Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction &amp; overview</td>
<td>2</td>
</tr>
<tr>
<td>New &amp; re-emerging diseases and threats &amp; DNR</td>
<td>4</td>
</tr>
<tr>
<td>Ongoing new and re-emerging disease investigations</td>
<td>4</td>
</tr>
<tr>
<td>Unusual diagnoses</td>
<td>5</td>
</tr>
<tr>
<td>Changes in disease patterns and risk factors</td>
<td>7</td>
</tr>
<tr>
<td>Horizon Scanning</td>
<td>16</td>
</tr>
<tr>
<td>Diagnostic Submissions Trend</td>
<td>18</td>
</tr>
<tr>
<td>Publications</td>
<td>19</td>
</tr>
</tbody>
</table>

Highlights

- *Salmonella* Typhimurium DT104
- Ruminal acidosis
- Chemical Food Safety

VIDA diagnoses are recorded on the APHA FarmFile database and SAC Consultancy: Veterinary Services LIMS database and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

The investigational expertise and comprehensive diagnostic laboratory facilities of both APHA and SAC C VS are widely acknowledged, and unusual disease problems tend to be referred to either. However recognised conditions where there is either no diagnostic test, or for which a clinical diagnosis offers sufficient specificity to negate the need for laboratory investigation, are unlikely to be represented. The report may therefore be biased in favour of unusual incidents or those diseases that require laboratory investigation for confirmation.

APHA VICs have UKAS Accreditation and comply with ISO 17025 standard. SAC C VS have UKAS accreditation at their central diagnostic laboratory and at the Aberdeen, Edinburgh, Perth, Ayr, Dumfries, Inverness, St Boswells and Thurso Disease Surveillance Centres which comply with ISO 17025 standard.

From September 2014 APHA contracted the services of partner Post-mortem providers. From April 2015, these services were provided by the Royal Veterinary College, the University of Bristol, University of Surrey, the Wales Veterinary Science Centre and SACCVS. These providers contribute to the VIDA diagnoses recorded on the APHA FarmFile database and comply with agreed diagnostic criteria. To achieve a VIDA diagnosis, all testing must be carried out by a laboratory with ISO 17025 accreditation.
INTRODUCTION

This report contains analysis of disease data from APHA, SAC Consulting: Veterinary Services (SAC CVS) division of Scotland’s Rural College (SRUC) and partner post-mortem providers (SAC CVS, University of Bristol Veterinary School, Royal Veterinary College, University of Surrey and Wales Veterinary Science Centre) from samples submitted in the second quarter of 2017 compared to the equivalent quarter of previous years. It aims to identify emerging small ruminant disease related threats. The production of the report is underpinned by a large quantity of surveillance data and information, compiled as part of the Defra Plant and Animal Health and Animal Health and Policy Implementation Directorates. Further information can be found at http://ahvla.defra.gov.uk/vet-gateway/surveillance/index.htm.

OVERVIEW

Weather

This has been a warm and rather dry spring. It was generally warmer than average (Fig 1) during March and early April which was welcomed by shepherds during lambing. During May it was wetter in the South and drier in the North with some exceptionally warm days at the end of the month. Mean maximum temperatures were generally about 2.5°C above normal in Scotland and Northern Ireland, but nearer 1.5°C above in the south, while mean minimum temperatures were between 1 and 2°C above average in all regions. Young lambs were able to get off to a good start.

The *Nematodirus* alerts were provided by SCOPS at the end of March when temperatures monitored by ground stations across the country identified the increased risk of *Nematodirus battus* hatching and early cases of nematodirosis were reported in the southern counties.

Fig 1: Spring 2017 mean temperature anomaly and rainfall (right) compared to 1981-2010 expressed as % of the average for 1981-2010
Industry

In the second quarter of 2017, lamb prices recorded a rise in the UK as new season lambs came to market. Retail demand has continued to decline overall, although the industry did get a boost with Easter falling within Q2 this year. Throughputs have been consistently higher in Q2 this year compared to last year, by around 14%, partly due to the continued numbers of hoggets coming forwards. Prices have been higher than last year, although not high enough to attract more imports, which are down year-to-date compared with 2016, by 15%. Around 70% of the UK imports come from New Zealand, where throughputs have been lower year-on-year, by around 5%. Farmgate prices in New Zealand have largely been consistent with those seen over the last few years for the time of year, however a high New Zealand dollar to sterling exchange rate has contributed to exports to the UK falling. France is an important export market for UK lamb. After a disappointing start to the year French demand appears to have picked up with year-to-June 17 figures showing a year on year rise of 5% in UK exports to France. Overall UK exports on the year to date are higher by 18% compared to last year, helped by weaker sterling.

