GB Emerging Threats
Quarterly Report
Small Ruminant Diseases


Contents
Introduction & overview 2
New & re-emerging diseases and threats 3
Ongoing new and re-emerging disease investigations 4
Unusual diagnoses 5
Changes in disease patterns and risk factors 7
Horizon Scanning 14
Diagnostic Submissions Trend 17
Publications 21

Highlights
- Milk Drop - agalactia 4
- Dietry deficiency – milk replacer 11
- Bluetongue update 14

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 2016 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

Issues & Trends

Weather

At the start of April, the UK’s weather was unsettled and dominated by low pressure, with frequent showers and some longer spells of rain. Sleet and snow fell unusually widely for late-April. May began unsettled and windy but for much of the month there was plenty of fine, warm and sunny weather. This pattern was interrupted by a brief colder interlude mid-month and an unsettled spell from the 17th to 22nd which may have interrupted Nematodirus hatching in more northerly regions. At the start of June, Britain's weather was dry and settled. The maps below show the spring averages with rainfall (Fig 1) higher than the average in the north and temperatures (Fig 2) higher than average in the south.

Fig 1 Spring average rainfall

Fig 2. Spring average temperature
Industry

The second quarter of the year saw prices begin to increase as new season lambs started coming to the market. Prices saw their largest rises during May, before beginning to fall again in June. Prices moved above the level from the previous year in May for the first time since February. Prices rose due to continuing tight supplies throughout this period as slaughter numbers declined leading to lower levels of production in the UK. The lamb crop in 2016 is thought to have been a similar size to that seen in the previous year; however, the wetter conditions at the beginning of the season are thought to have meant numbers have been slower to come forward than in 2015. Imports so far this year have also been lower, due to changes in supplies from New Zealand. Since the result of the EU referendum was announced on 23 June the pound has weakened, which has helped to drive lamb prices to higher levels as exports from the UK have become more competitive on the continental market, while imports to the UK have become less competitive.

Mark Koslowski AHDB

The Food Standard Agency (FSA) has been working closely with AHDB Beef and Lamb to provide a new list of post-mortem rejection conditions and new electronic system for the Collection and Communication of Inspection Results (CCIR). The aim is to improve feedback to producers and therefore to improve public health, animal health and animal welfare.

The new conditions are the result of a series of workshops on CCIR involving representatives from the meat industry, including producers and processors, which reviewed the data collected by Meat Hygiene Inspectors at post-mortem inspection.

This has now been implemented in a number of abattoirs across England and Wales.

APHA are meeting with FSA to determine how this more accurately recorded post-mortem data can be incorporated to inform surveillance

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 for Quarter 2. 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

Milk drop/agalactia

Milk drop/agalactia is usually a problem seen in cattle dairy herds but each year a few sheep from commercial (non dairy) flocks around the country struggle with this. The University of Bristol Farm Animal Pathology Service has followed a case where during the 2014 lambing period a 470 ewe flock of Scotch Mules and Texel x Lleyns had many ewes showing milk drop which resolved within 3 days (following treatment with antibiotics and anti-inflammatory). Most of the ewes affected were culled, but 6 were retained and none of the flock including the retained affected ewes showed milk drop the following year (2015). However, during the 2016 lambing period at least 100 ewes had shown milk drop – within 12 hours of lambing the udders became hard, little milk was produced but there was good response within 3 days to treatment.

The only change this year is that the ewes were in much better condition (6 had experienced vaginal prolapses). There was no age or breed predilection in the ewes affected. A live affected ewe was submitted to investigate. The udder was symmetrically swollen and firm but well differentiated from the surrounding tissue and sub-cutaneous tissue and skin. Normal milk was expressed from both teats. The ewe was euthanased; at post-mortem examination there was no indication of mastitis or any other pathology to explain the milk drop/hard udder/failure of let down. Extensive bacteriological testing of the udder and milk (including *Mycoplasma* DGGE) was unrewarding as was serology for maedi-visna, leptospiriosis, and exotic mycoplasmas including *Mycoplasma agalacticae*, *M. capricolum* and *M. mycoides*. Histology of the udder showed normal active mammary tissue and there were no abnormalities detected in liver, kidney and other organs.

