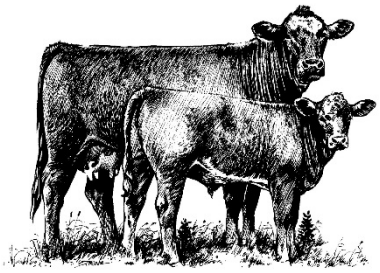
Animal & Plant Health Agency



SRUC

GB cattle quarterly report

Disease surveillance and emerging threats

Volume 33: Quarter 3 (July to September) 2022

Highlights

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the third quarter of 2022 (Quarter 3), July to September. It contains analyses carried out on disease data gathered from APHA, SRUC Veterinary Services division of Scotland's Rural College (SRUC) and partner postmortem providers; and intelligence gathered through the Cattle Expert Group networks. In addition, links to other sources of information, including reports from other parts of the APHA and Defra agencies, are included. A full explanation of how data is analysed is provided in the annexe available on GOV.UK https://www.gov.uk/government/publications/information-on-data-analysis

Cattle disease surveillance dashboard outputs

The most frequent diagnoses made in the quarter 3 of 2022, compared to quarter 3 in 2021, and quarter 3 for 2015 to 2022 inclusive, through the Great Britain (England, Wales and Scotland) scanning surveillance network are illustrated in Table 1. These can be interrogated further using the interactive cattle disease surveillance dashboard which was launched in October 2017.

Table 1: Great Britain scanning surveillance 10 most frequent diagnoses in quarter 3 of 2022, quarter 3 of 2021, and quarter 3 for 2015-2022

10 most frequent diagnoses Q3 2022	10 most frequent diagnoses Q3 2021	10 most frequent diagnoses Q3 2015-2022
1. Johne's Disease	1. Johne's Disease	1. Johne's Disease
2. Coccidiosis	2. Coccidiosis	2. Coccidiosis
3. Lungworm	3. Mastitis – Strep uberis	3.Cryptosporidiosis
4. Cryptosporidiosis	4. Cryptosporidiosis	4. Mastitis – E. coli
5. Mastitis – E. coli	5. Salmonellosis – S. Dublin	5. Salmonellosis – S. Dublin
6. Salmonellosis – S. Dublin	6. Rotaviral enteritis	6. Mastitis – Strep uberis
7. Hyposelenaemia / hyposelenosis	7. Mastitis – E. coli	7. Lungworm
8.Parasitic gastroenteritis	8. Lungworm	8. Rotaviral enteritis

9. Mastitis – Strep uberis	9. Pneumonia-other cause	9. Fascioliasis
10. Rotaviral enteritis	10. Babesiosis/Piroplasmosis	10. Parasitic gastroenteritis

Dairy update

Dairy sector updated overview and forecast: Dairy market outlook | AHDB

- Prices: The UK average milk price for September 2022 was 48.86 pence per litre (ppl), according to Defra. This is 1.78ppl (3.8%) up on the previous month. UK farmgate milk prices | AHDB. Milk price increases continued to peter out for November, with price holds starting to outnumber the rises. Milk price changes | AHDB
- Production: GB milk production for September is estimated at 981 million litres based on daily delivery data, 0.6% above last year's 5-year. The higher deliveries seen through September are likely the result of more favourable weather and improved grass growth. UK milk deliveries | AHDB
- Trade: Year to date (Jan – Aug) volumes of dairy products exported from the UK totalled 848,100 tonnes, up 7% year on year. UK dairy trade dashboard | AHDB. The value of these imports has increased 38% year on year to £1.21 billion driven by increased market prices. World wholesale prices | AHDB
- Demand: During the 52 weeks ending 4 September we have seen a volume decline of -7% for milk, -7% for yogurt, -6% for cheese and -10% for butter as prices have increased between 5-13% Dairy retail markets | AHDB

Beef update

Beef sector updated overview and forecast: Beef market outlook | AHDB

- Prices: Although prices for prime cattle dipped a little over the summer, they since been steadily growing again. Prices remain at record highs with prime cattle prices standing at 442.5p/kg in the week ending 5 November. GB deadweight cattle prices by region | AHDB
- Production: The UK produced 73,400 tonnes of beef in September, in line with volumes seen for September last year. Year to date production (Jan-Sep) is 665,200 tonnes, again in line with 2021. Prime cattle kill numbers for the year to date are also in line with those seen last year 1.5 million head, however cull cow kill is up 3%. Beef production eases in September | AHDB
- Trade: UK exports of fresh and frozen beef totalled 9,500 tonnes in August, 1% behind volumes from July but a 5% increase from this time last year. Shipments of fresh and frozen beef to the EU grew year on year, bolstered by a weakening GB pound as well as a return to normalcy of trade following Brexit. The UK imported 17,900 tonnes of fresh and frozen beef in August, up 3% on July but down 16% compared to this time last year. Ireland remained the dominant supplier of fresh/frozen beef followed by Germany. Beef trade up year to date | AHDB

Demand: In the 12 weeks ending 2 October spend on beef increased 1.1% year on year while volumes purchased fell 8.4%. As inflation causes price rises retail sales of beef are coming under increased pressure as consumers react to the cost-of-living crisis. GB household beef purchases | AHDB

Acknowledgment for the dairy and beef updates: Freya Shuttleworth AHDB

New and re-emerging diseases and threats

Gastroparesis syndrome in dairy heifers

In our Quarter 2 2022 Report, we described cases of apparent gastroparesis in 9 to 22 month old Holstein Friesian bulling and in-calf dairy heifers on two farms. It was reported that the majority, or all, of the affected heifers had the same sire. The heifers had presented with progressive abdominal distension and condition loss, became inappetant, and had had to be euthanised. No obvious dietary or management risk factors have been identified. Since that report, further cases on at least four other farms have been reported to APHA.

At postmortem examination the abdomen, and the rumen, are markedly distended and the ruminal contents had a distinctive frothy texture. One of the affected farms uses a cow monitoring system, which records rumen function, and the outputs demonstrated markedly reduced, and eventually absent, rumen contractions at the time when the clinical signs became apparent and then worsened. At the time of writing the mechanism underlying this syndrome is uncertain. The histopathological findings of the cases have so far been inconclusive. A genetic investigation of the cases in underway. The Cattle Expert Group are still interested to hear about other similar cases.

Colisepticaemia in non-neonatal dairy calves

Three dairy calves were received over a period of a week at Shrewsbury Veterinary Investigation Centre (VIC) for postmortem examination. They were from a rearing unit of 250 young stock, all originating from the adjacent 410 cow dairy herd. The three calves, each around 3 months of age, were well grown, weighing between 90kg and 98kg. They were from two separate pens in an open shed with good ventilation; their diet consisted of hay and 3kg per head per day (given as two feeds) of proprietary calf rearing pellets. Each calf was either found dead, or acutely ill, with death occurring in less than 12 hours from the onset of signs. Attempted treatment with antibiotic and NSAID for those found ill was unsuccessful. The pathology was consistent in the three animals, comprising profuse fibrinous peritonitis, pleuritis and polyarthritis (Figure 1). *E. coli* was isolated in pure profuse growths from all sites cultured.

