Animal & Plant Health Agency

SRUC

GB small ruminant quarterly report
Disease surveillance and emerging threats

Volume 23: Q4 – October - December 2020

Highlights

- **Injection site infections – page 8**
- **Copper toxicity in two cases involving unusually young lambs – page 10**
- **Tick borne fever page - 12**

Contents

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Introduction and overview

This quarterly report reviews disease trends and disease threats for the fourth quarter of 2020, October - December. It contains analyses carried out on disease data gathered from APHA, SRUC Veterinary Services division of Scotland's Rural College (SRUC) and partner post-mortem 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: https://www.gov.uk/government/publications/information-on-data-analysis

Issues & Trends

New Post-Mortem Providers join APHA's Scanning Surveillance Network in England and Wales

The APHA's post-mortem examination and diagnostic testing service provides a major component of the GB scanning surveillance network. The network works closely with vets and farmers to detect and investigate new or re-emerging disease, and diagnose endemic diseases in farm animals.

The APHA Surveillance Intelligence Unit and Surveillance and Laboratory Services Department are very pleased to announce that during January and February 2021, three additional post-mortem examination (PME) providers have joined the scanning surveillance network. These are the Universities of Cambridge, Liverpool and Nottingham.

This broadens the expertise of, and contributors to, livestock disease surveillance in England and Wales and also brings livestock premises in the areas they cover closer to a post-mortem provider.

The new PME providers join the seven current PME Providers (Royal Veterinary College, Universities of Surrey, Bristol, Cambridge and Liverpool, the Wales Veterinary Science Centre, and SRUC Veterinary Services St Boswells) that work together with the six APHA Veterinary Investigation Centres, all of which will continue their valued contribution to scanning surveillance.

Key points about accessing PME in APHA's scanning surveillance network:

- Each PME Provider has an assigned area as shown in colour on the map on this link: http://apha.defra.gov.uk/documents/surveillance/maps/england-wales-map20.pdf
- Within each assigned area, the hatched area shows where premises are eligible for free carcase collection and delivery of animals to the PME Provider

- Premises within non-hatched areas need to arrange to deliver animals themselves
- The postcode search tool identifies and provides contact details for the allocated PME provider and indicates if the premises is eligible for free carcase collection. This is based on the postcode of the premises from where an animal is to be submitted rather than a veterinary practice: http://apha.defra.gov.uk/postcode/pme.asp
- To arrange a PME, the vet calls the relevant PME provider to speak to the duty VIO/vet
- There will be some livestock premises for which the allocated PME provider has changed, and the free carcase collection service may no longer be provided for some holdings. The APHA postcode search tool allows farmers and vets to see the situation for individual premises.

More information about APHA's scanning surveillance and diagnostic services is available on Vet Gateway (link) below and in the attached farmer and vet information leaflets which include a map showing the PME sites:

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

Please do let me know if you have queries which are not addressed in this communication, or contact the APHA Surveillance Intelligence Unit SIU@apha.gov.uk for more information.

Weather

2020 was on the whole a rather wet year, with the wettest February on record, all summer months being wetter than average, and October and December also notably wetter than average (Figure 1). October was a wet and dull month, with 142% of average rainfall and 72% of average sunshine – provisionally the fifth wettest October in a series from 1862. November began mild, wet and windy with a provisional UK mean temperature of 7.7 °C, which is 1.5 °C above the 1981-2010 long-term average, making it the 6th warmest November in a series from 1884 (Figure 2). December was unsettled and turned increasingly cold during the last week, with widespread wet and windy weather from Storm Bella.

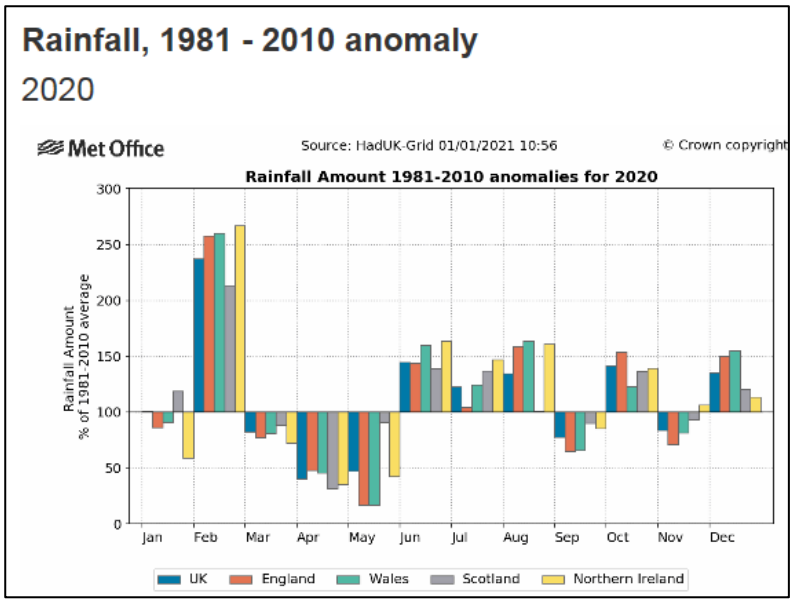


Figure 1 Rainfall amount 1981 -2010 anomalies for 2020

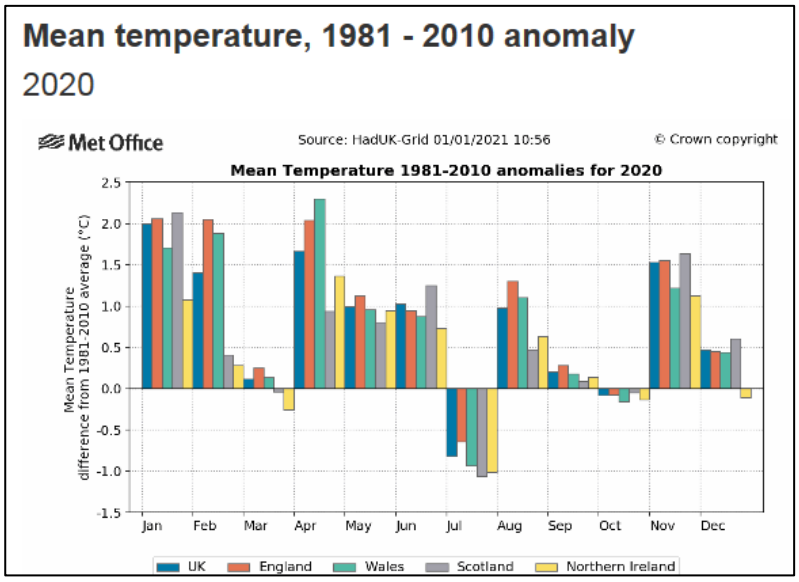


Figure 2 mean temperature 1981 - 2010 anomalies for 2020

The milder temperatures meant that confirmation from The Pirbright Institute that **28th December 2020** was the start date for the seasonal vector-free period (SFVP). This was much later than in previous years – which has previously been around the end of November, start of December. This is of particular relevance to Bluetongue and other midge borne diseases e.g. Schmallenberg virus; especially in relation to possible findings of congenital deformities, following infection during gestation being seen as deformed lambs born during the following lambing season.

Cases of acute fluke also appeared delayed, although the first case was reported by SRUC in October in North East Scotland. A group of famers in the north of England

performed sentinel surveillance for liver fluke antibodies in lambs from September, on farms known to have liver fluke problems. The majority failed to detect antibodies until December and this informed those farmers on the best time to target liver fluke treatments.

