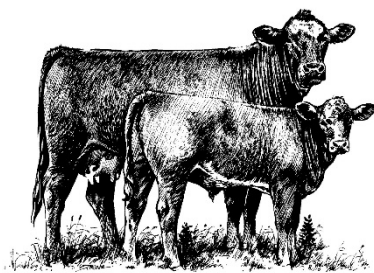




Animal &
Plant Health
Agency



GB cattle quarterly report

Disease surveillance and emerging threats

Volume 27: Quarter 1 (January to March) 2023

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the first quarter of 2023 (Quarter 1), January to March. 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:** [UK farmgate milk prices](#) averaged 45.98ppl in March, which was down 2.32ppl (-4.8%) on the previous month according to Defra. [Cuts to milk prices](#) were seen throughout the first three months of the year and are expected to continue until after the spring flush. Whilst farmgate milk prices remain higher than this time last year, farm input costs are also significantly higher.
- **Production:** For the first three months of 2023, [GB milk production](#) is estimated at 3,070 million litres, a 1.8% increase on the same period last year. This three-month period also brought the 2022/23 milk production season to a close, with production for the season estimated at 12,386 million litres, a marginal increase of 0.2% compared to the 2021/22 season.
- **Trade:** Year-to-date (Jan-Feb) volumes of [dairy exports](#) from the UK totalled 214Kt, a 9.8% decline compared to the same period in 2022. Despite this, the value of these exports has increased by 23.1% to £322 million, driven by inflation.
- **Demand:** During the 52 weeks ending 19 February 2023, [key dairy retail products](#) all saw declines in the volume of sales, including milk (-6.1%), yoghurt (-6.9%), cheese (-4.0%) and butter (-7.0%). Despite this, spend increased as inflation causes rises in average prices paid.

Beef update

- **Prices:** [GB deadweight cattle prices](#) remain strong with average prices in Q1 rising week-on-week, with prices reaching a record high in March. For the week ending 1st April, the average overall steer price was 489.4p/kg, up 61.7p year-on-year (YOY).
- **Production:** [Beef production in the UK](#) totalled 80,400 tonnes in March, a marginal 0.7% (500 tonne) increase on the same month last year. Beef production for the quarter rose by 1.5% (3,300 tonnes) compared to Q1 2022, totalling 227,000 tonnes. This comes as both prime cattle kill and cull cow kill for the YTD (Jan-Mar) saw YOY increases of 2.6% (to 498,600 head) and 5.4% (to 169,800 head) respectively.
- **Trade:** [UK exports of fresh and frozen beef](#) totalled 8,800 tonnes in February, increasing 3% on January's levels but down 24% YOY. This YOY decline was

driven by a fall in exports to the EU, especially to France, the Netherlands and Ireland. Nevertheless, an increasing share of UK beef exports are going to the EU, rising by 4 percentage points YOY to 89% in February. Both month-on-month (MOM) and YOY fresh and frozen beef imports saw declines, falling by 9% and 17% respectively. Declining imports from Ireland was the main driver of this, which is likely a reflection of [subdued domestic retail demand](#).

- **Demand:** In the 12 weeks ending 19 March 2023, we saw [average consumer spend on beef](#) rise by 8.0% YOY whilst volumes fell by 2.4%. As has been well-documented, inflation is causing price rises across many beef products, with the average price paid over the same period rising by 10.7% YOY. Steaks saw the biggest volume decline of primary beef, down 9.2%, while processed beef declined by 4.4%. Volumes of mince saw very little change, down just 0.1% YOY.

Acknowledgment for the dairy and beef updates: AHDB

Cattle disease surveillance dashboard outputs

The most frequent diagnoses from carcase submissions made in the first quarter (Q1) of 2023, compared to Q1 in 2022, and Q1 for 2015 to 2023 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 carcase submission diagnoses in Q1 of 2023, Q1 of 2022, and Q1 for 2015-2023

10 most frequent diagnoses Q1 2023	10 most frequent diagnoses Q1 2022	10 most frequent diagnoses Q1 2015-2023
1. Pneumonia due to <i>Mycoplasma bovis</i>	1. Pneumonia due to <i>Mycoplasma bovis</i>	1. Pneumonia due to <i>Mycoplasma bovis</i>
2. Pneumonia due to <i>Pasteurella multocida</i>	2. Cryptosporidiosis	2. Cryptosporidiosis
3. Pneumonia due to <i>Mannheimia haemolytica</i>	3. Pneumonia due to <i>Pasteurella multocida</i>	3. Respiratory disease due to other causes (not listed)
4. Cryptosporidiosis	4. Respiratory disease due to other causes (not listed)	4. Pneumonia due to <i>Mannheimia haemolytica</i>
5. Hypogammaglobulinaemia	5. Rotaviral enteritis	5. Hypogammaglobulinaemia
6. Rotaviral enteritis	6. Digestive disease due to other causes not listed	6. Pneumonia due to <i>Pasteurella multocida</i>

7. Colisepticaemia	7. Pneumonia due to BRSV	7. Digestive disease – due to other causes (not listed)
8. Pneumonia due to BRSV	8. Pneumonia due to <i>Mannheimia haemolytica</i>	8. Pneumonia due to BRSV
9. Digestive disease due to other causes (not listed)*	9. Hypogammaglobulinaemia	9. Rotaviral enteritis
10. Respiratory disease due to other causes (not listed)**	10. Systemic disease – due to other causes (not listed)	10. Colisepticaemia

For Q1 2023, the digestive disease diagnoses not listed (*) included peritonitis (of which most cases were associated with gross pathology of the gastrointestinal tract), abomasal torsion, necrotising colitis (of unknown aetiology), and eosinophilic enteritis (not associated with Johne's disease). For Q1 2023, the respiratory disease diagnoses not listed (**) included aspiration pneumonia, an untypable *Mannheimia* species, and diffuse alveolar damage of unknown aetiology.

New and re-emerging diseases and threats

Update on 'Gastroparesis Syndrome' in dairy heifers

During 2022 cases of apparent gastroparesis in 9-24 month-old, Holstein Friesian, bulling and in-calf dairy heifers were described. To date all the affected heifers have had the same sire. The heifers typically present with progressive abdominal distension and condition loss, become inappetent, are non-responsive to treatment, and have had to be euthanised. No obvious dietary or management risk factors have been identified. APHA has received either submissions or reports related to at least 15 affected farms in the UK.