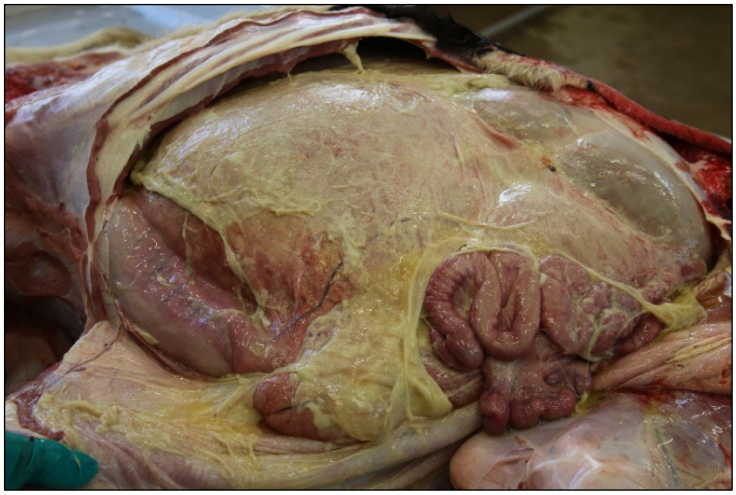

Figure 1: Thick fibrinous peritoneal exudate in a 3 month old dairy calf with colisepticaemia.

Two other calves had previously died on the premises, after having shown similar signs, but were not investigated. No further losses were reported over the six weeks subsequent to the examinations. Similar cases have also been identified in six other herds in England and Wales, and in the last year, colleagues in SRUC have identified similar outbreaks in dairy-bred calves on several farms (Mason and others 2022).

These recent cases are in contrast with the customary presentation of septicaemic *E. coli* infection in neonatal calves, most having received insufficient systemic colostrum. Poor environmental hygiene and other managemental factors can also be contributory. In comparison, all calves in the recent investigations, with one exception of an unweaned three month old, have been weaned. There has been no consistent evidence of other diseases; low grade coccidiosis was identified in two of the calves examined at Shrewsbury, although its role in the disease outbreak is uncertain. Further investigations into the *E. coli* types are ongoing. We are interested to hear of any other suspected cases of what appears to be a new manifestation of colisepticaemia in older calves.

Reference:

Mason C, Stevenson H, Henderson K, Corbett A, Foster G, Patterson G, Pollock J. E. coli septicaemia and meningitis in 3-6 month-old dairy-bred calves. Cattle Practice 2022;30(1):17

Changes in disease patterns and unusual diagnoses

Systemic disease

Salmonella

The Salmonella in Livestock Production in GB 2021 has been published on Gov.uk. This annual publication provides data on reports of salmonella in livestock species in Great Britain, which was collected and collated by the Department for Environment, Food and Rural Affairs (DEFRA).

There were 521 Salmonella isolations from cattle in 2021, the highest since 2013 (604 isolations). This is a 33.6% increase compared to 2020 (390 isolations). The three most commonly reported serovars were S. Dublin, S. Mbandaka and S. Typhimurium, which have been the most common serovars isolated from cattle every year since 2013. The number of S. Dublin isolations rose by 36% compared to 2020 (306 versus 225 isolations), and isolations of S. Mbandaka and S. Typhimurium also rose.

Salmonella Dublin cases

Salmonellosis due to *Salmonella* Dublin was one of the most frequent diagnoses in this quarter. S. Dublin has been recorded as the most common Salmonella serotype in cattle for the last 20 years. Annually it shows a regular pattern, with more disease diagnosed in the latter half of the year (Figure 2). Examples of S. Dublin cases from quarter 3 2022 are described below.

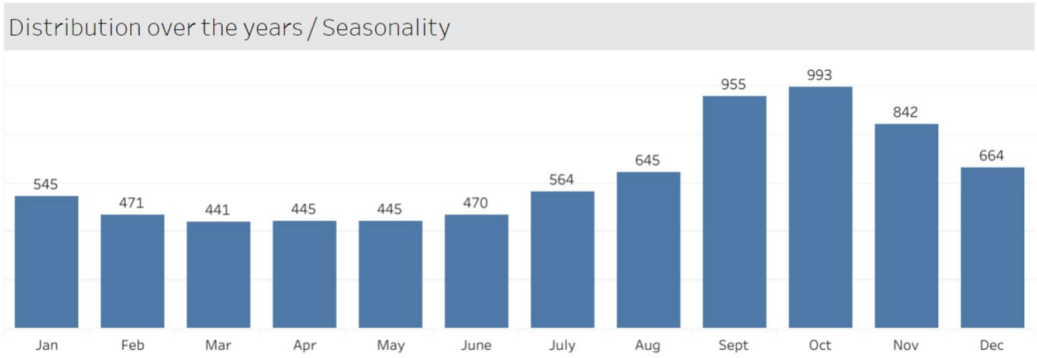

Figure 2: Seasonality of diagnoses of Salmonella Dublin abortion, enteritis, and septicaemia in cattle in England and Wales 2002 to 2022

S. Dublin was identified as the cause of two outbreaks of septicaemia in calves. Six calves had died in a group of 50 on a calf rearing unit. Prior postmortem examination by the practitioner identified generalised jaundice and hepatitis; *S*. Dublin infection was suspected. The sixth calf to die was submitted. As with the others, it was reported to have rapidly become listless and anorexic before it died. It was in reasonable condition but showed marked yellowing of the subcutaneous tissues, body fat and serosal surfaces, on which there were also petechiae. The liver was orange coloured and there was yellow fibrinous synovial fluid in joints. Anteroventral consolidation was present in some of the lung lobes and there were fibrinous adhesions of the pleura to the ribs. *Salmonella* Dublin was isolated in septicaemic distribution, confirming salmonellosis.

Two calves were submitted from a group of 90 calves, where acute onset respiratory disease and death was reported in three of the group. Both had marked jaundice of the carcases and diffuse petechiation. There was also anteroventral lung consolidation in both, with a diffuse fibrinous pleural exudate in one animal (Figure 3). *S*. Dublin was recovered from all viscera of each calf, and *Mannheimia haemolytica* was also isolated from the lung of one of the calves.

Figure 3: Cranioventral lung consolidation in a calf with Salmonella Dublin and Mannheimia haemolytica infection.

A three week old calf was submitted to investigate ongoing issues with ill-thrift and mortality in pre-weaned dairy calves. Over the previous few months approximately 120 had been affected and 10 had died. The calves were not growing well and were drinking less milk than expected. S. Dublin was isolated from intestinal contents and testing for BVD virus in splenic tissue was negative.

Control of Salmonella is predominantly by hygiene, especially in the calving pen as cows with latent infections may shed more around calving. Good colostrum management and cleanliness of feeding equipment are also very important. Vaccines are available to assist in the control of *Salmonella* Dublin in cattle.

Two abortions due to salmonellosis were confirmed. Two foetuses were submitted from separate dams from a herd with all year round calving. Five cows had aborted in a group of 140 over the previous six weeks; one of the cows which had aborted subsequently died during a period of extreme heat. *S*. Dublin was isolated from one of the two calves while no infectious cause was identified for the second, raising the possibility that the abortion was also associated with the recent hot weather.

Salmonella Typhimurium cases

Two outbreaks of *Salmonella* Typhimurium were diagnosed in the north of Scotland in this quarter. The first involved the sudden death of three dry suckler cows with no premonitory clinical signs. On postmortem examination (PME) one animal had a section of ileum that was congested, with haemorrhagic mucosa and contents. *Salmonella* Typhimurium was recovered in pure growth from liver and kidney as well as from mixed growth in lung and intestinal content.

The second case involved pyrexia, milk drop and diarrhoea in lactating dairy cows. Over the course of ten days, thirteen animals became affected. Four out of five submitted faecal samples were positive for S. Typhimurium on culture.The farmers and vets involved with both herds were contacted. During the investigation no common risk factors were identified

in the following areas: suppliers of feed and bedding, contractors carrying out work on farm, veterinary services, fallen stock services, staff, and sourcing of replacements. The only common factor to both farms was a high prevalence of wild birds.