Industry

Lamb prices in Q4 2020 remained firm for the time of year, with prices steadily increasing towards the end of the year. Prices during Q4 were above the previous year's levels and well above the five-year-average. Retail sales of lamb continued to be higher than the previous year, with increases for both volume and spend on lamb, in the 12 weeks ending 27 December. Retail purchases of lamb were up in volume by 13.9% year-on-year and average prices were up 3.9%.

In terms of trade, during the first 11 months of 2020, volumes of both UK imports and exports were down year-on-year. This reduction in trade volumes was predominantly a result of disruptions due to the coronavirus pandemic and stronger domestic demand in the UK limiting supplies available for export. There was further disruption to trade, with delays and closures at borders during December, although trade data is yet to be released to reflect this. Export prices during Q4 were still being supported by a weak Sterling compared to the Euro, helping to make UK exports more price competitive on the continent.

Charlie Reeve, AHDB

New and re-emerging diseases and threats

Unusual diagnoses

Oak/Acorn poisoning

There were large numbers of oak poisoning/acorn poisoning cases recorded this year, with 16 cases diagnosed when only 10 cases in total (2 to 3 cases/year) had been recorded over the preceding 5 years. The cases were recorded between mid-September and the middle of December. There were in addition telephone conversations about other cases where acorn poisoning was suspected, but where carcases were not received for postmortem. Seventy percent of the postmortem cases were adult sheep (30% were weaned lambs) and these were predominantly on lowland farms in Wales, the Welsh borders and the West of England. The year 2020 was described as a "Mast Year" for oak trees, which is a year where oak trees produce particularly large numbers of acorns. This can unfortunately increase the risk of livestock poisoning. Typical signs seen in cases included inappetance, lethargy, recumbency, diarrhoea (green/black and watery, or haemorrhagic in some), abdominal pain and weight loss.

Typical postmortem findings might include the following:-

- Black tarry faeces around perineum.
- Rumen full of green herbage in green fluid, with several partial acorns and remnants of acorns.
- Red/brown fluid in small intestine and severe haemorrhagic enteritis, with dark blood and blood clots throughout the large intestine and black necrotic sloughing of the oesophagus.
- Pale, grey coloured and fragile kidneys (Figure 3).
- High serum or ocular fluid urea concentrations.
- Sub-capsular petechial haemorrhaging in the kidney and tubular changes consistent with nephrotoxic injury.
- Strong uraemic smell to carcases, indicating terminal kidney failure.

These changes are not specific to any one toxin, but we have seen a number of cases of oak toxicity this autumn and the identification of acorns in the stomachs supports the diagnosis.

Some of the cases included:

- A yearling ewe submitted to investigate the death of four from a group of 150 at grass.
- Six ewes had died within three to four weeks from a large flock. The ewes had been moved to ground with lots of acorns and oak trees.
- A ram-lamb that had died, and another four had black watery diarrhoea and anorexia.
- Two ewes were submitted for PME, after four had been found dead.

Acorns contain tannins, which when broken down during digestion form toxic substances. These toxins cause gastroenteritis and renal failure, and poisoning is usually fatal. In small quantities acorns can be eaten and may not cause harm, however the amounts ingested which are likely to cause toxicity are not well understood. Access to acorns should be prevented by moving sheep, or fencing off. Treatment of affected ewes can be attempted with activated charcoal, polyethylene glycol and fluid rehydration.

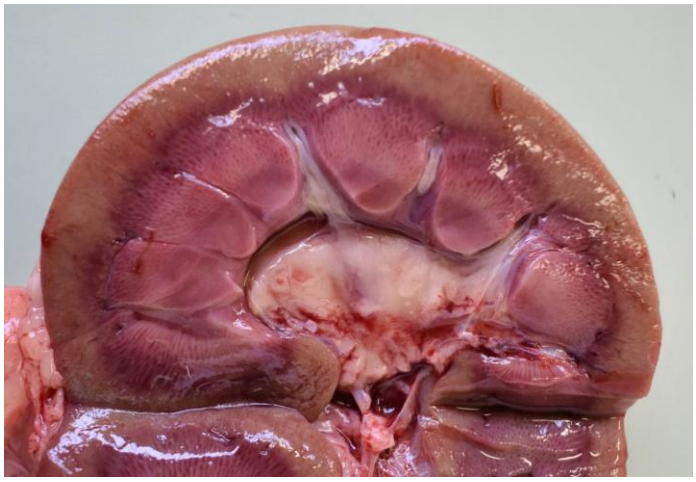


Figure 3 Pale enlarged renal cortices in a sheep with oak poisoning

APHA issued an alert for the risks due to ingestion of acorns
https://www.facebook.com/APHAGov/posts/1681947668637976

Necrotising encephalopathy due to inadvertent intra-arterial injection

Two ten-month-old ewe lambs were presented for examination to APHA VIC Thirsk, with a history of per-acute onset malaise and recumbency post-vaccination for clostridial disease. This was the third injection the lambs had been administered in their lifetime. One lamb died within a few hours of injection, having become recumbent and non-responsive. The second lamb had been found collapsed in the race post injection. The group of 16 lambs had been on permanent pasture all summer with the provision of mineral buckets. On postmortem examination, gross findings typical of an acute endotoxaemia, or septicaemia, were seen in one lamb. The second lamb was grossly unremarkable. No significant bacterial pathogens or clostridial toxins were detected on laboratory testing. Brain histopathology in both lambs showed a similar pattern of severe, multifocal, random, acute, and necrotising encephalopathy. There was multifocal vascular injury resulting in leakage of protein-rich oedema, perivascular haemorrhages and ischaemic necrosis of neuroparenchyma. The lesion distribution was asymmetric and affected areas of both cortex and brainstem. Given the timing of clinical disease relative to vaccination, and the unusual pattern of lesion distribution, it was suspected that the changes reflected inadvertent intra-arterial injection (e.g. via the auricular artery or intervertebral arteries), with retrograde propulsion into the arterial supply to the brain. APHA see these cases occasionally in both sheep and cattle and they can be associated with the administration of both vaccines and other treatments. The submitting private veterinary surgeon was advised to report this adverse reaction to the Veterinary Medicines Directorate (VMD).

Large losses in fattening lambs

Twenty five lambs, out of 500, died within a week following acute illness; they exhibited reddened ocular membranes and nasal discharge. They had received one dose of Pasteurella vaccine.

On postmortem examination the lambs had:

- Subcutaneous congestion and haemorrhages
- Excess peritoneal fluid containing fibrin strands
- Small numbers of white foci on the liver
- Extensive fibrinous pleurisy and fibrin overlying the majority of the left lung lobes
- Dark red firm consolidation of the underlying lungs
- Scattered areas of consolidation in the right lungs
- Oedema of the pericardium
- Enlarged lymph nodes, especially those in the thorax

Bacteriology of multiple sites identified *Pasteurella multocida* and *Mannheimia haemolytica*: confirming septicaemia and there was a high worm egg count.

Injection site infections

Severe skin ulceration and necrosis post vaccination: A group of 250 purchased ewe lambs received separate worm and fluke drenches, vaccinations and mineral boluses, on multiple days, within a week of arrival on the new holding. Some were dull with respiratory signs within three days of the final treatment and were treated by the owner with long acting antibiotic. Two days later the vet was called, as ten of the sheep had developed swollen limbs, necks or heads. The neck swelling was often unilateral. The skin had a blueish tinge and there was sloughing. Fourteen died, despite treatment with antibiotic and steroids and another affected lamb was submitted to APHA for investigation, two weeks after the last treatment. Postmortem examination identified extensive lesions affecting the skin and subcutaneous tissues of the neck (particularly the left side), both front legs, sternum and ventral abdomen. Large areas of the skin were hairless, discoloured brown and moist, with ulceration and necrosis, including full thickness ulceration over the forelimbs. The front legs were swollen and there was extensive subcutaneous necrosis and purulent material down the neck (Figure 4), forelimbs (Figure 5) and along the ventral abdomen to the caudal sternum. The initiating cause of the skin lesions could not be elucidated, however contaminated injection sites during vaccination were suspected, as the lesions were worst on the side the vaccination injection had been given. A review of vaccination procedures was recommended.

