left atrio-ventricular valves. The gilts were not vaccinated against erysipelas.

Oedema disease was determined to be the cause of death in two nine-week-old weaned pigs, submitted from a group of 75 where two were found dead and another three showed signs of illness. At postmortem examination subcutaneous oedema was found in the face and around the eyes and in the mediastinal lymph nodes, stomach and right atrial wall. There was also clear peritoneal and pericardial effusion. A profuse and pure growth of *Escherichia coli* was isolated from the intestines of both pigs. The isolate was serotyped as poly B positive, E4 positive and the virulence gene PCR test confirmed that the strain was positive for adhesive fimbriae F18 and a shiga toxin producer. Vaccination of suckling piglets to prevent oedema disease was initiated.

**Alimentary tract disorders**

Severe peritonitis and abdominal neoplasia was diagnosed in a seven-year-old female wild boar that had started to lose weight in January. It was from a herd that was maintained in rough hilly terrain.

At gross postmortem examination extensive internal adhesions were noted throughout the abdomen. Within the adhesions there were cavernous, 5 cm in diameter, white masses filled with brown fluid. Histopathological examination of the masses showed cavernous spaces containing fronds of mesenchymal cells, mucoid material and mixed inflammatory debris that were consistent with a neoplastic process suggesting a mesothelioma or myxosarcoma. Given the history concerns were raised with regards to bracken and its potential carcinogenic effect.

**Skin diseases**

Exudative epidermitis due to *Staphylococcus hyicus* infection was determined to be the cause of raised skin lesions mainly over the flanks of a group of 15-week-old Hampshire-cross pigs that were housed on straw. Approximately 80 per cent in the group of 300 showed similar lesions. At postmortem examination of one
euthanased pig there were multiple skin erosions and ulceration. Ulcers were irregular in shape varying from 1 to 5 cm across, the majority of which were overlaid by scabs. Some were individual while others coalesced to form larger lesions. *S. hyicus* was isolated on skin culture. Although *S. hyicus* is a common pathogen in suckling and weaner pigs, it is unusual to see severe lesions and outbreaks of skin disease in the finisher stage. The pigs were reported to respond well to antimicrobial treatment.

**BIRDS**

**Poultry**

Ayr examined five nine-month-old turkeys from a housed batch of 1,100 that were recently artificially inseminated. Twenty birds were found dead over the previous week. All five turkeys had cyanosis of the head region, enlarged spleens, bronzed livers and congested lungs. *E. rhusiopathiae* was isolated from the birds confirming a diagnosis of erysipelas. *E. rhusiopathiae* is ubiquitous in nature and found where nitrogenous substances decompose. Infection results from entrance of the organism through breaks in the skin, through the mucous membranes such as during artificial insemination, by ingestion of contaminated foodstuffs (particularly cannibalism of infected carcasses), and possibly by mechanical transmission via biting insects. The poultry red mite *Dermanyssus gallinae* can harbour the organism and may serve as a mechanical vector.

Perth diagnosed scirrhous adenocarcinoma in a two-year-old ISA Brown hen which showed inappetance, lethargy and loose faeces. Body condition was poor and necropsy revealed intestinal tract thickening with fibrinous adhesions between the serosal surfaces. Histopathology revealed changes consistent with scirrhous adenocarcinoma. This tumour was considered most likely to be of reproductive tract origin (ovary or oviduct). These tumours are common in older hens and unlike many other common tumours of the fowl are not thought to be virus-associated. They nevertheless sometimes occur in small clusters within flocks. They metastasise by seeding into the body cavity and growing on the serosa of other organs (transcoelomic spread), most often the intestine, where they induce a marked fibrous tissue (scirrhous) response.

**MISCELLANEOUS**

**Deer**

Edinburgh diagnosed Johne's disease in a two-year-old red deer hind (*Cervus elaphus*), from a commercial herd established within the previous year from multiple sources. Severe condition loss was observed in this hind, while the rest of the group of 120 deer appeared unaffected. Significant findings at necropsy included lungworm, and fluid large intestinal contents. No gross thickening of the intestinal wall was seen, but numerous acid-fast bacilli consistent with *Mycobacterium avium paratuberculosis* were seen in Ziehl Neelsen stained smears of ileal mucosa.

**Exotic animals**

Inverness made a presumptive diagnosis of iodine deficiency in a neonatal Mishmi takin (*Budorcas taxicolor taxicolor*) that was found dead. Necropsy revealed that the lungs were only partially inflated and the thyroid gland was prominent. No evidence of an infectious cause for non-viability was detected. Histopathology of the thyroid revealed a moderate generalised thyroid follicular hyperplasia with very little colloid present. Thyroid iodine was below the diagnostic threshold of 180 mg/kg dry matter (DM) (reference range in domestic ruminants is greater than 1200mg/kg DM).

**References:**


JONES, J. R., MITCHELL, E. S. E., REDMAN, E. & GILLEARD, J. S. (2009) *Toxocara vitulorum* infection in a cattle herd in the UK. *Veterinary Record* 164, 171-172

Feature: SAC C Veterinary Services Ovine Abortion Diagnoses 2015

SAC Consulting Veterinary Services examined 614 submissions of ovine foetal material in spring 2015. In several submissions more than one pathogen was detected (Figure (a)). These submissions consisted of 70.1 per cent complete foetuses, with the remaining 29.9 per cent made up of samples collected either on farm or at the surgery and submitted by post. The quality of the latter varied as did the range of samples submitted. This is pertinent to note as it is likely that an increasing proportion of viscera samples will be received in the future. The most common abortifacients can be diagnosed based on examination of foetal stomach contents, foetal fluids and placenta. Overall a diagnosis was reached in 41.9 per cent of submissions, but this figure was greatest when both foetuses and placenta were submitted (47.1 per cent) and lowest when viscera excluding placenta was received (24.3 per cent). The overall importance of placenta in ovine abortion investigations is well known and this was confirmed by the receipt of some placenta in 79.9 per cent of submissions. Chlamydial abortion (EAE) was once again the most commonly diagnosed cause of abortion and it is seldom confirmed in the absence of placenta. Vaccination for EAE and toxoplasmosis would prevent 61 per cent of the diagnosed abortions and this strategy should be encouraged.

**Figure A**

- **EAE**: 33.8%
- **Toxoplasmosis**: 27.2%
- **Campylobacter species**: 16.3%
- **Dystocia**: 11.1%
- **Salmonella Montevideo**: 11.1%
- **Escherichia coli**: 4.3%
- **Listeria species**: 4.3%
- **Congenital deformity**: 3.4%
- **Bacillus species**: 3.1%
- **Border Disease**: 3.1%
- **Truperella pyogenes**: 3.1%
- **Yersinia species**: 3.1%
- **Mannheimia haemolytica**: 3.1%
- **Other bacteria**: 1.5%

* Bibersteinia trehalosi, Salmonella Arizonae, Staphylococcus aureus, Streptococcus dysgalactiae, Arcanobacterium plurisanimalium, Serratia marcescens.