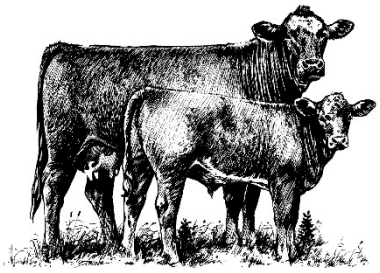
Animal & Plant Health Agency



SRUC

GB cattle quarterly report

Disease surveillance and emerging threats

Volume 34: Quarter 4 (October to December) 2022

Highlights

- **Tick Borne Fever cases – page 4**
- **Suspected Neurogenic Cardiovascular Collapse in calves – page 8**
- ***Bibersteinia trehalosi* in cattle – page 14**
- **Arnold-Chiari malformations – page 22**

Contents

Editor: Vanessa Swinson, APHA Thirsk
Phone: + 44 (0) 208 5654574
Email: Vanessa.swinson@apha.gov.uk

Introduction and overview

This quarterly report reviews disease trends and disease threats for the fourth quarter of 2022 (Quarter 4), October to December. 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

Dairy update

- **Prices**: The UK average milk price for December 2022 was 51.51ppl, according to Defra. This is 0.45ppl (0.9%) up on the previous month: https://ahdb.org.uk/dairy/uk-farmgate-milk-prices. The weakness in dairy commodity markets, which started to show in the latter part of 2022, is now making itself felt at the farmgate. There has been an increase in both the size and number of announced milk price reductions: https://ahdb.org.uk/dairy/milk-price-changes
- **Production**: Defra data has been delayed, and so UK milk production data is only recorded up to November, when 1,200 million litres we recorded for the month, 3.2% above last year: https://ahdb.org.uk/dairy/uk-daily-milk-deliveries. AHDB estimates that in December, 1,238 million litres of milk were produced in the UK.
- **Trade:** For the calendar year of 2022, volumes of dairy products exported from the UK totalled 1.20 million tonnes, an increase of 2.4% year on year: https://ahdb.org.uk/dairy/trade-dashboard.The value of these exports has increased 38.3% year on year to total £1.88 billion, driven by increased market prices during the first half of the year: https://ahdb.org.uk/dairy/world-wholesale-prices
- **Demand:** During the 52 weeks ending 25 December, we have seen year on year volumes of dairy retail sales decline by -6.8% for milk, -6.9% for yogurt, -4.7% for cheese, and -8.7% for butter, as inflation has caused prices to increase between 8%-22%. https://ahdb.org.uk/dairy/consumer-insight-retail-markets

Beef update

- **Prices:** Deadweight cattle prices remain at record highs, with prime cattle ending the year (week ending 31 Dec) at 448.1p/kg and cull cows sitting at 349.4p/kg: https://ahdb.org.uk/beef/gb-deadweight-cattle-prices-by-region
- **Production:** During December, the UK produced 74,800 tonnes of beef and veal, with total production for calendar year of 2022 at 906,400 tonnes. Prime cattle slaughter totalled 161,700 head for the month, bringing full year numbers to 1.99 million head. Cull cows totalled 60,800 head in December, totalling 673,700 head for the full year: https://ahdb.org.uk/news/uk-beef-production-up-on-2021
- **Trade:** Beef exports for the month of December totalled 10,300 tonnes, down slightly (177 tonnes) from the same time last year. Total exports for 2022 stood at

123,700 tonnes, up 20% (20,800 tonnes) on the total volume from 2021. Increases in exports for 2022 mainly came from the first two quarters, with the last two quarters staying closer to volumes seen in 2021. The UK imported 21,500 tonnes of beef in December, down 10% compared to this time last year. For the full year of 2022, beef imports totalled 233,300 tonnes, down 3.6% from the 2021. https://ahdb.org.uk/news/uk-beef-imports-down-exports-up-2022-trade-review

- **Demand:** In the 12 weeks ending 22 January, spend on beef increased 8.0% year on year, while volumes purchased fell 2.5%, with prices paid rising 10.7% due to inflation: https://ahdb.org.uk/beef/consumer-insight-gb-household-beef-purchases However, red meat did see a boost in Christmas sales as consumers moved away from Turkey: https://ahdb.org.uk/news/consumer-insight-christmas-opportunities-for-red-meat-as-turkey-tradition-fades

Acknowledgment for the dairy and beef updates: Freya Shuttleworth, AHDB

Weather

The Met Office reported that 2022 was the warmest year on record for the UK in a series from 1884 for maximum and mean temperatures, and it was the second warmest for minimum temperature (behind only 2014) (Figure 1). All individual months except December were warmer than average. It was also the warmest year on record for the Central England Temperature (CET) series from 1659. Rainfall was mostly below average for the year, with the months from January to August, and December, all being generally drier than average (Figure 2). The autumn months were wetter than average, although this was not enough to fully offset the deficit from the previous eight months. It was a sunnier than average year for most areas, especially eastern England, with only some northern and western fringes recording less sunshine than average. Quoted from: uk_monthly_climate_summary_annual_2022.pdf (metoffice.gov.uk). The mean temperatures in Scotland in December 2022 were 1.4°C below average, making it the coldest December since 2010. Rainfall was below average in the west, with an overall figure of 79 per cent. Sunshine figures were close to average at 105 per cent.

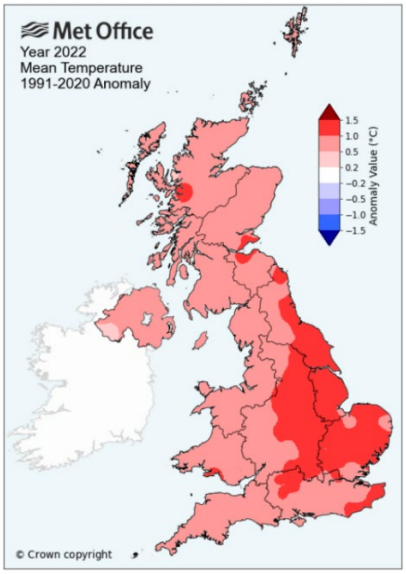


Figure 1: Year 2022 mean temperature compared to averages for 1991- 2020

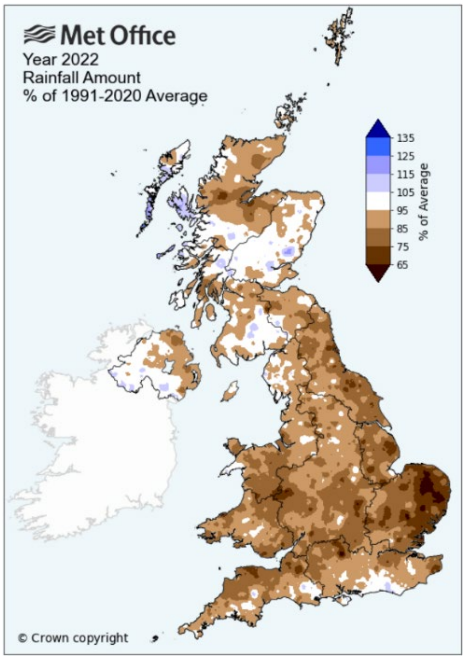


Figure 2: Year 2022 rainfall amount compared to averages for 1991-2020

Cattle disease surveillance dashboard outputs

The most frequent diagnoses from carcase submissions (please note that the table presented for Q3 2022 was for all submissions) made in the fourth quarter (Q4) of 2022, compared to Q4 in 2021, and Q4 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 4 of 2022, quarter 4 of 2021, and quarter 4 for 2015-2022

10 most frequent diagnoses Q4 2022	10 most frequent diagnoses Q4 2021	10 most frequent diagnoses Q4 2015-2022
1. Pneumonia due to *Mycoplasma bovis*	1. Pneumonia due to *Mycoplasma bovis*	1. Pneumonia due to *Mycoplasma bovis*
2. Pneumonia due to *Mannheimia haemolytica*	2. Pneumonia due to *Pasteurella multocida*	2. Pneumonia due to *Mannheimia haemolytica*
3. Pneumonia due to *Pasteurella multocida*	3. Cryptosporidiosis	3. Pneumonia due to *Pasteurella multocida*
4. Pneumonia due to other causes (not listed)	4. Pneumonia due to *Mannheimia haemolytica*	4. Pneumonia due to other causes (not listed)

10 most frequent diagnoses Q4 2022	10 most frequent diagnoses Q4 2021	10 most frequent diagnoses Q4 2015-2022
5. Pneumonia due to BRSV	5. Pneumonia due to *Pasteurella multocida*	5. Cryptosporidiosis
6. Cryptosporidiosis	6. Rotaviral enteritis	6. Pneumonia due to *Histophilus somni*
7. Parasitic gastroenteritis	7. Lungworm	7. Rotaviral enteritis
8. Salmonellosis – S. Dublin	8. Pneumonia due to *Histophilus somni*	8. Salmonellosis – S. Dublin
9. Pneumonia due to *Histophilus somni*	9. Coccidiosis	9. Pneumonia due to BRSV
10. Poisoning oak/acorn	10. Parasitic gastroenteritis	10. Ruminal acidosis

New and re-emerging diseases and threats

Tick-borne fever (TBF) cases

One twelve-year-old Simmental cow with a calf at foot had a history of watery diarrhoea, which started 3 to 4 days before it died and was submitted to APHA Bury St Edmunds for postmortem examination (PME). The cow had been grazing since the beginning of spring 2022 on marshland and, had moved to a new field two weeks previously. No other farmed species were on the premises. The cow was dehydrated and grossly there was jaundice and haematuria. Tick-borne fever (TBF) was diagnosed, with the detection of *Anaplasma phagocytophilum* nucleic acid by PCR, and with the other main causes of jaundice and haematuria (leptospirosis, babesiosis, and copper toxicity) having been ruled out. TBF occurs in both sheep and cattle and is more frequently diagnosed in sheep. The organism multiplies in neutrophils which are destroyed, producing profound neutropenia. There is also lymphocytopenia and transient thrombocytopenia. While infection with TBF alone may result in abortion and some morbidity, the immunosuppressive effect is also significant; with concurrent bacterial, viral, or protozoal infections resulting in more severe disease.

