



Animal &
Plant Health
Agency



Great Britain small ruminant quarterly report

Disease surveillance and emerging threats

Volume 24: Quarter 4 2021 (October to December)

Highlights

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the fourth quarter of 2021, October to December. It contains analyses carried out on disease data gathered from the Animal and Plant Health Agency (APHA), SRUC Veterinary Services division of Scotland's Rural College (SRUC) and partner postmortem providers and intelligence gathered through the Small Ruminant Species Expert 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.

Issues and trends

Weather

The autumn was warmer and milder than average. October was wetter than average nearly everywhere, especially southern Scotland, Cumbria, and much of southern England with 128% of normal rainfall. November was a much drier month, especially in southern areas with 63% in November and 90% in December of normal rainfall (see Figure 1)

Average temperatures were increased with October 1.4 °C, November 0.8 °C and December 1.1 °C above the above the 1981 to 2010 long-term average (see Figure 2).

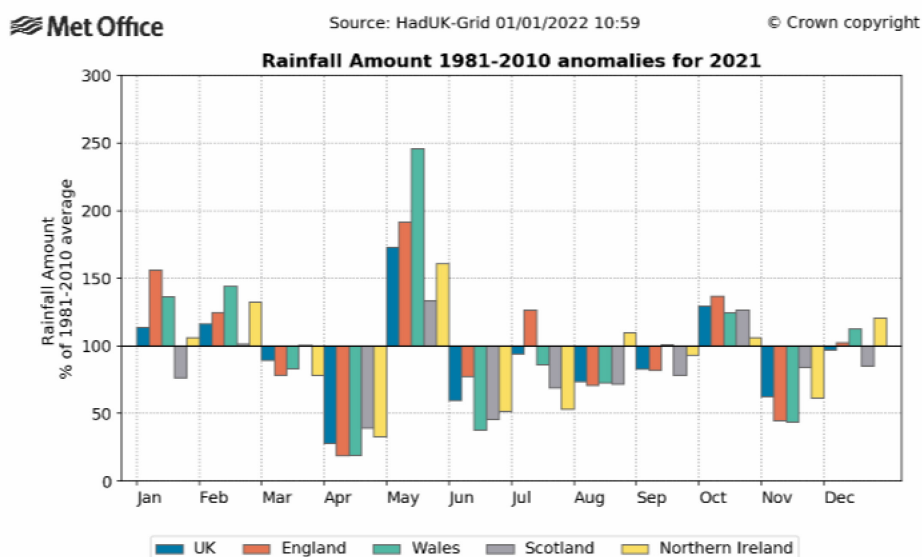


Figure 1: Rainfall amount 1981 to 2010 anomalies for 2021

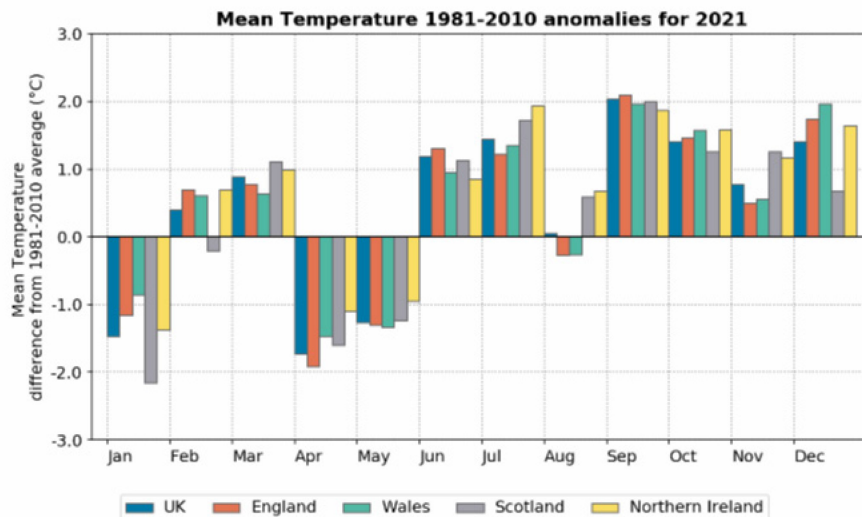


Figure 2: Mean temperature 1981 to 2010 anomalies for 2021

Industry

Farm gate prices have been buoyant throughout the year, supported by tight lamb availability and good demand. UK lamb kill during the fourth quarter totalled 3.4 million head, 8% less than a year ago. Coupled with lower ewe kill, production fell 7%, to 75,800 tonnes.

Export volumes had struggled through much of 2021 due to the combined effects of COVID-19 and increased trade friction post Brexit. Through the latter months of 2021 we have seen volumes recover to be at similar levels as in quarter 4 of 2020. Import volumes have remain depressed, reflecting the continued buoyant Asian market.

Demand is the key watch point for the lamb sector ahead. Lamb did well during lockdowns as consumers looked to purchase more takeaways. As consumers return to eating out lamb demand could suffer as many restaurant menus have been slimmed down over the course of the pandemic, with lamb being dropped in many cases. Lamb is also at a higher price point than some other proteins which could see lamb struggle as consumers tighten the purse strings and move to recessionary type behaviours.

Rebecca Wright, AHDB

Unusual diagnoses

Pituitary abscess syndrome

Pituitary abscesses were diagnosed on three separate occasions this quarter.

The first case involved a five year old ewe that was found recumbent in the field showing facial paralysis and died despite treatment. Postmortem examination found a covering of thick, purulent yellow to green material over the ventral surface of the brainstem and extending dorsally to cover the right side of the cerebellum. The source of the infection appeared to originate from the pituitary gland. *Staphylococcus aureus* was isolated on brain culture.

In the second case, a three year old ewe was submitted following the development of neurological signs. Again, a localised meningitis was seen grossly associated with the pituitary gland, which had been replaced by a purulent abscess filling the pituitary fossa. Bacterial cultures were unrewarding in this case, most likely a result of the antibiotic treatment given prior to submission.

The final case was a Blue Faced Leicester tup. The farmer had noticed drooping of the ears and found a superficial abscess on top of the tup's head one week prior to submission, which appeared to respond to antibiotic therapy. The tup then seemed to become hollow' and stopped eating before being found dead. On gross examination a 1.7cm diameter discrete abscess had replaced the area of the pituitary gland, however in this case there was no evidence of spread to the rest of the brain. Bacteriology was again unrewarding.

Pituitary abscess syndrome has been reported in humans, cattle, goats and sheep. Infection may occur via haematogenous or lymphatic spread, from a focus of infection elsewhere in the body (which may have resolved at the time of presentation) and has also been associated with the ringing of bull's noses and the use of anti-sucking devices in calves. In the cases described above abscesses were found in other areas of the body, including the lungs, which suggests haematogenous spread as the likely route of infection.

Male animals are often over-represented and are deemed more at risk of developing pituitary abscesses, as a result of secondary infection to cranial trauma associated with head-butting behaviour. Cases are usually sporadic with outbreaks rarely reported.

Due to the location of the pituitary gland cranial nerve deficits (facial paralysis or ocular dysfunction or dysphagia) are commonly observed most likely due to the pressure caused by the enlarging abscess and its local extension causing damage to the adjacent cranial nerves and their nuclei. As such these cases can often be confused with listerial encephalitis and they highlight the importance of utilising a full gross postmortem examination (with brain histopathology if required) to investigate neurological disease in sheep.

Listerial enteritis

Two cases of listerial enteritis outbreaks causing deaths and diarrhoea were investigated this quarter. In the first case five lambs died overnight from a group of 100 housed animals, a further nine animals died the following day and four others the day after. They had been housed for a week and were receiving pit silage. The lambs were in fair condition with marked faecal soiling.

Postmortem examination of two lambs identified multifocal ulceration of the abomasum. In one there was severe thickening and haemorrhagic inflammation of the caecum and colon with brown and bloody contents (see figure 3). The mesenteric lymph nodes were enlarged and reddened. Additional small discrete areas of ulceration were present on the larynx and rumen pillar of one lamb.

