Animal & Plant Health Agency

SRUC

GB small ruminant quarterly report

Disease surveillance and emerging threats

Volume 24: Quarter 4 – October to December 2022

Highlights

Contents

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the fourth quarter of 2022, October to December. It contains analyses carried out on disease data gathered from APHA, SRUC Veterinary Services division of Scotland's Rural College (SRUC) and partner postmortem providers and intelligence gathered through the 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

2022 was the warmest year on record for the UK in a series from 1884 for maximum and mean temperatures, and it was the second warmest for minimum temperature (behind only 2014). Figure 1 shows mean temperatures for the UK for 2022 higher than the averages for 1991 to 2020. All individual months except December were warmer than average. It was also the warmest year on record for the Central England Temperature (CET) series from 1659.

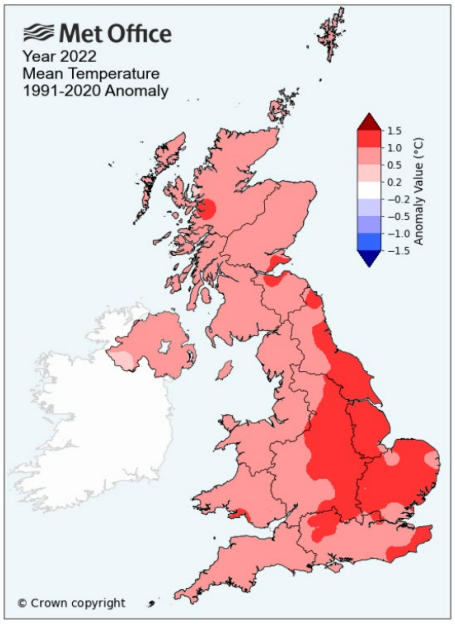

Figure 1: Year 2022 mean temperature compared to 1991 to 2020 averages

Rainfall was mostly below average for the year, with the months from January to August, and December, all being generally drier than average. The autumn months were wetter than average, although this was not enough to fully offset the deficit from the previous 8 months. Figure 2 shows that the average annual rainfall for the UK was well below the average for most areas when compared to average figures for 1991 to 2020. It was a

sunnier than average year for most areas, especially eastern England, with only some northern and western fringes recording less sunshine than average. This information can be found in the MET Office's annual climate summary for 2022.

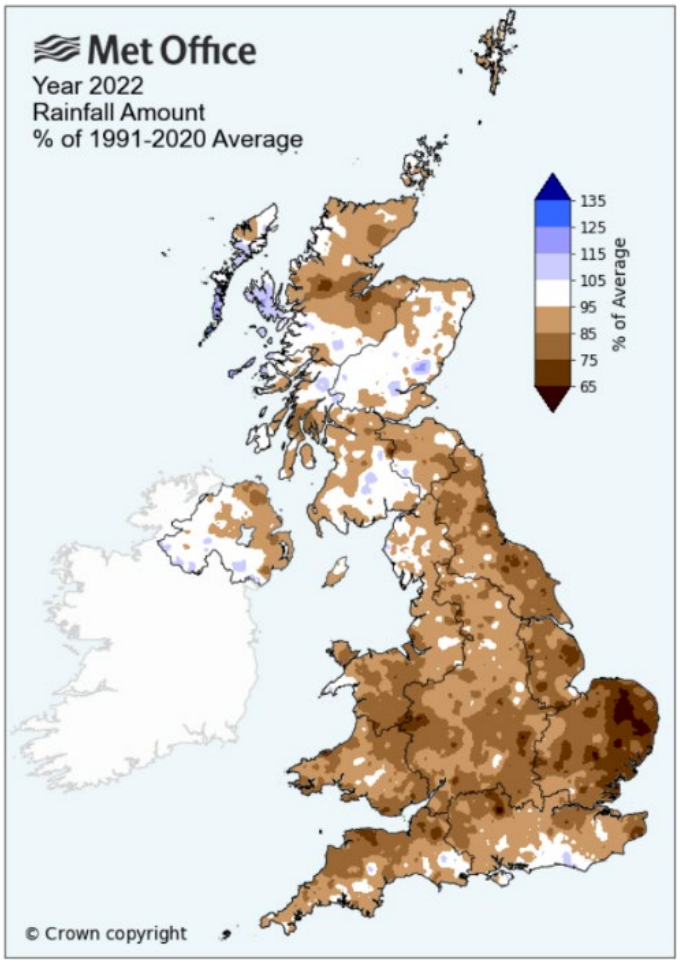

Figure 2: Year 2022 rainfall amount percentage of 1991 to 2020 average

Industry

Prices have eased on the highs seen last year but continue to follow seasonal trends. GB new season lambs, Standard Quality Quotation (NSL SQQ) lamb prices stood at 251.3p/kg in the week ending 24 December with cull ewe prices averaging £88.10 for the same week. The average deadweight NSL SQQ price for December was 543.4p/kg.

The UK produced 276,300 tonnes of sheep meat in 2022 according to Defra, 3.4% more than in 2021. UK lamb kill is up 4.9% year on year, totalling 12.15 million head.

December trade figures showed the typical seasonal uplift in lamb exports with volumes very similar to the same month last year. For the full year of 2022, UK exports of fresh and frozen primary sheep meat stood at 75,300 tonnes, up 8% compared to 2021. Imports for December totalled 2.400 tonnes, 39% below volumes from December 2021. For the full year of 2022, imports reached 54,300 tonnes, up 17% compared to 2021.

In the 12 weeks ending 22 January spend on lamb has increased 1.7% year on year while volumes purchased fell 6.8%, with prices paid rising 9.2% due to inflation. However, red meat did see a boost in Christmas sales as consumers moved away from Turkey.

Acknowledgment for the dairy and beef updates: Freya Shuttleworth, Agriculture and Horticulture Development Board (AHDB)

Unusual diagnoses

Pyothorax in a goat

A 3 to 4-year-old goat was submitted to investigate the cause of death following a 5-day-period of scouring and malaise. Faeces were initially noted to be loose, then progressed to a watery scour which prompted treatment with antibiotics, rehydration fluids, probiotics, and a combined wormer and flukicide. Faeces did firm up slightly following this, and some improvement was noted, but then the goat deteriorated again, became recumbent and died the following day.