Tick borne fever PCR was positive in EDTA blood samples from five heifers which had recently aborted at grass. Twelve animals were affected in total in the group of 80, all of which were clinically well in themselves. No foetuses had been found, ruling out the potential for foetal examination and testing. Bloods samples had been screened by serological testing for IBR, leptospirosis, neosporosis and salmonellosis, all of which were negative at the point of abortion.

A group of 15-20 bullocks appeared off-colour at grass. Most had responded to tetracycline treatment, but two animals died, prompting the submission of a carcase. Striking gross pathology, consisting of an ulcerative glossitis, laryngitis and oesophagitis were found. Infectious Bovine Rhinotracheitis (IBR) and Bovine Papular Stomatitis were ruled out as causative agents, and histopathology found evidence of severe bacterial infection. A tracheitis was also present, with visible white fluffy plaques over the tracheal and bronchial mucosa. Cultures isolated *Aspergillus fumigatus*, an unusual pathogen to be causing respiratory disease. Severe immunosuppression was deemed to be a likely underlying factor for both the bacterial ulcerative lesions and the fungal tracheitis and, was confirmed using histopathology of the sternum which showed marked bone marrow depletion. Testing ruled out other causes of immunosuppression, including BVD, MCF, trace element deficiency, and parasites. Tick borne fever PCR, however, was positive. It was deemed likely that the immunosuppression caused by *Anaplasma phagocytophilum* infection could be severe enough to account for this presentation. Blood testing of cohort animals for this infection was offered.

Gastroparesis syndrome in dairy heifers

In both the Q2 and Q3 2022 reports, we have described cases of apparent gastroparesis in 9-to-22-month-old, Holstein Friesian, bulling, and in-calf dairy heifers on several farms. It has been reported that the majority, or all, of the affected heifers had the same sire. Further cases were reported to APHA in Q4 2022. One such case is described below.

A pregnant Holstein heifer was submitted for PME to investigate the cause of abdominal distension, wasting, and collapse. It was in a group of 60 heifers in a milking herd of 215 cows. A vagal indigestion or intestinal paresis was suspected. The heifer had not been doing well for the previous 2 to 3 months, becoming weaker, and not wanting to eat concentrate. PME revealed that the abdomen was distended due to an enlarged rumen, with much brown-green liquid and foamy contents. There was also a large amount of sand. The serosae of all the stomachs were oedematous. The abomasum had viscous brown liquid contents, with several fibrous balls (of 1-4 cm diameter). Three deep ulcers of up to 2.5 cm were in the fundic mucosa, and the pylorus was thickened causing some restriction to the outflow into the duodenum. The intestines were relatively empty. No specific infectious agents were identified, and histopathology confirmed ulcerative abomasitis, with mild pyloric hyperplasia. The underlying cause of the gastric dysfunction is uncertain. This case resembles others which have been investigated in the UK this year, all affected animals having a common sire, and further investigation of a suspected genetic link is ongoing.

Colisepticaemia in non-neonatal dairy calves

Colisepticaemia was diagnosed in two, three-month-old dairy bred calves submitted from a calf rearing unit. The calves were in a group of 30 and were the fourth and fifth to have died with acute malaise. This was characterised by recumbency and respiratory signs. PME identified polyserositis in both, with fibrinopurulent polyarthritis, pericarditis, pleuritis, peritonitis, and meningitis. *E. coli* was recovered in pure growth in septicaemic distribution.

There have been several such incidents in recent months being investigated by both APHA and SRUC. Colisepticaemia in older calves is generally considered sporadic, and these are in contrast with the customary presentation of septicaemic *E. coli* infection in neonatal calves. Whole genome sequencing of the different isolates recovered is underway, to establish if a specific *E. coli* strain is involved.

Similar cases have also been identified in six other herds in England and Wales, and over the last year colleagues in SRUC have identified similar outbreaks in dairy-bred calves on several farms (Mason and others 2022). Most cases have been in weaned calves, and there has been no consistent evidence of other diseases. We are interested to hear of any other suspected cases of what appears to be a new manifestation of colisepticaemia.

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

Malignant Catarrhal Fever (MCF)

An unusual outbreak of Malignant Catarrhal Fever (MCF) was diagnosed at Langford, following the submission of two purchased 3-year-old Stabiliser cows showing chronic, unrelenting diarrhoea and condition loss. Johne's Disease was excluded (negative serology) and at PME the gross findings were limited to unformed intestinal content, and suppurative pneumonia in one cow, which also had pale-coloured lesions in the kidneys (Figure 3). Moderate worm burdens were detected, but MCF antibody was also detected in both animals (one animal had unilateral, and not the usual bilateral, ulceration/uveitis; so initially MCF was not suspected) and histological findings were consistent (renal vasculitis amongst other findings). MCF can be associated with haemorrhagic diarrhoea (particularly in deer), but it is unusual for it to cause chronic diarrhoea in cattle, this was possibly linked to chronic renal disease.

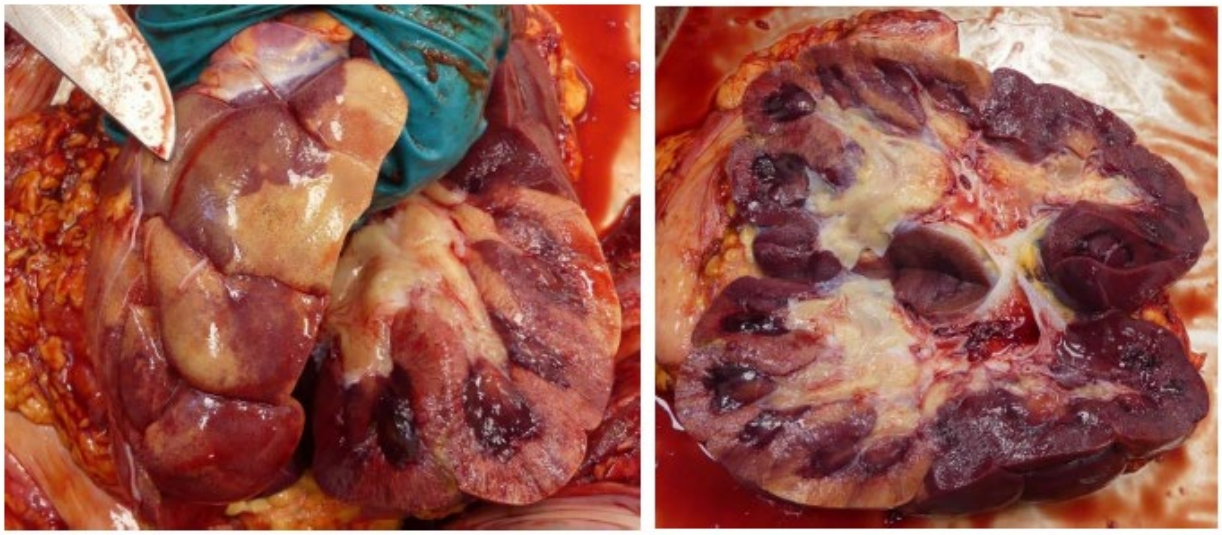


Figure 3: Pale infarct kidney lesions in a cow with MCF

Salmonella

The Salmonella in Livestock Production in GB 2021 can be found on Gov.uk. This annual publication provides data on reports of salmonella in livestock species in Great Britain (England, Wales, and Scotland), which was collected and collated by the Department for Environment, Food and Rural Affairs (Defra). *Salmonella* Dublin, *Salmonella* Mbandaka, and *Salmonella* Typhimurium are the three most frequently detected salmonellae in cattle.

Enteritis Complex in a dairy heifer calf involving a rare *Salmonella* Typhimurium phage type

A two-week-old heifer calf was submitted for PME. She had been small since birth and not suckled well. Five days prior to submission she developed a yellow 'sour' smelling scour. Despite antibiotics, anti-inflammatories, and oral rehydration therapy, she became depressed and reluctant to suckle and died. Two other similar aged calves in the same shed had died in the previous two weeks. Significant PME gross findings were sunken eyes indicating severe dehydration, enlarged liver with rounded edges, milk clots present in the rumen indicating rumen drinking (often secondary to either diarrhoea, stress or issues with feeding management), jejunitis and mesenteric lymphadenopathy.