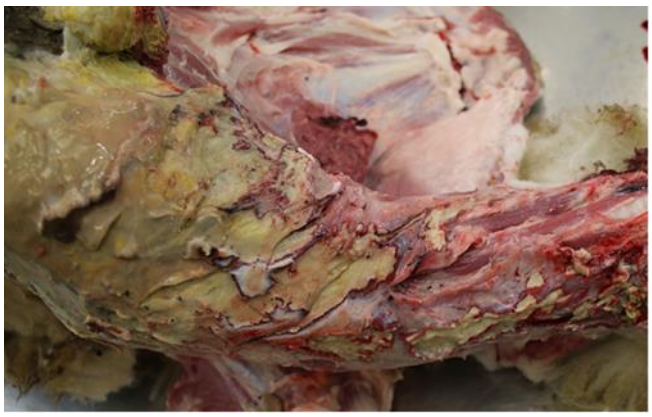


Figure 4 Subcutaneous cellulitis and purulent material ventral neck

Figure 5 Skin lesions and necrotic tissue extending down fore legs

Anthelmintic injection site infection: Six lambs were found dead over two weeks, following purchase of 200 store lambs. The group had been treated with moxidectin 2%, injected at the base of the ear, on arrival from the market. Severe fasciitis and myositis with an associated haemorrhagic foul-smelling exudate were found in the left neck, findings were considered to be consistent with unhygienic and inaccurate injection technique.

Vaccination site reaction/infection: Two flocks reported issues due to poor injection technique following administration of a *Dichelobacter nodosus* vaccine.

Five Scottish blackface ewe hoggs from a group of 180, were found unable to stand at grass. Opisthotonus was reported and some affected animals were believed to be blind. Proprioceptive reflexes were present in all four limbs, but it was unable to bear weight. Histopathological examination of multiple transverse sections of the cervical spinal cord, located a severe focal lesion in the ventral white matter, with a symmetrical distribution. This was considered consistent with a traumatic event, such as needle penetration of the vertebral canal.

Eight animals, from a group of 180 gimmers, showed varying degrees of ataxia two to four days after being vaccinated. One animal became recumbent and was submitted for postmortem examination. Firm and yellow gelatinous material was found ventral to and extending into the atlanto-occipital joint and vertebral canal, causing compression of the spinal cord. *Streptococcus uberis* was isolated in mixed growth from this area.

A ewe from a second holding became recumbent two weeks after administration of the same vaccine. Evidence of myositis and microabscessation were detected in the caudal oblique muscle and purulent material was present around the atlanto-axial joint. Spinal cord compression at this site was confirmed on histopathology.

Injection site reaction was diagnosed as the cause of the clinical signs in both cases. These cases illustrate the importance of adequate restraint and hygienic injection technique when administering vaccines to sheep. Vaccinators should be aware of the correct injection site and the potential consequences of a lack of precision.

Copper toxicity in two cases involving unusually young lambs

Copper toxicity was confirmed in a 4-5 month old, jaundiced, housed lamb; fed creep and hay, the second lamb to show similar signs. Postmortem findings were typical, with a jaundiced carcase and black-coloured kidneys (Figure 6). The liver copper level was 14,800 micromol/kg DM, (ref.range 314-7850 micromol/kg DM) confirming the diagnosis, levels still below the food safety threshold.

Copper poisoning was also diagnosed in three of six lambs purchased by a small holder in early summer, which died over three weeks, again with typical findings of jaundice and dark brown to black kidneys. Kidney copper concentration was 1540 µmol/kg DM (reference range values 0-787 µmol/kg DM).

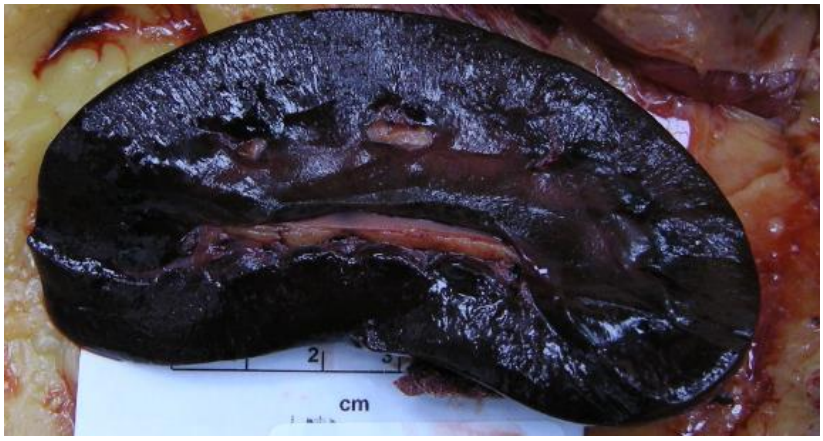


Figure 6 Ovine kidney from a case of copper poisoning, often described as gun metal kidney

Copper poisoning in sheep can result from feeding of concentrates too high in copper (such as cattle feed); accumulation from prolonged feeding of supplemented concentrates,

or from over-administration of minerals or supplements. Certain breeds are particularly susceptible to copper toxicity and require careful management to avoid accidental toxicity.

Changes in disease patterns and risk factors

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

Poisoning due to oak/acorn, Trueperella pyogenes infection, Johne's disease, Ovine Pulmonary Adenocarcinoma (OPA / Jaagsiekte), and Sheep Scab.

Parasitology

Parasitic gastroenteritis (PGE)

In Q4 2020 the number of VIDA diagnoses for PGE were similar to the previous year, with 101 diagnoses in 2020 compared to 109 in 2019 and 44% of diagnoses in the post-weaned age group. PGE was also found together with trace element deficiencies and in a small number of cases, *Anaplasma phagocytophilum* (tick borne fever).

PGE continues to be the most commonly diagnosed disease in sheep for 2020 (Figure 7)

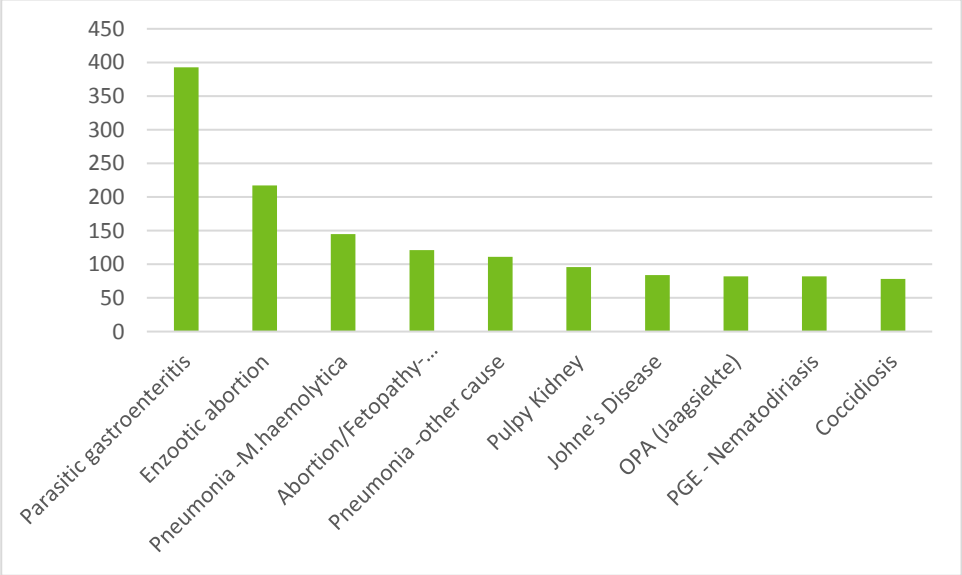


Figure 7 most common VIDA diagnoses GB 2020

PGE Haemonchus

PGE Haemonchosis was reported in 37 submissions in 2020, compared to 30 submissions in 2019, but was still being diagnosed in quarter 4, in both adults and lambs. *Haemonchus contortus* larvae can survive warmer temperatures on pasture for longer than other

nematodes, so the warmer temperatures seen in the last couple of years could have influenced this. Cases were diagnosed in all areas of GB, more commonly in lowland sheep, but also some in hill/upland flocks.