Significant postmortem examination (PME) findings were:

- an approximately 5cm diameter area on the tip of the right pinnae had distinct circular, dark brown, firm masses of varying sizes protruding from and adhered to the skin
- the caecum contained brown liquid and there were soft semi-solid tan-brown faeces in the rectum
- there were approximately 1.5-2 litres of opaque cream-coloured liquid in the thoracic cavity, with large white clumps floating throughout, and lung consolidation and pleurisy

Culture of the thoracic fluid produced a pure growth of *Trueperella pyogenes.* Pyothorax (Figure 3) in goats may arise secondary to traumatic reticulo-pericarditis or ruptured lung abscesses. However, in this case there was no evidence of either of these scenarios. Other potential routes of infection include a prior bacteriaemia, or perforation of the chest wall or oesophagus by a foreign body. Again, grossly no origin of infection was identified

and the inciting cause of the pyothorax was not determined. The microscopic appearance of the ear lesion was highly suggestive of infection with orf parapoxvirus.

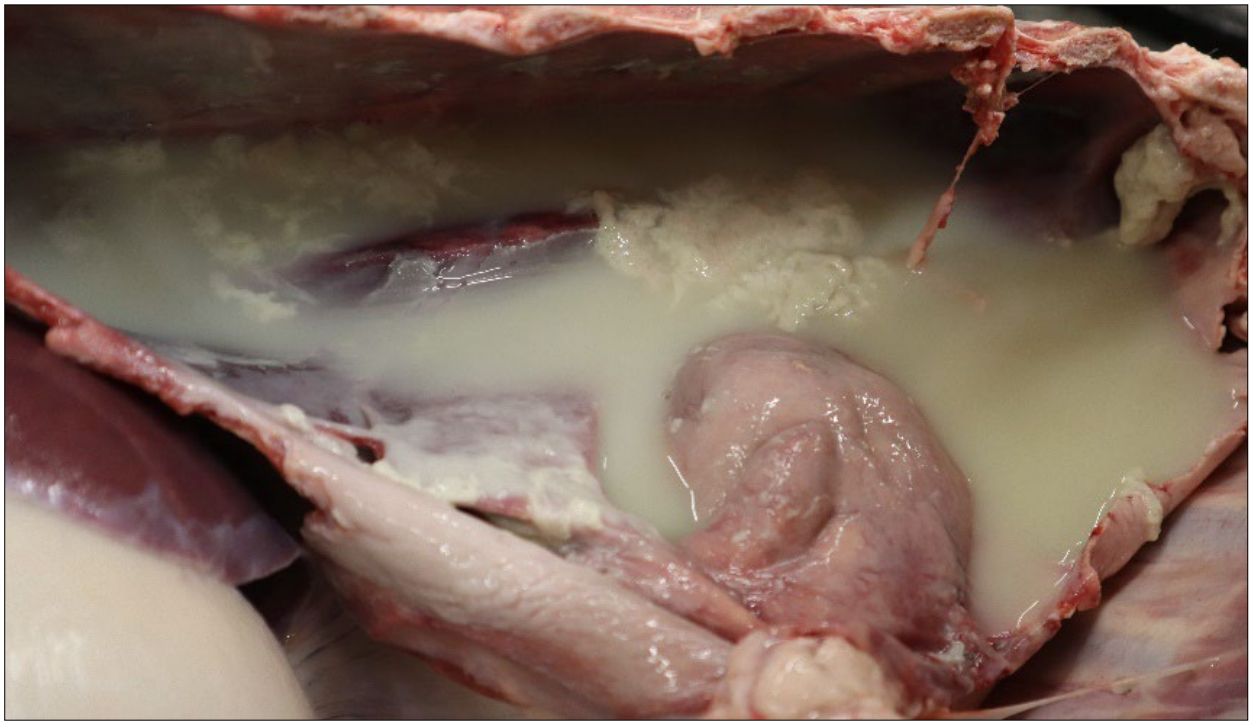

Figure 3: Pyothorax in a goat

Changes in disease patterns and risk factors

Syndromic analysis - Syndromic alerts were raised this quarter for GB for the following diseases:

Increases in selenium deficiency, cobalt deficiency, oak/acorn poisoning (APHA only), PGE, Haemonchosis (APHA only), Mannheimia pneumonia (APHA only), Mycoplasma ovipneumoniae (APHA only) and Tick Borne Fever were recorded for this quarter, when compared to the average for the quarter over the past 5 years.

Parasitology

Parasitic gastroenteritis (PGE)

Nematodirus Forecast

As in the previous year, APHA will assist the Sustainable Control of Parasites in Sheep (SCOPS) with the production of a Nematodirus Forecast service. The SCOPS

Nematodirus Forecast will be active from late February onwards. 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 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.

Parasitic Gastroenteritis not otherwise specified (PGE NOS)

As shown in Figure 4, the number of submissions for this quarter continued to show an increasing trend, with 309 submissions diagnosed with PGE NOS, compared to 235 for the equivalent quarter the previous year.

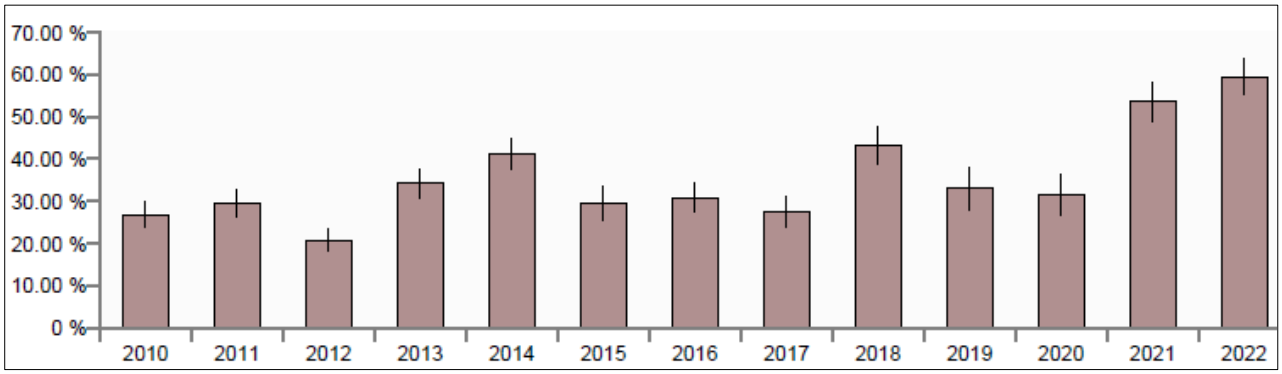

Figure 4: GB incidents of PGE NOS in sheep as percentage of diagnosable submissions

The highest numbers were seen in post weaned lambs from lowland flocks. Western England recorded the highest number of cases.