Rotavirus, coronavirus, and cryptosporidium infections were all detected on faecal testing. *Salmonella* Typhimurium phage type 75 was also cultured and serotyped; a rare phage type, previously associated with wild birds. It was resistant to chloramphenicol, ampicillin, streptomycin, sulphonamides and tetracyclines. Both *Salmonella* Typhimurium and cryptosporidiosis are significant zoonoses, and strict hygiene precautions are essential for control. Advice was given on control and management of neonatal diarrhoea, along with prevention of ruminal drinking.

Three cases of suspected neurogenic cardiovascular collapse

Occasionally calves are submitted to investigate unexplained deaths around the time of feeding (usually in calves fed powdered milk). In one such case at least three, 4-week-old calves were reported to be normal at the start of feeding time, became excited, then collapsed, struggled to breathe, and died. One of these was submitted and there were very few gross findings to suggest a diagnosis. Given this, the history of once daily milk feeding, and the excitement that preceded seizures and death in at least three of the calves; a diagnosis of neurogenic cardiovascular collapse was most likely. The condition has been reported (see below). There was no convincing gross evidence of white muscle disease in the heart; and histological examination of heart, brain and other viscera was unrewarding. Vitamin E levels were low, a not uncommon finding in milk fed calves (1.8 µmol/, reference 3-18). Little is known of the risk factors for this condition, but once-daily feeding of milk may have predisposed in these calves.

A similar case was seen when two, 3-week-old dairy cross calves in single hutches were found dead, with a large volume of white froth around the nostrils and mouth (Figure 4). At PME, mild to moderate pulmonary oedema was evident (but there was no emphysema, which would also be seen with interstitial pneumonia, effectively excluding it). Lung and systemic cultures were unrewarding and the history and lack of significant PME findings made the diagnosis of neurogenic cardiavascular collapse most likely. Histological findings were unremarkable, aside from marked pulmonary oedema and congestion.

Navel ill, ruminal drinking, ruminal acidosis and rotavirus infection were all identified in a three-week old dairy calf submitted to SRUC. However, none of these diagnoses were consistent with the presenting sign of acute collapse. After drinking milk, the calf was seen to collapse immediately and die following a very short period of thrashing. At PME there was no evidence of dehydration, pus was present at the umbilicus but had not tracked to other organs, and milk was present in both the abomasum and rumen. Histopathology found changes consistent with ruminal acidosis and rotavirus infection but no reason for the sudden death. Cases of acute arrythmia in anticipation of milk feeding have previously been reported and was suspected in this case.

Figure 4: A large volume of white froth around the nostrils and mouth of a calf with suspected neurogenic cardiovascular collapse (*Courtesy of Chris Warren, George Veterinary Group).*

Reference: Jones, *Veterinary Record 1979; 104:414*, and in the SAC surveillance report - *Veterinary Record 2014;174: 374-377*.

Digestive system disease

Parasitic gastroenteritis (PGE)

PGE can occur in any grazing animal (or animal that has a history of grazing) 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 youngstock 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 in 2022: 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/.

Parasitic gastroenteritis including haemonchosis in dairy calves

Two 6-month-old dairy calves were submitted, one having been found dead, the second euthanased by the practitioner as it was recumbent. They were in a group of 30 at pasture, one other in the group had previously died. The group was fed 2 to 3kg of concentrate each day in addition to having reasonable pasture grass, and they had been wormed using a pour-on six weeks previously. The two calves were in poor to emaciated condition and were dehydrated. There was reasonable rumen fill with good papilla development. The abomasum of each was distended, and in the freshest calf the mucosa was inflamed and oedematous, and the content showed much 'writhing motility'. Intestines were dilated with some haemorrhagic loops, and gastric and mesenteric lymph nodes were very reactive. A worm egg count of 25,050 epg was identified in the freshest calf; a peanut agglutinin fluorescent test on the eggs confirmed that 56% were *Haemonchus* species. Analysis of the worms present identified very high numbers of abomasal parasites including *Ostertagia* species, *Trichostrogylus axei* and *Haemonchus* species, together with immatures. The findings indicated heavy parasite challenge on the pasture and possibly failure of efficacy of the pour-on. *Haemonchus* parasites are more commonly associated with abomasal parasitism in sheep and, can cause significant morbidity and mortality as they suck blood which can result in fatal anaemia. They are renowned for producing large numbers of eggs, and consequently, where very high worm egg counts are detected, it is worth considering the possibility of these parasites. Immediate worming of others in the group was recommended, in addition to continued provision of supplementary feed to try to assist the calves' recovery. A parasite control plan, to include further monitoring for parasitism (post-treatment checks), should be considered for subsequent grazing seasons.

Two cases of bovine viral diarrhoea (BVD)

A four-month-old calf was submitted to investigate four deaths in a group of 20 housed dairy-cross calves. Affected animals looked poor and some had diarrhoea and pneumonia. At PME, the calf was in very poor condition, had diarrhoea and oral ulceration. Testing for BVD by PCR was positive. Given the stunted growth and oral ulceration, it is likely this animal was persistently infected, though a positive PCR can also indicate acute infection. It was advised to further investigate the BVD status of the herd and instigate control measures. *Mycoplasma bovirhinis* and *Mycoplasma dispar* were detected in lung samples. These can be found in both healthy and pneumonic lungs but could have contributed to the respiratory disease. The calf also had low liver selenium, and it was recommended to determine the trace element status of the group.

A two-year-old, pregnant, Holstein-Friesian heifer was one of a group of 30 in-calf heifers which had been housed with a group of 30 adult dry cows for three weeks. Over the past

three weeks, three had aborted at approximately 4.5 months gestation, and in the previous three days, three heifers had died following a brief illness. There was also some coughing amongst the adult cows. Significant PME findings were a severe bronchopneumonia and marked ulceration of the abomasal mucosa in the pyloric region. A PCR test on spleen was positive for BVDv, which may have indicated a transient or a persistent infection in this heifer. BVDv is likely to have been linked to the abomasal ulcers and may have predisposed to the bacterial pneumonia. BVDv infection in the herd may also have contributed to the recent abortions reported. Investigation into BVDv at a herd level, including sampling to identify persistently affected animals (PI hunt), was advised.

Suspect Severe Summer Scour Syndrome

An ulcerative glossitis and stomatitis were detected in a five-month-old housed dairy calf, submitted to investigate poor condition and wasting in a group of calves, with no response to coccidiosis treatment. This affected calf was typical, and displayed little carcase fat and liquid intestinal content. Investigations ruled out common causes of scour (worms, coccidia, Salmonella, BVD, yersiniosis, and enteric listeriosis), and no evidence of Bovine Papular Stomatitis was found in tongue lesions using electron microscopy. Histopathology showed that the tongue and oesophageal lesions were chronic, with the initiating factor unclear at this stage of disease. The pathology and clinical signs in this case were very similar to those associated with “summer scour syndrome”. There is still very little known about this syndrome and the cause or causes of it are uncertain. It typically presents as scour, wasting and ulceration of the gastrointestinal tract in young dairy calves, approximately one-month post-turnout. One theory for the development of the oesophageal lesions in this syndrome, is the presence of ruminal acidosis related rumenitis and dysbiosis. The resulting acid reflux could result in oesophageal ulceration. A change in diet (including turnout on lush pasture) and poor rumen development are suspected contributing factors. The acidosis, gastrointestinal inflammation and maldigestion become self-perpetuating, producing signs of scour and weight loss. Of note in this case was the very short fibre present in the rumen and no evidence of a fibrous mat, suggesting nutritional factors may have been an underlying factor.

Yersinia pseudotuberculosis enteritis cases

Yersinia pseudotuberculosis was diagnosed in submissions from Aberdeen and Dumfries this month, in the latter case in conjunction with PGE. In Dumfries, two seven-month-old Hereford-cross stirks were submitted for investigation of diarrhoea and mortality in a group of 53. Six animals were markedly affected, and four had died, but most of the group were reported to have had diarrhoea. The group had been strip grazed on fodder beet for five weeks. Both submitted animals had exhibited profuse diarrhoea. Strongyle egg counts were 850 and 250 eggs per gram respectively, and *Y. pseudotuberculosis* was cultured from the intestines of both animals. Histopathology confirmed an eosinophilic enteritis consistent with parasitic gastroenteritis, but autolysis hindered the assessment of the significance of the *Y. pseudotuberculosis*.

Aberdeen diagnosed *Y. pseudotuberculosis* as the cause of a severe enterocolitis in a weaned Spring-born Wagyu calf on pasture. The bacterium was isolated from the small

and large intestinal contents, which were watery in consistency and contained fibrous strands. The intestinal walls of the distal jejunum (Figure 5), caecum and colon were markedly thickened, with diffusely red jejunal mucosa, whilst the large intestinal mucosa was grey with white proliferations (Figure 6). Histopathological examination of the intestinal mucosa was hampered by autolysis, however changes of focal necrosis and suppurative inflammation within lymphoid deposits were thought to be typical of yersiniosis.