At postmortem examination, the abdomen and the rumen are markedly distended, and the ruminal contents have a distinctive frothy texture. Abomasal impaction and/or ulceration has also been a feature of some of the cases. 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.

The breeding company has been working with partners across the UK disease surveillance network, private vets, and a specialist genetic research team in France since May 2022. At the time of writing, the mechanism underlying this syndrome is uncertain. The gross pathological and histopathological findings of the cases have so far been inconclusive. The appropriate blood and tissue samples have been collected from affected and non-affected (control) animals. These are currently being analysed to try and uncover

the precise genetic mechanism of the issue and, will hopefully aid better understanding of this syndrome.

The working hypothesis is that the sire carried a de novo (new) mutation that is inherited in a dominant fashion. There appears to be mosaicism of the bull's germ cells, where there is more than one genetic line of the germ cells (as the result of genetic mutation), and the condition appears to develop in approximately 25% of his offspring. It is thought that animals sired by this bull which are functioning normally beyond their first calving, are unlikely to have inherited the mutation, and therefore may remain healthy and possibly not transmit this fatal condition.

The bull has been removed from AI service and his semen has been removed from the market. He does not have any sons in AI service. The breeding company will contact customers directly who bought this bull's semen. Farmers that suspect they have experienced cases, but that have not yet been approached by the breeding company, should contact the breeding company directly. The APHA Cattle Expert Group, which has members across the UK surveillance network, is interested to hear about similar cases, so that it can continue to increase awareness and develop greater understanding of this issue.

Update on colisepticaemia in non-neonatal dairy calves

During 2022, colisepticaemia has been diagnosed in two-to-four-month-old dairy-bred calves. The clinical signs included acute malaise, recumbency, and respiratory signs. Cases have been identified in seven herds in England and Wales, and 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 involved. The *E. coli* isolates from some of the cases have undergone whole genome sequencing and the results of this are currently being analysed. 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

Hypocuprosis, hyposelenosis, and low cobalt in weaned suckler calves

An 18-month-old Angus cross calf was submitted to investigate poor thrift, weakness, and recumbency. Six of a group of 50 were affected, three of which had previously died in the herd of 30 cows. The animals had been at pasture away from the home farm, then

returned and were housed on silage, with some wheat and beef nuts also fed. The animal submitted was in very poor condition. The liver was small. Ulcers were present on the nasal planum and upper lip. The rumen was well filled but, the abomasum had oedematous mucosa with some pyloric thickening, and the Peyer's patches in the lower small intestine were prominent, covered by pale plaques. BVD persistent infection was ruled out and chronic malabsorption was suspected. Histopathology did not indicate any specific lesions; however, interpretation of the alimentary tract tissues was hampered by autolysis. Low blood vitamin B12 (reflecting a low cobalt status) and low liver copper and selenium concentrations indicated multiple trace element deficiencies reflecting malabsorption, which was likely to be associated with parasitic gastroenteritis and a suboptimal quality diet.

Vitamin A deficiency in fatteners

A 15-month-old fattener was submitted to APHA Shrewsbury. Shifting lameness, blindness and recumbency were reported prior to death. Around 100 others of the total of approximately 250 on the farm, were also reported to be affected, three of which had died. The group was housed and fed a barley straw and concentrate diet. The animal was in good condition. Fibrous adhesions were present in the thorax and there was ventral lung consolidation. No gross pathology was identified in other organs, including the brain. *Bibersteinia trehalosi* and *Mannheimia haemolytica* were isolated from the lung. The liver vitamin A status was tested, with a very low concentration identified. There were no significant histopathological lesions identified in the brain to account for the reported blindness. The findings indicated chronic-active pneumonia, and the low vitamin A status in the liver suggested that hypovitaminosis A was the likely cause of the blindness. The primary lesion caused by vitamin A deficiency is retinal degeneration and compression of the optic nerve caused by defective remodelling of the bony optic canal. A re-evaluation of the diet fed to the cattle, to increase the vitamin A concentration, was recommended.

Digestive system disease

Cryptosporidiosis continues to be the most commonly diagnosed cause of digestive disease in cattle (Table 1), with rotaviral enteritis being the second most commonly diagnosed digestive disease in Q1 2023.

Laboratory diagnosis of gastrointestinal nematodes (GIN) in first grazing season cattle

A recent APHA Veterinary Record focus article discussed the importance of having a greater understanding of gastrointestinal nematode (GIN) infections in cattle. To improve our understanding of the composition of GIN infections, a survey of first grazing season cattle was undertaken across the England and Wales surveillance network. During the 2020 and 2021 grazing seasons, first grazing season cattle that were submitted to Animal and Plant Health Agency (APHA) Veterinary Investigation Centres (VICs) and partner PME providers for PME (for any reason) were sampled by abomasal and small intestinal washing. Representative aliquots underwent total worm count (TWC) at APHA Carmarthen VIC to provide an estimate of the numbers and species of nematodes present. Faecal egg

count (FEC) was also carried out using the modified, improved (centrifuge-enhanced) McMaster technique with a sensitivity of 50 eggs per gram (epg). Within our sample of 51 first grazing season cattle submitted for PME (for any reason) during the 2020 and 2021 grazing seasons the main findings were:

- GIN infection was common: 49% had FEC >50 epg; and 71% had nematodes detected by TWC
- *Ostertagia ostertagi* and *Cooperia oncophora* were the predominant species
- Wasting and diarrhoea were commonly reported with GIN infection but, were not pathognomonic
- In all animals with a FEC ≥150 epg, GIN were detected by TWC
- For those with a FEC <150 epg, GIN were detected in approximately half
- For those with a FEC <50 epg, *Ostertagia ostertagi* was the most commonly detected species.

The full article can be found at this link: [Laboratory diagnosis of gastrointestinal nematodes in first-grazing-season cattle](#)

Systemic Enterotoxigenic (K99 (F5) positive) Escherichia coli Infection in a two-day-old Dairy Cross Calf

A two-day-old calf presented with a one-day history of diarrhoea and malaise before death. This was the fifth case on the farm over the previous three months. Significant postmortem examination (PME) findings included a wet umbilical stump was moist, patchy lung consolidation, jejunal enteritis, yellow diarrhoea, and mesenteric lymphadenopathy. An enterotoxigenic (K99 (F5) positive) *E. coli* was isolated in pure growth from multiple sites, indicating colisepticaemia as the cause of death, with the umbilicus as the likely port of entry. It was recommended to review navel management on the farm and to ensure good hygiene in the calving and young calf pens. A vaccine to control enterotoxigenic (K99 (F5) positive) *E. coli* is also available.