Salmonella Montevideo abortion

An abortion caused by *S*. Montevideo was confirmed in a Cheshire dairy herd. This organism has been prevalent in this area for several years, although recently there have been fewer identifications compared with S. Mbandaka which has become the second most common Salmonella type in cattle.

Digestive system disease

Idiopathic necrotising enteritis cases

Idiopathic necrotising enteritis and fungal tracheitis were diagnosed following PME of a four month old suckler calf, which had presented with diarrhoea and pneumonia three days prior to euthanasia and submission. At postmortem the most significant findings were ulcerative oesophagitis, ulcerative typhlocolitis, and multifocal fungal plaques on the tracheal mucosa. *Aspergillus fumigatus* was isolated from the fungal plaques. The main potential causes of immunosuppression were investigated, and PCR testing was negative for Bovine Viral Diarrhoea (BVD), Malignant Catarrhal Fever (MCF) and tickborne fever. A moderate burden of coccidia was detected,1430 eggs per gram of which 98% were pathogenic (*Eimeria zuernii*). Liver levels of both copper and selenium were found to be low [Cu 286µmol/kg DM (reference range 314 to7850µmol/kg DM) and Se 0.48mg/kg DM (reference range 0.9-1.75 mg/kg DM). Histopathological examination detected a tracheitis, a bronchiolitis, an oesophagitis, a typhlitis and acute renal tubular injury. It is uncertain whether the acute tubular injury in the kidney was due to the mycotoxins released by *A.fumigatus,* or whether it preceded the fungal infection.

Idiopathic necrotizing enteritis was also suspected to be the reason for the multiple pathologies detected in a five month old suckler calf that was ill thriven before death. There were multiple circular areas of ulceration over the muzzle and perineal region, which continued to the tongue and palate. Ulcerations were also noted at the pylorus, ileo-caecal junction, and throughout the small intestinal and colonic mucosa (Figure 4). There was general pallor of the carcase. Screening for BVD virus and Ovine HerpesVirus-2 were negative. Histology described multifocal surface necrosis, inflammation, and bacterial invasion. In the bone marrow there was a noted reduction in erythroid and myeloid production lines. Chronic interstitial nephritis was also noted in the kidney. There was no evidence of lesions consistent with bovine popular stomatitis.

Figure 4: Raised 'button' ulcerations on the small intestinal mucosa

Parasitic gastroenteritis

Parasitic gastroenteritis (PGE) was diagnosed in first season grazing dairy calves at APHA Shrewsbury and Thirsk Veterinary Investigation Centres (VIC) as early as April and May. The cases highlighted the risk for other animals in England and Wales, reflecting favourable conditions for worm challenge early in the grazing calendar.

PGE can occur in any grazing animal and should be considered for those which are failing to thrive, especially if also diarrhoeic. It is important to bear in mind that faecal worm egg counts are not reliable for identifying significant parasite burdens in cattle, and even counts as low as 50 eggs per gram, especially if in liquid faeces, are potentially significant.

A grazing and parasite monitoring plan should be implemented for young stock in their first season at grass. Where possible, animals should be regularly monitored for weight gain, and for worm burdens by faecal examinations for parasite eggs. Screening faeces samples for fluke eggs later in the year should also be considered. If significant parasitic burdens are identified, effective treatments can be used, and the health plan updated. A Surveillance Focus Article on monitoring for PGE, and investigating for possible anthelmintic resistance, was published earlier this year: https://bvajournals.onlinelibrary.wiley.com/doi/epdf/10.1002/vetr.1758.

Further advice on endoparasitism, grazing management, and the effective use of anthelmintics, is available at https://www.cattleparasites.org.uk/.

Ostertagiasis was diagnosed in a five month old calf. Two calves had died from a group of 31, and 12 others had exhibited wasting, condition loss, or scouring. The affected group were turned out to pasture in mid May 2022, when all calves were in reasonable body condition, and they received a benzimidazole bolus at turnout. The calves had not moved pasture since then. Gross findings included emaciation, sunken eyes, raised nodules on the abomasal mucosa (Figure 5), liquid intestinal contents, and writhing motility in the colon. Faecal egg count testing revealed a Trichostrongyle type egg count of 1450 per

gram. The total worm count results were 106,000 abomasal *Ostertagia spp,* and the detection of immature worms in the abomasum and degraded (unidentifiable) worms in the small intestine (estimated at 22,000). The gross findings and the test results indicated the calf died due to PGE. Previous submissions from this farm, and the history, indicated benzimidazole resistance in *Ostertagia species* on this farm. It was advised that no benzimidazoles should be used to control PGE in cattle on this farm, and that the incident should be reported to VMD as an adverse event (possible lack of efficacy). It was also advised that supplementary feeding of cohorts was likely to be required.

Figure 5: Nodular appearance of the abomasal mucosa of a calf with ostertagiasis.

Coccidiosis due to *Eimeria auburnensis*

Coccidiosis is consistently one of the most frequent diagnoses and, was the second most frequent in quarter 3 2022. A three month old Aberdeen Angus calf was submitted following a two day history of diarrhoea. The group were housed on straw and no recent treatments had been given, although one other calf had died. There was little significant gross pathology on postmortem examination, but the calf was scoured. The coccidial oocyst count was 22,300 epg and 100% were *Eimeria auburnensis*. No significant bacteria were isolated. On histopathological examination, chronic coccidiosis was confirmed, with histopathology, especially in large intestine, sufficient to cause clinical disease. It was commented that cases of coccidiosis due to *E. auburnensis* are quite unusual.

‘Tyre wire’ or ‘hardware’ disease

A cow was submitted to the University of Nottingham to investigate recumbency, malaise and mortality in a group of 12 pre calving dairy cows. Four cows were affected and three had died. Metallic foreign bodies were detected in the stomachs of the submitted cow, and a 10 cm piece of wire had penetrated through into the spleen (Figure 6). Rebhun’s ‘Diseases of Dairy Cattle’ describes the increased risk of hardware disease during the last trimester. The farm reported that they now have a magnet fitted to the feeder wagon, which had collected more pieces of metal, but they had had no further clinical cases.

Reference: Peek S, Divers TJ (2016) Rebhun's Diseases of Dairy Cattle 3rd Edition - Saunders

Figure 6: Piece of wire retrieved from the spleen of a cow with 'hardware disease'

APHA Shrewsbury VIC also reported three cases of hepatic abscessation from three separate farms, all of which were suspected to be related to tyre wires.

Suspect Severe Summer Scour Syndrome in a dairy heifer

A four month old dairy heifer calf was euthanased and submitted to investigate wasting, poor condition and diarrhoea in a group of 68 animals. The whole group were not doing well, and this calf was one of three to have died or have been euthanased. The group were turned out in mid-May at 10 to 12 weeks of age and started scouring about four to five weeks later. They were being fed 1kg of cow cake per head at grazing. All calves had been vaccinated against clostridial disease and received moxidectin pour-on three to four weeks previously, with not much improvement noted following this worming treatment. Four days before euthanasia the submitted calf received treatment for coccidiosis. Gross findings included emaciation, dehydration, diarrhoea, erosions of the tongue and gums, ulceration of the oesophagus (Figure 7), and abomasitis.

There were no significant findings on faecal egg count testing and total worm counts. Histopathology of the tongue lesions was suggestive of viral infection, most likely due to bovine papular stomatitis virus (BPSV), with secondary bacterial infection of the damaged mucosa. PCR testing detected Parapox virus DNA from both oral and oesophageal lesions consistent with the histopathological findings. Testing for BVDV was negative, and cultures did not detect Salmonella.