A similar problem was observed in the Loire valley in France in 2012 – 15 farms had agalactia in at least half the ewes with lactation returning two to eight days post parturition. [http://promedmail.org/post/1526207](http://promedmail.org/post/1526207)
It is likely this is a physiological response linked to over-conditioning of the ewes and it was recommended that efforts are made next year to avoid this; this is problematic given the risk of pregnancy toxaemia if ewes are consequently undernourished. The APHA is aware of this problem and a letter was published in the Veterinary Record by the University of Bristol Farm Animal Pathology Service (Millar and others 2016) and work is underway to design a questionnaire to further investigate risk factors.

Please e-mail: mailto:vetschool-pathservices@bristol.ac.uk who are collaborating with colleagues in APHA if you have seen a similar case.

**UNUSUAL DIAGNOSES**

**Spinal cord abscessation following vaccination**

Two euthanased, four-week-old lambs were submitted to APHA Carmarthen Veterinary Investigation Centre (VIC) to investigate a problem of progressive limb weakness and recumbency following primary vaccination. 10 lambs were affected from a group of 200 ewes and lambs. Gross postmortem examination identified abscesses within the subcutaneous tissues on the left side of the neck with purulent material extending into the spinal canal. *Trueperella pyogenes* was isolated. It was postulated that the extension of the abscesses into the spinal column had resulted in spinal cord compression leading to the progressive neurological signs described by the submitting practitioner. The origin of the abscesses was deemed most likely a result of contaminated needles. A review of on-farm vaccination procedures was recommended.

**Hypoglycaemia encephalopathy in lambs**

Hypoglycaemia encephalopathy was diagnosed by APHA Thirsk VIC as the cause of weakness and inability to stand in 70 neonatal lambs from a 425 head lowland flock in North Yorkshire. No gross abnormalities were detected on gross postmortem examination and Border disease and swayback were ruled out on laboratory testing. Brain histopathology identified severe, multifocal, cerebrocortical neuronal necrosis consistent with hypoglycaemic encephalopathy as a result of ketosis in the ewe, previously documented by Scholes and Watson (Scholes and Watson 2004). Blood samples from the dams were subsequently submitted and confirmed inadequate nutritional status with both low albumins (poor protein status) and elevated BHBs (energy deficit) detected.

**Hepatic encephalopathy**

An unusual case of hepatic encephalopathy as a result of severe hepatic dysfunction caused by haemolytic anaemia was diagnosed in a 12 week-old Zwartbles lamb. This was the only animal affected in a group of 50 lambs kept outside on pasture with supplementary lamb feed available. The lamb died following an acute episode of illness characterised by malaise, tachypnoea, recumbency and icteric conjunctivae. Postmortem examination revealed a severely jaundiced carcase with pale liver, pale brain and extremely watery, pale red blood (no haemoglobinuria
was detected). Laboratory testing was not informative with copper, lead, molybdenum and vitamin B12 being within reference range and negative bacteriology. The iron level was high in both kidney and liver samples. Histological examination confirmed severe centrilobular hepatic necrosis with haemosiderin in hepatocytes and Kupffer cells, as a result of severe extravascular haemolytic anaemia. The cause of anaemia could not be established in this case. No evidence of toxic plants ingestion could be found in the rumen.

Kangaroo gait

“Kangaroo gait” was suspected by APHA Carmarthen VIC as the cause of forelimb knuckling in two post-lambed ewes from a group of 50 shortly after turnout. On clinical examination by the submitting practitioner there was no evidence of foot or joint disease. Trace element blood tests were all within normal limits. Kangaroo gait is an uncommon locomotor disorder typically affecting adult ewes. Ewes remain bright and alert, but develop radial nerve dysfunction with knuckling and stumbling on the forelimbs. This leads to a bounding, kangaroo-type gait when encouraged to move. It is primarily a condition of lactating ewes, but may also be seen in pregnant animals. The aetiology of the condition is unknown, but cases often spontaneously resolve once the lambs are weaned and therefore has no flock health implications. Interestingly a hard winter and a shortage of grass were reported as potential risk factors for development by Pritchard and others (2006), which are very similar to the conditions reported this year.