Sporadic cases of enterocolitis due to infection with *Y. pseudotuberculosis* have been reported in cattle, for example in Australia, where disease including scour occurs mainly during the winter and early spring, primarily in cattle grazing pastures affected by flooding or heavy rain. The Australian authors speculated that the association with wet conditions and low temperatures favours the survival and transmission of *Y. pseudotuberculosis*. The organism appears to respond well to antibiotic treatment and the isolate from this calf was sensitive to all target antibiotics. Significantly low liver selenium concentration and marginally low vitamin E concentration may have contributed to infection susceptibility.

Figure 5: Jejunum with fibrinous exudate in the lumen and markedly thickened mucosa in a calf with yersiniosis

Figure 6: Thickened grey and white large intestinal mucosa in a calf with yersiniosis

Respiratory system

As can be seen in Table 1, the five most frequent diagnoses from carcase submissions in Q4 2022 all form part of the bovine respiratory disease complex. Mixed infections were frequent, with viral pathogens commonly acting as a primary insult, with secondary bacterial colonisation following. Primary bacterial pneumonias were also recorded. In quarter (Q4) of 2022, compared to the same quarter in previous years, respiratory disease has been seen increasingly in post-weaned dairy calves in West and NW England.

In Scotland, over the last 20 years, the most common respiratory disease diagnoses for Q4 were pneumonias due to *Mannheimia haemolytica*, IBR, and *Pasteurella multocida*, whilst in England they were lungworm, and pneumonia due to *Mannheimia haemolytica.* However, if we take Q4 of the last three years only (2020-2022), the situation changes, with *Mycoplasma bovis,* RSV, and *Pasteurella multocida,* having been the most common pathogens isolated in Scotland. This is similar to the situation in England over the same period, with the three most common pathogens associated with pneumonia being: *Mannheimia haemolytica, Mycoplasma bovis* and *Pasteurella multocida.*

This quarter has seen similar percentages of diagnosable submissions for bovine respiratory disease pathogens to previous years. The only increasing trend seen over Q4 of recent years has been in the percentage of diagnosable submissions where IBR (Figure 7) and *Haemophilus somni* (Figure 8) were detected. This ascending trend has only been noted in Scotland, which has recorded an all-time-high for both diagnoses in this quarter, although it should be noted that this may have also been influenced by changes in testing methods (such as increased use of PCR testing for *H.somni*).

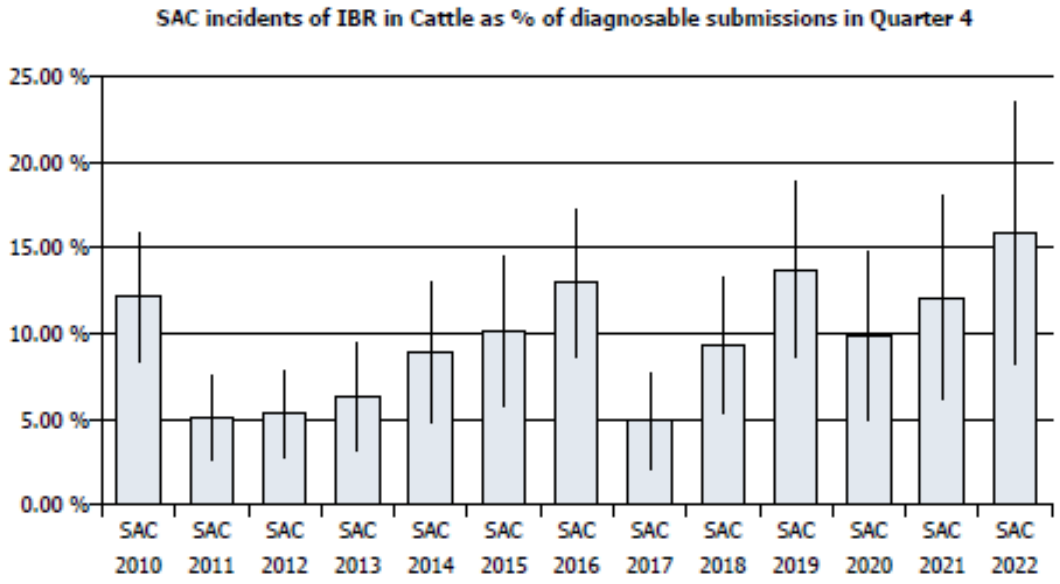


Figure 7: Incidents of IBR in cattle in Scotland as a percentage of diagnosable submissions 2010 – 2022

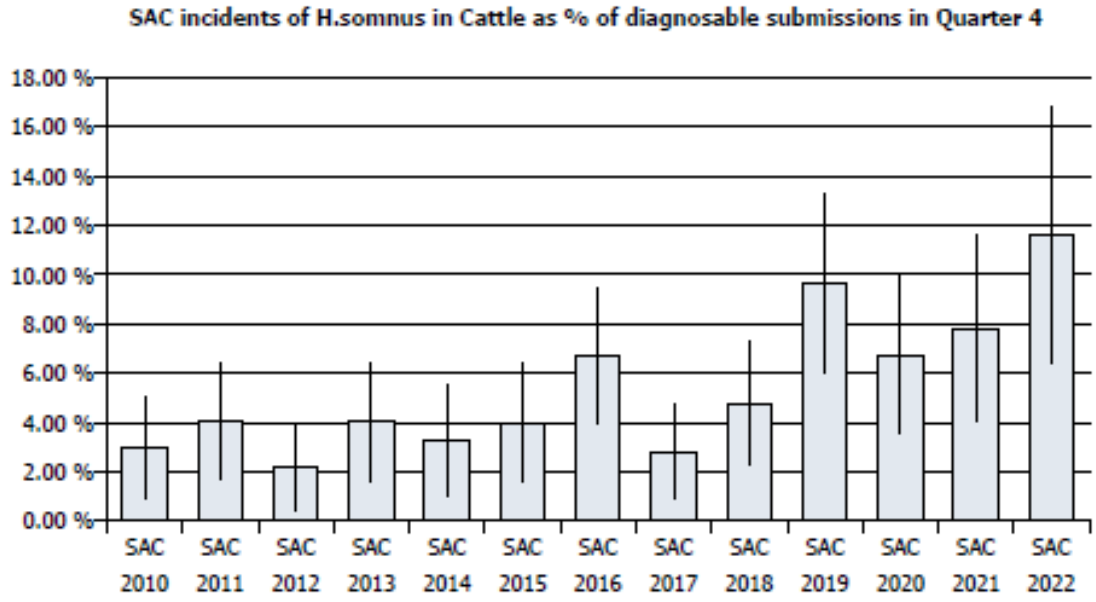


Figure 8: Incidents of pneumonia due to *H. somni* in cattle in Scotland as a percentage of diagnosable submissions 2010 - 2022

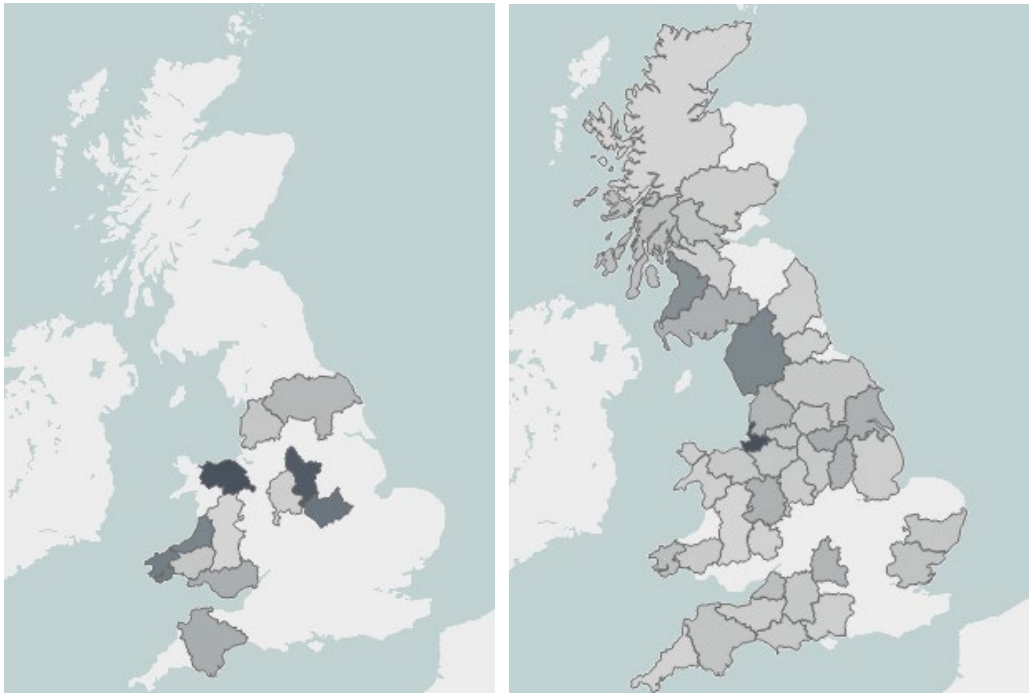
Bibersteinia trehalosi in cattle

Bibersteiniosis was diagnosed in a pre-weaned dairy heifer. The calf had died after a brief period of inappetence, and vague malaise. Investigation was undertaken as the 280-cow herd had lost 10 calves in the past month. The gross findings were of a severe bacterial pleuropneumonia with the lungs and pericardium encased in fibrin with a substantial turbid thoracic effusion. The lung lobes were brick red with extensive inter and intralobular fibrin deposition. Bacteriology recovered *Bibersteinia trehalosi* from multiple sites. It was highlighted that this bacterial species has increasingly been identified in cases of per-acute disease in different age groups of cattle. The client was directed to a recent online article which provided some additional insight into the condition.