Concurrent conditions were also diagnosed in some animals and included pulpy kidney disease, low liver cobalt levels, low liver selenium levels, and bacterial pneumonia, often involving both *Mannheimia haemolytica* and *Mycoplasma ovipenumoniae.* Although many of these lambs were submitted with a history of recent worming, a late flush of worm larvae on the pasture due to the warmer autumn meant that many of these lambs were becoming quickly re-infected. This has been highlighted by the detection of large numbers of immature L4 larvae on a total worm count of the gastro-intestinal tract, combined with low faecal worm egg counts in some. The following case is a typical example.

The overnight death of 20 lambs from a group of 480 prompted the submission of two carcases to Starcross Veterinary Investigation Centre. Gross examination identified sunken eyes, scour staining of the tails, tacky subcutaneous tissues, and green liquid throughout the small and large intestines, with thickening of the abomasal and intestinal mucosa. Parasitic gastroenteritis was confirmed with large numbers of adult worms and L4 larvae identified on a gut wash:

Table 1: Total worm count (twc)

Test	Lamb 1 (GI tract)	Lamb 2 (GI tract)
Abo/C3 *Haemonchus spp.* twc	8500	900
Abo/C3 *T. axei* twc	5000	6700
Abo/C3 Immature / L4 twc	53500	26900
SI - *Cooperia spp.* twc	500	0
SI - *Nematodirus battus* twc	26000	20000
SI - *Trichostrongylus spp.* twc	30500	5000
SI - Immature / L4 twc	35500	22000

Table 2: Worm egg count

Test	Lamb 1 (caecal contents)	Lamb 2 (caecal contents)
Sample consistency	liquid	liquid
Trichostrongyle-type eggs (per g)	1300	100
Nematodirus battus eggs (per g)	100	50
Trichuris spp. eggs (per g)	50	less than 50
Coccidial oocysts (per g)	300	less than 50

The worm egg counts in each lamb were markedly different, indicating how these can sometimes be misleading due to the presence of L4 larvae and the effect of dilution. In addition, both lambs had low to marginal liver selenium levels.

Haemonchus contortus survey

APHA offered free testing for *Haemonchus* spp. using the peanut agglutination test between July and October 2022.

Haemonchus contortus is a blood sucking nematode found in the abomasum of sheep and goats. It is a major pathogen in tropical and sub-tropical climates where it causes severe anaemia and ill-thrift in affected animals. It has a relatively short life cycle, and a single adult will produce 5000 to 15,000 eggs per day, leading to a rapid build-up of infective L3 on pasture under favourable climatic conditions. In Great Britain, disease is most frequently seen in the south of England, and cases of haemonchosis were diagnosed relatively early in summer 2022, which prompted enhanced surveillance of the parasite through the free *Haemonchus* testing.

For the enhanced surveillance, 342 samples from 256 holdings were tested in total and 81% were positive for *Haemonchus*. As shown in Figure 5, there was a significant increase in haemonchosis in 2022 compared to previous years. However, the free testing offered is likely to have influenced this.

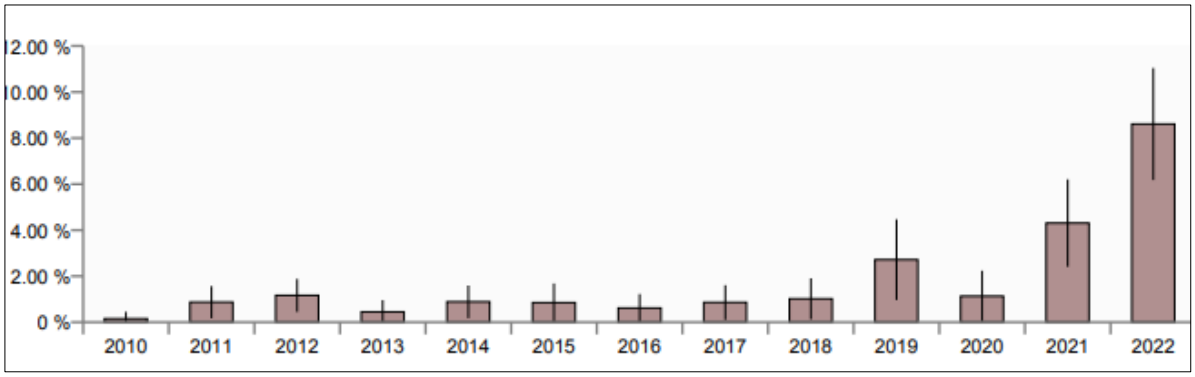

Figure 5: GB incidents of PGE Haemonchosis in sheep as percentage of diagnosable submissions

Previous studies have found evidence of *Haemonchus* on approximately 50% of farms, including in the north of Scotland (Burgess and others, 2012). As already discussed, disease is more commonly seen in the south of England, where the climate is more suitable. It is thought that although *Haemonchus* is present in the north of England and Scotland, climatic conditions have historically kept larval pasture burdens low. As depicted in Figure 6, the results of the free *Haemonchus* testing have shown that the parasite is widespread in all regions of Great Britain.