The clinical presentation and gross pathology in this calf were consistent with Severe Summer Scour Syndrome. Over recent years the farm animal disease surveillance systems in the UK and Ireland have become aware of a syndrome of diarrhoea and rapid loss of condition affecting dairy calves, typically up to 12 months old. It often occurs within a month of turnout to grass, is unresponsive to treatment and the common bacterial, parasitic and viral causes are not detected. Oral and oesophageal ulceration and necrosis can be a feature in some cases. BPSV has been found in some of these calves and in some cases of a similar condition described in south-eastern Australia (Upper Alimentary Ulcerative Syndrome, UAUS), but contribution of this virus to the disease syndromes, whether it is a primary agent or a secondary or incidental infection, remains unclear.

It was highlighted to the submitting practitioner that, should another animal be euthanised, it is important that the animal be submitted immediately following euthanasia (early in the day) to allow for samples of the GI tract to be taken and fixed for histopathology.

Figure 7: Ulcerated oesophagus in a calf with suspect Severe Summer Scour Syndrome.

Suspected summer scour syndrome and hyposelenaemia

A 10 month old dairy heifer was submitted, being the second to die in a group of 55 in a large dairy herd. The group was turned out a month previously onto lush grass pasture; they had been fed calf cake and grass silage while housed, but this supplementary feeding stopped when they were turned out. The group was considered to be generally poor, and a week previously many passed loose faeces, prompting treatment for coccidiosis and parasitic gastroenteritis. The carcase of the Holstein Friesian weighed 188kg and was in fair condition. A few ulcers were present on the hard palate, and the mucosa of the oesophagus was sloughing. The rumen and abomasum were well-filled with grass but there were scant contents in the large intestine. The liver was a pale tan colour and there were many ecchymotic haemorrhages over the heart and omentum. No trichostrongyle worm eggs were identified. Tests for Salmonellae and BVD virus were negative and histopathology confirmed ulceration of the oral mucosa but no other specific visceral pathology. Analysis of the liver trace element concentrations found low selenium status; cobalt and copper concentrations were adequate. The combination of oral ulcers, the onset of loss of condition and loose faeces after turnout and cessation of supplementary feeding, and the association with low selenium status, was similar to cases previously described as ‘summer scour syndrome’. Further evaluation of a fresher carcase, should another animal die or be euthanased, was recommended if problems continued.

Respiratory system

Lungworm (husk, parasitic pneumonia) cases

Lungworm was diagnosed in an 18 month old fattening animal submitted to APHA Thirsk VIC, which had died after an acute episode of malaise characterised by pyrexia and respiratory signs. It had been on farm since February 2022 and was currently at grass within a group of 29 with one other animal displaying similar signs. At PME there was reduced negative thoracic pressure. A stable froth was present in the tracheal lumen within which adult lungworm were observed. SRUC Dumfries diagnosed recent or current lungworm infection in several of the animals submitted during September. These ranged in age from three to 12 months old. One animal also had a substantial tick burden when it was submitted and subsequently tested positive for tick borne fever also.

The first diagnoses of parasitic pneumonia have been made this year as early as July 2022, through either faecal sampling or postmortem examination. Reports of lungworm outbreaks in adult cattle have increased dramatically over the last three decades, particularly in Scotland. Quarter 3 has seen an increasing trend in the percentage of diagnosable submissions for parasitic pneumonia (husk) in Scotland (Figure 8).

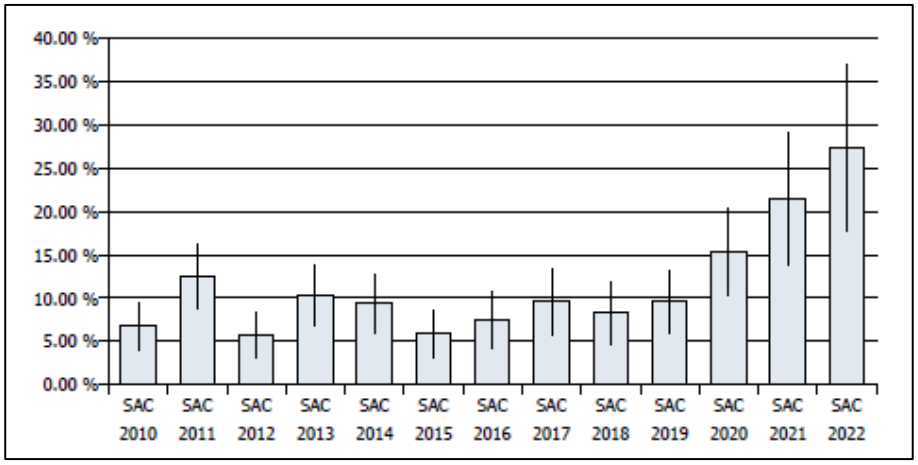

Figure 8: SRUC incidents of Husk in cattle as a percentage of diagnosable submissions for Quarter 3 2010 to 2022.

The main presenting sign is coughing in animals at pasture. In some of the submissions parasitic pneumonia is the sole cause of death, but secondary bacterial pneumonia has been a feature in some cases, with the usual pathogens involved in the Bovine Respiratory Disease (BRD) complex present.

Lungworm was diagnosed in two yearling cattle submitted to Nottingham. There was patchy consolidation of the lung parenchyma (Figure 9), and lungworm detected in the airways (Figure 10). Lungworm larvae and eggs were detected on a cytological examination (for veterinary student interest and demonstration of the potential diagnostic benefits) of bronchial mucus (Figure 11). Following bacteriology testing and histopathology, a secondary *Mannheimia* spp pneumonia was also diagnosed.

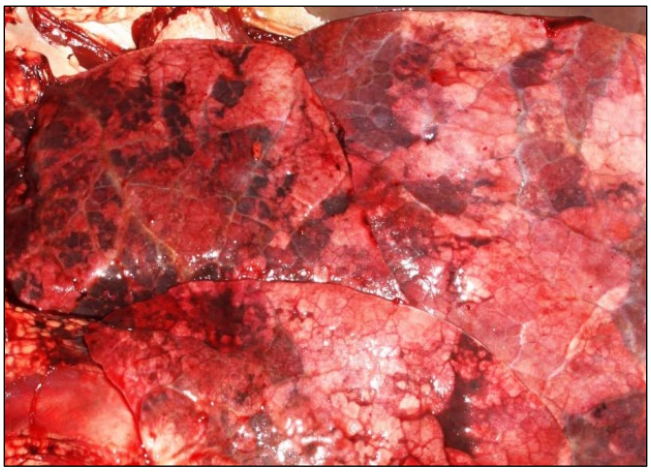

Figure 9: Patchy consolidation of the lung parenchyma

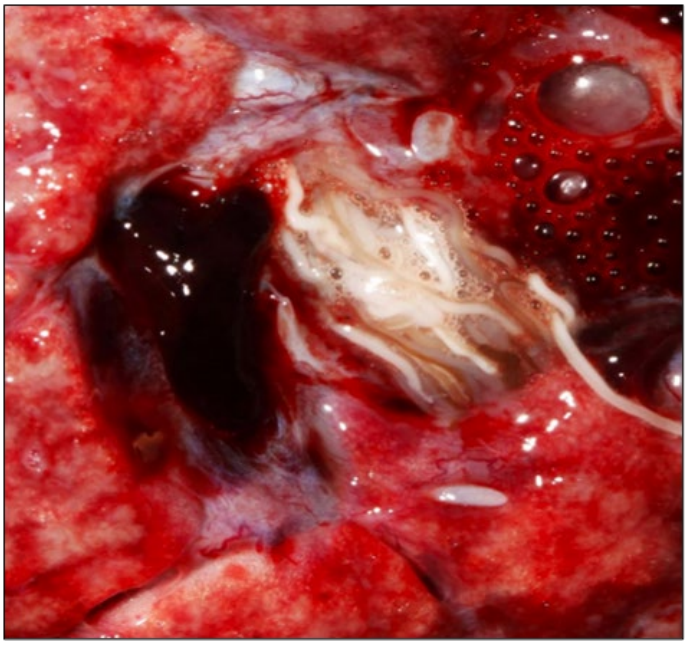

Figure 10: Lungworm in the airway of a yearling with parasitic pneumonia.