Report by Rebecca Oborne AHDB Beef and Lamb

AHDB published their report “What might Brexit mean for UK trade in beef and lamb products”. This report provides a good overview of the current industry position and examines the major global trade flows, to identify areas of potential UK export growth and areas that may be vulnerable to increased competition post-Brexit


NEW AND RE-EMERGING DISEASES AND THREATS

Monitoring the trends in diagnoses of known diseases cannot, by definition, detect either new diseases or changes in endemic diseases that would prevent a diagnosis from being reached (for example a change in the pathogen that compromised the usual diagnostic test). Such new or emerging diseases would probably first be detected by observation of increased numbers of submissions for clinical and/or pathological syndromes for which a diagnosis could not be reached in the normal way. Submissions for which no diagnosis is reached (DNR) despite testing deemed to allow reasonable potential for a diagnosis to be reached are regularly analysed to look for increases in undiagnosed disease which could indicate the presence of a new or emerging disease. Undiagnosed disease submissions are summarised broadly by the clinical presentation of disease and, once this has been determined by further investigation, the body system affected. Both groups are investigated and trends in the levels are compared over time.

Data recording by APHA and SACCVS was harmonised from 2007. The Species Expert Group reviews trends in VIDA DNR data each quarter with the aim of providing information on potential new or emerging diseases or syndromes. ‘Prior years’ refers to pooled data for 2010-2014 for GB VIDA data.

Supplementary analysis of APHA DNR data is also undertaken using an early detection system (EDS). This uses a statistical algorithm to estimate an expected number of DNR reports and a threshold value. If the current number of DNR reports exceeds the threshold (i.e. exceedance score>1), this indicates that the number of reports is statistically higher than expected. When this EDS identifies categories of submissions where the threshold DNR has been exceeded, the Species Expert Group reviews the data to investigate further. This review may involve assessment of individual DNR submissions. Where this DNR analysis finds no evidence of a new and emerging threat or other issue, the detail of these reviews in response to thresholds being exceeded may not be reported here.
Analysis of Diagnosis Not Reached (DNR)

Sheep & Goats

Analysis of cases with DNR is performed every quarter by the Small Ruminant Species Expert group. There are no indications of any new or emerging disease syndrome. There was no significant change in the overall %DNR and no significant increases for any of the presenting signs or syndromes.

ONGOING NEW AND RE-EMERGING DISEASE INVESTIGATIONS

Salmonella

Since 1st January 2016 there have been confirmed incidents of Salmonella Typhimurium DT104 in 24 premises in England and Wales (A further three cases are being investigated)

9 cases were disclosed in livestock holdings in Anglesey (North Wales) between 2016 and 2017 and one case was reported in Conwy (North Wales) in 2017. These 10 cases represent a high proportion of the total number of incidents in a particular area thus suggesting some clustering of Salmonella DT104 cases in livestock in time and space in North Wales.

The Anglesey Cluster comprises 13 incidents of Salmonella DT104 complex identified in livestock in Anglesey and the 2 in Conwy between 2014 and 2017.

Two of the cases involved horses thus non- livestock premises and as such not registered on any APHA system. Of the remaining 13 cases, 1 in sheep-only premises, 1 in cattle-only premises and 11 in mixed cattle/sheep premises. Interestingly on these 11 mixed species premises only one of the species were affected in 10 of these cases: 5 occasions in cattle and 5 in sheep.

Of the 7 cases where the affected species were cattle, two were dairy herds.

The other 5 cattle premises (either cattle-only or mixed cattle/sheep) were beef suckler herds with rearing, growing and finishing cattle.

Human cases have been identified and APHA are working with Public Health England and Public Health Wales to establish potential links especially livestock isolates t5:459 which are matching the human disease isolates.

Raw sewage, raw pet food, wild birds remain potential sources of spread however it remains interesting that there are cases in sheep with a low level ongoing in Angelsey.

Some of the strains identified bear similarities to the monophasic strains in pigs which might suggest genetic evolution and research is ongoing by PHE. Contact is also being made with colleagues in Netherlands who have had a similar situation with DT104 in goats.