Dog attack/bite wounds likely cause of injury and death in lambs

Four six-week-old lambs were submitted at the end of March to investigate the possibility of lambs being maliciously injured. One flock on this farm suffered a number of injured lambs over the previous two weeks. The day prior to this submission, 14 lambs from a flock with 50 ewes were affected with five dead and nine injured. The nine injured lambs were examined by a private veterinarian and four were euthanased. The four that were euthanased were submitted to APHA Thirsk VIC for investigation. The flock was on pasture field that was arable land. One of the field’s boundaries was bordered by a public road. Although there was some suspicion that the lambs may have been shot, no rifle casings could be found and neither did the radiographs on the four submitted lambs show any evidence of bullet fragments. The affected field was well fenced with pig netting with no easy access or entry. The grass cover was well grown and would not allow prints to be easily visible. The farmer was not aware of any other affected farms in this area but most of this area is arable land.

The postmortem examinations revealed extensive lesions consistent with bite wounds in all four lambs. Fig 3 shows the typical lesions detected in the submitted lambs. The importance of this case was the wide reporting in the farming press and social media that the injuries were due to gunshot wounds. This was despite investigations by the private veterinarian, whose findings were also consistent with dog attack/bite wounds.
Fig 3: Lesions consistent with dog bite wounds in a six-week-old lamb.

The National Sheep Association has dedicated pages on its website providing information for dog owners and farmers [http://www.nationalsheep.org.uk/dog-owners/](http://www.nationalsheep.org.uk/dog-owners/)

**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 due to Nematodirus battus**

The second quarter of the year is always the peak of diagnoses for PGE nematodirosis, due to the climatic hatching requirements of the parasite. GB shows a slight but significant increase in incidents on same quarter in 2014. 96 incidents (11.05% of diagnosable submissions) were recorded in 2016 for GB.

This increase is due to a large increase in diagnoses in Scotland from 2015 (fig 4). *N. battus* eggs are known to hatch when temperatures are between 10-17°C and it needs to be within this range for up to 2 weeks. In Scotland the minimum and maximum temperatures are much closer together than in the south and this is thought to lead to more of an abrupt peak of hatching primarily in June, whereas further south, with higher maximum temperatures the hatch can occur over a longer time as described by by van Dijk and others (2008).
Acute fasciolosis

No incidents of acute fasciolosis to report in this quarter. SAC C VS did however issue a disease alert for acute fasciolosis for later this year given that there have been similar climatic and production conditions in Scotland for this year, as in 2015.

Chronic fasciolosis

There is a significant rise in incidence of chronic fasciolosis in Scotland again this quarter which matches the trends of the last two quarters for Scotland (fig 5). Higher rainfall in Scotland than the rest of England and Wales and will have contributed to the higher incidence of fasciolosis. Again this year there was higher than average rainfall in Scotland in March and April compared to below average rainfall for most of the rest of England and Wales over this time period. Only in June of this year was there higher than average rainfall in regions of England and Wales, which may increase the risk of fasciolosis later in the year for these regions.
Reproductive & Mammary disease

Ovine abortions & Diagnostic rate abortions

The expected diagnostic rates for sheep postmortem examinations usually exceeds 80%; however, diagnostic rates for abortion are usually closer to 50%. The diagnostic rate for abortion in Q1 was 57% in Quarter 1 (fig 6) and 50% in Quarter 2 (fig 7). Diagnosis of abortion is more difficult if placenta is not submitted which may reflect the number of submissions with limited testing.