Liver Fluke

The first case of acute liver fluke for 2020 was identified by APHA VIC Shrewsbury in a sheep in November. The sheep were in good body condition, although mucus membranes were pale. On postmortem examination, there was excess, serous, red fluid in the abdomen and large blood clots adjacent to the abomasum and liver. The liver was pale, with multiple haemorrhagic tracts (Figure 8) throughout the parenchyma and immature liver fluke were identified on the liver surface. Associated lymph nodes were enlarged.

Figure 8 Haemorrhagic tracts in the liver of a sheep with acute liver fluke

Interestingly, already for 2021, we have had more cases of acute fluke in England than for the whole of 2020, although technically part of the same grazing season. This may relate to the increased rainfall in the latter part of 2020 following a drier spring.

Overall across GB incidence of chronic fluke for quarter 4 was much reduced than in previous years, as had been the pattern during 2020.

Tick-associated disease

Tick borne fever (*Anaplasma phagocytophilum*)

There were increased numbers of Tick-borne fever diagnoses made by APHA and SRUC during 2020, with 32 diagnoses in sheep, compared to a total of 119 (mean of 23.8 per year) during the preceding 5 years. The diagnoses were predominantly from Hill and Upland sheep (66%) but with pre-weaned lambs, post weaned lambs and adults representing an even split of the diagnoses. Diagnoses have been predominantly in Scotland, Wales and the West of England.

Cases described during Quarter 4 of 2020:

- A five-month-old lamb was gathered from hill grazing, weaned and handled before moving to a heavily stocked field. The lamb was unwell for one day before dying. There was mild oedema of the abomasal folds, patchy reddening throughout the lungs, generalised lymphadenopathy and reddening and oedema over the ventral brain and cerebrum. E. coli was isolated from multiple sites and histopathology confirmed a suppurative meningitis (with clusters of gram negative bacteria) and a hepatitis; and the lamb had PGE. The lamb was PCR positive for Anaplasma phagocytophilum DNA. (Carmarthen)
- The carcase of a six-month-old castrate lamb was submitted, following the death of two to three lambs daily, from a group of recently weaned and extensively grazed lambs. The carcase was in poor bodily condition and had a parasitic gastroenteritis (including Haemonchosis), Bibersteinia trehalosi pneumonia, severe cobalt and selenium deficiency and tick-borne fever.
- A six-month-old lamb with a history of wasting and recumbency; and grazing moorland pasture; had parasitic gastroenteritis, trace element deficiency and tick-borne fever.

Skin disease

Sheep Scab

Sheep scab was reported in most regions of GB during 2020 (Figure 9). The increased reporting of incidents in Wales are likely to be associated with free examination in Wales of skin scrape samples, from sheep showing suspected clinical signs of sheep scab. The scheme is operated by APHA and funded by the Welsh government, running until March 31, 2021.

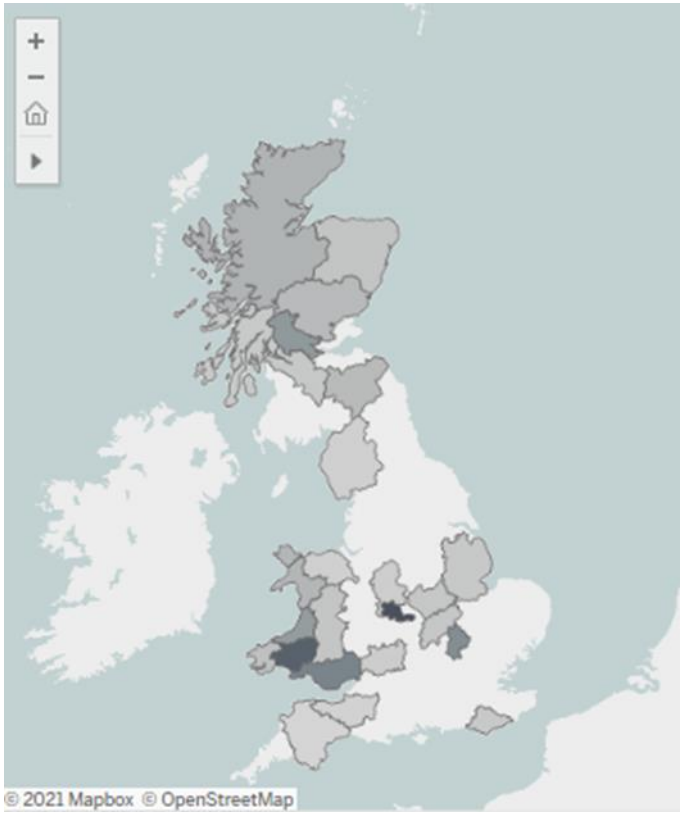


Figure 9 Counties where sheep scab has been identified in GB 2020

Respiratory disease

Diagnoses of *Mannheimia* pneumonia, *Bibersteinia* septicaemia and Mannheimiosis/Pasteurellosis were notably low for APHA and SRUC during Q4 2020. This followed relatively high numbers of *Mannheimia* infection (both pneumonia and systemic) earlier in 2020, which possibly improved levels of immunity to *Mannheimia,* and encouraged earlier vaccination in some of the higher risk flocks. *Mannheimia* immunity provides no cross-protection to *Bibersteinia*, however increased vaccination could have effectively suppressed *Bibersteinia* in some of these flocks.

Pneumonia (No organism specified)

APHA and SRUC had increased diagnoses of Pneumonia NOS during Q4. APHA recorded 19 diagnoses, 8.46% as a % of diagnosable submissions, where diagnoses are typically between 1.93% and 8.37% and SRUC recorded 10 or 8.33% of diagnosable submissions, where diagnoses are typically between 2.41 and 4.48% of diagnosable submissions. Almost half of the diagnoses were cases of lung abscessation or chronic pleurisy, in animals with wasting and with a combination of other disease issues. More than half of the APHA cases were adult sheep, the majority of SRUC diagnoses were in post weaned lambs. One more unusual case recorded by APHA was *Actinobacillus ligneresii* lung abscesses in an adult sheep, an organism which is more commonly associated with sporadic superficial lymph node abscessation, or testicular lesions, in

sheep. Other causes included low numbers of *Bibersteinia trehalosi* pneumonia, microabscessation due to *Staphylococcus aureus;* and a case involving 8 out of a group of 350 lambs with necrotising lung lesions, thought to have resulted from accidental inhalation during dipping.

The annual figures for Pneumonia NOS were also elevated for both APHA and SRUC. During the previous quarters of 2020, there have been elevated levels of other respiratory infections including *Mannheimia*, *Mycoplasma ovipneumoniae*, Lungworm and OPA. Prior challenges are likely to have increased levels of other more opportunistic infections, or chronic lung conditions, which are captured diagnostically by Pneumonia NOS.