Bacterial cultures identified *Listeria monocytogenes* with no salmonella isolated. A moderate worm egg count was also detected in each lamb on faecal examination.

Histopathology revealed suppurative and necrotising typhlocolitis orientated on the mucosa-submucosal junction, consistent with enteric listeriosis, and a gram stain revealed *Listeria*-like gram positive bacilli confirming the diagnosis.



Figure 3 - Mucosal thickening and haemorrhage of the caecum in a sheep with listerial enteritis

The second case diagnosed listerial enteritis and parasitic gastroenteritis, in a yearling ewe submitted to investigate the loss of two from a group of 400 in lamb ewes. It had presented with rapid onset diarrhoea and wasting. Twenty to twenty five animals were reported to have presented with diarrhoea a week after supplementary silage was introduced to the group at grazing.

Significant postmortem findings included:

- profuse brown watery abomasal contents, watery small intestinal contents and profuse, watery and blood-stained large intestinal contents
- the mucosal surface of the caecum and colon were thickened with irregular areas of ulceration and necrotic membrane overlying. There were ecchymotic haemorrhages of the caecum and colon serosal surfaces

Listeria monocytogenes was isolated on direct and enrichment culture from the mucosal surface of the caecum.

On histological examination a severe necrotising inflammation of the large intestinal mucosa was described, and a strong presence of gram-positive small bacilli in the inflammation over the mucosal-submucosal border on gram stain, supported a diagnosis of enteric listeriosis. No salmonella was isolated. The ewe also had a high worm count, with a high proportion of immature worms on examination of the gastrointestinal contents. This indicated recent and continued infection likely from a highly contaminated pasture.

As with neurological cases of listerial infection, there is a link to the feeding of sub-optimal quality silage, such as the 'mouldy areas' seen at the edges of the clamp and under the sheeting. Advice was given regarding these risk factors for enteric listeriosis in both cases.

Neoplasia in aged ewes

Nine diagnoses of neoplasia not otherwise specified (NOS) and 4 diagnoses of lymphoma or lymphosarcoma were made in sheep during 2021 by APHA and SRUC, in comparison to a mean of just 4.8 neoplasia NOS and of 2.8 Lymphoma or lymphosarcoma annual diagnoses per year, during years 2016 to 2020.

Neoplasia diagnosed during 2021 were identified as: Squamous cell carcinoma (3 cases), intestinal adenocarcinoma, lymphoma, hepatocellular carcinoma, Sertoli cell tumour, a pheochromocytoma and a sclerosing mesothelioma (as described below), confirming these were of mixed and relatively unusual types of neoplasm.

Intestinal adenocarcinoma was diagnosed in two separate submissions of a five-year-old ewe and an aged ewe, both in poor body condition. A common significant finding on gross examination was distension of the intestinal tract proximal to areas of thickening and stenosis caused by neoplasia.

In one there was a large, roughly circular very firm white mass in the centre of the spiral colon, forming a thick anulus around the intestinal wall. In the other, there was marked thickening of the wall of the mid small intestine, with firm white tissue and protrusion of a polyp-like structure into the lumen.

Histopathology confirmed intestinal adenocarcinoma in both cases. Unlike ovine pulmonary adenocarcinoma (OPA), intestinal adenocarcinoma is sporadic and not contagious, although in some flocks may be associated with consumption of bracken.

Lymphoma was diagnosed in an aged Herdwick ewe following a few days illness, during which time respiratory distress was evident. The tonsils were prominent and the retropharyngeal lymph nodes were greatly enlarged, resulting in functional occlusion of the larynx. The terminal ileum was thickened with necrotic content and there was marked enlargement of the associated mesenteric lymph nodes. There were multiple large pale masses within both kidney cortices.

A 12-year-old ewe was submitted with a history of sudden onset skin masses, prior to wasting and recumbence. At postmortem examination (PME) there were numerous 0.5 to 5.0 cm diameter masses throughout the skin, which when incised revealed amorphous, pale, fleshy tissue.

Similar masses were found in the wall of the abomasum, throughout the carcass lymph nodes and through the cortex of both kidneys. A diagnosis of lymphoma was confirmed by histopathology in both cases. Lymphoma is one of the more common neoplasms in sheep, behind pulmonary and intestinal adenocarcinomas.

Mesothelioma was diagnosed in an ewe with diarrhoea and wasting over a six to eight week period. The lesions in this wasted ewe were unusual and included ascites and hydrothorax, thickening of the peritoneum with some sheets which were nodular overlying the spleen and intestines, a thickened mesentery, and adhesions between the abdominal viscera by thickened peritoneum (See figures 4 and 5). Intestinal content was fluid and faeces loose.

Neoplasia was suspected and histological examination of a range of viscera confirmed a sclerosing mesothelioma.



Figure 4: Peritoneum (visceral and parietal) thickened, ascites: Sclerosing mesothelioma in an ewe



Figure 5: Nodular peritoneum over the splenic capsule: Sclerosing mesothelioma in an ewe

In the majority of these cases, ewes had been submitted to investigate the cause of ill-thrift at a flock level. Due to the sporadic nature of most neoplasms, with the exception of OPA, these ewes were unlikely to be representative of other animals affected by poor condition and submission of further affected animals for PME was advised.

Injection site infections

A recent case highlighted the importance of using correct handling and administration technique when treating sheep with injectable products.

Two yearling ewes were submitted for postmortem examination to investigate swelling of the upper forelimb and brisket with lameness affecting around 85 out of 342 sheep with 11 deaths. Signs were seen soon after injection of a second dose of a multi-valent clostridial vaccine. Both ewes had foul-smelling turbid fluid, cellulitis, oedema, and areas of necrosis within the subcutaneous tissues of the right axilla, sternum, and cranial thorax (see figure 6).



Figure 6: Extensive subcutaneous infection in a yearling ewe

Bacteriology isolated *Trueperella pyogenes* from multiple tissues of both ewes; *T. pyogenes* can be a commensal of the skin but is also an important opportunistic, and potentially primary, aetiological agent that is commonly isolated from abscesses and chronic infections.

It is not possible to know whether it was the primary cause of the infections in these ewes, or a secondary invader, which then contributed to abscess formation and systemic disease.

It was considered most likely that the origin of the subcutaneous infection was a contaminated needle. The vaccine was purchased on the morning of use making contaminated product less likely. It was strongly advised to review all stages of the injection procedure and equipment used, to identify and eliminate the cause of injection site infections.

Changes in disease patterns and risk factors

Syndromic analysis - Syndromic alerts were raised this quarter for Great Britain for the following diseases

Pine or Cobalt deficiency, hypocupraemia and hypocuprosis, Parasitic Gastroenteritis (PGE) NOS, PGE Haemonchosis, Pneumonia due to Mannheimia spp, Pneumonia due to Mycoplasma ovipneumoniae, Orf or Contagious pustular dermatitis, Diagnosis not listed – skin disease.

When looking at APHA data only, there were also syndromic alerts for hyposelenaemia and hyposelenosis and drenching gun or bolus injury.

Parasitology

Parasitic gastroenteritis (PGE)

A total of 224 submissions were VIDA diagnosed with PGE in quarter 4, compared to 112 for the same quarter in 2020 (see figure 7). The annual total diagnoses of PGE (497) were also higher than those of the previous year (391). Wasting, diarrhoea and death were the main clinical signs associated with the diagnosis of PGE. PGE was constantly detected throughout the year with a peak during the third quarter. The majority of the diagnoses were recorded in post-weaned lambs.