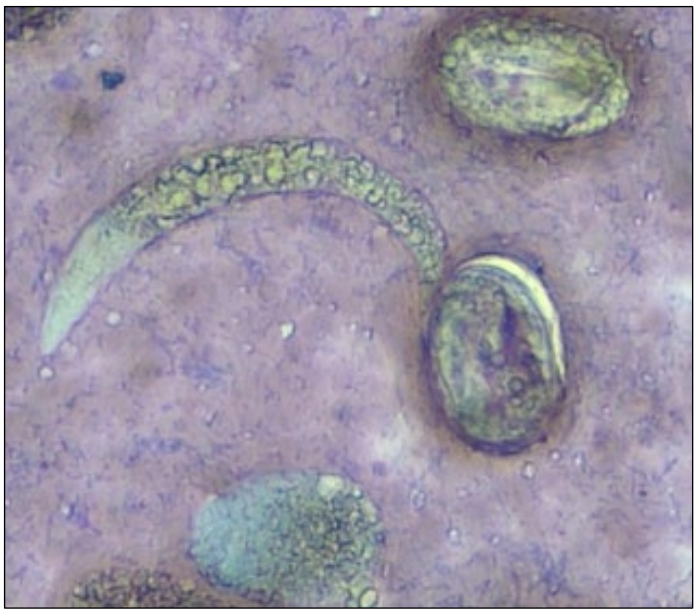

Figure 11: Lungworm larva and eggs in a stained sample of bronchial mucus (*image credit: Carlo Bianco, University of Nottingham).*

Influenza D Project

The APHA Mammalian Influenza team, are investigating whether Influenza type D virus is present in the UK, and whether it may be contributing to bovine respiratory disease as a new and re-emerging threat. Samples are usually accepted, following discussion with an APHA veterinary investigation officer (VIO), from cattle with acute respiratory signs (for example pyrexia, cough/ dyspnoea; clear nasal discharge). Samples from adult dairy cattle with milk drop and possible associated respiratory signs can be accepted on a case by case basis and after discussion with the project lead, or a VIO.

Musculoskeletal System

Chondrodystrophy in dairy calves

Chondrodystrophy is a disorder which interferes with the development of cartilage, leading to abnormal skeletal growth. Since the 1990s congenital chondrodystrophic calves have been identified on many farms in Great Britain. The majority have been in suckler herds, and most commonly born in the spring. Much investigation has been undertaken into the cause, with inconclusive findings. Although there has been speculation about trace element deficiencies, in particular manganese; and the possible interaction of other dietary components, such as copper and zinc, both having important roles in connective tissue development; there is inconsistent evidence.

A review of chondrodystrophy in Australian herds concluded that drought and poor nutrition were risk factors (White and Windsor 2012). In this country the diet in early pregnancy is considered the key factor. Most chondrodystrophic calves have arisen in herds where the dams were fed a 100% grass silage diet; provision of supplementary food, so that not more than 75% of the diet fed is grass silage, has prevented future cases.

Although most chondrodystrophic calves occur in suckler herds, some are identified in dairy herds. Two Friesian calves were examined postmortem at APHA Shrewsbury VIC from a 900-cow dairy herd, where 11 were similarly affected; all were born to a batch of heifers, each having the same sire. The affected calves were stunted, with bilaterally shortened humerus and femur, and distortion of the lower part of each limb. Histopathology confirmed growth plate pathology consistent with chondrodystrophy.

Whilst a nutritional cause could be responsible, it is difficult to investigate definitively, as the ‘insult’ would have occurred early in gestation. As all calves had the same sire, the possibility of a genetic origin was also considered. Numerous genetic causes of chondrodysplasia have been identified in humans and other animals; these are often related to the biosynthesis of proteoglycans (essential components of connective tissue extracellular matrix) or ‘signalling’ of cellular proliferation and differentiation. The better-known heritable forms of chondrodysplasia in cattle tend to have a more severe phenotype than that presented in these calves (for example the autosomal recessive lethal ‘bulldog’ dwarfism, which is recognised in Dexters, and related breeds, due to a defect in the ACAN gene). Genetic causes of chondrodysplasia probably occur more frequently than are diagnosed, but specific tests exist for only a small number.

Reference:

White PJ, Windsor PA. Congenital chondrodystrophy of unknown origin in beef herds. *The Veterinary Journal* 2012;193:336-343

Urinary System

Nephrosis Secondary to Nutritional Myopathy

A two month old Stabiliser calf was examined postmortem following a two week period of ill health and presumed pneumonia, and following the death of two other three-month-old calves from the same group. The main finding on gross examination was pale, firm kidney cortices bilaterally. *E. coli* was isolated in purity from the liver, kidney and brain, and colisepticaemia was considered to be the ultimate cause of death. Azotaemia was confirmed using ocular fluids, and histopathology confirmed acute tubular nephrosis. Examination of skeletal muscle showed extensive acute myofiber degeneration, which is atypical for nutritional myopathy where the degeneration is usually polyphasic, however low liver vitamin E of 1.77umol/kg FT (reference value >5.00umol/kg) and selenium 0.52mg/kg DM (reference range 0.9 to1.75mg/kg DM) confirmed nutritional myopathy was the most likely cause of the nephrosis. Histopathology concluded that the muscle pathology was most likely to be nutritional myopathy, and that the myoglobin was the most likely cause of the renal tubular injury (nephrosis), with material in some tubules resembling the appearance expected with myoglobin.

Nervous system

Listerial encephalitis cases

Cases of listerial encephalitis were confirmed in three separate herds in this quarter. One was from a dairy herd of 850 cows in which 10 lactating cows were reported with nervous signs and milk drop over a period of a few weeks. Five of the affected cows died. The cows were being fed a Total mixed ration (TMR) which included grass and maize silages, with molasses, a protein blend and fodder beet. Those examined clinically were reported to develop tongue paralysis and a tendency to turn to one side. The animals that recovered had been treated with amoxycillin and a spasmolytic drug. One cow was submitted for postmortem examination. Its tongue was protruding from the mouth, it had dry rumen and omasum content and large amounts of faeces in the distended rectum. The findings indicated a degree of stasis of the alimentary tract, and botulism was initially considered however, histopathology confirmed a severe subacute suppurative rhombencephalitis consistent with listerial infection; *Listeria monocytogenes* was not isolated in culture from the brain stem.

The second case was in a herd of 70 suckler cows, one of which was reported to have walked through a fence and got into a ditch. The animal was unresponsive when examined clinically, possibly blind, and in sternal recumbency, with its head to one side and pressing into the ground. Blood samples were collected, and magnesium, antibiotic and steroid administered, however the cow died later that day and was submitted for examination. A purulent abscess was found in soft tissues beneath the tongue. The rumen was two thirds filled with herbage, and the abomasal mucosa had multiple ulcers up to 2cm with brown fluid content. Bacteriology on the brain stem was not attempted but histopathology

confirmed severe suppurative rhombencephalitis associated with gram positive cocco-bacilli. It is uncertain whether the abscess beneath the tongue could have been the primary site of entry of the causative bacteria.