Lungworm/Parasitic pneumonia

There was a marked increase in the diagnoses of parasitic pneumonia (lungworm caused by *Dictyocaulus filaria*) recorded by APHA and SRUC during Q4. APHA recorded 19 diagnoses, representing 7.11% of diagnosable submissions, where diagnoses are typically 0.65-4.39% of diagnosable submissions during this quarter, and SRUC diagnosed 4 (4.49% of diagnosable submissions) when diagnoses are typically 0-1.97%. APHA cases were, in all but one case, adult sheep with wasting and a combination of other disease issues, such as poor teeth, Johne's or chronic respiratory infections, the lungworm was likely secondary to debility. SRUC cases were all in post weaned lambs, with primarily lungworm or combined PGE and lungworm infections, and lungworm was more likely playing a significant role.

Ovine pulmonary adenocarcinoma (OPA)

There was a particularly marked increase in OPA "Jaagsiekte" diagnoses made by SRUC this quarter. SRUC recorded 22 cases this quarter, representing 26.19% of diagnosable submissions, where they usually represent between 2.11-8.52% of submissions. This marked increase is likely to represent continued enhanced screening for the disease using scanning, which is particularly proactive in Scotland. Seven cases were diagnosed by APHA, a typical number for this quarter.

Musculoskeletal disease

Arthritis due to Streptococcus dysgalactiae subsp dysgalactiae

There were no significant changes to the Q4 data for arthritis due to *Streptococcus dysgalactiae* subsp *dysgalactiae*.

In comparison to the downward trend reported in 2018 and 2019 (Figure 10), this year there has been an annual increase in diagnoses of arthritis due to *Streptococcus dysgalactiae* subsp *dysgalactiae* across GB. In 2020 a total of 21 cases (1.10%) were

recorded compared to 13 cases (0.59%) in 2019. Increases were seen by both APHA and SAC.

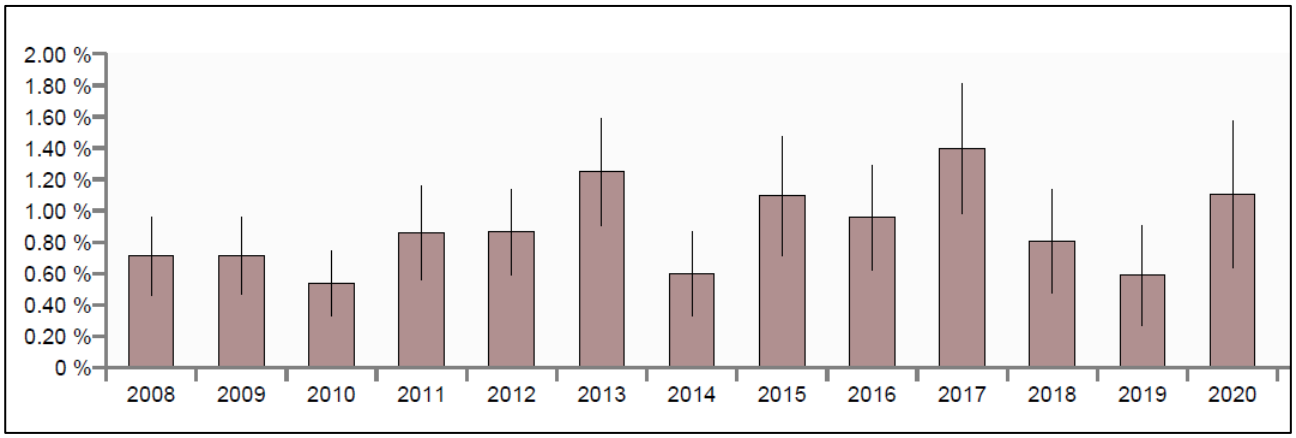


Figure 10 GB Incidents of Arthritis-Strep. Dysgalactiae in sheep as % of diagnosable submissions 2008 - 2020

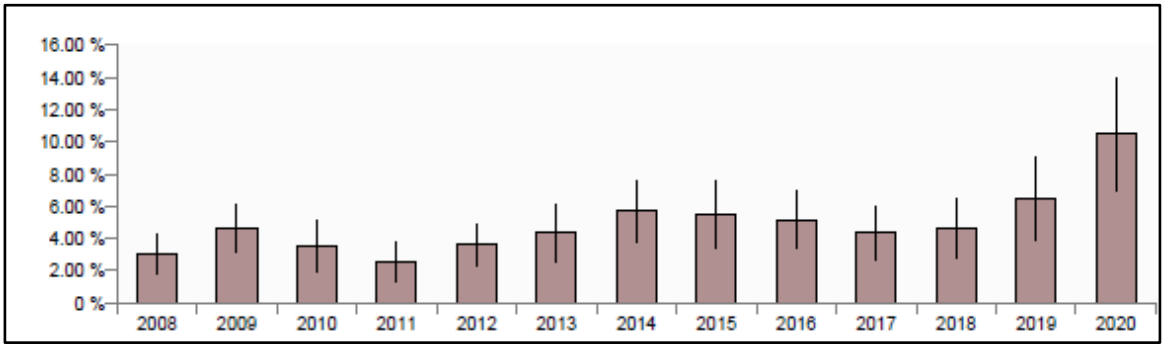
A Focus article was published in the Veterinary Record, providing an update on joint ill.

Joint Ill in sheep (2021) Disease surveillance in England and Wales, December 2020. Veterinary Record 188, 20-26

Enteric disease

Johnes disease

The number of incidents diagnosed with Johnes disease in Q4 appear to be increasing, with 31 this quarter, compared to 23 and 22 for the equivalent quarter in previous years (Figure 11). The annual figures have not shown any marked change.



Vertical bars represent 95% confidence limits)

Figure 11 Incidents of Johnes disease for GB for quarter 4, as a % of diagnosable submissions 2008-2020

During 2020 there were 84 diagnoses of Jones disease in sheep, with wasting as the most common presenting sign (Figure 12).

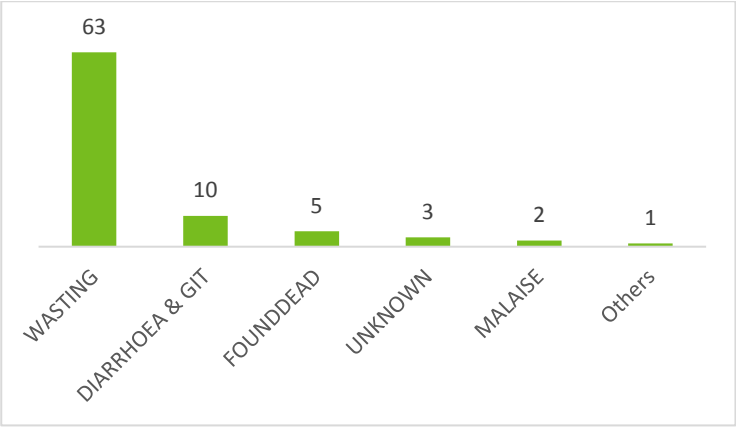


Figure 12 Clinical signs in sheep diagnosed with Johnes disease in 2020

Nervous disease

Listerial encephalitis

There was an increase in the diagnoses of Listerial encephalitis this quarter, with 7 (2.19%) incidents reported in 2020, compared to 4 (1.12%) in 2019. This was a result of a significant increase in cases recorded by SAC, with 6 cases (4.92%) diagnosed in 2020, compared to 2 cases (1.45%) in 2019. Cases reported by APHA remained static.

Cerebro-cortical necrosis (CCN)

Q4 diagnoses of CCN remained static, when comparing 2019 and 2020 data; however examination of the annual figures show an overall, but relatively small increase in cases reported across GB this year when compared to 2019. Thirty eight cases (2.83%) were reported in 2020, compared to 34 cases (2.16%) in 2019. This increase in cases was seen across both APHA and SAC.