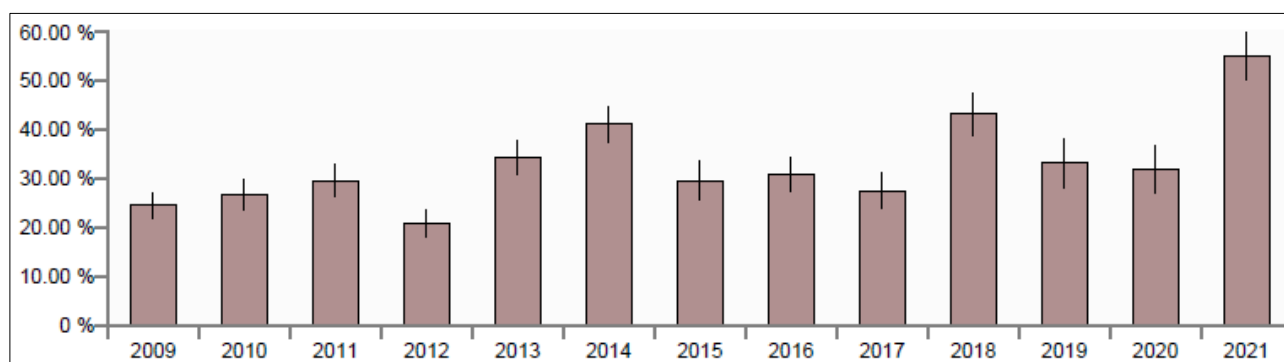


Figure 7: Incidents of Parasitic gastroenteritis for Great Britain for quarter 4, as a percentage of diagnosable submissions 2009 to 2021

In comparison, the analysis of the age of animal affected by *Haemonchus contortus* revealed that the majority of the diagnosis of haemonchosis obtained in 2021 were in adult animals, illustrating that all ages of sheep can be affected by this blood sucking worm. When lactating ewes are affected, there can be a profound depression of milk production, leading to lamb deaths and poor growth rates.

Historically, haemonchosis was considered only to be a problem in the south-east of the England, but as showed in the map (see figure 8) the geographic distribution of this parasite has changed, and the disease is now endemic in all of Great Britain. Where haemonchus is present on a farm, additional monitoring and management effort within the worm control strategy is required, to minimise the risk of production losses and mortality.

Haemonchosis is not normally a consistent threat, either within or between years. It tends to be sporadic, occurring when the climatic conditions combine with pasture contamination to produce a high challenge.

Affected farms can go several years in between outbreaks, making it important that they understand the factors that combine to present a risk on their grazing areas and have monitoring in place.

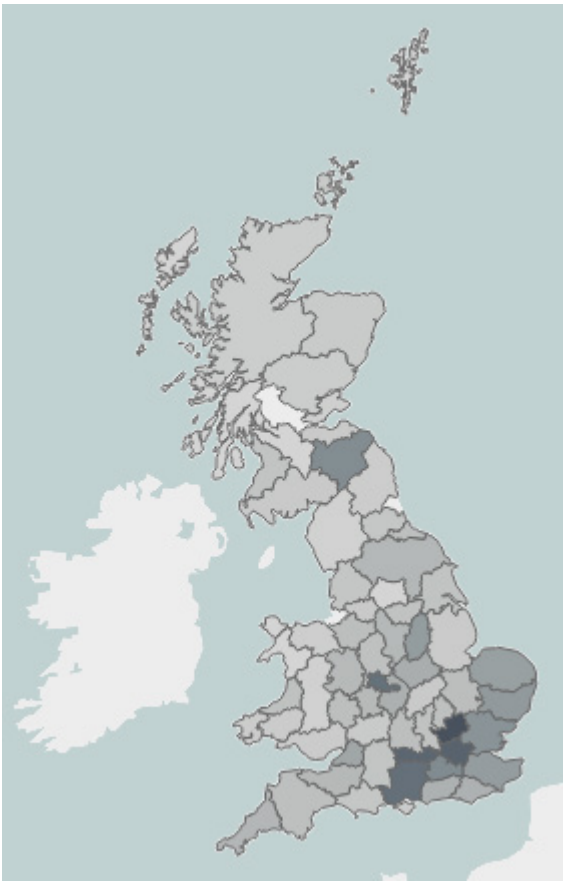


Figure 8: Counties in Great Britain shaded grey, where *Haemonchus contortus* was identified through VIDA diagnoses

Changes in the dynamics, life cycle traits, timing of infection and pathogenicity are all likely to have played a part in the number of diagnoses of PGE due to *Nematodirus* spp.

The percentage of diagnosis of Nematodirois obtained in 2021 by APHA and SRUC is the highest detected since 2013 (figure 9).

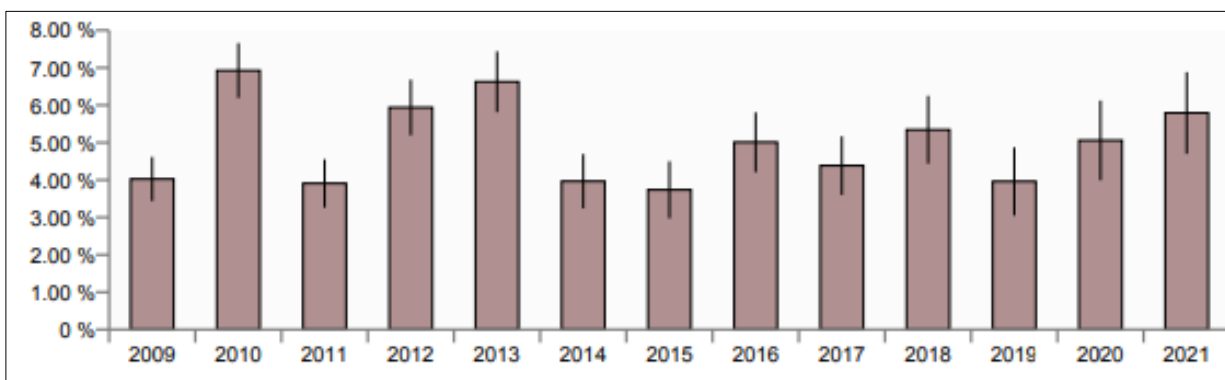


Figure 9: Annual incidents of *Nematodirus* for Great Britain, as a percentage of diagnosable submissions 2009 to 2021

Nematodiosis is a particularly serious disease in lambs, causing a high number of mortalities and stunting the growth of many others. It is caused by the *Nematodirus battus* worm, which has a different lifecycle to other sheep worms. Under certain climatic conditions it can strike very quickly, with little or no warning.

The main difference in the lifecycle of *Nematodirus battus*, compared with other parasitic worms, is that development to infective larvae takes place within the egg and infection passes from one lamb crop to the next year's crop.

Cold weather delays hatching, so when there is a sudden change in temperature it can trigger a mass hatch. If this coincides with the time when lambs are starting to take in significant amounts of grass (over about six weeks old), the result can be devastating.

As in the previous year APHA will assist the [Sustainable Control of Parasites in Sheep \(SCOPS\)](#) with the production of a Nematodirus Forecast service .

Due to the mild conditions experienced in parts of the UK during the New Year and a predicted warm January, the SCOPS Nematodirus Forecast will be launched from the 1 February. The forecast map is updated daily, using data from 140 weather stations (provided by the Met Office), tracking changes in risk throughout the spring and early summer.

The interactive Google map allows farmers and advisers to select the nearest or most representative weather station, and it then provides advice on how to relate the predicted risk to their particular farm, treatment options, and possible management actions. Sheep farmers should consult their vet or adviser regarding local risks and treat lambs if they are deemed to be at risk.

Liver Fluke

There were only two cases of acute fascioliasis recorded during quarter 4, one in Northeast Wales and the other in south-west Scotland. This continues the trend of low numbers of cases being seen following the very dry summer of 2018 (figure 10). In comparison in quarter 4 of 2017 there were 58 acute fascioliasis cases. The number of chronic fascioliasis diagnoses are also continuing at much lower levels than in 2017 (17 in 2021 quarter 4 compared with 79 in 2017 quarter 4).