K99+ve colibacillosis was also the cause of death in a two-day-old dairy calf, one of three to die shortly after birth. The dams were vaccinated and so a review of calving and calf pen hygiene and colostrum management was recommended.

Clostridial enterotoxaemia in two animals from separate herds

Starcross Veterinary Investigation Centre diagnosed clostridial enterotoxaemia in two animals from separate herds during this quarter. The first was a pregnant suckler cow which had been found dead. It was in a group of 29, which had been brought in from moorland one month previously and, housed on a diet of hay. There was no significant gross pathology, however histopathological examination of the brain indicated lesions consistent with *Clostridium perfringens* type D epsilon toxin enterotoxaemia.

The second case was an eight-month-old Red Devon heifer, being one of eight in a group of 40 which had developed acute onset ataxia, recumbency and blindness. Lead toxicity

was initially suspected, however, kidney biochemistry ruled this out. The rumen content consisted of short fibrous material and a large quantity of grain, and the liquor pH was 3.73, consistent with ruminal acidosis. Brain histopathology confirmed lesions of clostridial enterotoxaemia which accounted for the marked neurological signs.

Clostridial enterotoxaemia is most often diagnosed in sheep, where it is known as 'pulpy kidney disease', although the kidney pathology is non-specific. The characteristic pathology is fibrinous pericardial exudation, and usually there is cerebellar coning, and together with demonstration of the epsilon toxin by ELISA in the terminal small intestine contents, these are considered diagnostic. It has been sporadically diagnosed in all ages of cattle including neonates (Watson and Scholes 2009). However, in contrast with sheep, there is no consistent gross pathology in cattle, and the detection of epsilon toxin is not considered sufficiently sensitive (Jones and others 2015). Brain histopathology is the recommended diagnostic method in cattle, as performed in these cases (Otter and Uzal 2020).

What precipitates enterotoxaemia is uncertain. Dietary changes are often thought to predispose, through an effect on the microbial flora in the intestine, however this is largely speculative, and cases can arise in animals at pasture or in suckling neonates. In the second case reported here, it is presumed that the acidotic diet affected the bacterial flora leading to enterotoxaemia.

References

Watson PJ, Scholes SFE. (2009) *Clostridium perfringens* type D epsilon intoxication in one-day-old calves. *Veterinary Record* 2009;164:816-817

Jones AL, Dagleish MP, Caldow GL. *Clostridium perfringens* type-D enterotoxaemia in cattle: the diagnostic significance of intestinal epsilon toxin. *Veterinary Record* 2015;177:390-394

Otter A, Uzal FA Clostridial diseases in farm animals: 1. Enterotoxaemias and other alimentary tract infections. *In Practice* 2020;42:219-232

Jejunal haemorrhage syndrome in two dairy cows

Jejunal haemorrhage syndrome was diagnosed in adult dairy cows twice in this quarter. Presenting signs in the first case included acute collapse, hypothermia, poor rumen turnover, pallor, and death despite giving a normal milk yield a few hours previously. In the second case, clinical signs occurred over a few days with decreased rumination, tremor, and left flank tympany being noted before death. Postmortem findings included large linear blood clots filling the lumen of the jejunum, and in one of the cases additionally found in the duodenum and pylorus. The surrounding intestinal mucosa was deep red in colour, and in places was adhered to the blood clot or had an irregular surface.

Testing for *C. perfringens* toxins, BVD, *Salmonella* and copper levels was unremarkable and histological examination in both cases found effacement of normal architecture with extensive areas of haemorrhage and loss of the mucosa, supportive of a diagnosis of

haemorrhagic bowel syndrome with dissection and loss of the mucosa by haemorrhage. Jejunal haemorrhage syndrome (JHS) has been seen with increasing frequency particularly in adult dairy cattle, usually as a sporadic condition. Many potential pathogenetic pathways have been suggested, such as *Clostridium perfringens* type A, *Aspergillus fumigatus* and other mycotoxins, but, so far, none of these have been proven.

Mucosal ulceration and fungal colonisation of the rumen and omasum in a two-year-old dairy heifer

Mucosal ulceration and fungal colonisation of the rumen and omasum were the predominant findings, in a two-year-old dairy heifer submitted to investigate malaise and dark scour in a group of 55. Sub-acute ruminal acidosis was thought to be a potential predisposing factor, however the rumen pH at the time of postmortem examination was 5.7 (although a rise can be seen after death). A terminal septicaemia was also present with *Streptococcus bovis*, a commensal of the gastrointestinal tract, isolated from multiple organ sites, likely as a result of terminal translocation across a damaged ruminal mucosa. Histopathology of the ruminal and omasal lesions revealed secondary fungal colonisation following a primary insult. Chemical damage due to ruminal acidosis or toxin ingestion, with secondary dysbiosis, was the most likely scenario, however, marked immunosuppression was also considered in relation to the fungal colonisation. BVD and tick-borne fever were ruled out through PCR testing, and so the former aetiology was deemed more likely.

Johne's Disease and Infectious Bovine Rhinotracheitis (IBR) in a 22-month-old fattener

Johne's disease was diagnosed by SRUC as the primary cause of rapid weight loss in a 22-month-old Limousin-cross beast, who had scoured and been inappetent for a 10-day period. Histopathological examination confirmed a granulomatous enteritis and colitis (Figure 1a), with intracellular acid-fast bacilli and antibody to MAP also being detected. Secondary conditions included acute IBR, which presented grossly only as ulceration of the larynx (no typical tracheal lesions)(Figure 1b), limited pneumonia due to *Pasteurella multocida*, and multifocal fungal abomasitis. BOHV-1 RNA and *Pasteurella multocida* DNA were detected in the lung and, histopathological examination of the larynx confirmed an ulcerative and necrotising laryngitis, with epithelial syncytia present in adjacent intact epithelium.



Figure 1: (a) Granulomatous colitis due to Johne's disease (left) and (b) coalescing ulcerative lesions on the epiglottis and arytenoid cartilages due to acute IBR (right) in a 22-month-old fattening beast

Respiratory system

As for Quarter Four 2022, the first quarter was dominated by cold, wet weather, which often predisposes cattle to respiratory disease, particularly when housed at high stocking densities, and/or in housing with poor ventilation and drainage. Hence, it is no surprise that the pathogens in the bovine respiratory disease complex feature significantly at this time of year, as demonstrated in Table 1 on Page 2. In Quarter 1 (Q1) 2023, most cases of respiratory disease were diagnosed in postweaned cattle, with a notable increase being observed for this group.