Reproductive disease

Abortion due to Coxiella burnetii

No incidents were VIDA coded for Q fever for 2020. Our VIDA criteria requires that there is: suggestivegross pathology and histopathology; demonstration of typical acid fast organisms in MZN stained impression smears of placenta; and demonstration of the organism by PCR on placenta. However, there may not always be an obvious macroscopic placentitis. Therefore, positive PCR alone is insufficient evidence, as high Ct values may represent background environmental levels, or shedding at or around parturition, where *C. burnetii* is not the cause of abortion. Histopathology is therefore required to confirm the diagnosis where samples are available.

An abortion outbreak in a large dairy goat herd during June was most likely caused by *C. burnetii*. The incomplete range of submitted samples (often the case with goat abortions) could not satisfy the VIDA code criteria, but the PCR was positive on both submissions from the herd and no other abortifacient were detected or diagnosed. The case was notified to the Non-Statutory Zoonosis group and Public Health England.

C. burnetii was also detected in two fetuses from a dairy goat (aborted two months from expected kidding date) that were submitted for abortion investigation to the University of Bristol. The goat was one of 6 from 75 mixed breed goats to have aborted. The affected goats were in good health and they had been vaccinated for Coxiella, following the findings of a previous abortion enquiry. No infectious agents were identified on examination of placental smears and no Campylobacter organisms isolated through culture. Given the previous history, testing for *Coxiella burnetii* was performed through examination of placental tissue and PCR, with a positive result. While Q fever is a well recognised cause of abortion in ruminants, it was unclear if infection was the main cause here, because there were no changes to the placenta and no organisms seen on cytology/smear. The positive PCR test result is a reminder of the presence of this zoonotic organism on farms and the need to take precautions when handling samples from aborted livestock.

Systemic disease

Metabolic conditions

Case reports during Quarter 4 of 2020 continue to describe hyposelenaemia/hyposelenosis being diagnosed alongside pine/cobalt deficiency and parasitic gastroenteritis (PGE), continuing the association seen in the previous quarter between trace element deficiencies and PGE. In addition, there were two cases where Tick-borne Fever was diagnosed, alongside selenium deficiency and concurrent PGE. *Bibersteinia trehalosi* pneumonia was also present in one case. Systemic *B. trehalosi* was diagnosed in a separate case with concurrent PGE and marginal selenium levels. These cases highlight the multi-factorial disease presentations which can be associated with trace element deficiency. In some cases the trace element deficiencies can also be exacerbated by PGE or TBF, due to the changes in the intestinal mucosa and haematological implications respectively.

Cases described during Quarter 4 of 2020:

- The carcase of a six-month-old castrate lamb was submitted with a history of the death of two to three lambs daily, from a group of recently-weaned, extensively - grazed lambs. The carcase was in poor bodily condition and laboratory testing confirmed a multi-factorial cause of the clinical signs, with parasitic gastroenteritis including Haemonchosis, Bibersteinia trehalosi pneumonia, severe cobalt and selenium deficiency and tick-borne fever.

- A separate submission of a six-month-old lamb with a history of wasting, recumbency and grazing moorland pasture, also identified parasitic gastroenteritis, trace element deficiency and tick-borne fever.
- Five lambs had died, out of a group of 110 lambs, over a 10 day period. The lambs were about six-months-old. Following weaning in July, the group were reported to have lost condition and some had diarrhoea. The lambs were not vaccinated and were last treated for worms and fluke with a combined drench in September. Bibersteinia trehalosi was isolated in systemic distribution. Systemic B. trehalosi infections typically affect six to nine-month-old lambs, with outbreaks usually occurring between October and December. Control is best achieved by vaccination; however, parasitic gastroenteritis, stress and/or poor nutrition may cause animals to become susceptible. The lamb had a very high worm egg count of 4900 trichostrongyle-type eggs per gram indicating a heavy gastro-intestinal worm burden. It was advised to treat with an appropriate anthelmintic without delay. Liver selenium was marginal and it was advised to blood sample a group of representative animals to assess mineral and trace element status.

Pine/ cobalt deficiency was diagnosed in fewer APHA submissions for this syndrome in Q4 (3%) compared to Q3 (13%) in 2020. This was also lower than the general trend for Q4 over the previous 5 years (2015-2019), where it was diagnosed in 7% of APHA submissions for this syndrome.

Urinary disease

No significant trends were identified this Quarter.

Poisoning

The latest Chemical Food Safety report can be found at this link:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/961101/pub-chemfood0420.pdf

Acorn poisoning – see Unusual Diagnoses

Poisoning due to *Pieris*

Poisoning due to *Pieris spp.* was suspected as the most likely cause of death of submitted ewes to APHA VICs Carmarthen and Starcross. Histories of recumbency and teeth grinding prior to death were recorded.

A group of 300 Beulah Speckled Face ewes were grazing on rented land and were moved to a new field. Three days later 2 were reported dead and the following day 14 were dead

and 5 recumbent. The fields had been grazed in previous years with no issues, but some fences had been moved and there was additional access to some garden shrubs. Two postmortemed ewes had a significant number of Pieris leaves in their rumens. Gross findings included some pulmonary haemorrhages; congested lungs and liver and a small section of haemorrhagic small intestine.

Gross postmortem examination findings of the other case, included widespread haemorrhages over the internal thoracic cavity, on the serosa of the intestinal tract, over the heart and kidney surfaces and haemorrhagic intestinal content.

Pieris is an ornamental shrub containing grayanotoxins. These bind to sodium channels in excitable cell membranes of nerves, heart and skeletal muscle. Typical clinical signs of poisoning are abdominal pain, teeth grinding, vomiting followed by tremors, staggering, recumbency, paddling and death. *Pieris spp* poisoning is one of the commonest plant poisonings in sheep, often associated with animals breaking into garden settings**.**

Other plant poisonings:

Rhododendron poisoning was diagnosed as the cause of neurological signs in two lambs, after seven were unexpectedly found stumbling and frothing at the mouth (four were recumbent) one morning. Typical leaf fragments were found in the rumen on postmortem examination. The lambs had been brought inside the previous day for dosing with an anthelmintic and multivitamins and had been put in a pasture with a Rhododendron bush, which was found partially eaten.

Closantel toxicity

Two five-month-old lambs were found blind and pyrexic, and were euthanased to investigate. There were no significant findings on postmortem examination however, examination of the fixed eyes revealed greyish discolouration of the cut surfaces of the optic nerve in one lamb and pronounced decrease in diameter of the optic nerve and optic chiasm in the second. Histopathology of the brain and eye revealed a multifocal retinopathy in both lambs, together with pronounced axonal and myelin degeneration in one, and extensive gliosis of the optic disc/nerve in the other. A leucoencephalopathy was identified. The lesions were typical of Closantel intoxication in both lambs. Examination of the eye and optic nerve is essential for the histological confirmation of chronic Closantel toxicity.

Annual Summary

The VIDA codes are indexed by syndromes.

For all submissions received and VIDA coded from 2006 - 2020 the most common diagnoses are shown in the diagram (Figure 13) as a percentage by syndrome.