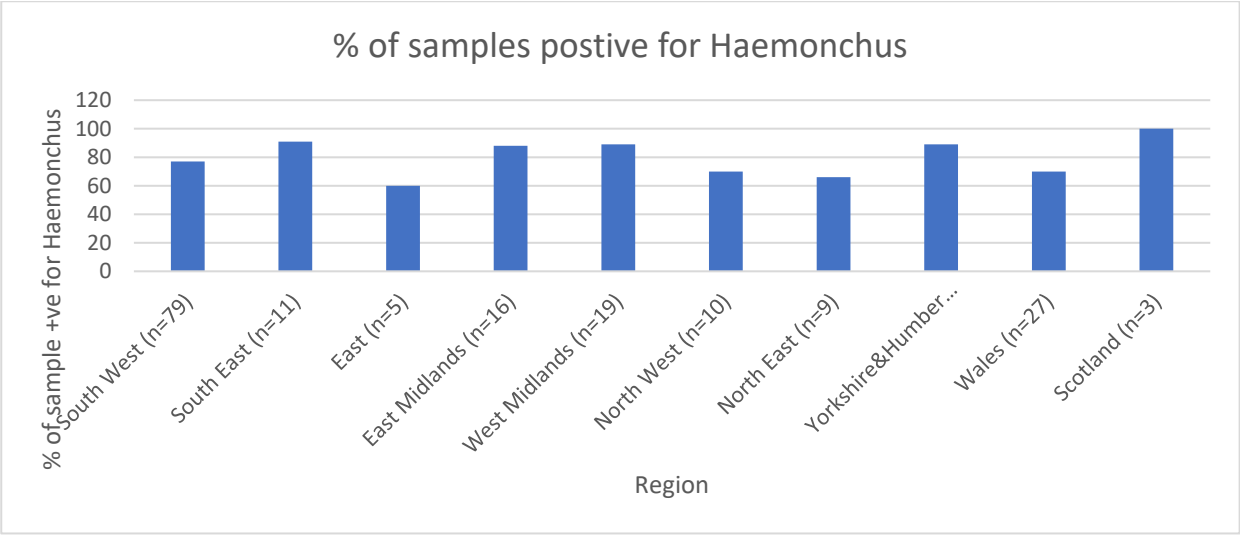

Figure 6: The percentage of positive *Haemonchus* samples by region

Evidently, the parasite is present in the North of England as well as Scotland. However, it's unlikely to be causing disease on all 'positive' farms. For example, a submission from North Yorkshire had a faecal egg count (FEC) of 18,100 eggs per gram (epg) of which only 2% were *Haemonchus eggs*, so although present, this case is unlikely to be harbouring a significant *Haemonchus* burden. Conversely, another submission from the same county had a FEC of 51,500 epg of which 90% were *Haemonchus* eggs. Of the 65 samples submitted from Northern England, 43 were listed as diagnostic and were positive for H*aemonchus* eggs. This could suggest haemonchosis is occurring relatively frequently in Northern England. There is evidence that *Haemonchus* can adapt to different climates through a range of adaptations, including hypobiosis and changes to mean egg size, allowing them to hatch at different temperatures (Emery and others, 2016). The milder autumn and winter seasons have allowed the seasonality of *Haemonchus* to extend into the autumn and even raised the possibility of allowing it to overwinter on pasture in Scotland (Van Dijk and others, 2008, Sargison and others 2007).

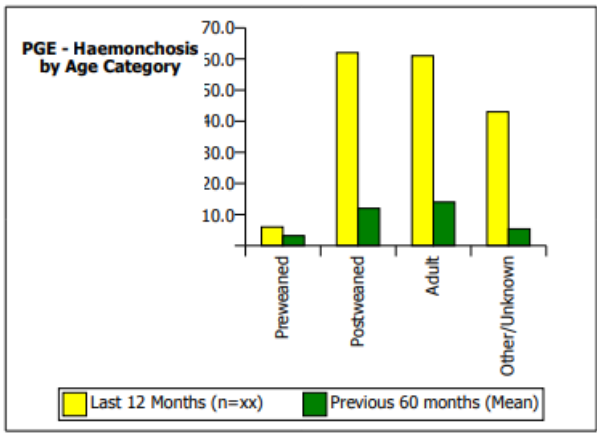

Figure 7: Haemonchosis by age category

Figure 7 shows the age distribution of haemonchosis cases for the last 5 years and the results of the free testing aligned with this. Adults and post-weaned lambs appear most affected, despite a sheep's ability to acquire immunity to *Haemonchus*. This is probably due to the sporadic nature of the disease and an absence of the regular exposure required for immunity to develop and be sustained. The parasite's ability to reach very large numbers quickly could also potentially overwhelm any established immunity.

Anthelmintic resistance (AR) in this parasite is common worldwide. However, only resistance to benzimidazoles has been demonstrated in the UK. In addition to Levamisoles and Macrocyclic Lactones, Closantel and Nitroxynil are also effective and provide a narrow spectrum treatment option for PGE caused mainly by *Haemonchus.* Experience in Australia has demonstrated that maintaining a susceptible population in-refugia is essential to combating AR and consequently, as with other gastro-intestinal parasites, suppressive worming regimes should be avoided. Quarantining of purchased animals remains an important tool in the control of *Haemonchus,* preventing its introduction onto farm.

There are currently no vaccines for Haemonchus licensed in the UK. A commercially available vaccine has been licensed in parts of Australia and South Africa and used successfully to help in the control of *Haemonchus contortus*. The use of the vaccine has not been evaluated in control programmes in the UK. You can read further guidance from SCOPS about *Haemonchus contortus*.

Liver Fluke

As shown in Figure 8 and Figure 9, very few cases of acute and chronic fluke (2 and 10 respectively) have been diagnosed this quarter, in contrast to the 190 and 230 recorded during a peak in quarter 4, 2012. The above average temperatures and drier conditions will have had a detrimental effect on snail habitats and are likely to have reduced the presence of cercaria on pastures. There will however be areas and pastures with permanent snail habitats which will be an ongoing threat even during drier and warmer periods, and ongoing vigilance and screening is recommended.