The usual combination of viral and bacterial pathogens has been seen, particularly as many of the submitted cases had a degree of chronicity. On the viral front, it is worth mentioning that the percentage of IBR diagnoses has seen a statistically significant decrease over the years in Q1, likely the result of widespread vaccination, particularly in dairy herds.

The opposite trend was seen for diagnoses of bovine respiratory syncytial virus (BRSV), as a percentage of diagnosable submissions (Figure 2). The overall Great Britain trend for BRSV in Q1 is following an ascending trend, with Scotland, England and Wales all contributing to this trend. The diagnosis is mostly reached in post-weaned beef and beef-rearing cattle in North-western England and Scotland.

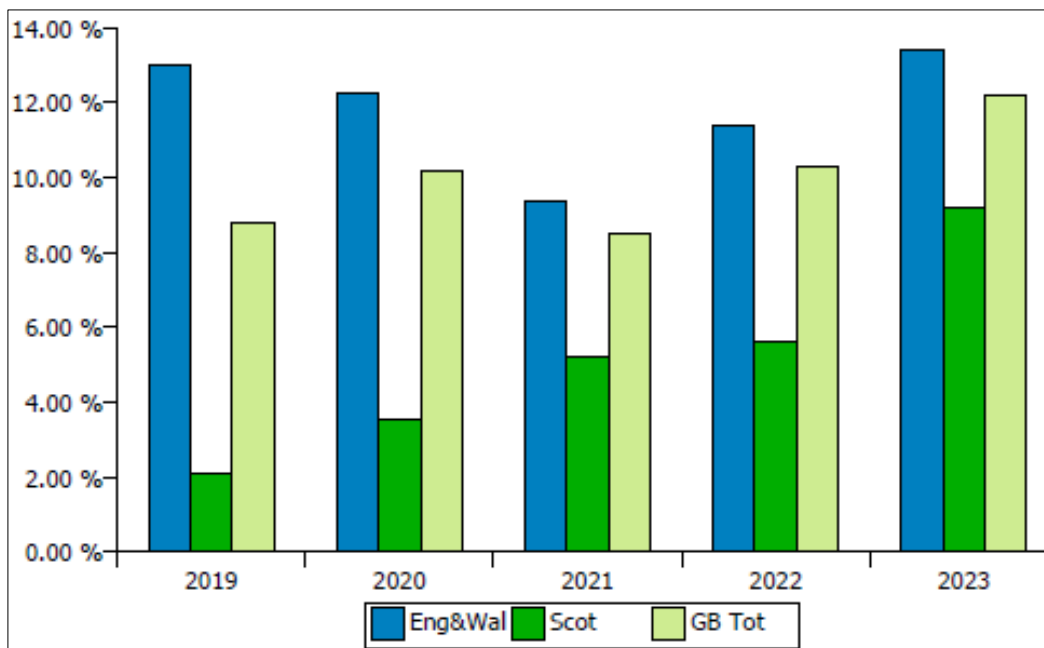


Figure 2: Incidents of BRSV as a percentage of diagnosable submissions for 2019 - 2023

When analysing the bacterial and mycoplasmal agents involved in the recorded pneumonias in Q1, all the main pathogens were detected: *Mycoplasma bovis*, *Mannheimia haemolytica*, *Pasteurella multocida*, and *Histophilus somni*; with *H. somni* being less commonly diagnosed in England and Wales than in Scotland (the figures for *H. somni* are likely to also be influenced by the testing methods used, with PCR testing being used more commonly in Scotland).

However, the most significant increase in Q1 of 2023 (as a percentage of diagnosable submissions) was *Pasteurella multocida* being isolated from pneumonic lung (Figure 3). This seems to be more pronounced for submissions of postweaned cattle from beef and rearing units in Northern England.

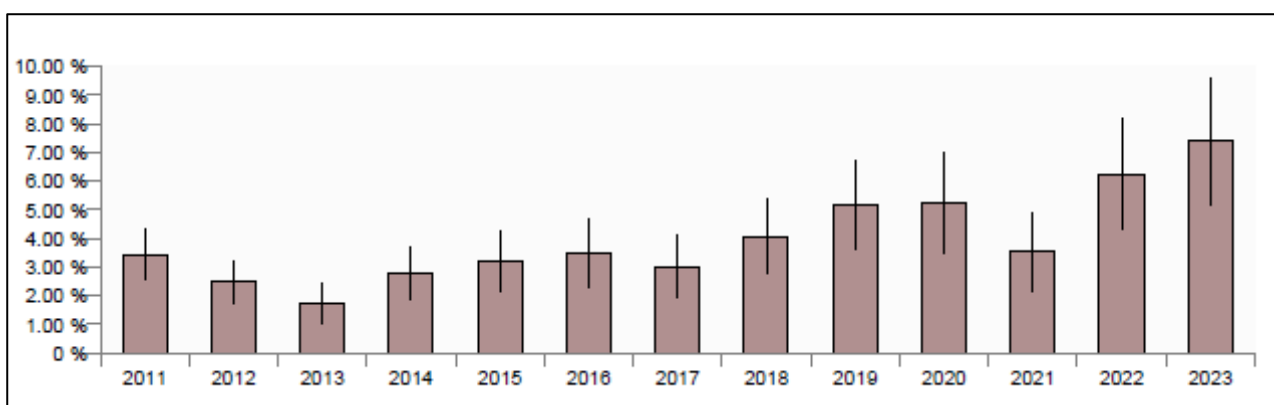


Figure 3: Incidents of *P. multocida* as a percentage of diagnosable submissions for 2011-2023

The percentage of diagnosable submissions where *Mycoplasma bovis* was detected continues to follow an upward trend across Great Britain, particularly in England. The

Cattle Expert Group will continue to monitor this trend. *Mycoplasma bovis* and *P. multocida* were identified as the cause of a pneumonia outbreak in 3- to 4-month-old weaned dairy calves. Around 13 of a batch of 50 were affected, two of which died. The group was reported to have been growing well. Approximately 70% of the lungs were consolidated, with anteroventral distribution, and many small mucopurulent foci were scattered throughout these areas. Despite the animal's good condition, histopathology confirmed a severe subacute to chronic-active fibrinosuppurative bronchopneumonia, indicating that the pathology had developed over a considerable period with an 'acute episode' causing the animal's death.