Bibersteinia trehalosi is a recognised cause of septicaemia and pneumonia in sheep and, in the last 20 years, it has increasingly been associated with respiratory disease in cattle.

In a 2011 Cattle Practice paper, R. Collins discussed the information collated from the analysis of data collected from APHA submissions between 2003 - 2011 and, concluded that *B. trehalosi* was potentially another bacterial component of the Bovine Respiratory Disease Complex. In the review, most isolates were cultured from pneumonic lung tissue, however the bacterium had occasionally been found in systemic distribution, being concurrently isolated from liver and/or spleen. It is interesting to note that, at the time of this paper, all 65 isolations had been from cases in Wales and three areas of England (Figure 9a). In contrast, from February 2011 to December 2022 there were 133 cases, with cases being spread across Great Britain (Figure 9b).

Reference: *Bibersteinia trehalosi* in Cattle - Another Component of the Bovine Respiratory Disease Complex? March 2011, Cattle Practice 19(1):9-12).



Figures 9a and 9b: Geographical distribution of *B. trehalosi* detection 9a (left) 2003-2011 and 9b (right) 2011-2022

Most of the diagnoses were in calves (both pre-weaned and post-weaned), with an even split between dairy and beef enterprises. The North-West of England is still the area with the largest number of diagnoses of *B. trehalosi* in association with respiratory disease in cattle (Figure 10). Dumfries and Galloway, and Ayrshire are the areas with the largest number of cases in Scotland, which is not unexpected given the high density of cattle in these regions.

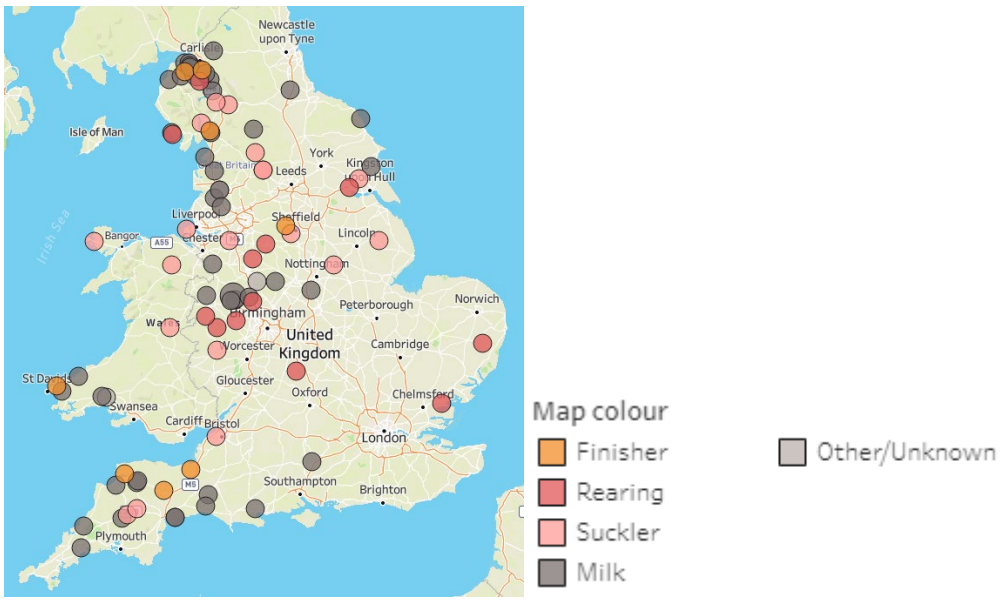


Figure 10: Geographical distribution of cases of pneumonia-associated *B. trehalosi* in cattle (England and Wales)

Two cases of Mannheimia haemolytica pneumonia in cattle

A second-calver was submitted to investigate respiratory disease in six recently calved cows, in a herd of 150 milkers. The submitted cow was seven days-in-milk, had calved normally, but had subsequently developed respiratory signs and died despite treatment. Significant PME findings were an increased volume of red pleural fluid, dark-red tracheal mucosa, marked dark purple cranioventral consolidation of the lungs (Figure 11) and yellow-coloured interlobular oedema of the affected lung parenchyma (Figure 12).

Gross pathology was suggestive of an acute bacterial pneumonia and a tetracycline resistant *Mannheimia haemolytica* was cultured from the lung. *Mycoplasma dispar* and *Mycoplasma bovirhinis* were also detected in lung tissue. Whilst *M. dispar* has been isolated from the lungs of healthy cattle, it is also considered to be a respiratory pathogen and may have contributed to the respiratory disease. *M. bovirhinis* can be found in the upper and lower respiratory tracts of both healthy and diseased cattle; it is not believed to be a primary pathogen but may exacerbate existing disease.

Potential risk factors for acute bacterial pneumonia in adult dairy cattle include transition or early lactation management issues, acidosis, high stocking rates and poor ventilation (particularly in congested areas of the shed such as collecting yards). Generally, prompt identification and early treatment of affected animals will improve the clinical outcome.

PCR screening for RSV, PI3 and BoHV-1 nucleic acids did not detect these viral pathogens in respiratory tissues. Negative results in animals sampled in the acute stages of respiratory disease suggest that respiratory viruses did not cause the disease in the animal sampled. Virus may still be present and detectable when nasal discharge is mucopurulent, but once animals have a purulent nasal discharge virus is unlikely to be present and a negative PCR result should be expected.

Figure 11: Cranio-ventral consolidation and pleurisy of left lung, with adhesions to pericardium in a dairy cow with *Mannheimia haemolytica* pneumonia

Figure 12: Cut surface of lung with consolidation, interlobular oedema, and pulmonary oedema in a dairy cow with *Mannheimia haemolytica* pneumonia

In the second case an 18-month-old heifer was euthanased and submitted for postmortem examination to investigate acute onset respiratory signs. At postmortem examination the heifer had a severe cranioventral fibrinous bronchopneumonia and pleuritis. A fully sensitive *Mannheimia haemolytica* was isolated in pure growth from the lung.

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 for free of charge testing and following discussion with an APHA veterinary investigation officer (VIO), from cattle with acute respiratory signs (e.g 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.

Nervous system and organs of special sense

Cerebrocortical necrosis

This quarter, outbreaks of cerebrocortical necrosis (CCN) were recorded at three Veterinary Investigation Centres. In one group of 70 yearlings, two were found recumbent with hyperextended necks on successive days. PME of the second animal, which was euthanased by the practitioner, revealed a full rumen with short fibre and some barley, similar content also being present in the abomasum and intestine. The brain was swollen and had yellowed cerebral cortices which showed autofluorescence under ultra-violet light; histopathology confirmed severe acute symmetrical laminar cerebrocortical necrosis. The animals were fed a TMR-type diet comprising 2/3 grass silage, which was last year's and

was reported to have mould contamination, 1/3 whole crop oats and peas, and 2kg barley per head. A review of the feeding regime was recommended.

In the second case three 5-month-old calves, which had been purchased at one month of age, developed diarrhoea and malaise, with circling and extended hind limb gait also reported. Two died or had to be euthanased, despite administration of fluids and symptomatic veterinary treatment, and one was examined postmortem. This identified dorsoventral compression of the midbrain, with yellow discolouration of the cerebral cortex. Histopathology confirmed CCN. In this case the diet consisted mainly of concentrate and barley straw, with limited access to haylage.

Two, ten to twelve-week-old Friesian calves were submitted for investigation of blindness, head pressing and vocalisation. Three calves were affected from a pen of twenty that had been weaned onto ad lib straw and concentrates two weeks earlier. The brains of both calves fluoresced under ultraviolet light, and neuropathology confirmed CCN consistent with sulphur toxicity/thiamine deficiency. Kidney lead levels were below detectable limits in both, excluding its involvement. One of the calves had frothy rumen contents and diarrhoea, 4150 coccidial oocysts per gram of faeces, and evidence of recent severe coccidiosis on histopathology. It was proposed that the abnormal rumen contents indicated a failure to adapt to the post-weaning diet, and in conjunction with previous coccidiosis could have predisposed to CCN through alterations in the rumen microbiota.

From 2010 to 2019, July was the month with the highest number of cases recorded (Figure 13). Although CCN occurs in animals at pasture, more cases are diagnosed in housed animals (Figure 14). Figure 15 shows that 70% of cases were in the post-wean age category. It is accepted that a lack of vitamin B1 is the principal cause (although similar brain pathology can potentially occur with sulphur, lead or salt poisonings, and hypoxia). The reason outbreaks arise in animals on apparently stable diets, including pasture grass, is not always clear. The proliferation of thiaminase-producing bacteria in the rumen has been shown to deplete the concentration of vitamin B1, which then reduces that which passes into the intestine for absorption. Intestinal disease, such as caused by parasitic gastroenteritis, can also affect the absorption of the vitamin from the jejunum. Restricted water availability is also considered a risk factor.