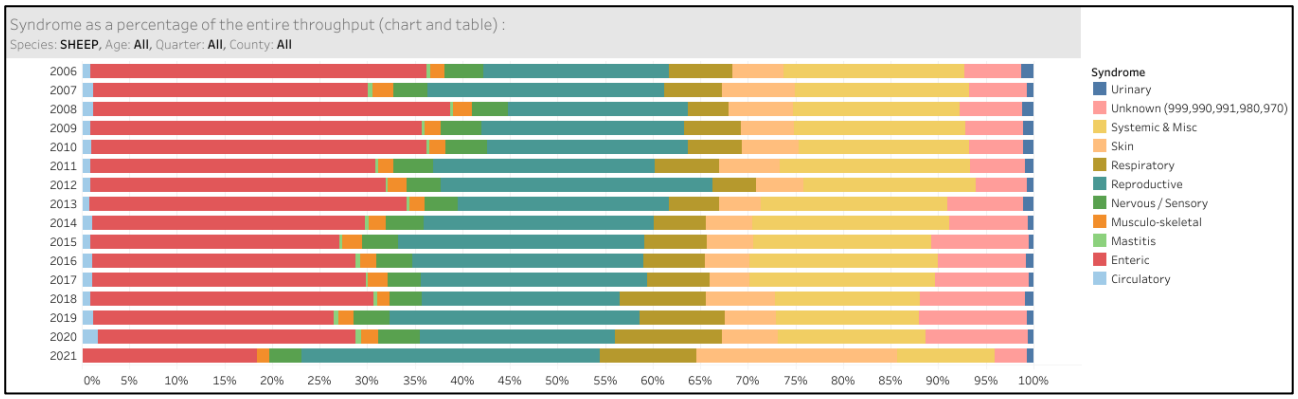


Figure 13 VIDA diagnoses as a percentage by syndrome

Breaking this down into age groups Figure 14 shows the syndromes diagnosed by age group 2006 – 2020 in Adult sheep, Pre wean and post wean ages (Figure 14).

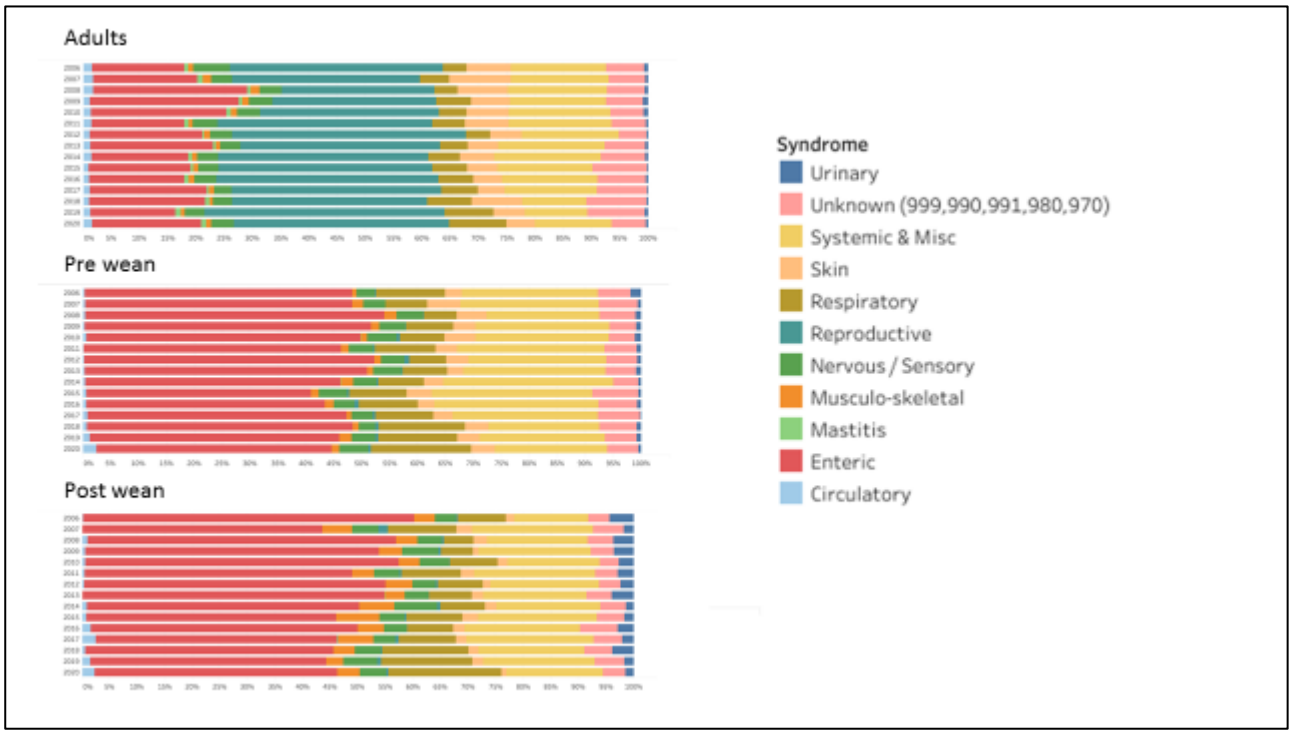


Figure 14 VIDA diagnoses by age group as a percentage by syndrome

During 2020 the diagnoses made by syndrome for all sheep, adults, prewean and postwean groups are shown in Figure 15. As a percentage of all diagnoses, enteric and respiratory conditions are diagnosed more in the pre and post wean age groups, whereas for adults the reproductive syndrome is most common.

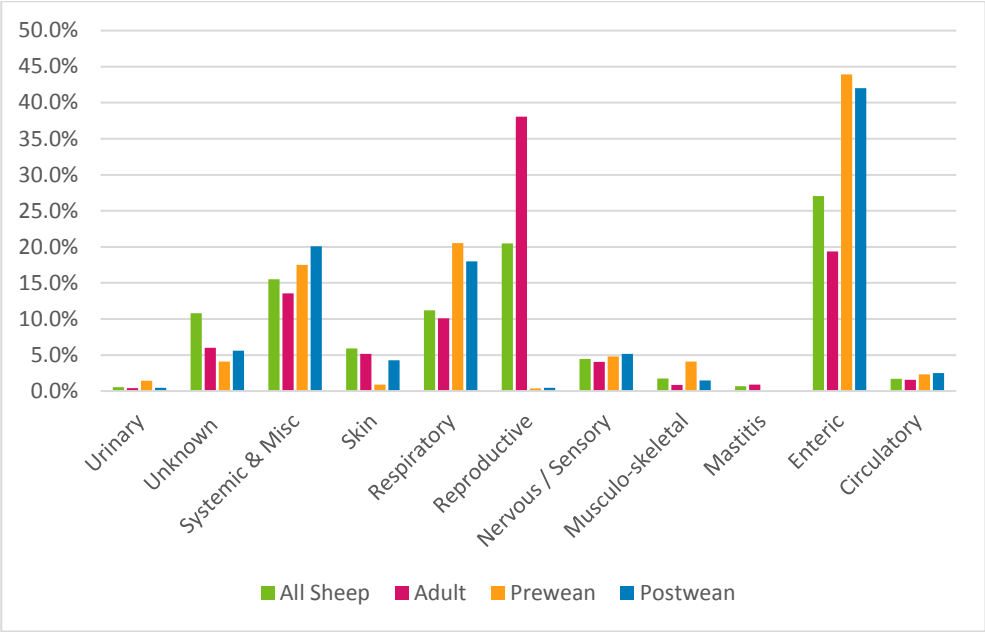


Figure 15 Comparison of age group and % diseases by system

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.

Following previous successful conferences and workshops, a tick-borne disease webinar was organised to engage with stakeholders virtually. Farmer feedback from previous meetings had identified tick-borne diseases as one of the top three disease priorities in extensively managed livestock, alongside liver fluke and sheep scab.

On 9th December 2020, expert speakers from the fields of animal and human health came together to talk about tick-borne diseases, via a webinar organised by the APHA Centre of Expertise for Extensively Managed Livestock.