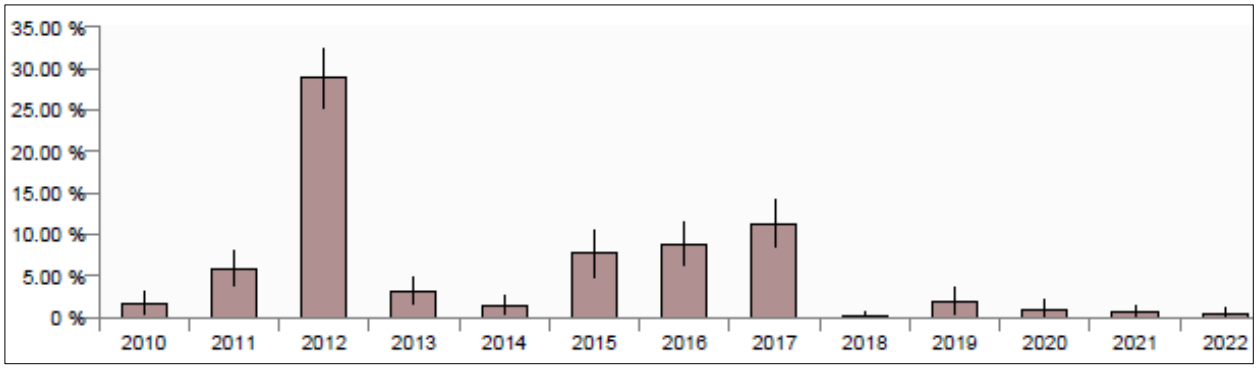

Figure 8: GB incidents of Acute Fasciolosis in sheep as percentage of diagnosable submissions in quarter 4, 2022

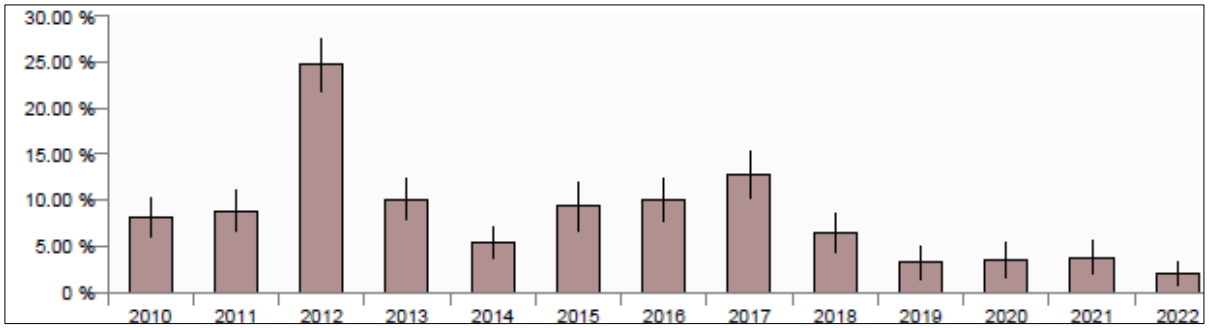

Figure 9: GB incidents of Chronic Fasciolosis in sheep as percentage of diagnosable submissions in quarter 4, 2022

Circulatory disease

Tick borne fever (Anaplasma phagocytophilum)

Although numbers diagnosed are not high, APHA and SRUC diagnosed increased numbers of tick-borne disease cases in sheep this quarter, when compared to the average over the previous 5 years. APHA diagnosed 10 cases and SRUC 6 cases, where in the previous 5 years the average would be 2 per year for APHA and 2.5 per year for SRUC. A raised awareness of this disease has increased testing in recent years, but relatively mild weather has extended the period of tick activity and increased the number of ticks. Change in land use may also contribute (McFadzean and others, 2019). The highest number of cases were recorded in Scotland, followed by Wales and then Western England.

Streptococcus dysgalactiae dysgalactiae joint infections and spinal abscesses in lambs co-infected with tick borne fever

Joint infections and spinal abscesses (Figure 10) were reported in lambs from 7 days of age, in a group of 200 September-born lambs in East Anglia, where 10% of lambs were affected with a 25% case mortality despite treatment. *Streptococcus dysgalactiae dysgalactiae* was isolated in pure growth from multiple systemic locations in a submitted dead lamb. *Streptococcus dysgalactiae dysgalactiae* is a relatively common cause of bacteraemia and joint infections in lambs. However, spleen sampled from 2 lambs were positive for *Anaplasma phagocytophilum* on polymerase chain reaction (PCR), confirming this co-infection was potentially exacerbating the signs.

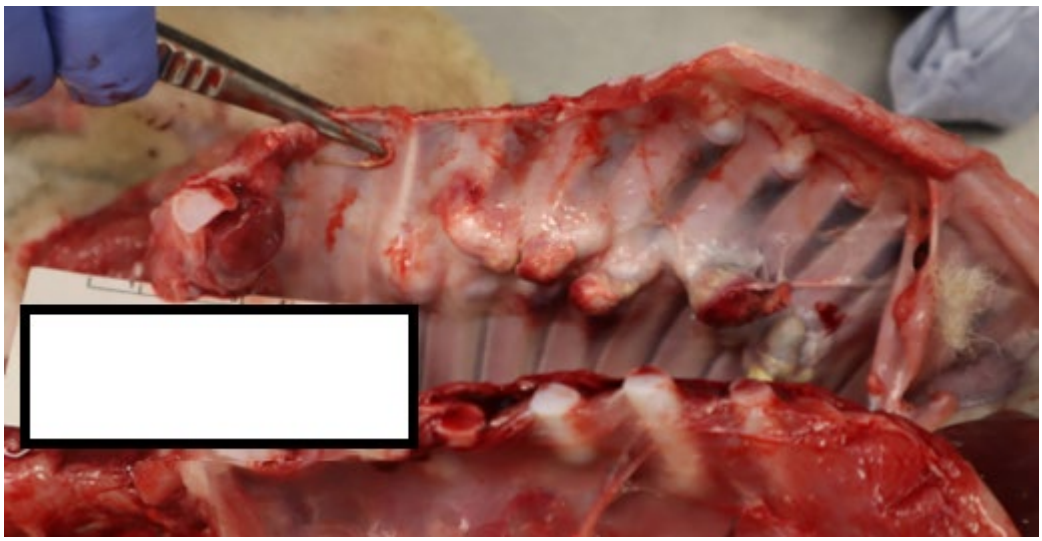

Figure 10: Multiple ribs with abscesses containing caseous yellow to green content

Mannheimia and *Bibersteinia* infection associated deaths in vaccinated lambs with concurrent tick-borne fever infection

Thirty weaned lambs died out of a group of 650 Swaledale lambs, shortly after having been dipped. The lambs had received several doses of combined Clostridial and Pasteurella vaccine, with the most recent vaccination only 3 to 4 weeks before the losses. *Bibersteinia* septicaemia and a *Mannheimia haemolytica* pneumonia were diagnosed as the causes of death despite vaccination. *Anaplasma phagocytophilum* was detected by PCR in 3 dead lambs, a concurrent tick-borne fever may have reduced vaccine efficacy in this case.