Additional surveillance has been implemented and we have written to practices in North Wales requesting they sample farm animals showing clinical signs where Salmonella infection could be involved. Samples submitted to APHA Shrewsbury Veterinary Investigation Centre (VIC) will be examined for salmonellae without charge. Appropriate samples would include faeces, intestinal content or viscera from a post-mortem examinations and foetal stomach content or, if unavailable, placenta from aborting animals.
UNUSUAL DIAGNOSES

Ruminal acidosis

A live five-year-old ewe was submitted to APHA Thirsk VIC to investigate the mortality of 30 sheep in a group of 300 breeding ewes with lambs. Several other sheep in the group appeared lethargic with some exhibiting signs of ataxia. A mechanical feeder had been installed five days earlier to feed this group of lambs and ewes. The same feeder system was used in previous years and also this year pre-lambing. On this occasion, within four days of the mechanical feeder being introduced, 30 ewes were found dead. The submitted animal was dull, depressed and still standing on arrival. On clinical examination the body temperature was 40.2°C and the mucous membranes were pale. The ewe was euthanased and a post-mortem examination performed which revealed that the peritoneum and omentum were grey in appearance with severely engorged mesenteric blood vessels. The rumen serosal surface had multifocal hyperaemic areas. The rumen was full, containing approximately 75% unrolled grain and 25% forage (Fig 2). The rumen pH was 4.5 (x 4 reading) using pH indicator strips. The large intestines contained brown liquid and no faeces were present in the rectum. These findings supported a diagnosis of dietary acidosis from grain overload.

![Fig 2 Rumen contents with high proportion of grain.](image)

In this case it is difficult to know if the problem could be wholly attributed to a problem with the 3-in 1 feeder as it was not examined. In addition it is not known if the animals could have had access to other sources of grain such as spillages.

As with any piece of equipment the manufacturer’s product guidelines and instructions should be followed and the manufacturer contacted for advice.

Nevertheless the following is worth noting in the use of mechanical feeders:
• Rolled grains should not be used as there is potential for dust to clog up the machine leading to the operator opening the feeding slit wider and wider to get the grain flowing which can then lead to overfeeding.

• When the machine is set up initially it needs to be tested with a small amount of accustomed feed such as ewe nuts for a few days to get the group used to feeding from the machine. Following this test the intended grain can then be loaded, again as a small test amount.

• The machine should not be positioned close to a water source – feed intake is limited by saliva production; however, if animals have access to water close by, they may make frequent trips between the feeder and the water, rather than return to grazing and this could lead to overconsumption of grain.

• Regular maintenance of these machines is required to ensure that damage resulting in an increase in the size of the feeding gap is corrected and that following removal of the front barrier/grid this is replaced to prevent the risk of overconsumption of grain.

Congenital myopathy in Beulah specked face lambs

A congenital myopathy was diagnosed in a speckled face lamb submitted to APHA Carmarthen VIC to investigate possible neurological signs present from birth. It was one of five lambs to have presented similarly from this pure bred flock. All affected lambs were reported with possibly swollen necks, ataxia, inability to stand or suckle. The submitted lamb had been bright but unable to stand or suck, its neck was hunched rather than swollen and bent to the right. There was no nystagmus and neurological reflexes were intact. Postmortem examination was unremarkable. Laboratory testing showed below reference vitamin E at 1.1 μmol/l (ref >2.3) and raised creatinine kinase (CK) at 957U/l -37 °C (ref 0-200). Neonates particularly those that have not fed, as was the case with this lamb, will often have low vitamin E and the raised CK was suggestive of muscle damage. PCR for Schmallenberg virus was negative. Given the breed and presentation together with the lack of gross pathology, histological examination was initiated. Changes in the skeletal muscles were consistent with a multifocal polyphasic myopathy. The heart was unremarkable, which makes the congenital form of nutritional myopathy less likely in this case. It was advised that keeping detailed flock records, and evaluation of breeding should be used to help identify potential high risk mating such as closely related blood lines. A letter describing a congenital myopathy in Beulah specked face lambs this disease was previously published - (Jones and others 2005).
CHANGES IN DISEASE PATTERNS AND RISK FACTORS

This section of the report gives information on occurrence of selected diseases. The data originate from submissions and are summarised and presented according to the diagnosis reached and assigned as a VIDA code. Our charts show the number of diagnoses (numerator) as a proportion of the number of submissions in which that diagnosis was possible (denominator), for all of GB, England & Wales and for Scotland. The bars indicate the 95% confidence limits. Note that the y-axis of the charts varies and therefore care must be taken when comparing individual charts.