***Mannheimia haemolytica* in two adult dairy cows**

Two cows were submitted for the investigation of herd issues with milk drop, pyrexia, dyspnoea, and diarrhoea in a closed dairy herd. There had been 20 affected from a herd of 230 cows, with three deaths. One of the cows had been noted to have had extensive crackles and respiratory noise on chest auscultation. There had been no significant feeding changes and the herd was vaccinated for IBR. Both cows had consolidation of approximately 40% of their lung tissue, with an extensive fibrinous pleurisy and pericarditis. *Mannheimia haemolytica* was cultured from the lungs of both, with no other respiratory pathogens identified on culture or PCR. Histopathology confirmed that there was no evidence of historical underlying respiratory pathology. *M. haemolytica* can cause significant outbreaks of disease in adult dairy cows, as found in the study by Dorso and others: [Animals | Free Full-Text | Infectious Bovine Respiratory Diseases in Adult Cattle: An Extensive Necropsic and Etiological Study \(mdpi.com\)](#)

Influenza D Project

The APHA Mammalian Influenza team are continuing to investigate 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 (e.g pyrexia, cough/ dyspnoea; and/or clear nasal discharge). Samples from adult dairy cattle with milk drop and/or respiratory signs can be accepted on a case-by-case basis and, after discussion with the project lead, or a VIO.

Musculoskeletal System

Osteoporosis and resultant femoral fractures in a fattening bull

Osteoporosis and resultant femoral fractures were diagnosed in a 20-month-old fattening bull presented for post-mortem. The bull had been recumbent for a period of five days, and it was the third such incident in a group of 28 animals over the previous fortnight. The bull was said to have been bright and alert with a good appetite. The group had been provided a home mixed ration, with a general-purpose beef mineral top dressed onto the feed. At post-mortem there was extensive, haemorrhagic oedema overlying both femurs and associated muscle haemorrhage. There were spiral fractures of both femurs (Figure 4), the cortices of which were thin and friable. There was marked thickening of all the costo-

chondral junctions. Histological examination of the bone tissue revealed a marked reduction in bone mass, affecting the cortices particularly. Bone ash analysis was also conducted with the percentage measured was approximately a third (Beighle D.E et al) of the value expected for rib bone. An urgent and complete review of the dietary provision for the group was advised.

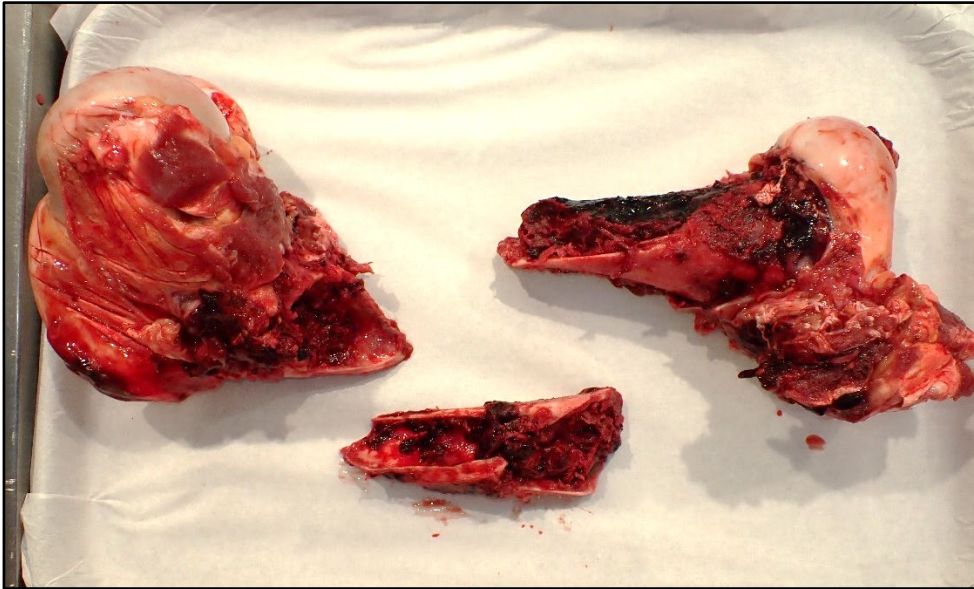


Figure 4: Spiral fractures of the femur in a fattening bull with osteoporosis

Reference:

Beighle, D.E., Boyazoglu, P.A., Hemken, R.W. and Serumaga-Zake, P.A. (1994) Determination of calcium, phosphorus, and magnesium values in rib bones from clinically normal cattle. *American journal of veterinary research*, 55(1), pp.85-89.

‘Blackleg’ of the diaphragm in a four-year-old bull

A four-year-old Belted Galloway bull, that had been running with a group of 13 cows and calves, was found dead with no prior clinical signs noted. It had been grazed on wet ground with rushes for three months and had not received any vaccinations. On postmortem examination there was a large volume of yellow fluid in the thorax, a large dark section of the diaphragm musculature, and a fibrinous pericarditis. *Clostridium chauvoei* was detected by FAT testing of the diaphragm, and histopathological examination confirmed a diagnosis of blackleg.

Urinary System

No significant trends this quarter.

Nervous system and organs of special sense

Histophilus somni myocarditis and thromboembolic encephalitis

Two uncommon manifestations of disease caused by *Histophilus somni* were investigated at Starcross Veterinary Investigation Centre this quarter. The pluck of a housed beef finishing heifer was received. It was the third of a group of 40 animals which was reported to have become recumbent and died. There was much froth in the trachea and bronchi, and the cranial lung lobes were dark red and haemorrhagic. The papillary muscle of the left ventricle was markedly enlarged and had irregularly-shaped lesions on its surface (Figure 5). Within the left ventricular myocardium there were variably-sized pale and dark red areas with numerous abscesses. *Histophilus somni* was isolated from the heart and lungs, and histopathological examination confirmed a severe chronic-active necro-suppurative myocarditis.