Tick-borne fever, parasitic gastroenteritis, *Mycoplasma ovipneumoniae* and systemic Mannheimiosis

These diseases were recorded in 3 ewes submitted for post-mortem. The ewes had been selected from a group of 600 where around 15% were ill thriven despite being on good grazing. All 3 were found to have severe fibrous pleuritis, with 2 also having minor lung abscessation. One had an abscessated mesenteric lymph node and *Mannheimia haemolytica* was recovered from all these sites. *Mycoplasma ovipneumoniae* was identified in all 3 ewes, whilst 2 had raised faecal worm egg counts. Systemic Mannheimiosis is an unusual finding in adult sheep and is more typical in lambs with an immature immune system. PCR testing for *Anaplasma phagocytophilum* confirmed 2 of the ewes were *Anaplasma phagocytophilum* PCR positive, suggesting the immunosuppressive effects of the tick-borne fever infection may have contributed to the multiple, chronic issues and a potentially more severe disease presentation in these ewes.

Skin disease

No significant trends were identified this quarter.

Respiratory disease

GB annual trend for sheep respiratory diseases

There has been an overall increasing trend for sheep respiratory diseases over the last 3 to 5 years. This includes increased trends of diagnoses of chronic viral infections such as Maedi Visna and ovine pulmonary adenocarcinoma (OPA) from 2010 to 2022, as shown in Figure 11 and Figure 12. Cases diagnosed with *Mycoplasma ovipneumoniae* pneumonia have also increased.

Many factors could be influencing this increasing trend, including increased sheep movements, greater stocking rates encouraging disease issues, concurrent disease such as PGE, and increased testing due to raised awareness. Changing trends in anthelmintic usage may contribute to the increased incidence of parasitic pneumonia, as regular anthelmintic usage in sheep for gastrointestinal worm control in the past also suppressed lungworm levels.

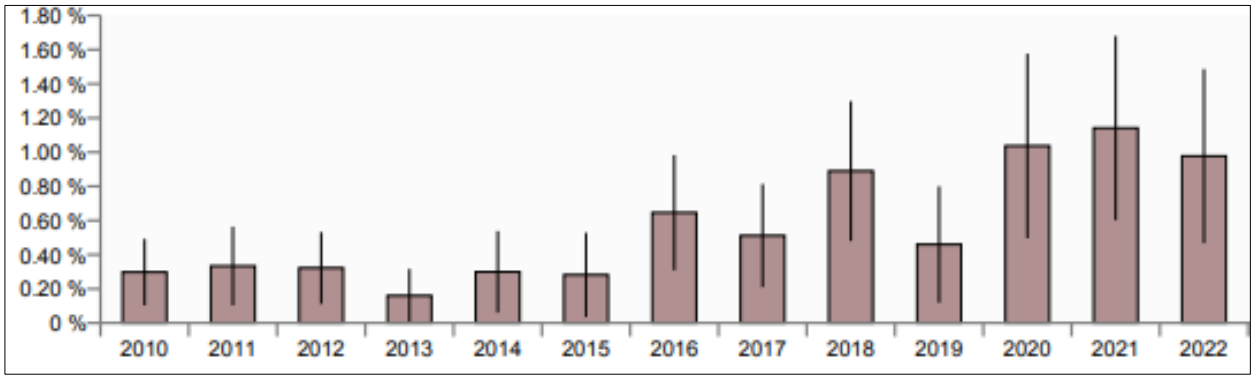

Figure 11: GB incidents of Maedi Visna in sheep as percentage of diagnosable submissions in quarter 4, 2022

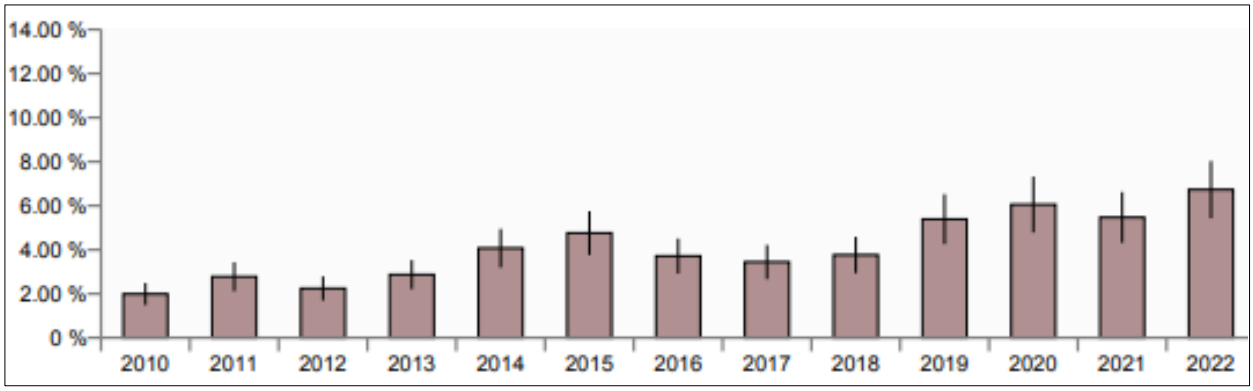

Figure 12: GB incidents of OPA/Jaagsiekte in sheep as percentage of diagnosable submissions in quarter 4, 2022

Mannheimia pneumonia in sheep

APHA cases of *Mannheimia* pneumonia increased again this quarter, continuing the trend from quarter 4 last year, as shown in Figure 13. The percentages diagnosed with this condition in 2022 and 2021 were significantly higher than in 2019 and 2020.