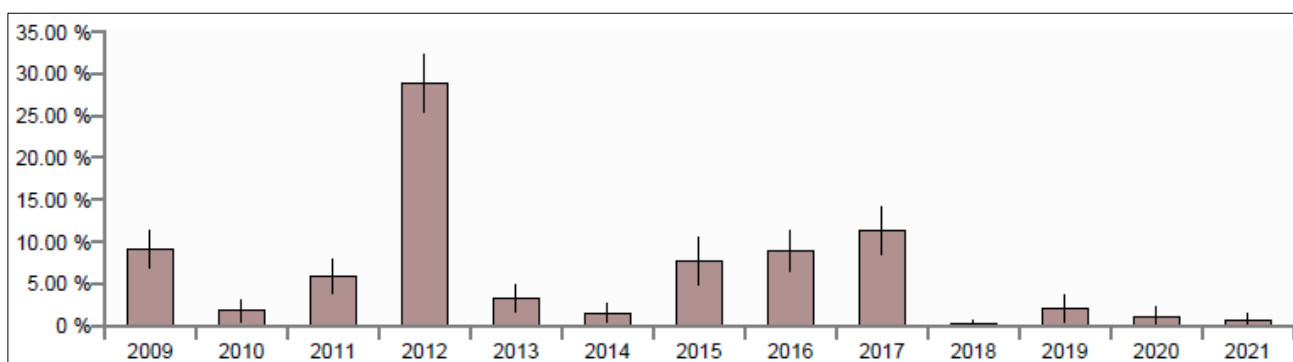


Figure 10: Annual incidents of Acute Fasciolosis for Great Britain, as a percentage of diagnosable submissions 2009 to 2021

PGE including Haemonchosis continues to be the most common diagnoses in goats, both adult and post-weaned, followed by Johne's disease in adults.

Circulatory disease

Between 2016 and 2020, 24 cases of diaphragmatic rupture and or internal haemorrhage due to blood vessel rupture were recorded in Texel sheep and another four were recorded in Beltex sheep.

In 2021 four cases were recorded in Texel's. The cause or causes are yet unknown but are likely to include: an underlying fragility in blood vessel or connective tissue, breed conformation, and alterations in pressure within the thorax or abdomen related to rumen size, or laryngeal shape (Waine K and others 2019).

Internal haemorrhage in a Texel shearling ram

Three shearling rams in a group of 22, were unexpectedly found dead over a 10-day period, with the latest one submitted for PME. All the shearlings had the same sire, their dams were likely related to each other through their sire as well.

At PME, there was extensive free blood and large blood clots within the abdominal cavity, with extensive retroperitoneal blood clots, consistent with haemorrhage as a result of rupture of a major blood vessel as the cause of death. The ram additionally had laryngeal chondritis, the right arytenoid was abscessated.

Diaphragmatic rupture and a fatal haemorrhage identified in shearling Texel rams

These cases were investigated after two had been unexpectedly found dead.

PME of one ram identified a ragged edged tear, of approximately 7 to 10 days duration, within the left central tendon of the diaphragm, resulting in entrapment of some intestine within the thorax, causing intestinal obstruction. There was also hypertrophy of the costal muscle, which has been observed in this breed before.

The other ram had a large blood clot within the thorax, resulting in compression of the lungs, and the mediastinum was full of blood. The aorta was found to have a small focal

tear at the point where it passes through the crura of the diaphragm, the source of the fatal haemorrhage. No underlying vessel fragility was identified histopathologically. This ram also had gross lesions consistent with laryngeal chondritis.

Tick-borne Fever

Combined *Clostridium perfringens* Type D (pulpy kidney), PGE and fibrinous pneumonia, pleurisy and pericarditis, were identified in a six-month-old Swaledale ewe lamb. Polymerase Chain Reaction (PCR) testing confirmed the lamb was also infected with *Anaplasma phagocytophilum* which causes 'Tick-borne Fever', an infection which potentially immunosuppresses lambs predisposing them to other infections.

The lamb had a history of malaise and loss of condition and was in a group of 60 lambs grazing moorland pasture. PME revealed pathology consistent with 'Pulpy kidney', consisting of an excess of pericardial fluid with a fibrin clot, congested lungs and confirmatory brain histological changes, confirming a Clostridial enterotoxaemia had been the ultimate cause of death.

Caseous lymphadenitis

There was a marginal increase in caseous lymphadenitis diagnoses made by SRUC in quarter 4, with 6 cases, where there had been between 0 and 5 diagnoses during the same quarter in the previous 5 years.

There was also an increase in the SRUC diagnoses for the year of 2021, with 19 diagnoses, compared to between 9 and 16 cases diagnosed per year recorded in the previous 5 years. This represented 2.97% of diagnosable submissions compared to a usual range of 0.91% to 2.16%.

Skin disease

No significant trends were identified this quarter.

Respiratory disease

Incidents of Mannheimia Haemolytica

There was a marked increase in *Mannheimia* pneumonia diagnoses recorded by APHA during quarter 4, with 33 diagnoses (12.79% of diagnosable submissions) where typically between 10 and 27 diagnoses are recorded during this quarter (2.89% to 8.10% of diagnosable submissions).

The cases were predominantly in post weaned lambs, particularly in lowland flocks, but with increased numbers also diagnosed in hill or upland sheep and finisher lambs, from all regions in England and in Wales. In Scotland SRUC also recorded a relative increase for this quarter with 14 diagnoses, or 9.59% of diagnosable submissions, when between 2.4 and 7.91% of submissions were diagnosed in the last 5 years (see figure 11).

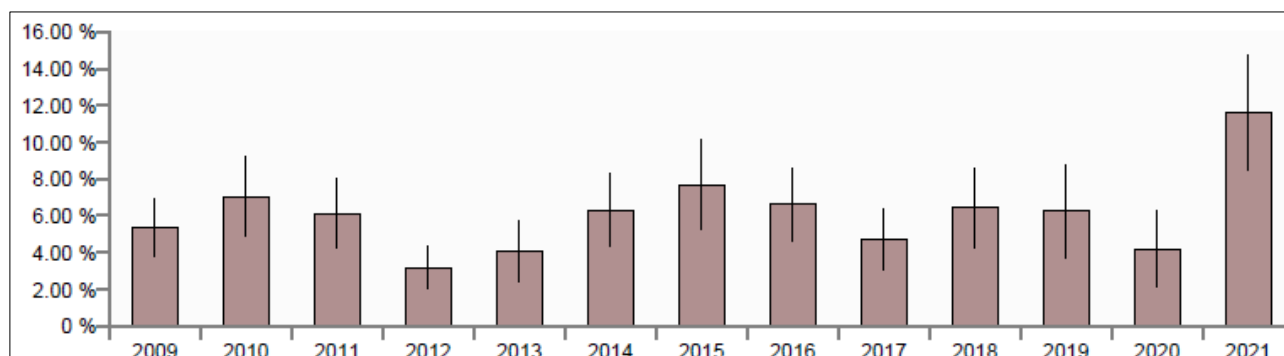


Figure 11: Annual incidents of *Mannheimia Haemolytica* for Great Britain, as a percentage of diagnosable submissions 2009 to 2021

APHA recorded increased numbers of cases of *Mycoplasma ovipneumoniae* during quarter 4. There were 22 cases diagnosed when the annual mean for the previous 5 years was 7.4 diagnoses. Most of the cases were recorded in post-weaned lambs, and similar to *Mannheimia pneumonia*, increases were seen in lowland, hill or upland and finisher lamb flocks. Although Wales and all regions in England recorded increased numbers of diagnoses, only relatively low numbers of cases were recorded in Scotland.

Coughing can be a prominent presenting sign of *Mycoplasma ovipneumoniae* in flocks experiencing outbreaks.