Parasitology

Parasitic Gastroenteritis

The second quarter of the year is always the peak of diagnoses for PGE nematodirosis, due to the climatic hatching requirements of the parasite. This year however there were fewer incidents of *Nematodirus battus* in GB than for same quarter in 2016. 53 incidents (7.3% of diagnosable submissions) were recorded in 2017 for GB. The SCOPS Nematodirus forecast issued alerts at the end of March 2017 with early cases reported in the South.

In May APHA were aware of a number of cases of PGE Haemonchosis being reported in adult sheep and camels, even in the north of England. This is an unusual time of year to see this disease and is likely to reflect warm weather during May. There was also the possibility of maturation of hypobiotic larvae picked up last grazing season. APHA issued an alert advising vets to consider this disease a possibility particularly where there is anaemia and high worm egg counts.

Postmortem examination (PME) maybe necessary to determine the cause of death which can occur in the prepatent period of infection. At PME the adult worm can be seen with the naked eye in the abomasum. In fresh specimens the female worm is about 2-3 centimetres long, with a ‘barbers-pole’ appearance as the white ovaries coil around the blood-filled intestine.

*H. contortus* eggs cannot be differentiated from other Trichostrongyle-type eggs so if high faecal egg counts are present further testing is necessary to diagnose haemonchosis. APHA offers a differential fluorescent staining test (TC0777) to detect *Haemonchus* sp. eggs in faeces. The test is used in conjunction with a worm egg count and requires up to 10g of fresh faeces. Samples that are sent in the post are best potted anaerobically (the pot filled as much as possible with faeces and topped up with water).

Acute fasciolosis

Only 3 incidents of acute fasciolosis to report in this quarter however the peak of diagnoses is usually later in the year. APHA are currently assessing Food Standards Agency data with a view to incorporating this data into trends over the coming months.

Chronic fasciolosis

There was a rise in incidence of chronic fasciolosis in Scotland this quarter (fig 3) compared to the same quarter last year. Rainfall in all regions of the country was below average over the winter
and spring. In June of this year there was higher than average rainfall in regions of England and Wales, which may increase the risk of fasciolosis later in the year for these regions.

![Fig 3: Incidents of Chronic fasciolosis for GB for quarter 2 as a % of diagnosable submissions 2004-2017](image)

### Systemic disease

Tick-borne fever (TBF) (*Anaplasma phagocytophilum*) is not one of the most common sheep diseases in the UK, but it has been reported by a number of investigation centres this quarter and can underlie other more common conditions. The numbers in fig 4 indicate an increase in the number of diagnoses for the second quarter. This increase may be due to a number of possible reasons; better diagnostic techniques, greater awareness and more testing, increased numbers and spread of ticks and increased exposure of susceptible animals. APHA started using a PCR test in 2014 and SAC in 2015. The clinical effects of *A. phagocytophilum* infection include initial pyrexia, with subsequent immunosuppression and possible secondary infections. It is transmitted by ticks and occurs in both sheep and cattle. We more frequently diagnose *A. phagocytophilum* in sheep. The organism multiplies in neutrophils which are destroyed, producing profound neutropaenia. There is also lymphocytopenia and transient thrombocytopenia. While infection with TBF alone may result in abortion and some morbidity it is more important because it is immunosuppressive. Thus concurrent bacterial, viral, or protozoal infections results in more severe disease.

We have created a story board using VIDA data to describe how our detection of TBF increased following the introduction of PCR testing

[https://public.tableau.com/profile/siu.apha#!/vizhome/tick-bornefever/TBF](https://public.tableau.com/profile/siu.apha#!/vizhome/tick-bornefever/TBF)
The following is one example of the impact this disease can have on an individual farm. TBF was implicated in an abortion storm in a group of 110 hoggets in a flock of 1,000 ewes in Wales. The group had been bought down from mountain pasture two weeks previously, had lost condition and began to abort. The farmer claimed that a separate group of hoggets carrying twins, in a different field, were unaffected. Submissions from the affected group included a hogget carrying a rotten lamb and three aborted foetuses. Positive PCR results for TBF were recorded in spleen from the hogget and pleural fluid from one of the three foetuses. Blood samples from two other aborting hoggets were also PCR-positive. TBF is known to cause abortion in sheep, the reason why only this group were affected was not clear, but there may have been infected ticks present on the field where the hoggets carrying single lambs were placed.