The second case was an eight-month-old beef steer which was submitted to investigate variable growth rates and coughing in a group of 36 purchased animals. Some of the affected animals, including that which was euthanased and submitted, had become disorientated and recumbent. There were fibrous adhesions between the left lung and the overlying ribs, but only small areas of the cranial lung lobes were consolidated. *Pasteurella multocida* was isolated in mixed culture from the lung, and PI3 was identified by PCR. No gross brain pathology was identified, and no bacteria were isolated in culture; however, histopathology revealed an acute necro-suppurative meningoencephalitis with vasculitis. The lesions were considered typical of *H. somni* infection; examples of which are shown in Figure 6, from another case. It can be difficult to grow this bacterium in culture, especially if animals have received antibiotic as in this case, illustrating the value of performing histopathology, especially for neurological diseases.

H. somni is primarily renowned for outbreaks of pneumonia, though it may cause thromboembolic meningoencephalitis and myocarditis, as in these cases, and also septicaemia, polyarthritis, otitis media, mastitis and reproductive disorders (Wessels and Wessels 2005, Van der Burgt and others 2007). Carriage of the organism in the nasal passages occurs in healthy animals (Thomas and others 2019). What 'triggers' disease outbreaks is uncertain, and hence prevention can be challenging, especially where cattle are from mixed sources. The use of vaccination may assist disease control, and as for all infectious causes of pneumonia, consideration must be given to all aspects of the management of the cattle. A useful 'auditing' worksheet to discuss with farmers is available at [Healthy calf rearing system checklist | AHDB](#).

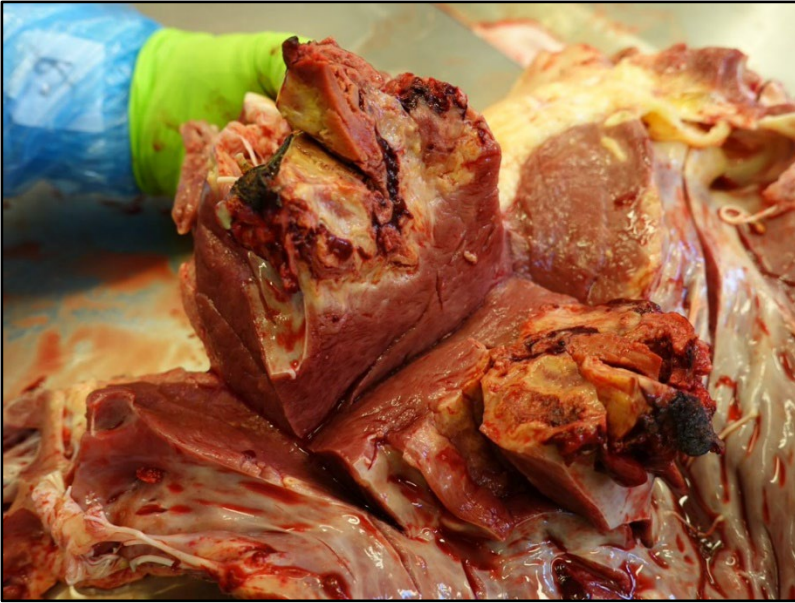


Figure 5: Myocarditis lesion of the left ventricle of a heifer with *Histophilus somni* infection



Figure 6: Multiple random foci of necrosis and haemorrhage in the cerebellum, medulla and midbrain of a steer with thrombotic meningoencephalitis. Sagittal and coronal sections of formalin fixed brain.

References

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Wessels J and Wessels ME. *Histophilus somni* myocarditis in a beef rearing calf in the United Kingdom. *Veterinary Record* 2005;157:420-421

Skin

Multifocal skin lumps in a four-year-old Friesian cow and a two-year-old heifer

Multifocal skin lumps appeared acutely on the skin of a four-year-old Friesian milking cow. No pruritus was noticed however the superficial skin appeared to have been eroded. Dermatophilosis was suspected and penicillin was administered which led to a mild improvement. Although not the main differential, Lumpy Skin Disease could not be ruled out from the clinical appearance, and the private vet reported suspicion of this disease, and enzootic bovine leukosis, to APHA field services. Notifiable disease was ruled out on the clinical history of the case. Fixed skin samples were submitted for histopathology, which led to a diagnosis of erosive to ulcerative eosinophilic crusting dermatitis, most likely due to hypersensitivity to ectoparasites. Midges or biting flies were deemed to be the most likely cause.

In a separate case, epitheliotrophic lymphoma was diagnosed in a two-year-old calved heifer that had developed multiple, raised, nodular skin lesions over a two-week period (Figure 7). They were mainly over the dorsum and neck and there was no evidence of systemic illness. Ringworm was not detected by culture. The case was reported to APHA field services and notifiable disease was ruled out on the clinical history of the case.



Figure 7: Nodular skin lesions in a heifer with epitheliotrophic lymphoma

Circulatory Disease

Ruptured aneurysm secondary to trauma

A recently calved cow was submitted to Penrith VIC, the third to recently die, shortly after producing healthy calves. All had presented with trembling soon after birth. Following administration of subcutaneous calcium, the condition of the three cows improved only to die unexpectedly two-three days after. Severe abdominal haemorrhage and thin, watery blood were noted on postmortem examination. Terminal branches of the internal iliac artery were trapped within a large pelvic blood clot adjacent to the bladder. Lateral and adjacent to one of these blood vessels there was a balloon-like pouch with irregular walls communicating with the lumen of the vessel at the site of roughened endothelium. It was concluded that death was due to a severe, subacute to chronic, arterial rupture. Histopathology provided no evidence of a primary underlying vascular insult such as a bacterial or fungal infection, or a genetic condition such as Marfan's syndrome. It was concluded that vessel rupture was the likely result of an aneurysm secondary to trauma during parturition, which had progressed over the following days.

Sporadic lymphoma in a dairy cow

A two-and-a-half-year-old dairy cow died after presenting with rumen stasis, milk drop and scour, which was unresponsive to antibiotic treatment. Interestingly, the only postmortem finding was marked enlargement of both kidneys, with diffuse pale tissue infiltration. A tumour was suspected, and kidney histopathology confirmed lymphoma as the cause of the lesions. Given the age of the animal (over two years old), this case was reported to APHA field services on suspicion of Enzootic Bovine Leukosis virus infection, an exotic notifiable disease which can cause lymphoma in cattle. EBLV PCR testing of kidney tissue was carried out and gave a negative result, ruling out this differential and confirming sporadic lymphoma as the cause of death.