Coughing had been reported as the main presenting sign in a group of spring-born lambs outside at pasture. The coughing seemed to be exacerbated by movement or gathering or other stress and this had been a feature all summer. The occasional ewe was also seen coughing, although mainly lambs were affected.

Postmortem examination of a typically affected live lamb found limited cranio-ventral pneumonic consolidation and excess pericardial fluid. Lung pathology was suggestive of a chronic 'atypical' pneumonia, *Mannheimia haemolytica* was cultured and *Mycoplasma ovipneumoniae* was confirmed through DGGE or PCR. *Pasteurella* vaccination was recommended.

Enteric disease

There was an increase in enteric diagnoses in October and November compared to the same months the previous year, dominated by PGE cases in post weaned lambs.

Ruminal acidosis was seen more frequently in England in quarter 4 of 2021 than the same quarter in 2020, while fewer cases were seen in Scotland than the same period the previous year. These were predominately in post-weaned lambs, with the main presenting signs being found dead, diarrhoea and malaise.

The main risk factor for ruminal acidosis is the sudden introduction of high quantities of palatable concentrates. However, some cases can occur in animals which have been fed concentrates for some time, particularly with ad-lib feeding, where a sudden high intake of concentrates is possible.

Drenching gun or bolus injury

APHA noted an increase in drenching gun or bolus injury this quarter, with 6 incidents being recorded. When considering APHA submissions only, this represents 8% of submissions under the systemic and miscellaneous syndrome, compared to 3% of submissions for this syndrome in quarter four of the previous five years (2016 to 2020). This makes drenching gun or bolus injury the second most common diagnosis made by APHA for this syndrome in this quarter (see figure 12).

In contrast, there was a reduction in the proportion of cases recorded in Scotland. Therefore, when combined with SRUC data, the number of diagnoses of drenching gun or bolus injury made as a percentage of all diagnosable submissions was slightly lower than in the equivalent quarter in the previous year.

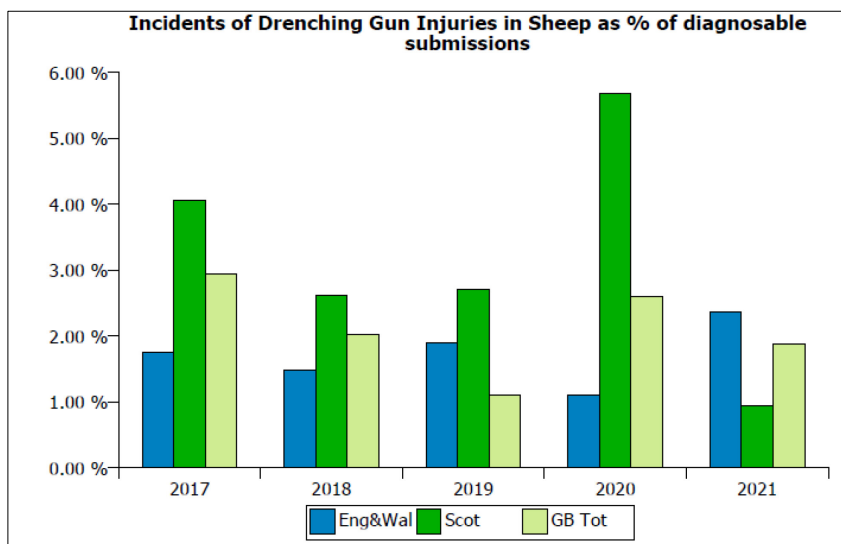


Figure 12: Incidents of drenching gun injuries in sheep during quarter 4 over the years 2017 to 2021

Trauma and secondary systemic *Bibersteinia trehalosi* infection were found to be the cause of death of three Mule gimmer lambs, from a flock where five out of 130 had died

unexpectedly. Several treatments had been administered to the group at gathering four days prior to submission: injectable vaccines, trace elements bolus, injectable Vitamin B12 and D3, fluke and worm treatment.

One lamb had a penetrating wound in the cranial oesophagus next to the epiglottis, extending to the thoracic inlet and containing a bolus and rumen content. The second was pale and had two fractured ribs with associated bruising, and a large blood clot within the thoracic cavity. The third presented with oesophageal and tonsillar ulcerations, reddened mucosa of stomachs, oedematous and congested lungs and *B. trehalosi* was isolated from all sites cultured. The deaths of the first two lambs had a traumatic nature and prompt review of the handling and dosing procedures was recommended.

Reproductive disease

Figure 13 illustrates the most common causes of abortion in Great Britain per year from 2011 to 2021.

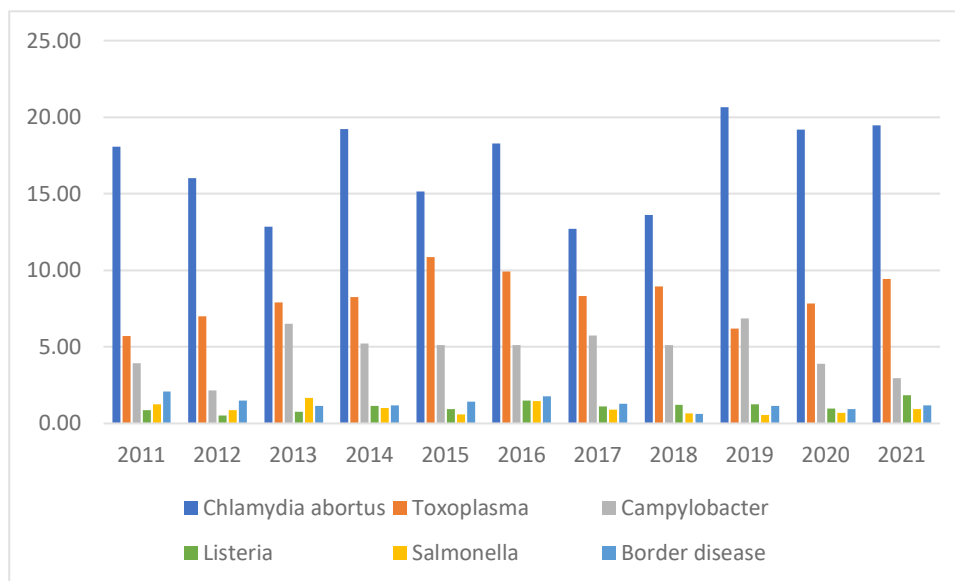


Figure 13: Common causes of sheep abortion in Great Britain as a percentage of diagnosable submissions 2011 to 2021

Abortion due to Schmallenberg virus

Abortion due to Schmallenberg virus was diagnosed on nine submissions during 2021. None were diagnosed in 2020. It is possible that we might expect an increase during the 2022 lambing season in line with the cyclical nature of this disease, which results from gradual waning of immunity and then a resurgence in cases every 3 to 4 years, when the breeding sheep population is naive. There is no available commercial vaccine. The national impact is generally low, but it may have a huge impact on some affected individual flocks.

Systemic disease

Border disease

There was an increase in diagnoses of Border disease recorded during 2021 (38 incidents; 1.81% of diagnosable submissions tested), compared to 16 diagnoses recorded during 2020 (0.92% of diagnosable submissions tested). As expected, the majority of diagnoses were made during the first two quarters of the year. The most frequently recorded main presenting clinical sign was abortion (Figure 14).