**Enteric disease**

Similar to the first quarter figures, there has been a gradual increase in the percentage of submissions diagnosed with Johne’s disease in the second quarter from a low in 2011 (Fig 5). This may be due to increased awareness and improved tests/testing rather than a real increase in prevalence.

Sheep vets are actively trying to raise awareness of Johnes disease (Farmer Weekly 11th August 2017) and AHDB have supported a University of Nottingham project to explore research, development and knowledge exchange to improve understanding of production limiting diseases in sheep.
Fig 5 Incidents of Johne’s disease for GB for quarter 2, as a % of diagnosable submissions 2005-2017

Respiratory disease

Laryngeal chondritis

Laryngeal chondritis has been diagnosed on 22 occasions over the preceding 12 months and in all cases either in Beltex or Texel breeds or their crosses (fig 6). Ages ranged from 3 months to 2 years and both males and females.

In addition Ben Strugnell - Farm Post Mortems Ltd (FPM) alerted the Small Ruminant group to 4 cases of laryngeal chondritis he has identified through post-mortem examinations at the fallen stock site over the same period and also all Texel.

Bristol Farm Animal Pathology Service (FAPS), SAC and FPM have all recorded cases of laryngeal chondritis with thoracic haemorrhage associated with caudal vena cava/diaphragm inflammation and rupture with laryngeal chondritis also present. While increased thoracic pressure/gasping associated with increased inspiratory effort due to the laryngeal chondritis may explain the rupture and further Texel examined by FPM showed diaphragmatic rupture and haemorrhage with no laryngeal pathology. Diaphragmatic herniation in the Texel has previously been described (Busin and others 2013) and it proposed that there may be a heritable susceptibility to diaphragmatic tearing in the Texel breed. An anatomical study of the larynges/arytenoids of affected and unaffected sheep could be helpful.

Fig 6 Number of cases of Laryngeal chondrosis diagnosed in sheep in GB June 2016 – June 2017
Musculoskeletal disease

Arthritis due to *Streptococcus dysgalactiae subsp dysgalactiae*

The total of number of diagnoses of arthritis due to *Streptococcus dysgalactiae subsp dysgalactiae* has not significantly changed this quarter; however there have been marked differences in cases recorded by APHA and SAC. APHA diagnoses were reduced with 7 cases (1.71%) in 2017 compared to 14 in 2016 (3.13%). In contrast, SAC reported an increased number of cases (12 cases, 3.17%, in 2017 vs 7 cases, 1.62%, in 2016) (fig 7) which probably reflects a short project carried out in Scotland during the spring where free PME was offered as part of an investigation into the causes of joint ill.

![Graph showing incidence of arthritis due to *Streptococcus dysgalactiae* for GB for quarter 2 as a % of diagnosable submissions 2004-2017](image)

**Fig 7** Incidents of Arthritis due to *Streptococcus dysgalactiae* for GB for quarter 2 as a % of diagnosable submissions 2004-2017

Compressive Cervical Myelopathy in Texels

The carcase of a euthanased, one-year-old Texel ram was submitted to APHA Bury VIC with a three week history of lameness and fore limb ataxia. This was the third animal from a group of 32 to be similarly affected in six months with poor response to antimicrobial and anti-inflammatory treatment. Post-mortem examination was gross unremarkable. Bacterial infection and trace element deficiencies were ruled out on laboratory testing. Further histopathological investigation was subsequently carried out on spinal cord. Severe Wallerian degeneration, particularly of the lateral and ventral funiculi was observed supporting the presence of a myelo-compressive lesion. This compressive cervical myelopathy or “Wobbler Syndrome” in young Texel and Beltex sheep has been comprehensively described (Penny and others 2007).
Reproductive & Mammary disease

Fig 8 illustrates the most common diagnoses in GB for 2017. Note this chart was created from data downloaded from the Sheep Disease Dashboard

https://public.tableau.com/profile/siu.apha#!/vizhome/SheepDashboard_/SheepDashboard

Fig 8 Count of diagnoses of cause of abortion Jan – Jun 2017

Both EAE and toxoplasmosis are preventable by vaccination. Both have zoonotic implications and both can have a significant impact on flock production and profitability. The impact of Schmallenberg is described on page 17. A proportion of farmers continue to refer to flock performance based on scanning percentages. At this stage of the production cycle it is important to identify the cause of abortion. There is a wide range of potential causes of abortion which have been reviewed (Mearns 2007) and which also includes Schmallenberg virus (SBV). Veterinary investigation including submission of appropriate samples to a diagnostic laboratory is required to achieve a diagnosis, and to determine how disease may have entered the flock. The APHA online submission guidance booklet provides advice on samples to take for a number of conditions including abortion http://ahvla.defra.gov.uk/documents/surveillance/sub-handbook.pdf. If initial investigations are unrewarding and abortions continue then further sampling should be undertaken.