Reproductive system – Abortion, Stillbirth, and Congenital Deformities

Abortion Due to *Bacillus licheniformis* in a Suckler Herd

An aborted calf was submitted to investigate three recent abortions in a spring calving suckler herd due to calve in March. The isolation of a heavy and pure growth of presumptive *Bacillus licheniformis* strongly suggested that *B. licheniformis* infection was the cause of abortion. *Bacillus licheniformis* abortion is typically associated with ingesting silage or silage liquor with high numbers of *B. licheniformis* present. It is more commonly seen in the late winter months and causes a necrotising placentitis. No placenta was submitted with the calf, as is often the case with bovine abortions, so it was not possible to determine if there was placentitis present.

Renal dysplasia in a third trimester fetus

Renal dysplasia was diagnosed in a third trimester fetus aborted by a second calver in a 100-cow-suckler herd. Gross findings in the fetus were suggestive of fetal stress, as the hide was covered in meconium and the stomach contents were blood stained. The other gross observation was that the kidneys were small and fibrous. Routine screening for infectious agents was unremarkable and histology confirmed severe renal dysplasia. There was no evidence of differentiation of cortex and medulla. There were subtle cellular changes in the brain attributable to the accumulation of toxic waste products not being eliminated by the kidneys, but autolysis prevented a full assessment for any developmental anomalies. Renal dysplasia can result from genetic defects (inherited or spontaneous) or exposure to one of several infectious, toxic, or physical insults during gestation. Maternal hyperthermia by any means can produce renal dysplasia, along with several other developmental anomalies. Finally, anything that impedes urine flow (such as obstruction of the ureter) will impact on the normal development of renal tissue.

Congestive heart failure in a fetus

Congestive heart failure was the presumptive diagnosis in an approximately eight months gestational age aborted calf. This was the second calf aborted in two groups of 10 high health suckler cows. Postmortem examination revealed a large volume of fluid containing fibrin stranding present within the body cavities. Rounding of the heart was present however, it had no discernible gross anatomical abnormalities. The liver appeared markedly swollen and mottled, thought to be due to chronic passive congestion. No infectious agents were identified through routine abortion investigation testing. Selenium and/or vitamin E deficiency has been previously hypothesised as a cause of fetal cardiac failure and abortion due to myocardial necrosis, however the exact role of these elements in fetal heart failure is poorly described. In this case histopathology was performed and no significant lesions were detected in the heart tissue. It was concluded that even though there was no structural abnormality, congenital congestive heart failure likely accounted for the calf's abortion.

Mastitis

Mastitis due to *Brevibacillus parabrevis*

An adult dairy cow was submitted after dying two days post drying off. This herd had an adult cow mortality rate of 7%, with deaths attributed to multiple causes. Striking postmortem changes were evident. Stringy, thick clots were expressed from the back right udder quarter, with pink-coloured watery milk expressed from the front right. The udder tissue itself was deep red in colour with areas of tissue necrosis in the affected quarters. These findings were highly suggestive of a toxic mastitis. A *Bacillus* spp. was isolated in purity from both affected quarters and deemed to be the most likely causative organism on histological examination of udder. To identify this further, 16s typing was undertaken and the isolate was identified as *Brevibacillus parabrevis*, formerly *Bacillus brevis*. This is a recognised environmental organism often being found in soil, air, water, and decaying

material. This organism is deemed a rare pathogen, but cases of infection (meningitis, peritonitis and tracheitis) have been reported in human literature following surgical procedures and medical interventions. These findings would support inadvertent introduction of the organism during the drying off routine as the most likely source of infection. A review of the drying off procedure was advised.

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, 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 latest UK-VARRS report continues to document downward trends in sales of veterinary antibiotics in the UK. In addition, the latest RUMA Targets Task Force report can be found at: [Reports – RUMA](#)

The Medicine Hub, a voluntary industry 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

Nitrate poisoning in a group of 18-month-old cattle

Five of a group of approximately 60 cattle, aged 18 months, died over a period of 12 hours. One of the animals had been seen walking alongside an electric fence and was later found dead, whereas no prior clinical signs were seen in the other four. The group had been strip-grazing stubble turnips for the previous five to six weeks. The incident occurred after freezing weather, which had affected the water supply, although water had been transported to the animals. The practitioner initially undertook anthrax investigation,

and once completed and negated, one of the animals was submitted for postmortem examination.

Blood was present at the nose and anus. The carcase blood was dark brown (Figure 8), and the conjunctivae and other mucous membranes were dark red to brown. The rumen was well filled with forage and chewed pieces of turnip. Testing of the aqueous humour proved positive for nitrites. The history of recent freezing weather and grazing turnips, dark blood and mucous membranes, and identification of nitrites were consistent with nitrate toxicity.

Excess nitrates can accumulate in animals grazing brassicas, such as stubble turnips, when the plants are 'stressed', as occurred in this case due to freezing weather conditions. The nitrate concentrations can return to normal several days later if the plants haven't died or been harvested. Temporary removal of the livestock from the turnips is recommended, and then very gradual, managed access resumed. Consultation with an agronomist may be helpful to work out how to graze the crop safely again, although the weather is an unpredictable factor. Other features of nitrate poisoning can include dyspnoea, which is caused by methaemoglobinaemia. The production of ammonia in the rumen can result in ataxia and other nervous signs. Abortion storms, or weak poorly viable calves, may occur if pregnant cattle are exposed to high nitrate concentrations.

In addition to root crops being a source of nitrates, direct access to fertiliser, or the water used to clean machinery used to spread it on land, has also been the cause of outbreaks. Fertiliser is a concentrated source of nitrate and cattle are considered to like its taste. The food safety implications of outbreaks should be assessed but, it is usually not considered a problem for the other exposed animals as nitrate is rapidly metabolised.



Figure 8: Dark-brown carcase blood from an 18-month-old steer with nitrate poisoning

Horizon scanning

Bluetongue (BTV) update

The risk of BTV incursion to the UK in Q1 2023 was low. Animals travelling to or from BTV-affected areas of Europe, and back to the UK, must be vaccinated against both BTV-8 and BTV-4. Further advice on how to spot and report BTV can be found at:

www.gov.uk/guidance/bluetongue.

Foot and Mouth Disease (FMD) update

In March, the FMD outbreaks reported were: serotype O in Libya (11) and Palestine (one), and serotype SAT 2 in Iraq (seven), South Africa (20) and Türkiye (six). (WOAH data only). There remains a low risk of FMD incursion into the UK from any affected region.