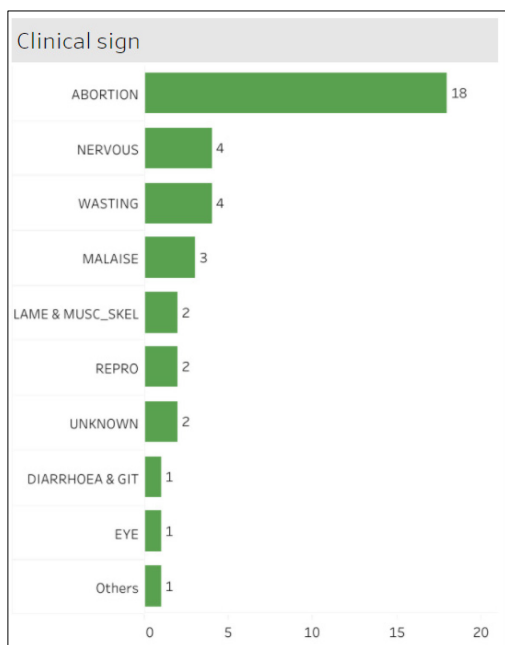


Figure 14: Main presenting clinical sign recorded for submissions where a diagnosis of Border disease was made during 2021

Hereditary or developmental abnormalities not otherwise specified (NOS)

There were 31 recorded incidents of hereditary or developmental abnormalities NOS during 2021. Of note was that 11 of these had a comment of either arthrogryposis, brain lesions, or both, and Schmallenberg virus (SBV) was suspected but PCR testing for SBV was negative which might arise where the virus has cleared from the fetus depending on the stage of gestation when infection occurred.

The increase in submissions with a diagnosis of hereditary or developmental abnormalities NOS recorded by APHA may have been a result of the free Schmallenberg PCR testing being offered for ruminants with arthrogryposis, during the lambing and calving season of 2021. Fetopathy due to SBV was diagnosed on nine submissions during 2021.

Bibersteinia trehalosi septicaemia

Bibersteinia trehalosi septicaemia was diagnosed in fewer submissions in Great Britain for this syndrome in quarter 4 (7%) compared to the general trend for quarter 4 over the previous 5 years (2016 to 2020), where it was diagnosed, on average in 17% of Great Britain submissions for this syndrome.

However, there was a slight increase in diagnoses made as a percentage of all diagnosable submissions in this quarter, compared to the same quarter in 2020, but cases recorded were not as high as those seen during preceding years (figure 15).

The majority of cases this quarter were recorded by SRUC (15) with only 2 incidents recorded by APHA.

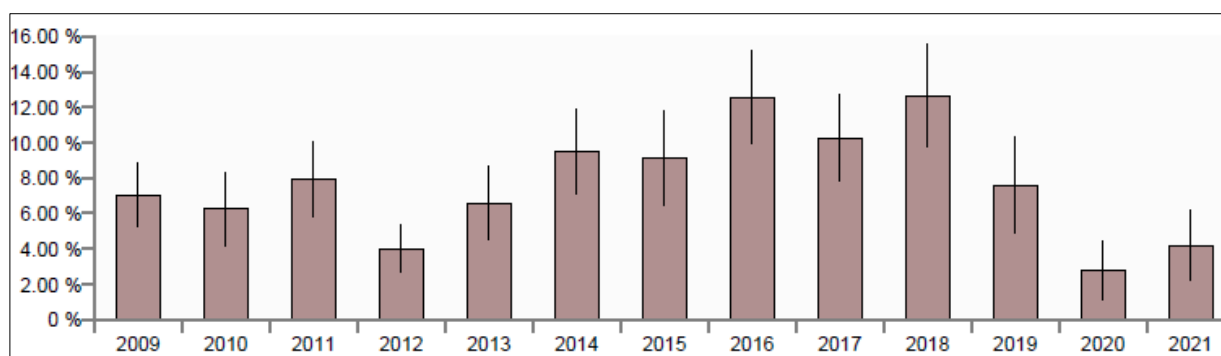


Figure 15: Great Britain incidents of *B. trehalosi* septicaemia for quarter 4 as a percentage of diagnosable submissions 2009 to 2021

Maedi Visna

Maedi Visna was diagnosed in Great Britain in 17 submissions this year, compared to 14 for 2020.

The following case illustrates the insidious nature of this disease and how it can become widespread in a flock before it is detected and diagnosed. A commercial flock reported that every year 10 to 12 ewes fell behind when moved, develop respiratory signs (panting, dyspnoea), lost weight, and eventually died. Mostly older ewes were affected, but occasionally 2 or 3 year olds were affected. The flock had been closed for 20 years, apart from rams that were bought in.

Three ewes were euthanased and submitted for PME. In one ewe the lungs had poorly demarcated pale firm areas, with adhesions between lungs and chest wall. On incision, affected areas were pale and some contained micro-abscesses. In sheep 2 and 3 the lungs were markedly enlarged, with less defined paler areas. The lung lymph nodes were enlarged in all three ewes.

Histopathology was inconclusive but did not rule out Maedi Visna. The private veterinarian blood sampled 12 ewes and all tested positive on serology. Another 50 ewes were then sampled and all, but four ewes were positive.

Metabolic conditions

Pine or cobalt deficiency

During quarter 4 of 2021 a diagnosis of pine (cobalt deficiency) was made in 7.8% of diagnosable submissions tested, compared to only 5.7% in the same quarter in the previous year. The majority of diagnoses (69%) were made in Scotland (figure16).

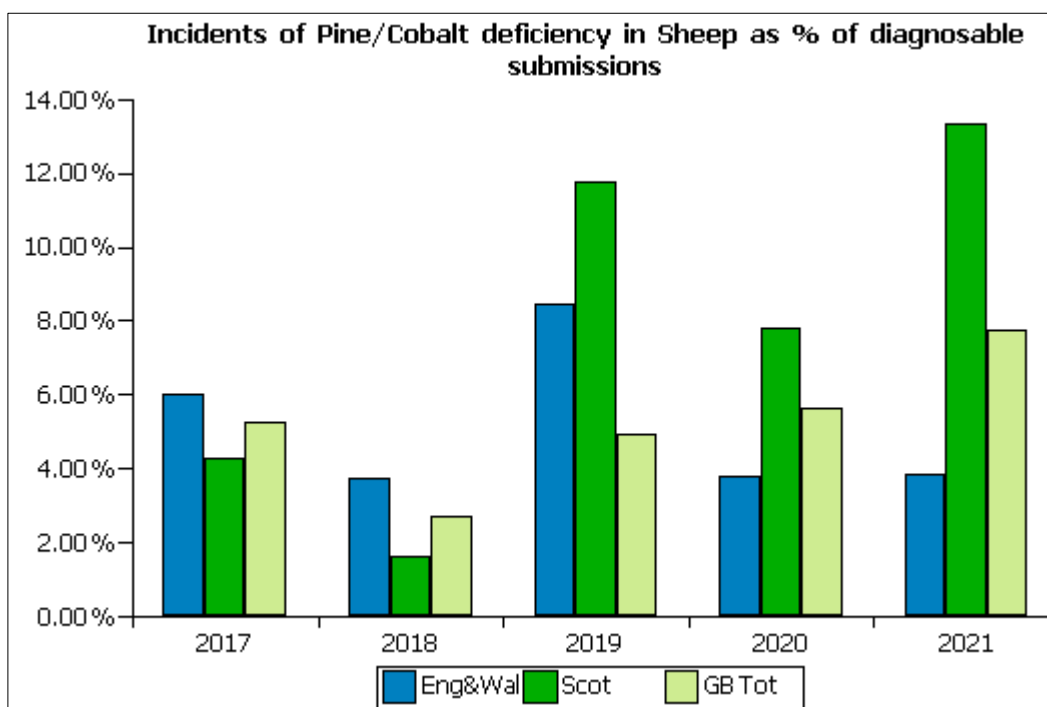


Figure 16: Location of incidents of Pine or cobalt deficiency in sheep during quarter 4 for years 2017 to 2021

The largest proportion of diagnoses of pine were made in post-weaned animals (41%) during the last quarter of 2021. This is similar to the equivalent quarter in the preceding five years (2016 to 2020) where 44% of diagnoses were made in post-weaned animals. The proportion of diagnoses made in adults during quarter four of 2021 (28%) was higher than the preceding five years (10%).