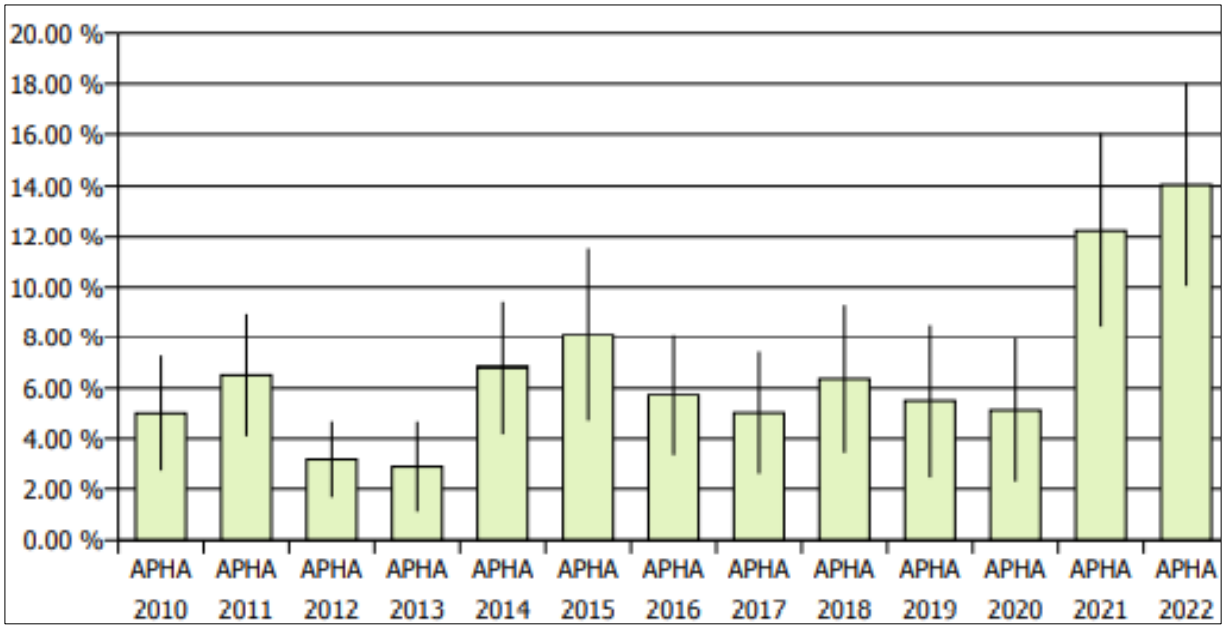

Figure 13: APHA incidents of Mannheimia haemolytica pneumonia in sheep as percentage of diagnosable submissions in quarter 4, 2022

The increase in *Mannheimia* pneumonia cases (41 cases) were predominantly in post weaned lambs (83% of cases), mostly from lowland flocks, although there was also a slight increase in hill flock diagnoses. The increase in *Mannheimia* diagnoses was likely predominantly influenced by other concurrent issues such as parasitic gastroenteritis (66% had both diagnosed) or other concurrent disease (in a further 20% of cases). Disease

stress or debility potentially predisposes lambs to secondary issues with *Mannheimia* pneumonia.

Mannheimia pneumonia cases recorded by SRUC in contrast were at a relatively low level this quarter.

Marked fibrinous pericarditis seen in a lamb with combined *Mannheimia haemolytica* pneumonia and *Bibersteinia trehalosi* infection

The death of 30 lambs, from a group of 180 at grass, prompted the submission of the most recent case for investigation. Most affected lambs had either been found dead or were seen unwell before dying. The group were vaccinated against clostridial disease and had been recently wormed. An extensive fibrinous pleuritis, with underlying lung consolidation and a fibrinous “bread and butter” pericarditis was seen grossly. Laboratory testing identified *Mannheimia haemolytica, Bibersteinia trehalosi* and *Mycoplasma ovipneumoniae* as the causative organisms.

Lung consolidation and pleuritis are commonly seen with *Mannheimia haemolytica* infection, and pericardial effusion with some fibrin is seen in some cases. Pneumonia and a pericardial effusion with some fibrin are also seen to varying degrees with *Bibersteinia* infections. A severe pericarditis (Figure 14) is not commonly seen with either *Mannheimia* or *Bibersteinia* infections but, in these cases may have occurred because of a combined infection, although *Bibersteinia trehalosi* was specifically isolated from the pericardial fluid.

Figure 14: Extensive pericarditis in a lamb with combined *Mannheimia haemolytica* and *Bibersteinia trehalosi* infection

Mycoplasma ovipneumoniae pneumonia

Increased numbers of *Mycoplasma ovipneumoniae* pneumonia cases were recorded by APHA this quarter. There were 30 incidents this quarter compared to the fourth quarter average of 11 over the past 5 years. As with the *Mannheimia* pneumonia cases, these were predominantly recorded in post weaned lambs from lowland flocks, with a smaller increase in numbers recorded in hill flocks. Most of the cases were reported in Western England. Risk factors are likely to be similar to *Mannheimia* pneumonia and many cases involved had combined *Mycoplasma* and *Mannheimia* infection (63% of diagnoses). All but one case had concurrent disease and 60% of cases were diagnosed with a concurrent parasitic gastroenteritis.

Enteric disease

Apart from parasitic gastroenteritis (discussed under ‘Parasitology’ above) there were no significant increases for quarter 4 2022.

Reproductive disease

There were no significant increases for quarter 4 2022.

Systemic disease

No increases apart from metabolic conditions for quarter 4 2022.

Metabolic conditions

There were increased diagnoses for hyposelenaemia/hyposelenosis and pine/cobalt deficiency this quarter. Figure 15 shows the increase in percentage diagnosed with pine/cobalt deficiency this year, compared to the equivalent quarter in previous years.

Most cases of hyposelenaemia/hyposelenosis and cobalt deficiency were diagnosed in post weaned lambs from lowland flocks. Scotland and Northern England recorded more than other areas.