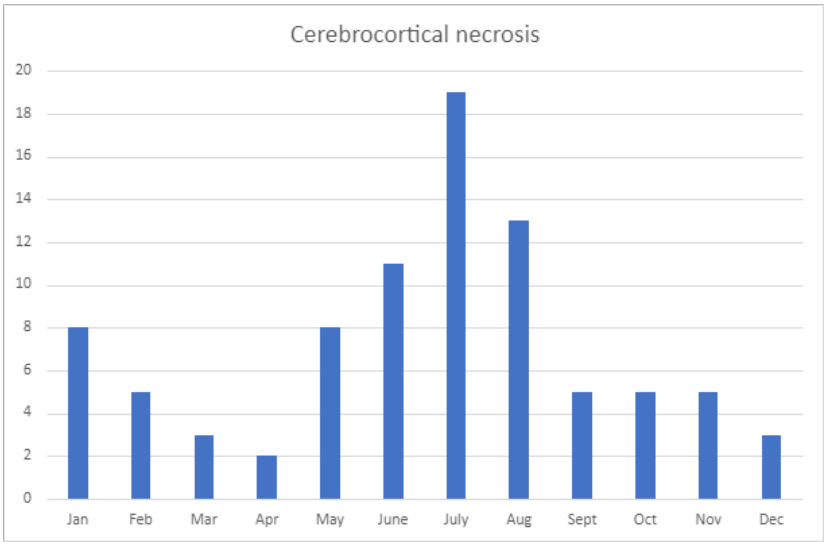


Figure 13: Seasonality of diagnoses of CCN in England and Wales 2010-2019

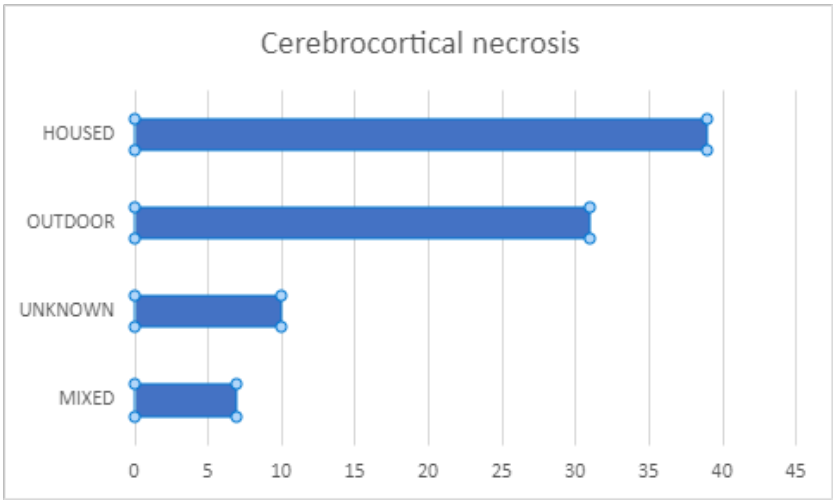


Figure 14: Distribution of CCN cases diagnosed in housed or outdoors cattle 2010-2019

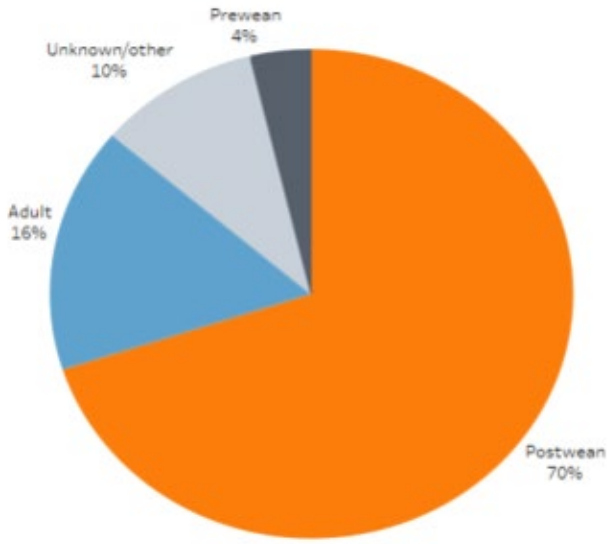


Figure 15: Age distribution of CCN cases diagnosed in cattle 2010-2019

Closantel toxicity

A 16-month-old steer had exhibited vague malaise, did not respond to treatment, deteriorated, was euthanised and then submitted. Another animal had looked dazed and was walking into troughs, suggesting blindness. The group had been clipped, individually weighed, and given a closantel and ivermectin pour-on treatment six days previously. Other animals were subsequently affected, with at least one other having been blind. There were no significant gross PME findings.

At another centre a euthanised steer was received for examination. It was one of five in a group of 65 which developed blindness; the animal submitted had also become recumbent and failed to improve with treatments including antibiotic, NSAIDs, vitamin B1, and oral fluid. Two others were also weak and struggling to stand, while two others were standing but dull. The group had been collected up, weighed, clipped, and then dosed with a closantel and ivermectin pour-on. The animals were being fed a mixture of rolled barley, silage, straw, mycotoxin binder and protected urea (the same mixture having been fed for the last five years; other groups also fed this had no clinical signs). Other than slight swelling of the brain, there was no significant gross pathology; and no autofluorescence was observed under ultraviolet light. Closantel toxicity was suspected; as blindness has been a consistent presenting sign for this, usually starting a few days after dosing.

There is a low safety margin for closantel products. The history and clinical signs in both cases were consistent with closantel toxicity, and microscopic changes in the brain were typical of closantel intoxication (acute, symmetrical, angiocentric, vacuolar leukoencephalopathy). Clinical signs include weakness, ataxia, and blindness, which can be permanent. Clipping prior to administration and mutual grooming (or self-licking) can increase the possibility of overdosage. One group had not been individually weighed, so overdosing could also have been involved. All adverse events should be reported to the VMD.

Closantel is a salicylanilide, which is effective against adult and immature liver fluke. Salicylanilides are hydrogen ionophores and referred to as oxidative phosphorylase uncouplers. They interfere with ATP production and intoxication in ruminants results in intramyelinic (cytotoxic) oedema and degeneration of the optic nerve and retina. They selectively bind to plasma proteins, which reduces the incorporation into host tissues and theoretically accounts for their selective parasite toxicity. However, the safety margin is not as high as for other parasiticides, and in sheep toxicity has been reported after using no more than 1.6 times the recommended dose (Crilly and others 2014).

Reference: Crilly JP et al. Retinopathy and optic neuropathy following closantel treatment of ewes. Vet Rec Case Reports 2014;2:e000044

Skin

No significant trends or unusual cases for this quarter.

Reproductive system – Abortion, Stillbirth and Congenital Deformities

The pie chart below (Figure 16) illustrates the main causes of bovine abortion recorded by the GB Scanning Surveillance Network for 2011-2021.

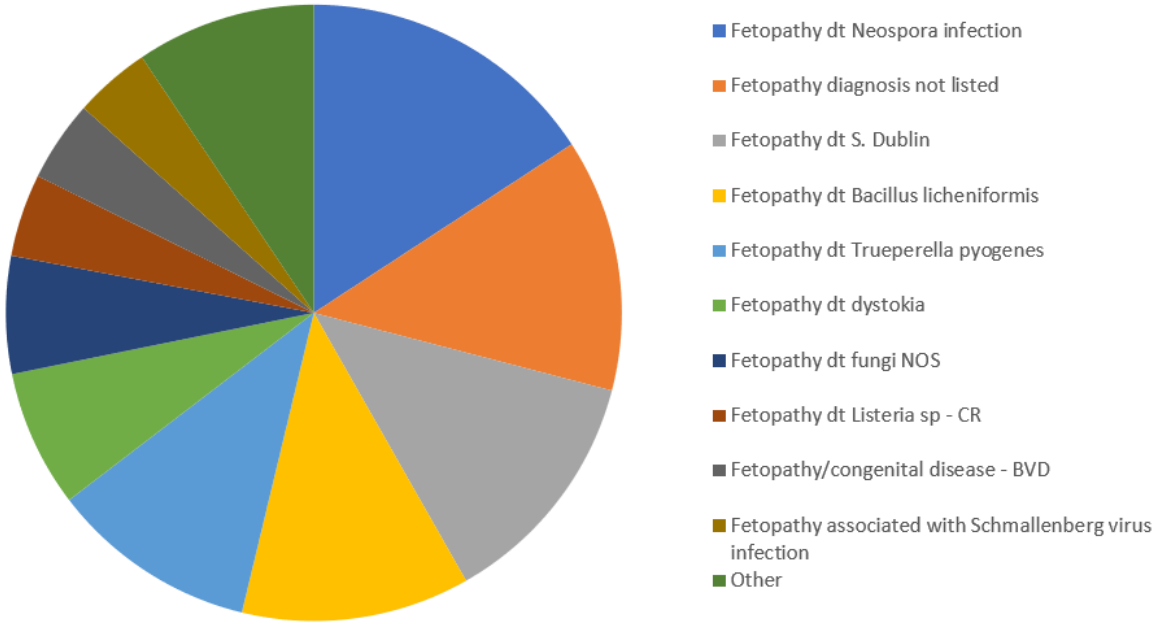


Figure 16: The main causes of bovine abortion recorded by the GB Scanning Surveillance Network for 2011 - 2021

Neosporosis was the most common cause of bovine abortion recorded for 2011-2021. Some examples of neosporosis cases from Q4 2022 are described below.