Hypocupraemia and hypocuprosis

As was seen during the quarter 3 of 2021, syndromic analysis indicates an increase in submissions diagnosed with this condition in quarter 4, compared to the equivalent quarter for previous years. A diagnosis of hypocupraemia and hypocuprosis was made in 3% of submissions tested, when typically, a diagnosis was only made in 0.7 to 1.5% of submissions tested during the previous five years (figure 17). An increase in cases was seen in Scotland specifically.

Mainly post-weaned sheep were involved, with lowland flocks being over-represented. Copper deficiency occurs when sheep graze pastures low in copper or high in iron, molybdenum, and sulphur.

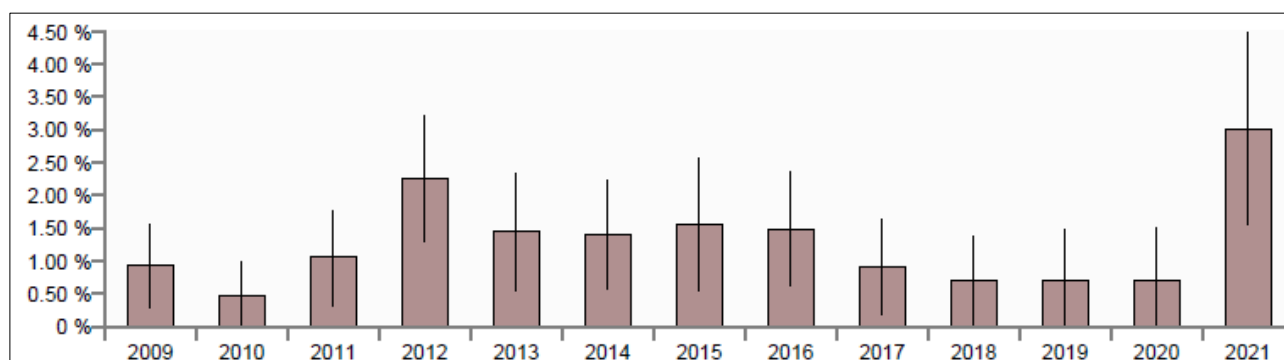


Figure 17: Great Britain incidents of hypocupraemia and hypocuprosis as a percentage of diagnosable submissions during quarter 4

Hyposelenaemia and hyposelenosis

APHA saw an increase in hyposelenaemia and hyposelenosis this quarter, with 12 incidents being recorded. When considering APHA submissions only, this represents 16% of submissions under the systemic and miscellaneous syndrome, compared to 6% of submissions for this syndrome in quarter four of the previous five years (2016 to 2020). This makes hyposelenaemia and hyposelenosis the most common diagnosis made by APHA for this syndrome in this quarter. The increase appears to be mostly in lowland post-weaned lambs.

Case reports of concomitant cobalt and selenium deficiency in lambs with parasitic gastroenteritis continued into quarter 4. It is well recognised that cobalt deficiency is a common feature in lambs with parasite burden but, this year interestingly APHA VIC Starcross found cobalt levels within normal range in the bulk of submissions, with selenium deficiency a regular occurrence instead.

Selenium deficiency was confirmed from tissue samples submitted from a five-month-old lamb, which had been found dead and had loose intestinal content at on-farm postmortem, despite recent anthelmintic treatment.

The rule of thumb guidance is that liver tissue is the best tissue to submit for assessment of mineral status and, kidney tissue is the best tissue in cases of suspect toxicity. The potential for mineral deficiency needs to be borne in mind as 'tail end lamb' season approaches. 'Tail-end lamb' disease is a multifactorial condition, seen clinically as chronic ill-thrift with a variety of causes including chronic intestinal parasitism, mismothering, poor rumen papillae development and trace element deficiencies.

Concomitant PGE and trace element deficiency has also been recorded in goats. A six-month-old Saanen goat kid was submitted for PME, the second to die from a group of 30 recently housed goat kids. The group was treated with anthelmintic three weeks previously and no scour was evident in the dead kids. No concentrates were being fed and there was no history of clostridial vaccination.

The mucous membranes were pale, and blood was watery in appearance, with excess pale fluid in the serous cavities including the pericardial sac. There was a high worm egg count from caecal contents and a total worm count confirmed large numbers of *Haemonchus* spp. Worms, as well as *Teladorsagia* and *Ostertagia* species. As mentioned above, cobalt levels were within normal reference range with selenium deficiency confirmed from liver analysis.

Urinary disease

No significant trends were identified this quarter.

Obstructive urolithiasis

A 6-month-old ram was found dead after appearing to recover from a period of abdominal discomfort. It was in good bodily condition. The abdominal cavity contained more than 2 litres of blood-stained urine which contained blood clots. The bladder was empty, and haemorrhages were present on the external and internal surfaces. A small whole thickness tear, approximately 5mm diameter, was present on the dorsal bladder surface.

Dissection of the bladder and urethra revealed abnormal dark discolouration of the glans penis, and dark red necrotic-looking material in the urethra, preceding a very small amount of pale gritty material at the start of the urethral process. The ram had died due to rupture of the bladder and uraemia associated with obstructive urolithiasis.

Musculoskeletal disease

No significant trends were identified this quarter.

Nervous disease

No significant trends were identified this quarter.

Cerebro-cortical necrosis (CCN)

Quarter 4 diagnoses of CCN remained static, when comparing 2020 and 2021 data. However, examination of the annual figures demonstrates an overall, but relatively small, decrease in cases reported across Great Britain this year when compared to 2020. Thirty-five cases (2.31%) were reported in 2021 compared to 40 cases (2.89%) in 2020. This was mainly a result of SRUC recording a significantly lower number of diagnoses this year, whereas diagnoses by APHA remained stable.

Louping ill

Interpretation of the trend for diagnoses of Louping ill remains a challenge, due to the small number of cases reported each year. SRUC typically record highest case numbers compared to APHA, with the overall Great Britain case rate generally fluctuating around 1% of diagnosable submissions each year. This year there was a slight increase in diagnoses with 15 cases (0.96%) recorded compared to 11 cases (0.78%) in 2020.

Poisoning

The most [recent chemical food safety newsletter](#) has been published on GOV.UK.

Plant poisoning

APHA recorded 10 cases of plant poisoning in 2021, a higher number of cases than the mean of six cases per year from the previous five years. Exposure to toxic plants occurred under varying circumstances, ranging from direct access on pasture occurring due to a shortage of grass, access whilst being moved from a field, or exposure following escape.

The plants involved included: Rhododendron, Laurel, Pieris, Cabbage, suspect Dog's Mercury toxicity, oxalate poisoning from likely plant exposure, Yew and *Euonymus* spp (Spindle Tree).

Plant poisoning following ingestion of *Euonymus* spp leaves was thought to have resulted in the deaths of four yearling ewes from a group of 140. Trembling, recumbency, teeth grinding and frothing at the mouth were reported before the animals died.

Centre of Expertise for Extensively Managed Livestock (COEEML)

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.

Transmissible spongiform encephalopathy (TSE)

Surveillance for TSEs is carried out in the United Kingdom in animals susceptible to the disease. This includes cattle, sheep and goats. The main aim is to monitor trends in disease incidence and prevalence to evaluate the effectiveness of TSE disease controls.

There are two categories of surveillance:

Passive surveillance

This is when an animal with clinical signs suspicious of BSE or scrapie is reported to an APHA Office to be investigated. Such cases are slaughtered, and the examination of the brain determines whether the animal was affected by BSE or scrapie.

APHA has been recording and analyzing data from reported cases in cattle since the start of the BSE epidemic in 1986, and for scrapie in sheep and goats since this disease became notifiable in 1993.