Control measures should be implemented in the face of an abortion problem, including farm hygiene and management practices, and personal hygiene to minimize the risk of zoonotic infection. Veterinary flock health plans which must include protocols for the investigation of flock health problems including abortion, and which should consider subjects such as quarantine, biosecurity, vaccination and flock management, should be reviewed and/or implemented to improve flock performance and profitability.
Nervous disease

Whilst listeriosis, CCN, lead poisoning and Gid are relatively common causes of nervous disease in sheep, non-suppurative encephalitis not associated with Louping ill has been recognised in recent years in sheep in this country (Pfaff et al 2017), and is occasionally diagnosed as a cause of outbreaks of nervous disease in sheep flocks and in cattle. 

Listeriosis is the commonest cause of encephalitis in sheep, but this is a suppurative process (neutrophils seen perivascularly and in microabscesses in the neuropil). With viral encephalitides, there is an absence of neutrophils but mononuclear cells (lymphocytes/plasma cells and histiocytes) are noted in the Virchow-Robbin space, and glial nodules are also a feature of this disease. Possible causes include astroviruses and enteroviruses (protozoal encephalitis eg sarcocystis also needs to be excluded histologically).

Three such incidents were seen at Langford between May and July. In the most noteworthy outbreak, six ewes and lambs from a 380 Lleyn ewe flock had been found dead in May. A ewe and a lamb were submitted to Langford, but no diagnosis was reached (hypomagnesemia was suspected in the ewe). Later in July another 6 week old lamb was submitted after at least 9 lambs (3 to 6 week old) had shown lameness/ataxia deteriorating to lateral recumbency and poor response to treatment with tetracyclines and/or penicillin/streptomycin. Grossly there was little to see but histologically severe non-suppurative encephalomyelitis with moderate, multifocal, perivascular cuffing with mononuclear cells (predominantly lymphocytes) and multifocal accumulations of glial cells (glial nodules) in the brainstem and spinal cord was noted. Serology was negative for anti-louping ill virus antibodies. The brains of the ewe and lamb submitted in May were then examined retrospectively, and similar changes to the lamb submitted in July were seen in both. Interestingly in this flock, bilateral radial nerve paresis of unknown aetiology causing a hopping gait (Kangaroo gait) was present in another ewe. Further investigation is underway.

In another incident, only one ewe from a flock of 50 Wiltshire horn ewes was found dead, and a non-suppurative encephalitis was identified. In the remaining incident, an outbreak of nervous disease in at least 8, 6-12 month old goats and sheep in a goat dairy was diagnosed primarily due to listeriosis, but one affected sheep had a non-suppurative encephalitis.

Urinary disease, Skin disease, Metabolic disease, 

No statistical significant increases for any of the diseases monitored

Chemical Food Safety

Copper poisoning

Copper poisoning was reported during the quarter but levels did not exceed the FSA/APHA food safety incident trigger when the liver copper concentration exceeds 500 mg/kg WM. In one case the sheep had access to land on which poultry litter was spread but the levels of copper detected in the litter were not considered excessively high. It was considered that toxicity was most likely to be associated with the cumulative impact of multiple sources which included the use of copper boluses. Poultry litter has been linked to cases of copper poisoning in the USA where poultry litter is fed. There is reference in the literature to an outbreak (Tokarnia and others 2000). In this incident the hens which produced the litter were on copper sulphate as a treatment for aspergillosis resulting in a litter with a copper content of around 230ppm.

In another case copper poisoning was diagnosed in a yearling Dartmoor sheep presenting with haemolytic icterus. It was one of four purchased as pets. The sheep were being fed ewe nuts and grazed areas of a small holding to keep the grass down. Here it was considered that the cause was linked to too high a plane of nutrition.