Both cases were confirmed by histopathology on the brains, with the causative bacteria not isolated from the one animal where bacteriology was undertaken; this is not uncommon in cattle which are the most resistant of farmed species. *Listeria* species are soil organisms and the source of infection is commonly spoilt silage, however direct ingestion from wet muddy pastures, and especially those with mole hills, and root crops such as fodder beet, can all potentially be sources of infection. The incubation period in cattle is around 4 to 6 weeks and hence when trying to determine a possible source, investigating what animals were fed or had access to one month previously is recommended. Listerial infections (primarily encephalitis and abortion) are most commonly diagnosed in the late winter and spring months (Figure 12).

Encephalitis due to *Listeria monocytogenes* was diagnosed in a four-year-old suckler cow which had developed neurological signs. The cow was in a group of 25 others at grass. It had been observed as ataxic and was difficult to handle when examination was attempted. Clinically it was pyrexic, with a raised respiratory rate. It proved refractory to treatment and postmortem examination was undertaken to establish an aetiology. Grossly the carcase was unremarkable. Bacteriology recovered a growth of *Listeria monocytogenes* on direct culture of the brain, confirming listeriosis.

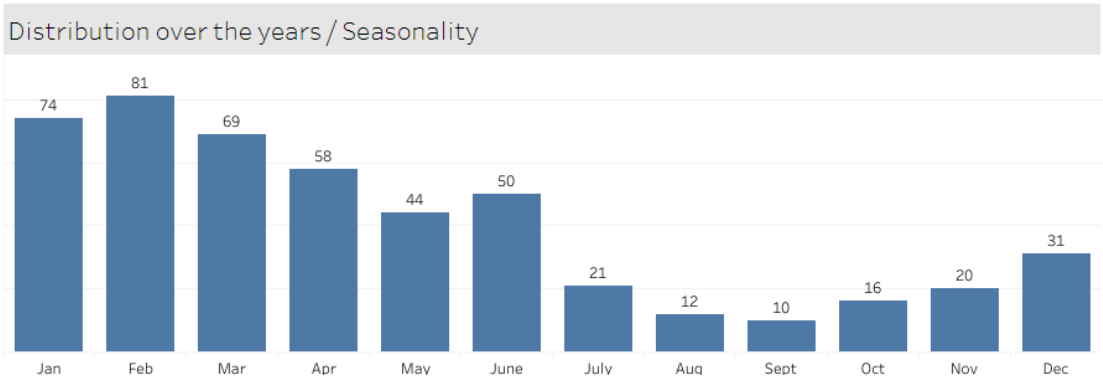

Figure 12: Seasonality of diagnoses of listerial encephalitis and abortion in cattle in England and Wales 2002 to 2022

Skin

Photosensitisation cases

APHA received a report of a dairy herd which had had five animals affected with photosensitisation during June and July. The affected cattle were from a range of stock classes including youngstock, low yielders and dry cows (the high yielding cows were housed). The cattle were grazing the same fields as previous years and there were no concerns regarding a lack of grass. No toxic plants were detected on investigation of the

pastures. The most likely cause in this case was considered to hepatopathy linked to the ingestion of mycotoxins from the pasture. At a European surveillance meeting, colleagues from the Netherlands presented cases of hepatopathy due to mycotoxins and blue green algae. They had concluded that there had been an increased risk this grazing season linked to drier, warmer weather, and stagnant water.

Photosensitisation was suspected in an eight year old cow who died after a week of inappetence. There was crusting of the nose and eyes and mucopurulent discharge from the nares. Five days after the cow became inappetant she was observed to have bloody diarrhoea, but three days later no more faeces were produced, with only mucus and blood observed on a rectal glove. There were limited gut sounds. The cow was salivating but no ulceration was observed in the oral cavity. MCF PCR carried out to rule out ovine herpesvirus 2 was negative. Salmonella was not detected in the faeces, neither were liver fluke eggs. Multiple red to brown, angular gallstones up to 2cm in length were observed in the bile ducts (Figure 13). The gallbladder was markedly distended with thick bile but contained no large stones.

Histopathology confirmed photosensitisation. No underlying cause for the gallstones was identified, although the herd had a history of severe fluke infection a few years previously. It is possible that the gallstones began to form then, but acute disease occurred when the biliary tract became obstructed.

Figure 13: Gallstones retrieved from the gallbladder of a cow with photosensitisation *(Photo credit: Franz Brülisauer)*

Suspected bovine erythropoietic protoporphyria in a two week old Limousin cross suckler calf

Samples were submitted to APHA Starcross VIC from a two week old Limousin cross suckler calf. At a week of age, this animal developed progressive ulceration of the skin over the dorsum, face, neck and thorax. Pyrexia was noted and a mild scour developed. Scour testing was negative for common infectious causes. Histopathology performed on multiple skin biopsies confirmed the cause of lesions to be photosensitisation. This occurs

when skin becomes more susceptible to ultraviolet light due to presence of photodynamic agents. Primary photosensitisation due to exposure to photosensitising plants such as St John's wort was ruled out on the history. Underlying hepatic disease, a cause of secondary photosensitisation was considered, however biochemistry demonstrated no abnormalities in liver enzymes. In the absence of these causes, inherent disorders of haem synthesis causing aberrant pigment metabolism were considered and one of these, Bovine erythropoietic protoporphyria (BEPP) was suspected. BEPP is an autosomal recessive genetic disorder recognised in the Limousin breed. However, studies of heterozygotes for the defect allele show reduced ferrochelatase activity and cases can occur in crossbred cattle. Sometimes affected calves will present with neurological signs as well. Porphyria's are well recognised conditions in humans and EDTA blood was sent to the NHS Wales Cardiff Porphyria Service, however unfortunately haemolysis prevented confirmatory testing.

Reproductive system: Abortion, Stillbirth and Congenital Deformities

Congenital Hepatic Fibrosis in two dairy calves

SRUC Perth and Ayr both saw cases of congenital hepatic fibrosis. Both were stillborn dairy calves. The case from Ayr had a large volume of abdominal fluid, while the case from Perth was small, with a domed skull. In both cases histopathology identified severe, extensive fibrosis consistent with congenital hepatic fibrosis. In the case from Perth, the kidneys were also abnormal, with collapse and suspected fibrosis. Congenital hepatic fibrosis is a well described but rare condition in humans, cattle and dogs. In humans there is kidney involvement usually in the form of polycystic disease. Kidney involvement does not appear to be a consistent finding in cattle. Ascites or generalised oedema has been reported in most of the cattle cases. The limited reports describe the condition in a number of different breeds and propose a genetic cause either hereditary or spontaneous mutation. There was no infectious cause of fetopathy detected, and SRUC requested further information regarding whether a new bull had been used this year.

Retinal Dysplasia in two Shorthorn calves

Two shorthorn calves born to cows that had been purchased in calf were reported to be blind from birth. The older calf had microphthalmia of the right eye, whilst the younger calf had a lens opacity in the left eye. Histopathology confirmed the presence of a cataract in one calf and detected severe retinal dysplasia in both calves. Severe dysplasia of some cerebellar lobules was also found. Screening for BVD virus and antibody was negative in both cases. Microphthalmia, retinal dysplasia and hydrocephalus were reported as likely genetic issues in shorthorn cattle in the 1970s.

Osteopetrosis in a Holstein calf

An aborted Holstein calf was presented from a dairy heifer in a 300 cow herd. It weighed 4kg and was estimated to be 5 to 6 months gestational age. It had a domed head and markedly shortened maxilla, with oedema over its muzzle. There was marked shortening of the femur and humerus of each limb, and both hind legs were fractured. The thorax and abdomen had been predated and those viscera remaining were exposed and contaminated. No infectious agents were demonstrated, and histopathology on a humerus and rib identified osteopetrosis (‘marble bone disease’) due to severe osteoclastopenia.