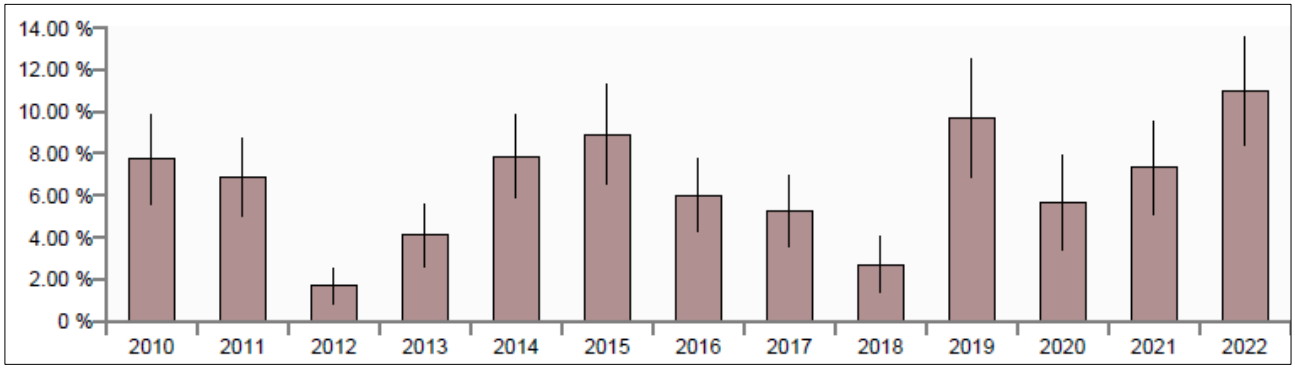

Figure 15: GB incidents of Pine/Cobalt deficiency in sheep as percentage of diagnosable submissions

Urinary disease

No significant trends were identified this quarter.

Musculoskeletal disease

No significant trends were identified this quarter.

Nervous disease

No significant trends were identified this quarter.

Poisoning

The most recent chemical food safety report is available on GOV.UK.

Oak (acorn) poisoning

Half (n=6) of the diagnoses of oak (acorn) poisoning recorded during quarter 4 of 2022 were made in Wales.

Cattle and sheep are farm animal species more commonly poisoned by acorns, and they can develop a craving for them. Acorns contain tannins which, when broken down during digestion, form toxic substances that cause gastroenteritis and renal failure, and poisoning is usually fatal. Tannins are particularly high in green acorns and poisoning often occurs in autumn after storms. Care should be taken with grazing pastures with oak trees in autumn and winter. Access to large numbers of acorns, fallen oak leaves and twigs should be reduced or, preferably, prevented.

Centre of Expertise for Extensively Managed Livestock (COEEML)

A well-attended and successful conference was held on 24 November 2022, at Aberystwyth University. Two presentations were recorded:

1. Free sheep scab testing in Wales
2. APHA Thin Ewe Project

TSE

Surveillance for transmissible spongiform encephalopathies (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 2 categories of surveillance:

- passive surveillance
- active surveillance

Passive surveillance

This is when an animal with clinical signs suspicious of bovine spongiform encephalopathy (BSE) 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 a TSE.

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

APHA published updated TSE statistics in December 2021:

1. Sheep: TSE surveillance statistics
2. 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

Sheep and goat pox virus (SGPV)

The Official Veterinary Services (OVS) of the Junta de Andalucía in Southern Spain reported an outbreak of sheep and goat pox virus (SGPV) on 19 September 2022, at a breeding sheep farm. The farm has 314 sheep and 11 goats, and located in the municipality of Benamaurel, in the province of Granada (Figure 16). The OVS detected 50 clinically affected sheep (including 30 dead animals). Testing by the National Reference Laboratory in Spain confirmed the samples to be positive by RT-PCR and sequencing for sheep pox virus.

While no live sheep or goats have been imported from Spain, importation of wool and sheep hides occurs monthly. Based on the sporadic nature of the outbreak in Spain, the disease report and situation assessment, the risk of introduction of SGP to the UK through all pathways is currently considered to be LOW. APHA's International Disease Monitoring Team are monitoring the situation. Read further information about sheep and goat pox in Southern Spain.

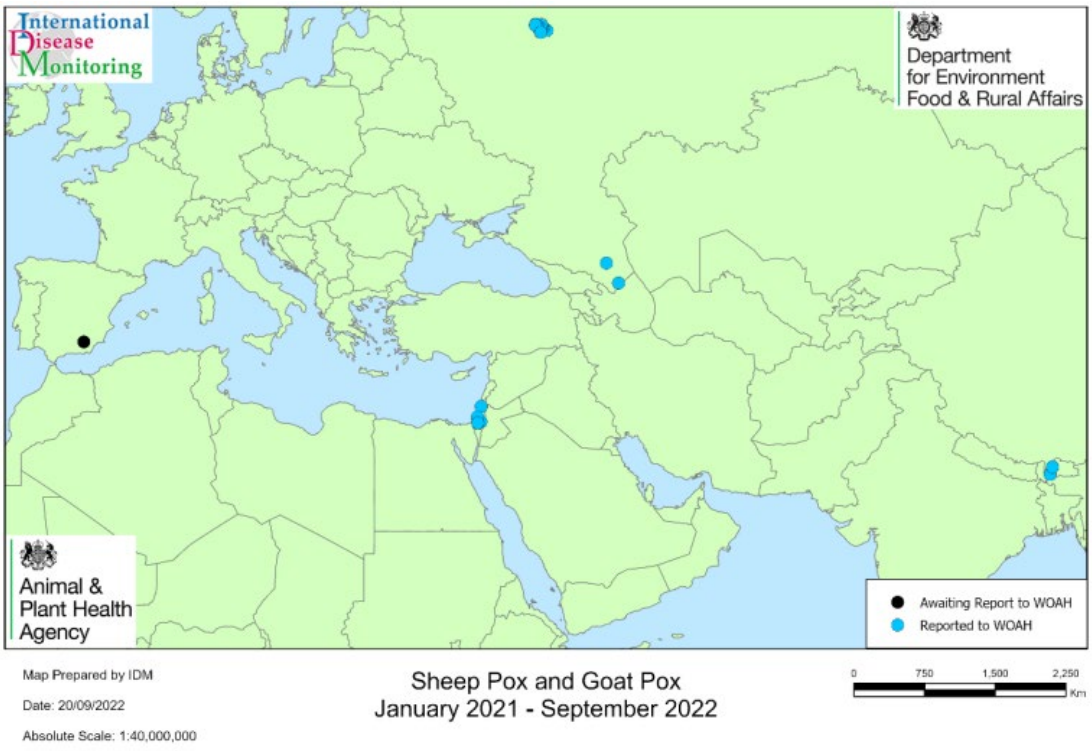

Figure 16: Reported outbreaks of sheep and goat pox virus, January 2021 to September 2022

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