Botulism

Suspected botulism was diagnosed in a flock of adult ewes. The ewes were divided into four different groups and ewes from all groups were affected. The total number of potentially exposed ewes was 1000 and of these 14 died. The source was suspected to be related to broiler litter which had been spread onto the grazing land prior to turn out. The farm has its own broiler unit and has previously used litter without a problem. APHA advised the farmer to try and move the ewes into fields where broiler litter had not been spread and also provided advice to the farmer regarding the use of broiler litter and its known association with botulinum toxin. The farmer was made aware of his duty to protect the food chain and advised that any sheep showing clinical signs of botulism should not be presented to the food chain and recovered clinical cases should not be presented to the food chain for 18 days following cessation of clinical signs.

Creosote

A farmer identified that around 35 lambs in a group with ewes had creosote on their fleece. He informed his veterinary surgeon who contacted APHA. The source of creosote was from telegraph poles that had been left in the field during maintenance works. There was no evidence that the lambs had ingested creosote and all the sheep (ewes and lambs) appeared healthy. Some of the lambs were due to be drawn for slaughter from the group over the following few days. APHA advised the farmer to not submit lambs that had creosote on their fleece or that smelled of creosote as it was likely that they would be rejected by the abattoir at inspection and there was also a risk of carcase taints. The farmer agreed not to send these lambs to slaughter and to shear the worst affected lambs and trim off any visible contamination. The farmer was reminded of his responsibilities to protect the food chain.
TSE

The latest statistics on the active and passive surveillance of transmissible spongiform encephalopathies (TSEs) in sheep in Great Britain were published on 4th August 2017. The last cases of classical scrapie in sheep were recorded in 2015.


A summary of scrapie statistics for active surveillance in sheep and goats is also available


Welfare

Farm Animal Welfare Committee (FAWC) advice on sustainable agriculture and farm animal welfare and FAWC opinion on the health and wellbeing of farmers and farm animal welfare was published in February 2017.


Bovine tuberculosis in non-bovine species


These latest data were published for all investigations into Bovine tuberculosis for 2016 and highlights that during 2016 2 sheep and 27 goats were positive on culture for *Mycobacterium bovis*.

Tuberculosis was diagnosed in a 2 year old Texel cross ewe from a small flock, submitted to APHA Shrewsbury VIC. Out of a group of 14 which lambed in December, 4 had died following a period of ill thrift. Scour was reported before death. The remainder of the group improved following worming. On PME the ewe was in poor body condition with obvious scour. There was over a litre of yellow fluid free in the abdomen. There was white froth in the trachea and diffuse reddening of all lung lobes apart from the distal area of the left caudal lobe. On palpation there was a firm 1cm diameter swelling in the left caudal lobe which on incision contained caseous material and was surrounded by multiple white calcified lesions 1-2 mm in diameter. There were a few lungworms visible. Multiple 2mm calcified white/cream lesions were present in the mediastinal lymph nodes. The lesions were suspicious of tuberculosis so the case was reported to APHA field services. Histopathology was consistent with mycobacterial infection and *Mycobacterium bovis*, spoligotype 17 was cultured. Although not the predominant spoligotype for the locality, it has been seen in the area.
HORIZON SCANNING

International Disease Monitoring

Blue tongue

There have been few reports of BTV-8 from France, however this is similar to the epidemiological situation reported last year where there were only a handful of cases reported in these early months, and generally July onwards is when disease starts to remerge across Europe. Of particular note is that there have been no recent reports in the northern regions along the coast in France, although this may be in part due to lack of sentinel surveillance testing which is no longer required once an area is within a restriction zone.

Recent meteorological modelling has shown there have been very few days in the last months where the wind has been sufficiently strong or in the right direction to reach the English mainland. The hot temperatures experienced in Southern England in late June and heavy rainfall more recently can reduce the number of active midges.

APHA in conjunction with The Pribright Institute and the Met Office continue to monitor the situation and provide a fortnightly assessment. See Fig 9 for current situation in Europe.

The risk of BTV incursion into UK population remains at LOW to reflect the low levels of infection in northern France.

France has also been reporting BTV-4 in sheep and cattle on the island of Corsica, where vaccination has been mandatory.

Italy has reported BTV-4 in the north of the country as well as BTV-1 and BTV-4 in other regions.

BTV-8 vaccine has been available for the GB market since mid-July 2016, and the decision to vaccinate will be taken by the farmer, which the GB authorities have encouraged all of them to consider, in consultation with their private veterinary surgeon.

For information on bluetongue and the vaccine availability in GB, see the latest materials recently posted on line by the National Farmer’s Union (NFU) at www.nfuonline.com/bluetongue and the latest information to encourage BTV vaccination by the Joint Action against Bluetongue (JAB) campaign.
In November 2016 Schmallenberg virus (SBV) was detected in a deformed calf in Cornwall and evidence of seroconversion as part of routine screening in cattle in the Midlands was reported.