There is a group of rare disorders characterized by defects in osteoclastic bone resorption, with resultant primary spongiosa accumulation in the marrow cavity. This disease has been described in many species including humans, companion animals, laboratory animals, and ruminants. Commonly affected animals are aborted or stillborn. In cattle, this disease has been recognised in Aberdeen Angus cattle including Red Angus, Hereford, Simmental, Belgian Blue, and Holstein breeds. In Red Angus cattle, this has been demonstrated to be an autosomal recessive disease due to a deletion in the SLC4A2 gene which is involved in premature apoptosis of osteoclasts. There are commercially available tests available for Holstein cattle, which are useful to screen for carrier animals. Osteopetrosis has also been observed in calves infected with BVDv during the first trimester. PCR testing of the calf in this case was negative for pestiviruses.

References:

(PDF) Transient benign osteopetrosis in a calf persistently infected with bovine virus diarrhoea virus (researchgate.net)

https://bmcgenomics.biomedcentral.com/articles/10.1186/1471-2164-11-337

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1695103/

https://journals.tdl.org/bovine/index.php/bovine/article/view/1261/1252

Mastitis

Mastitis due to E. coli was one of the most frequent diagnoses in quarter 3 2022. Toxic *E. coli* mastitis was diagnosed as the cause of malaise and death of a six year old cow submitted to investigate ongoing, sporadic losses in a 220 head dairy herd. The recently calved cow was reported to have showed vague malaise since calving before developing increased respiratory and heart rates and being hypothermic. Veterinary treatment with antibiotic and steroid was administered, but the cow died within eight hours.

Centre of Expertise for Extensively Managed Livestock

The COEEML was developed by APHA to address potential surveillance gaps for extensively managed animals. Extensive management of livestock potentially makes

regular or close inspection for disease detection more challenging. The Centre is based at the APHA Veterinary Investigation Centre in Carmarthen; however, it is a Great Britain-wide resource and forms part of the wider veterinary surveillance system operated by APHA.

The COEEML conference is due to be held in November 2022 in Aberystwyth. For more details on the conference please see the COEEML pages on the Vet Gateway.

Bovine Babesiosis Project

Many thanks for your continued support with Bovine Babesiosis project. Further samples were received this quarter and tested by PCR. A summary for each submission is provided below:

- Milk drop and red urine was reported in an adult milking cow that was otherwise clinically normal on veterinary examination. An in house PCV was 21%. *Babesia divergens* DNA was detected.
- *Babesia divergens* DNA was also detected in samples received from two other dairy cows on separate units with haematuria and milk drop, but no significant anaemia or clinical disease.
- EDTA blood samples were submitted from two adult beef cows that were homebred and grazing the same field for several weeks. The farmer had initially noticed that both cows had become unusually docile. Examination by the submitting PVS identified pale mucous membranes and watery blood. In house PCVs were 12% and 7% respectively. The animal with the lowest PCV died despite treatment. Both animals tested positive for *Babesia divergens.*
- Jaundice, anaemia (PCV 8%) and death was also reported in an adult Jersey cross dairy cow. *Babesia divergens* DNA was also detected in this case.
- Co-infection with *Babesia divergens* and *Anaplasma phagocytophilum* (Tick borne fever) was confirmed in one case this month in a 10 month old beef animal that was part of a group of 50 animals grazing a common. Seven animals in the group were poorly, inappetant and losing condition. They were anaemic and one had died. Co-infections with these two organisms have been previously reported in cattle in the UK and it is recognised that it can increase the severity of disease.

Antimicrobial use and resistance

The Veterinary Antibiotic Resistance Sales and Surveillance (UK-VARRS) report 2021 has been published by the Veterinary Medicines Directorate (VMD):

Veterinary Antimicrobial Resistance and Sales Surveillance 2021 - GOV.UK (www.gov.uk)

This year's UK-VARSS report continues to document downward trends in sales of veterinary antibiotics in the UK.

The latest RUMA Targets Task Force has also been recently published:

Reports – RUMA

The Medicine Hub, an industry voluntary initiative, developed and managed by AHDB, was launched in 2021 and provides a central location for the collection of medicine data, including antibiotic use.

Medicine Hub for dairy, beef and sheep farmers | AHDB

Chemical food safety and toxic conditions

The latest Chemical Food Safety Reports can be found at:

APHA chemical food safety reports (livestock) - GOV.UK (www.gov.uk)

Botulism in fattening calves

Over two days from a group 50 beef calves aged 4 to 7 months three calves presented with sternal recumbency progressing to lateral recumbency and euthanasia. Whilst down the calves retained cranial nerve reflexes and were alert but, although willing to rise when encouraged, could not raise themselves or move forward. The calves were housed in an open-sided shed and fed a TMR, which included baled home-produced grass silage, clamp home-produced maize silage, brewer's grain and mineral mix with concentrate pellets. The silage had been fed for six months. Broiler litter was spread on two fields adjacent to the affected group six weeks and three weeks previously.

The cause of recumbency and clinical signs was not apparent at post -mortem examination with no significant lesions present. Clinical pathology did not indicate metabolic disease or lead poisoning. There were no significant histopathologic changes in the brain and spinal cord. Clinical history of recumbency affecting several calves over a few days and potential exposure to broiler litter either from litter spread on a field 40m away or from contaminated feed was suggestive of botulism. Information on botulism was provided Botulism in farmed ruminants (defra.gov.uk) The case was raised as a potential food safety incident.

APHA VIDA data shows that botulism is more commonly seen during the period May to October (Figure 15).

Reference

Payne JH, Hogg RA, Otter A, Roest HIJ, Livesey CT. Emergence of suspected type D botulism in ruminants in England and Wales (2001 to 2009), associated with exposure to broiler litter. *Veterinary Record* 2011;168:640-643

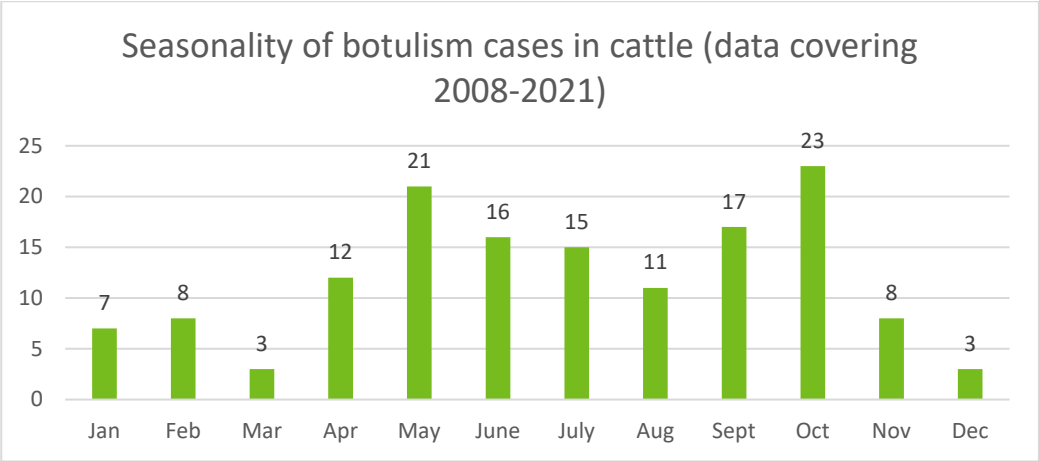

Figure 14: Seasonality of botulism in cattle VIDA data 2008 to 2021.