Active surveillance

The UK carries out active surveillance for TSEs. The UK has:

- tested cattle since July 2001
- tested sheep and goats since January 2002
- conducted a survey in 2007 and 2008 of farmed and wild deer

Updated TSE statistics were published in December 2021 on GOV.UK:

- [Sheep: TSE surveillance statistics](#)
- [Goat: TSE surveillance statistics](#)

The [Scrapie Monitoring Scheme](#) rules have recently been amended temporarily to allow new members to the scheme to export to Northern Ireland (NI). This should allow around 8,000 sheep to move the NI, currently held up due to Brexit changes. For details see

Horizon scanning

Bluetongue (BTV) update

APHA no longer has access to the EU's Animal Disease Notification System (ADNS), hence we are now only using World Organisation for Animal Health (OIE) data (for mapping), and the weekly outbreak summary data published by the new EU Animal Diseases Information System (ADIS). The current BTV restricted zones are shown on the map in Figure 18.

In December, Portugal reported ten outbreaks of BTV on sheep farms and a mixed farm of sheep, goats and cattle. In total 109 animals were affected.

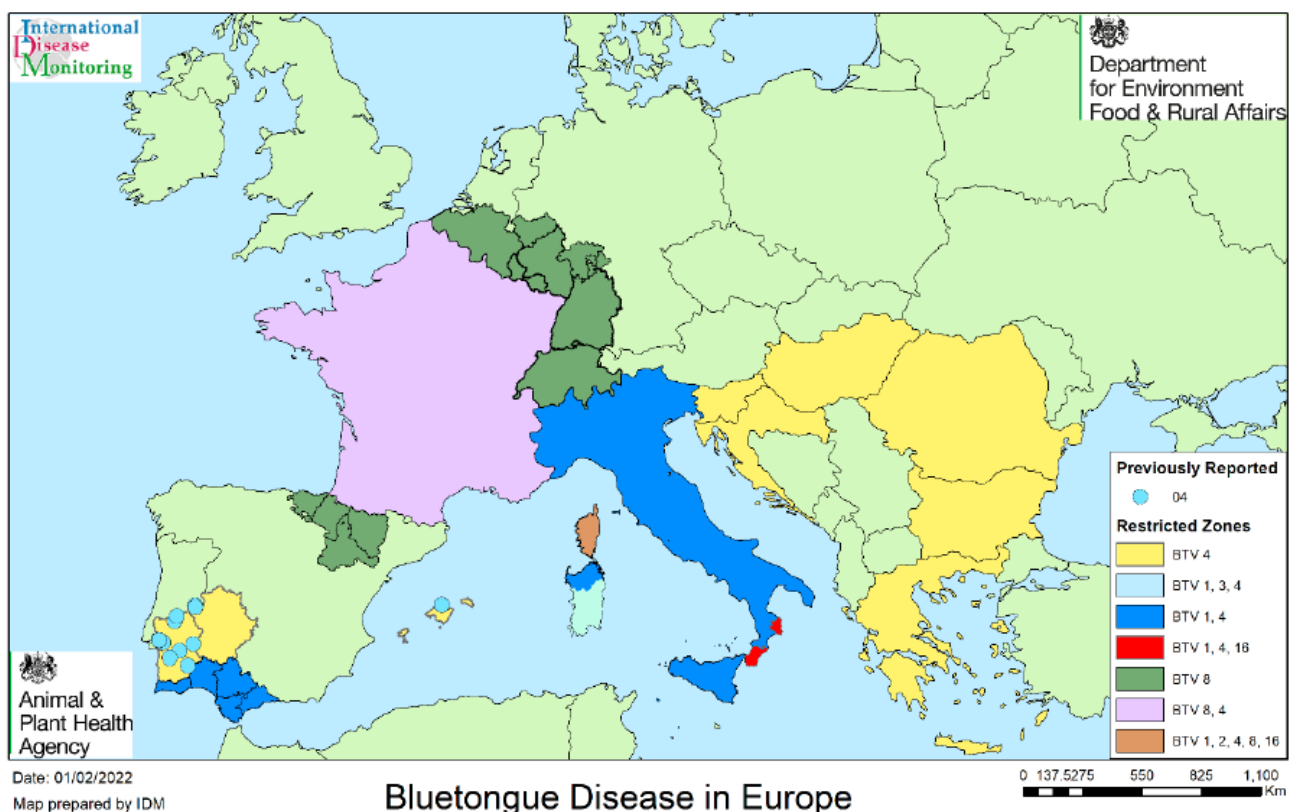


Figure 18: Bluetongue disease in Europe August 2021 to January 2022.

For more information, see our [BTV Outbreak Assessment](#) on GOV.UK

APHA have released a series of [animations on Facebook and Twitter](#) to inform keepers of BTV.

References

Waine, K., Strugnell, BW., Howie, F., Swinson, V., Millar, M.(2019) Diaphragmatic lesions and fatal haemorrhage in Texel sheep. *Veterinary Record Case Reports* 7

Publications

APHA Staff

Crilly, J., CARSON, A., Gascoigne, E., Griffiths, B., Griffiths, L., Henry, J., Hamer, K., Hovers, K., Lovatt, F. and RICHEY, M. (2021) Sheep abortion – a roundtable discussion. *Livestock* 26, S1-S15

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.

Galluzzo P; Migliore S; Puleio R; Galuppo L; La Russa F; Blanda V; Tumino S; Torina A; Ridley A; Loria GR (2021) Detection of *Mycoplasma agalactiae* in ticks (*Rhipicephalus bursa*) collected by sheep and goats in Sicily (South-Italy), endemic area for contagious Agalactia. *Microorganisms* 9 (11) 2312.

Melville LA; Innocent G; Van Dijk J; Mitchell S; Bartley DJ (2021) Descriptive analysis of nematode management practices and *Nematodirus battus* control strategies on UK sheep farms. *Veterinary Record* 189 (9) e775.

Other publications of interest

Clune T; Lockwood A; Hancock S; Thompson AN; Beetson S; Campbell AJD; Glanville E; Brookes D; Trengove C; O'handley R; Kearney G; Jacobson C (2022) Abortion and lamb mortality between pregnancy scanning and lamb marking for maiden ewes in Southern Australia. *Animals* 12 (1)

Duncan JS; Angell JW; Grove-White D; Walsh TR; Seechurn N; Carter S; Evans N (2022) Impact of research on contagious ovine digital dermatitis on the knowledge and practices of UK sheep farmers and veterinarians. *Veterinary Record* 190 (1) e674

Health, E. Panel O. A., Welfare, Nielsen, S. S., Bicout, D. J., Calistri, P., Canali, E., Drewe, J. A., Garin-Bastuji, B., Gonzales Rojas, J. L., Gortazar Schmidt, C., Herskin, M., Michel, V., Miranda Chueca, M. A., Padalino, B., Pasquali, P., Roberts, H. C., Spooler, H., Stahl, K., Velarde, A., Viltrop, A., Winckler, C., Dewulf, J., Guardabassi, L., Hilbert, F., Mader, R., Baldinelli, F. and Alvarez, J. (2021) Assessment of animal diseases caused by bacteria resistant to antimicrobials: sheep and goats. *EFSA journal*. European Food Safety Authority 19, e06956-e06956

Hunt H, Dittmer K.E, Garrick DJ, Fairley RA, Heap SJ, Jolly RD. An inherited night blindness in Wiltshire sheep. *Vet Pathol.* 2022 Jan 3:3009858211067461. doi: 10.1177/03009858211067461. Epub ahead of print.

Quintas, H., Pires, I., Garcês, A., Prada, J., Silva, F. and Alegria, N. (2021) The Diagnostic Challenges of Ovine Pulmonary Adenocarcinoma. *Ruminants* 1, 58-71

Weissenböck H, Ebinger A, Gager AM, Thaller D, Höper D, Lichtmannsperger K, Weissenbacher-Lang C, Matt J, Beer M. A novel enterovirus in lambs with poliomyelitis and brain stem encephalitis. *Transbound Emerg Dis.* 2021 Dec 7. doi: 10.1111/tbed.14412. Epub ahead of print.



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