Neosporosis

Neosporosis was diagnosed in a seven-month-gestation foetus. This permanently housed dairy farm was reporting an increasing number of abortions in high yielding cows. The herd was previously closed but had recently purchased some cows from market. Combined positive brain PCR and confirmatory heart histopathology results confirmed the diagnosis.

Two abortions from separate dairy herds were confirmed due to neosporosis, by the identification of *Neospora caninum* using PCR and histopathological identification of non-suppurative inflammation. Four recent abortions were reported in the one herd of 180 cows, and five abortions had occurred in a 10-day period in the second herd of 250 cows. Monitoring of cows by serology, preferably in late gestation, was being considered to assess the prevalence and inform management decisions for future breeding.

Two second-trimester foetuses were submitted from a 600-cow flying dairy herd, which had experienced a ‘storm’ of nineteen abortions in the space of two weeks. It was reported that recently sourced cows were primarily affected. Cows on this farm were housed permanently, and it was known that a new farm dog had been able to access (and was known to defecate in) the sheds. Bacteriology testing results were unremarkable. In one

animal the Neospora PCR test was positive. Histopathology of heart tissue was actioned in both foetuses and non-suppurative myocarditis indicative of neosporosis was identified in both, confirming this as the cause of abortion.

Neosporosis was the most common infectious agent involved in bovine abortion investigations at APHA Carmarthen during this quarter. In one abortion outbreak, three six-month-old foetuses were submitted, over two separate submissions, to investigate 11 abortions in the previous month, in a group of 600 pregnant cows from a spring calving dairy herd. Neospora DNA was detected in the brain tissue of two of the foetuses, and histopathology demonstrated changes likely due to this organism in both calves, confirming neosporosis as the cause of abortion.

Dystocia cases

Traumatocia was suspected in a stillborn calf submitted from a dairy farm. The dam was reportedly five months in calf, however the foetus weighed 21kg and had hair and hooves present, suggesting it was close to term. Additionally, the absence of haemoglobin staining of tissues and partial aeration of the lungs suggested that foetal death occurred either during or after stage 2 labour. The abdomen contained a large volume of blood which appeared to originate from mesenteric vessels. Testing for infectious causes of abortion was unrewarding, but histopathology findings described squames in the lungs which reflect foetal stress and aspiration of amniotic fluid. It was recommended that service dates of cohorts were checked and that the group were checked for signs of dystocia.

Twin heifer calves had been delivered stillborn by the vet on the day of submission. The dam was a pedigree Charolais heifer, the twins were conceived to natural service from a Charolais bull, and the calves were 9 days overdue. Calving was assisted by the vet, two hours after the heifer was first observed to be in labour. The first calf born was backwards and the second was in normal presentation. The calving was reported to be easy; the placenta was delivered by the vet and disintegrated when pulled. The heifer was not unwell. The vet assessed the body condition of the dam as fair. There had been no other abortions or stillbirths in 2022. Both calves were pale, with foetal hooves present, no clot in the umbilicus, no meconium staining in one/ some staining in the other, and the lungs were not inflated. There was a fracture of the distal metatarsus of the right hind just above the fetlock, with minimal bruising/haemorrhage in the surrounding tissue in one calf. No infectious cause of stillbirth was determined through testing or histopathology. The PME findings were suggestive of death prior to or during stage two labour, and the death of the twins therefore likely due to dystocia and delayed parturition.

Arnold-Chiari malformation

In recent months, three calves which had Arnold-Chiari malformation (ACM) were examined at Starcross and Thirsk Veterinary Investigation Centres (VICs). These were from unrelated herds and were submitted because they exhibited congenital abnormalities. The most recently examined calf had hindlimb arthrogryposis, scoliosis, and skull flattening (Figure 17). Postmortem examination also revealed elongation of the cerebrum, especially the caudal/occipital gyri, with cerebellar hypoplasia, and herniation of the caudal brainstem

and cerebellum through the foramen magnum (Figure 18). In the previously examined calf there was also spina bifida, a deformed tail and atresia ani. PCR examinations did not detect BVD virus or Schmallenberg virus, and there were no histopathological lesions suggestive of an in utero viral challenge. The gross brain and spinal cord pathology was consistent with Arnold-Chiari malformation (ACM). ACM is well-reported in humans but, is a rare condition in cattle, identified sporadically. It is also recognised in other animal species, especially brachycephalic dogs. Its aetiology is uncertain and in cattle there is no known genetic link. In humans, an association with maternal nutritional deficiencies has been hypothesised, and there is research into genetic mutations.

Bovine cases of ACM are uncommon and there are few published case studies. The similarity with cases of Schmallenbergvirus (SBV) infection, which also causes arthrogryposis, is noteworthy. This feature may account for under-reporting, as veterinary practitioners and farmers have become accustomed to SBV malformation. However, the investigation of such cases is encouraged to determine the likely aetiology. This not only ensures continued surveillance for SBV, but for other potentially neuropathic viral agents which have yet to be identified and, also for potential toxic or genetic aetiologies.

Figure 17: Aborted calf with arthrogryposis of the hind legs, scoliosis and flattening of the skull due to Arnold-Chiari Malformation

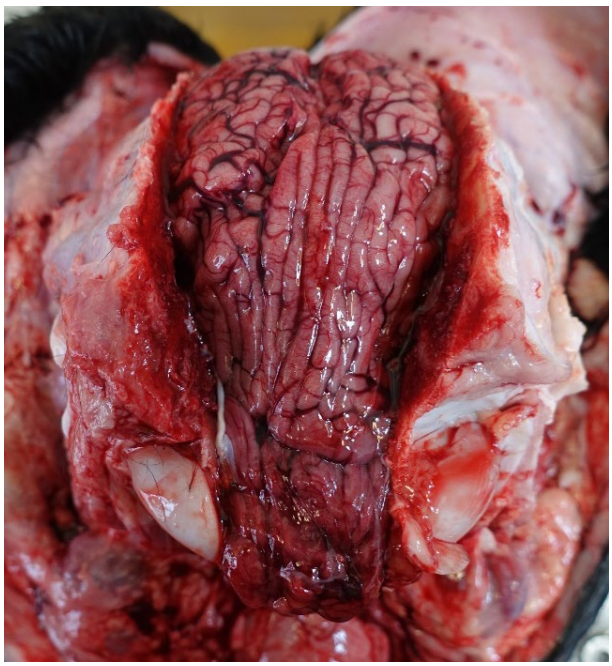


Figure 18: Longitudinal extension of the occipital/caudal gyri of the cerebrum, with herniation through the foramen magnum in a calf with ACM

References: LeClerc, S., Lopez, A. and Illanes, O (1997) Central nervous system and vertebral malformation resembling the Arnold-Chiari syndrome in a Simmental calf. *Canadian Veterinary Journal*, 38, pp. 300-301. Available at: https://www.researchgate.net/publication/14050600_Central_nervous_system_and_vertebral_malformation_resembling_the_Arnold-Chiari_syndrome_in_a_Simmental_calf

Hiraga, T and Mitsuo, A.B.E. (1987) Two calves of Arnold-Chiari malformation and their craniums. *The Japanese Journal of Veterinary Science*, 49, pp. 651-656. Available at: https://www.researchgate.net/publication/19536175_Two_calves_of_Arnold-Chiari_malformation_and_their_craniums

Alpha mannosidosis

Congenital alpha-mannosidosis was diagnosed in six Belted Galloway calves born in a herd of 31 cows. A range of malformations were observed including brachygnathia superior doming of the head, arthrogryposis, ascites, and internal hydrocephalus. Histopathology revealed clear cytoplasmic microvacuolation within neurones, hepatocytes, renal tubular epithelium, and thyroid follicular epithelial cells. These findings are typical of a lysosomal storage disease, and genetic testing on two of the calves confirmed that both were homozygous for the genetic mutation causing alpha-mannosidosis. This condition has an autosomal recessive mode of inheritance and has previously been well described in Galloway and Aberdeen Angus cattle. It causes an inherited deficiency of the enzyme alpha mannosidase resulting in storage of water-soluble oligosaccharides within vesicles. Clinical signs can vary from stillbirth to severe congenital neurological disease. Calves that survive the neonatal period can exhibit progressive ataxia, head tremor and aggression. In this case the affected calves were stillborn or died a few hours after birth. A new young bull had been used for the first time in 2022 along with an old bull previously used in 2020

and 2021. Affected calves were sired by both bulls. All the old bull's calves had survived, but there had been two stillbirths in 2020 that were assumed to be a result of dystocia and not investigated.