The last confirmed case of SBV in sheep was in March 2013 when of 132 samples tested that year, by PCR, 27 confirmed cases were identified.

Surveillance for SBV continued. In 2014, 44 samples were tested, in 2015, 20 samples tested and no SBV was identified. In 2016, 24 samples were tested and on the 21st December 2016 Schmallenberg virus was confirmed by PCR on four occasions in sheep fetuses with deformities. These were from Devon (2) Dorset (1) and Somerset (1) and reported in the Veterinary record [http://veterinaryrecord.bmj.com/content/179/22/565?ijkey=9BP1tLzrC1kVg&keytype=ref&siteid=bmjjournals](http://veterinaryrecord.bmj.com/content/179/22/565?ijkey=9BP1tLzrC1kVg&keytype=ref&siteid=bmjjournals).

Surveillance for SBV continued and during the 2017 lambing and calving season in cases of sheep or cattle fetal malformation, veterinary surgeons were offered SBV PCR tests on fresh brain free of charge.

Since the beginning of 2017 APHA have recorded on the Vetgateway pages [http://ahvla.defra.gov.uk/vet-gateway/schmallenberg/index.htm](http://ahvla.defra.gov.uk/vet-gateway/schmallenberg/index.htm) all confirmed cases, by county, of SBV on a fortnightly basis.
During the lambing period 2016/17 samples have been submitted from 291 sheep farms in England and Wales of which 138 (96 Eng 42 Wales) were confirmed as SBV positive by PCR (Fig 10).

As the lambing season is now over and spring calving ended APHA withdrew this free testing from the end of June 2017. Nevertheless APHA continues to monitor the situation and VIOs are available to discuss individual cases of interest.

A survey being carried out by the Universities of Nottingham and Liverpool is gathering information on the impact of SBV this year. The survey ended on 16th June 2017, the results of this survey will be published in due course.

**Diagnostic submission trend**

**Throughput Maps**

The map Fig 11 shows the geographical spread of submissions and alerts received from small ruminants for Q1 and Q2 2017.

These maps have been developed in collaboration with the Data Systems Group GIS team at APHA Weybridge, who generate the outputs to support the work of the SIU in evaluating the coverage achieved in England and Wales by scanning surveillance activities. The first drafts provided a spatial representation of the distribution of submissions, by holding, to the diagnostic service network, including APHA laboratories, submissions from holdings in England and Wales to SAC-SVS and to the partner providers of post-mortem examinations. The maps have been developed further to include other components of early warning surveillance: notifications of welfare complaints investigated by the Field Service and clinical report cases of exotic disease suspects handled by VENDU.
The surveillance rate for each species is the proportion of holdings that submitted at least one carcase or diagnostic sample or had at least one of the other alert types in the reference period over all holdings of that species in the spatial unit (hexagon).

**Fig 11.** Percentage of sheep holdings alerts in Q1 2017, expressed as equal-sized hexagons

**Publications of interest**

**Sheep and goats papers published by APHA staff April – June 2017**

Bahir W; Omar O; ROSALES RS; HLUSEK M; Ziay G; Schauwers W; WHATMORE AM; Nicholas RAJ  2017
Search for OIE-listed ruminant mycoplasma diseases in Afghanistan.
BMC Veterinary Research 13:149.

KONOLD T; PHELAN LJ; DONNACHIE BR; CHAPLIN MJ; CAWTHRAW S; GONZALEZ L  2017
Codon 141 polymorphisms of the ovine prion protein gene affect the phenotype of classical scrapie transmitted from goats to sheep.
BMC Veterinary Research 13:122.

Millar M; CARSON A 2017
Holly leaf ingestion causing pharyngeal obstruction in lambs (letter).
Veterinary Record 180 (23) 574-575.

NICHOLAS RAJ 2016
Contagious agalactia.

Papoula-Pereira R; Hancock B; MITCHELL S; Semple H; McGarry JW 2017
Dicrocoeliosis in sheep in England and Wales: under diagnosed and misdiagnosed?
Veterinary Record Case Reports 5 (1) e000386.

Other publications of interest

Digital dermatitis-associated treponemes in a wound in a sheep. Veterinary Record 180, 453-453


RU, G. (2017) Do we need to explain the occurrence of atypical scrapie? Veterinary Record 180, 400-402


References