Paul Phipps, a scientist based at APHA Weybridge, in the Wildlife Zoonoses and Vector Borne Disease Research Group, delivered the first talk; describing the role of ticks as important disease vectors, and how their geographical range, abundance and period of activity seems to be changing in the UK.

Dr. Jolyon Medlock, the PHE Head of Medical Entomology presented findings from the PHE national Tick Surveillance Scheme (TSS). This was established in 2005 to monitor tick distribution and seasonality on a nationwide scale.

Katie Lihou, a PhD student in the department of Veterinary Parasitology and Ecology at the University of Bristol, gave an overview of her research into the distribution and prevalence of ticks and tick-borne disease on sheep and cattle farms in Great Britain.

Suzanna Bell, vector borne disease discipline champion within APHA and Veterinary Investigation Officer at APHA Shrewsbury, covered the diagnosis, treatment and management options for tick-borne diseases in livestock, including Tick-borne Fever, Louping ill, Red water Fever (bovine babesiosis) and Tick pyaemia.

To end the webinar we had two interesting case studies, firstly from Bev Hopkins, a Veterinary Investigation Officer at the Wales Veterinary Science Centre, who presented a case of high mortality in a sheep flock, caused by coinfection of Louping ill virus and Tick-borne Fever. Harriet McFadzean, a Veterinary Investigation Officer at APHA Starcross, presented a case of Red water Fever (bovine babesiosis) and Tick-borne Fever, in a small beef herd in Dorset, associated with early and high burdens of ticks on pasture. Both cases demonstrated how significant the losses incurred by cattle and sheep farmers can be as a result of tick-borne diseases.

Further information can be found in previous APHA Science Blogs:

- Centre of Expertise for Extensively Managed Livestock https://aphascience.blog.gov.uk/2018/09/07/caring-for-extensively-managed-livestock/
- Ticks as vectors of disease https://aphascience.blog.gov.uk/2019/06/11/ticks/

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.

https://www.gov.uk/government/collections/tse-disease-surveillance-statistics

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

APHA also provides summary statistics on the number of submissions tested and cases confirmed through the Compulsory Scrapie Flocks Scheme.

Table 1 provides a summary for sheep for the last 5 years taken from the published statistics https://www.gov.uk/government/publications/sheep-tse-surveillance-statistics

Table 1 summary for scrapie cases in sheep for the last 5 years

Species	Sheep			
	Passive		Active	
Year	Classical	Atypical	Classical	Atypical
2015	0	0	2	15
2016	0	0	0	13
2017	0	0	0	12
2018	0	0	0	16
2019	0	0	1	6
2020	0	0	0	13

Data valid to 30 November 2020

Table 2 provides a summary for goats for the last 5 years taken from published statistics

https://www.gov.uk/government/publications/goats-tse-surveillance-statistics

Table 2 summary for scrapie in goats for the last 5 years

Species	Goats*		
	Passive Classical		Active Classical
Year	All Cases	Index Case*	All Cases
2015	4	0	0
2016	2	0	0
2017	0	0	0
2018	0	0	0
2019	0	0	1
2020	0	0	1

Data valid to 30 November 2020

Horizon scanning

Bluetongue (BTV) update

BTV continues to be reported in Europe and Figure 12 shows Bluetongue disease in Europe August 2020 – January 2021. In December, in Europe, there were cases of BTV-8 in France (6), Luxemburg (7) and Spain (17), and BTV-4 in Bosnia and Herzegovina (1), Bulgaria (2), Croatia (14), France (3), Greece (31), Italy (38), and Serbia (3). BTV-1 was also reported in Spain (3) and BTV-16 in Greece (5).

Cases in sheep were reported from Bosnia and Herzegovina, Bulgaria, France, Greece and Spain and in sheep and goats in Italy.

In January 2021 One case of BTV-8 in cattle in Antwerp was reported to OIE in January, where 31/1104 cattle tested positive by RRT-PCR.

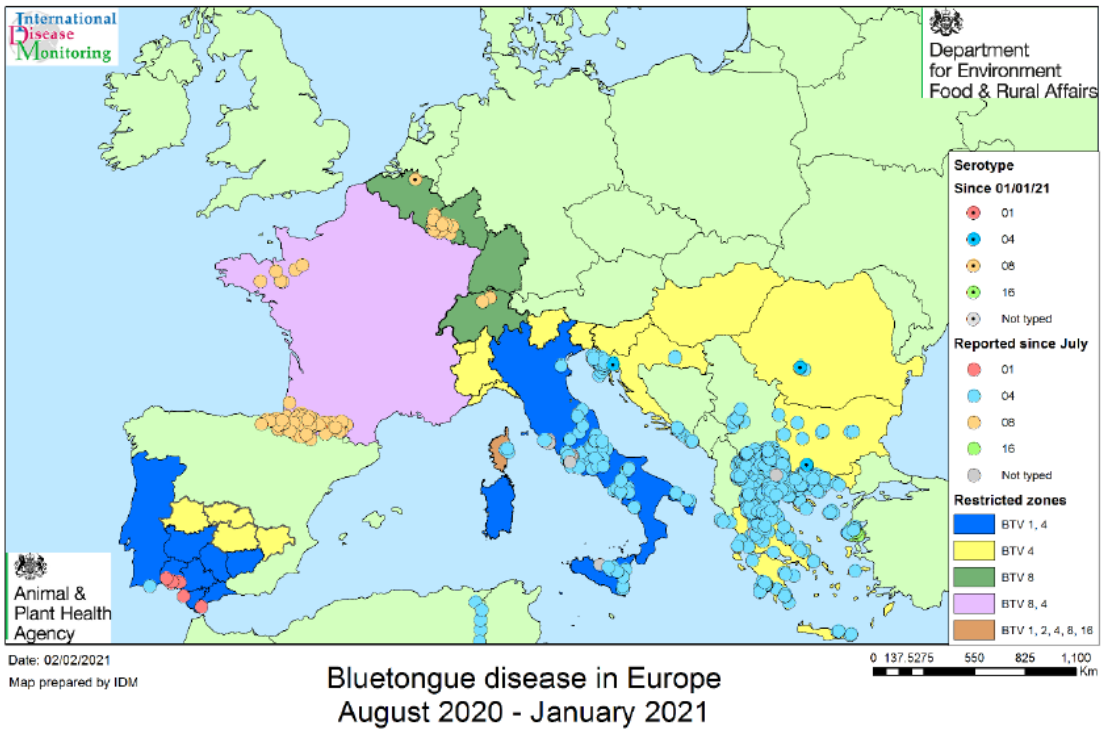


Figure 16 Bluetongue disease in Europe August 2020 – January 2021

The Pirbright Institute through their midge monitoring activities (active midges trapped at various sites =/>5 pigmented vectors) communicated that **28th December 2020** was the start date for the seasonal vector-free period (SFVP). This was much later than in previous years – which has previously been around the end of November, start of December.

Some risk always remains from illegal imports of animals or germplasm. The risk of introduction of BTV-4 or BTV-8 to the UK is considered to be **LOW.**

For more information, see our Outbreak Assessment at:

https://www.gov.uk/government/publications/bluetongue-virus-in-europe

APHA have released a series of animations on Facebook and Twitter to inform keepers of BTV. https://www.facebook.com/APHAGov/

For more information, see the updated situation assessment, at:
https://www.gov.uk/government/publications/bluetongue-virus-in-europe

Publications

APHA Staff

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KONOLD T; DALE J; SPIROPOULOS J; SIMMONS H; Godinho A (2020)
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Variation in hatching responses of Nematodirus battus eggs to temperature experiences.
Parasites & Vectors 13, Article number: 494.

Other publications of interest

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Statement regarding use of this material

This publication is available at https://www.gov.uk/government/collections/animal-disease-surveillance-reports

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

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

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