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. For more details on the conference please see the COEEML pages on the Vet Gateway.

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

The latest Chemical Food Safety Reports can be found at:

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

Toxic conditions

Oak/acorn poisoning

Reports of oak/acorn (*Quercus* species) poisoning were widespread this quarter. This reflected the large crop of acorns, and probably that those stock accessing them had limited alternative forage, a sequel to the long dry summer which significantly affected grass growth. Some animals are also considered to develop a 'craving' for acorns.

Two of a group of 14 heifers aged six-to-eight months were examined postmortem at Shrewsbury Veterinary Investigation Centre. They had lost condition and recently become inappetant and weak; there was no scour or respiratory signs. They had been on a field with oak trees, and were also fed straw and calf concentrate, though this had been refused in the last few days. All the group was looking poorer than expected, with several more considered likely to die or require euthanasia**.** Both had much clear peritoneal, pleural and pericardial effusions, and prominent oedema, especially around the spiral colon and the kidneys. There were acorns within the watery content in the rumens. The kidneys were slightly enlarged and paler than normal, with diffuse petechiation, and the urine in the bladders was colourless and odourless. Much increased blood urea and creatinine concentrations indicated significantly compromised renal function, consistent with acorn poisoning. Additionally, the abomasal mucosa was reddened, the contents of the fresher animal had ‘writhing motility’, and gastric and mesenteric lymph nodes were enlarged; a worm egg count of 2750 trichostrongyle eggs per gram confirmed a substantial nematode parasite burden.

Acorns and oak leaves contain phenols and tannins; these damage kidney tubules and cause gastrointestinal irritation. Typical clinical signs of intoxication are anorexia and sometimes colic, with initially constipation, which may be followed by affected animals passing dark tarry faeces. Blood biochemistry in live animals is helpful, with urea concentrations in excess of 50 mmol/l indicating a poor prognosis. The toxic effects are cumulative if animals continue to ingest acorns and, can cause clinical signs several days after having moved off the suspect pasture. Prevention of access to acorns should be done, though can be difficult if grazing is limited; fencing off areas around oak trees, if the animals can’t be moved to alternative pasture, should be considered.

Bracken toxicity

The carcase of a 29-month-old dairy heifer was submitted following four deaths from a group of 38. Clinical signs were of malaise, recumbency and pyrexia. Post-mortem findings were striking, with extensive haemorrhages throughout the carcase and body systems. The carcase had a yellow tinge and there was yellow-orange fluid in body cavities and liquid large intestinal contents. There was also evidence of recent abortion. Findings were suggestive of a septicaemia or toxaemia, and salmonellosis was suspected. No Salmonella or Clostridia were isolated, and BVD and TBF PCRs were negative. Colisepticaemia was an unexpected diagnosis, and histology identified bone marrow suppression as the underlying cause, with changes typical of bracken toxicity. Bracken toxicity is often seen during the summer months due to reduced grass availability. Bracken contains possibly genotoxic substances including ptaquiloside, kaempferol and shikimic acid. Ptaquiloside from bracken ingested by food producing animals (eg dairy cows) can be passed into milk that might be consumed by humans. No information is available on the amount of ptaquiloside and other possibly genotoxic substances that may be left as residues in other animal-derived foods, however the level of human exposure to these substances should be kept as low as is reasonably practicable. Available data suggests a withdrawal period of at least four days for ptaquiloside in milk. Further studies are required to be able to specify a withdrawal period prior to slaughter for human consumption of meat

and offal. As these were in-calf dairy heifers the risk to the food chain was deemed minimal.

Horizon scanning

Epizootic Haemorrhagic Disease (EHD) in Europe

Following the initial report of the emergence of Epizootic Haemorrhagic Disease (EHD) in Europe, with outbreaks in cattle in Sardinia and Sicily, two outbreaks have now been confirmed for the first time on cattle farms in southern Spain (Figure 19). One farm had 1,098 cattle and is located in Seville, and the second farm had 139 cattle and is located in Cádiz. In total 12 cattle were confirmed positive with EHD in Spain according to WOAH (World Organisation for Animal Health). In addition, since the first report there has been a further outbreak of EHD in cattle confirmed in Sardinia and a case in wild red deer as reported by WOAH. The cattle farm was in Arbus and had 11 cattle, one of which was confirmed with EHD. The red deer was in a natural park in Pula, near the southern coast of Sardinia.

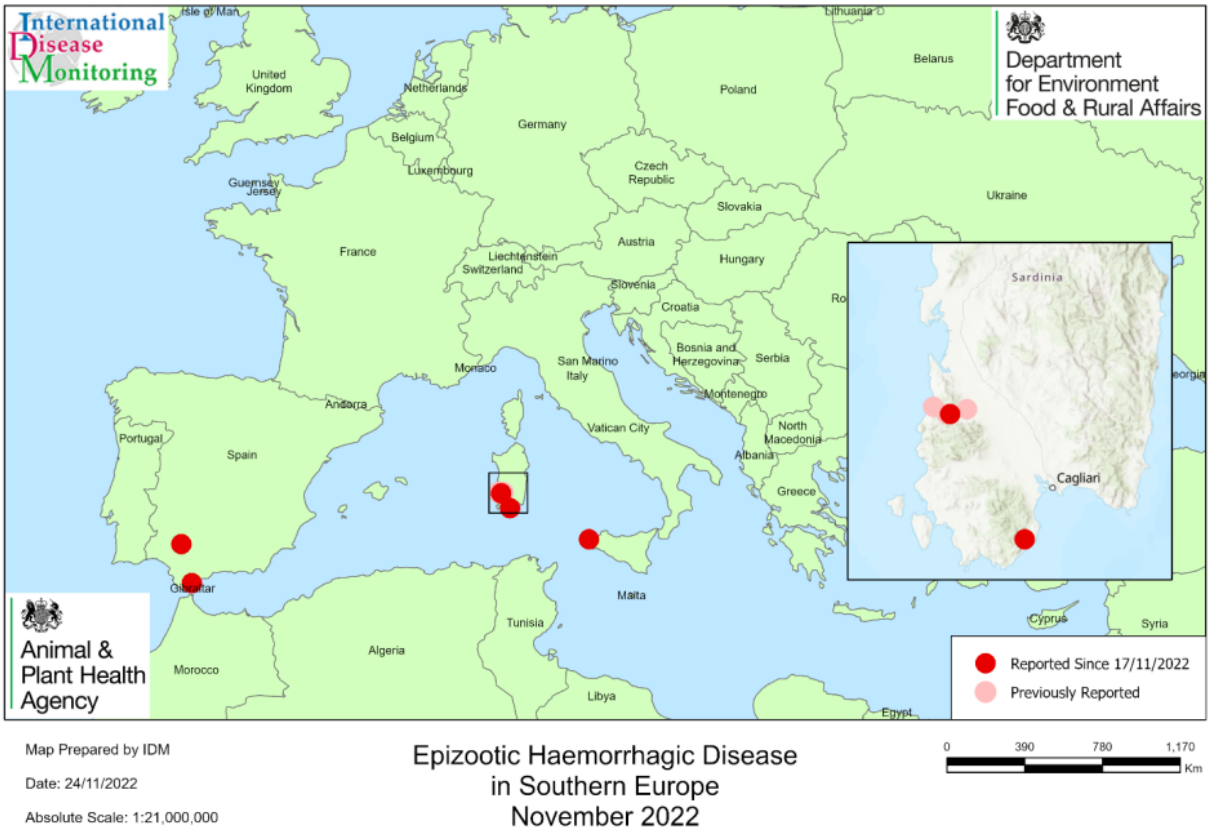


Figure 19: Outbreaks of Epizootic Haemorrhagic Disease in Southern Europe in 2022

Publications of interest

1. Disease surveillance in England and Wales, December 2022. *Veterinary Record* 7/14 January 2023: Disease surveillance in England and Wales, December 2022 (wiley.com)

2. DASTJERDI A; Jeckel S; DAVIES H; Irving J; Longue C; Plummer C; Vidovszky M Z; Harrach B; Chantrey J; Martineau H; Williams J (2022) Novel adenovirus associated with necrotizing bronchiolitis in a captive reindeer (Rangifer tarandus). *Transboundary and Emerging Diseases* 69 (5) 3097-3102.

3. Carson A. et al. (2023) *Haemonchus contorus*: an overview. *Veterinary Record* 7/14 January 2023 Haemonchus contortus: an overview (wiley.com)

4. Besnard F; Leclerc H; Boussaha M; Grohs C; JEWELL N; Pintom A; Barasc H; Jourdain J; Femenia N; Dorso L; Strugnell B; FLOYD T; Danchin C; Guatteo R; Cassert D; Hubin X; Mattalia S; Boichard D; Capitan A (2023) Detailed analysis of mortality rates in the female progeny of 1,001 Holstein bulls allows the discovery of new dominant genetic defects. Journal of Dairy Science 106 (1) 439-451.

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

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

7. 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.*

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

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

10. Effect of neonatal immunoglobulin status on the outcomes of spring-born suckler calves - Bragg - Veterinary Record - Wiley Online Library

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.