Horizon scanning

Bluetongue (BTV) update

APHA no longer has access to the EU's Animal Disease Notification System (ADNS), hence we are now only using World Organisation for Animal Health (WOAH) data, and the weekly outbreak summary data published by the new EU Animal Diseases Information System (ADIS), to estimate the disease status in countries near to Great Britain.

Amongst countries in northern and western Europe, the following areas are currently classified by the European Commission as containing circulating BTV-8 (Figure 16):

Mainland France (since 1 January 2018), Belgium (since 1 April 2019), Luxembourg (since 17 September 2020), Switzerland (since 20 April 2021), and Germany (only the states of Saarland and Rhineland Palatinate; since 14 July 2022).

Amongst these, mainland France is also considered to contain circulating BTV4.

On 28th October 2022 Sardinia reported an outbreak of BTV3. BTV was first reported in Sardinia in 2000 and has become endemic. A national surveillance plan for BTV was put in place in Italy in 2002, allowing periodic testing of sentinel animals. The first cases of BTV3 on Italian territories were identified in late 2017, in Sicily. Its circulation in Sardinia was initially evidenced in sentinel animals located in the province of Sud Sardegna, in September 2018. The strain was demonstrated to be almost identical to the BTV3 strain identified in Tunisia in 2016 and 2017. A similar scenario had been observed during earlier incursions of other BTV serotypes originating from Northern Africa into southern Europe and, may be suspected to be involved in the current event. Currently, Sardinia is declared endemically infected by BTV serotypes 1, 3, and 4, as illustrated in the EC Bluetongue map (Figure 16), presenting the BTV status of the Member States and their 'infected' and 'free' zones as of 28 Jul 2022.

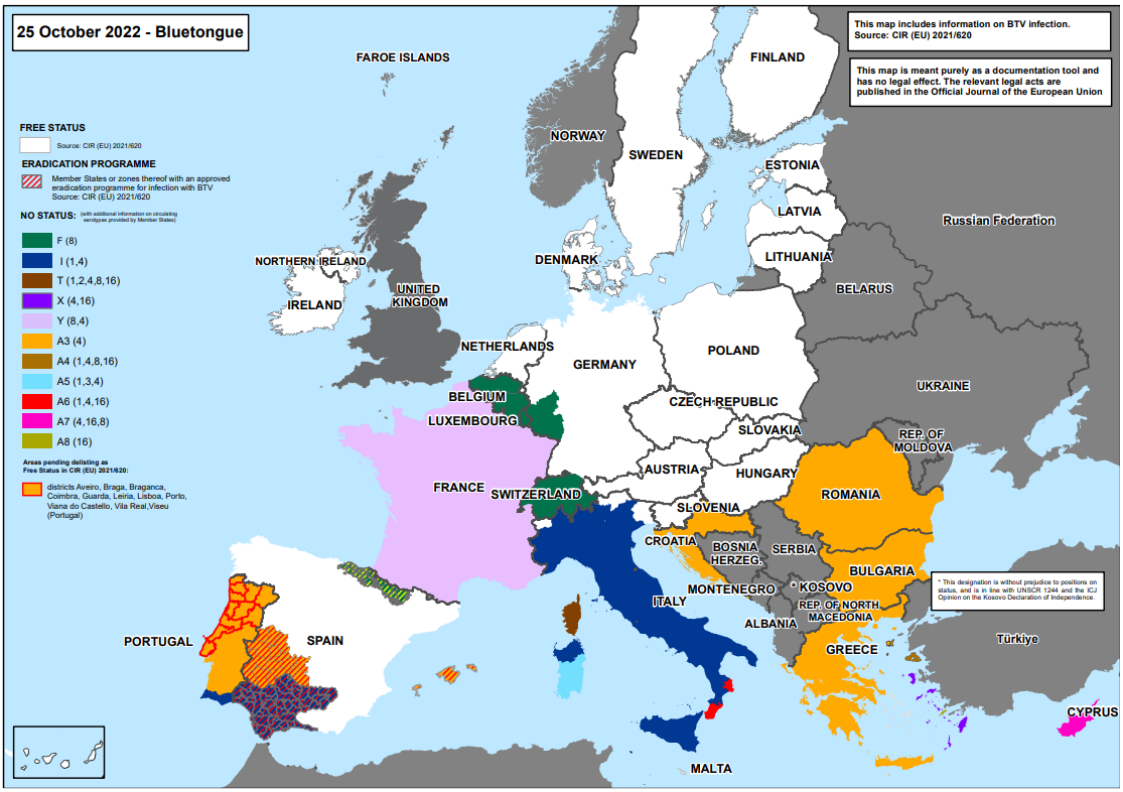

Figure 15: Map showing BTV status of the Member States and their 'infected' and 'free' zones (October 2022)

Publications of interest

APHA Staff

APHA (2021) Disease surveillance in England and Wales, June 2022. *Veterinary Record* Disease surveillance in England and Wales, June 2022 - 2022 - Veterinary Record - Wiley Online Library

APHA (2021) Disease surveillance in England and Wales, June 2022. *Veterinary Record* Disease surveillance in England and Wales, July 2022 (wiley.com)

APHA Surveillance Focus Article, August 2022. *Veterinary Record* Managing liver fluke on hill farms (wiley.com)

OTTER A; BRZOZOWSKA A (2022) Pneumonia in adult cattle, *Veterinary Record 5/12 March 2022 191-193* Pneumonia in adult cattle (wiley.com)

DEENEY AS; COLLINGS R; RIDLEY AM (2021) Identification of Mycoplasma species and related organisms from ruminants in England and Wales during 2005-2019. *BMC Veterinary Research 17, Article number: 325*.

SWINSON V; PAPADOPOULOU C; Rafferty L (2021) Bluetongue virus surveillance study (letter). *Veterinary Record 189 (9) 369*.

OTTER A; TORRENS N; MARTINDALE L (2021) Pestivirus infections of cattle. *Veterinary Record 189 (7) 281-282.*

JEWELL N; JONES J; FLOYD T; DAVIES G; PAYNE J (2022) Facial paralysis with ear droop in calves exposed to steelworks slag, possibly due to vanadium toxicity. *Veterinary Record Case Reports 18 February 2022* http://doi.org/10.1002/vrc2.339

Facial paralysis with ear droop in calves associated with exposure to steelworks slag, possibly due to vanadium toxicity - Jewell - - Veterinary Record Case Reports - Wiley Online Library

Phipps Lp; Hansford Km; Hernandez-Triana Lm; Golding M; Mcginley L; Folly Aj; Vaux Agc; De Marco Mf; Carter Dp; Medlock Jm; Johnson N (2022)
Detection of Borrelia and Babesia species in Haemaphysalis punctata ticks sampled in Southern England. *Ticks and Tick-borne Diseases 13 (2) 101902*.

Other publications of interest

SRUC VS (2022) Disease Surveillance, 19/26 March 2022. *Veterinary Record*
Schmallenberg virus transmission confirmed in north-east Scotland (wiley.com)

COLLINS, A. B., DOHERTY, M. L., BARRETT, D. J. & MEE, J. F. (2019) Schmallenberg virus: A systematic international literature review (2011-2019) from an Irish perspective. Irish Veterinary Journal 72

Statement regarding use of this material

This publication is available at:

https://www.gov.uk/government/collections/animal-disease-surveillance-reports

Any enquiries regarding this publication should be sent to us at SIU@apha.gov.uk

http://apha.defra.gov.uk/vet-gateway/surveillance/index.htm

The Animal and Plant Health Agency (APHA) is an executive agency of the Department for Environment, Food & Rural Affairs, and also works on behalf of the Scottish Government and Welsh Government.