Focus on Brucellosis

During Q1 the PM rooms are busy with abortion submissions, all of which are routinely screened for *Brucella* spp. Brucellosis is a notifiable disease. The UK is officially free of brucellosis (OBF) however, the disease is present in Southern Europe (Figure 9), and importation of cattle risks introduction of the disease. The last outbreak in British cattle was in 2004.

In cattle, the main signs of brucellosis are abortions and premature calf birth.

In sheep and goats the main signs of brucellosis are:

- abortions in the herd
- swollen udders due to infection of the mammary glands (milk producing organs)
- swollen testicles
- nervousness
- fever

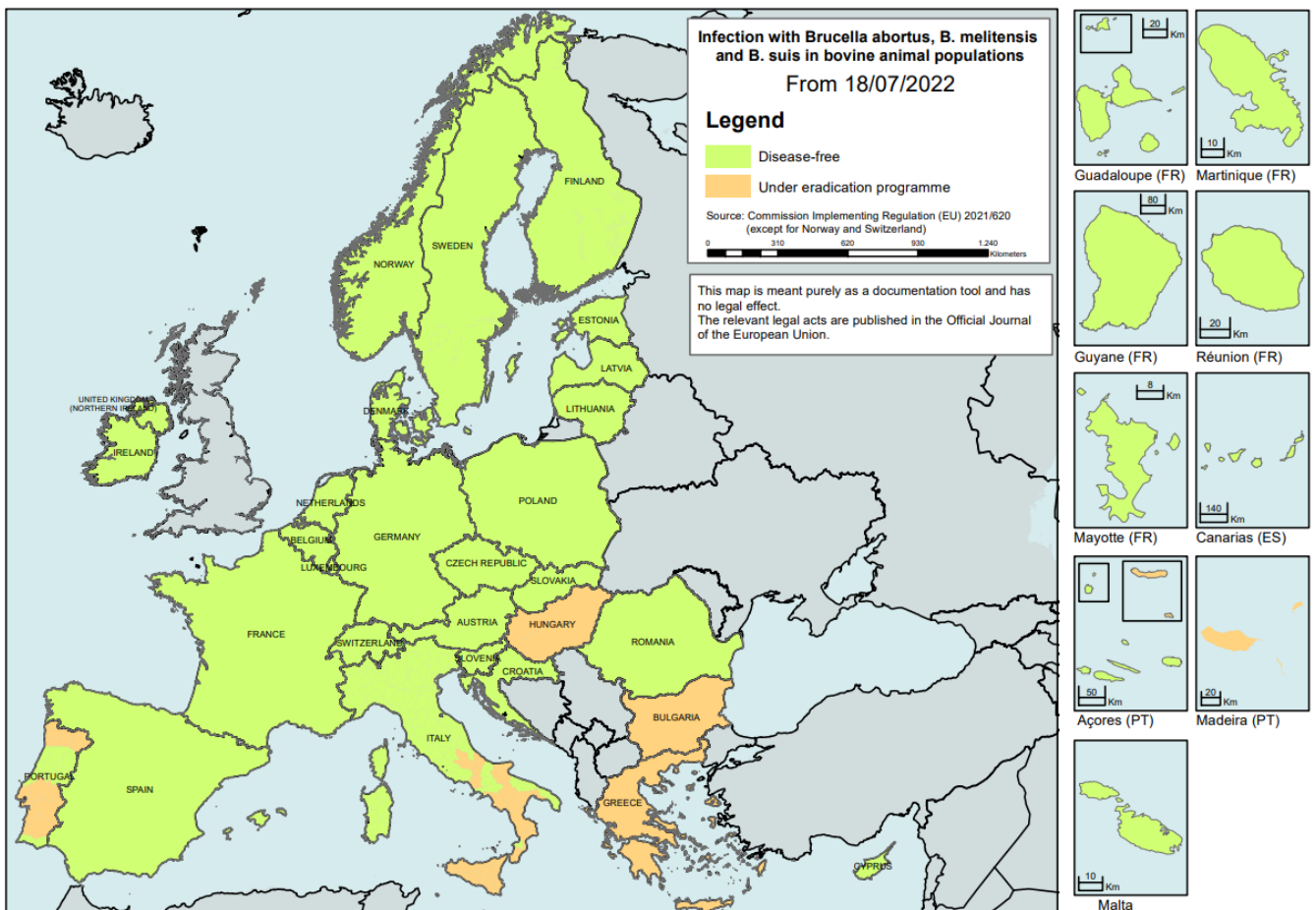


Figure 9: European Commission map showing countries which are under an eradication programme for *Brucella abortus*, *B. melitensis* and *B. suis*

[Image from the European Commission (https://food.ec.europa.eu/system/files/2022-07/ad_surveillance_disease-status_map_bovine-brucellosis.pdf)]

Brucellosis is a zoonotic disease and can spread to humans through contact with infected birth products or vaginal discharge, or from drinking raw milk from infected animals.

Vets and farmers are reminded about the requirement to notify APHA of every bovine abortion or premature birth (less than 271 days after service). APHA will then decide whether an investigation is required. This reporting is an essential piece of how we maintain evidence of our OBF status.

Publications of interest

APHA (2021) Disease surveillance in England and Wales, April 2023. *Veterinary Record* [Disease surveillance in England and Wales, April 2023 - 2023 - Veterinary Record - Wiley Online Library](#)

Monthly APHA disease surveillance reports can be found at this link: [APHA disease surveillance monthly reports - GOV.UK \(www.gov.uk\)](#)

APHA focus articles in the Veterinary Record can be found at: [APHA focus articles in the Veterinary Record - GOV.UK \(www.gov.uk\)](#)

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.

Huber N; Andraud M; Sassu E L; Prigge C; Zoche-Golob V; Kasbohrer A; D'Angelantonio D; Viltrop A; Zmudzki J; JONES H; SMITH R P; Tobias T; Burow E (2022) What is a biosecurity measure? A definition proposal for animal production and linked processing operations. *One Health* 15, 100433.

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.

[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 (England, Wales, and Scotland), which was collected and collated by the Department for Environment, Food and Rural Affairs (Defra).

Bragg R; Corbishley A; Lycett S; Burrough E; Russell G; Macrae A (2023) *Veterinary Record* 192 (6)

[Effect of neonatal immunoglobulin status on the outcomes of spring-born suckler calves - Bragg - Veterinary Record - Wiley Online Library](#)



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This publication is available at:

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

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