![Fig 6 Diagnostic rate Q1 2016](image1)

![Fig 7 Diagnostic rate Q2 2016](image2)

Of those submissions where a diagnosis was reached the top ten diagnoses are shown in fig 8:

![Fig 8:Most commonly diagnosed causes of Ovine abortion in GB 2016](image3)
**Systemic disease**

**Persistent Border disease infection (BDV) associated with illness in lambs**

The death of a six- to eight-week-old lamb that had diarrhoea was due to persistent Border disease infection (BDV). Five lambs had died out of approximately 470 in the flock. The history reported was that affected lambs develop diarrhoea and lose weight over about five days and do not respond to antibiotic treatment. At post mortem examination, the mucosal surfaces of the Peyer’s patches of the ileum were reddened and the ileum appeared thickened (fig 9). Histopathology of ileum showed necrosis and collapse of Peyer’s patches and necrosis of crypts consistent with a cytopathic pestivirus infection. Immunohistochemistry for pestiviruses demonstrated antigen in the hippocampal neurons, confirming that this lamb was persistently infected with BDV. Intractable diarrhoea in lambs from 2-21 months is reported in lambs persistently infected with border disease virus.

Recommended control measures for Border disease vary depending on whether this is a sporadic outbreak or an endemically infected flock. In this case it is thought to be a recent introduction and control measures would include not retaining any of this year’s lamb crop for breeding and testing recently purchased rams to attempt to identify a persistently infected animal.

![Fig 9. Ileum of a 6-8 week old lamb with persistent Border disease infection.](image)

**Enteric disease,**

**Sarcina-like bacterial abomasitis**

This condition was diagnosed as the cause of bloated abdomens and death in four-week-old lambs. The farmer had noted that prior to death the animals had bloated abdomens which appeared to be painful but there was no scour. The farmer had vaccinated against clostridial disease. On postmortem examination the lamb the abomasum had multiple gas pockets and an ulcer. Histopathology revealed a mild/moderate subacute emphysematous abomasitis. **Sarcina-like** bacteria were present. There was no evidence to support clostridial infection playing a role. Sarcina abomasitis associated with bloat in lambs and calves has previously been reported in the Veterinary Record (Edwards and others 2008).
Nervous disease

Listeria encephalitis

Following on from quarter one, diagnoses of listerial encephalitis were again increased this quarter with 24 (2.76%) incidents reported in 2016 compared to 13 (1.47%) in 2015 (fig 10). Increases were seen by both APHA and SAC, although this was most notable in England and Wales with 15 cases (3.25%) recorded this year compared to 6 cases (1.28%) in 2015. The majority of cases were again in adult animals from Lowland flocks. It is possible that the weather conditions during the spring lead to prolonged silage feeding of adult animals or ingestion of the organism through soil due to poor grass growth or the feeding of supplementary concentrate directly from pasture.

Fig 10: Incidents of listeria encephalitis for GB for quarter 2 as a % of diagnosable submissions 2004-2016

Urinary disease, Skin disease, Metabolic disease, Respiratory disease

No statistical significant increases for any of the diseases monitored

Nutritional disease

Two live lambs were submitted to St. Boswells Disease Surveillance Centre for investigation of the cause of non-pruritic alopecia in eight pet lambs from a group of 26. Milk replacer had been fed for two weeks and both lambs were in poor body condition with diffuse wool loss and skin thickening plus crusting lesions particularly around the eyes and mouth. Serum and liver analysis confirmed hypovitaminosis A (Table 1). It is suggested that clinical signs are likely to occur when liver vitamin A content falls to 2ug/g or below (Radostits, Gay, Blood and Hinchcliff. Veterinary Medicine, 9th edition, page 1553).
Table 1: Serum and liver Vitamin A results

<table>
<thead>
<tr>
<th></th>
<th>Serum Vitamin A (µmol/l)</th>
<th>Liver Vitamin A (µmol/kg FT)</th>
<th>Liver Vitamin A (converted to ug/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference range</td>
<td>0.87-1.75</td>
<td>≥60</td>
<td></td>
</tr>
<tr>
<td>Lamb 1</td>
<td>0.24</td>
<td>4.22</td>
<td>1.2</td>
</tr>
<tr>
<td>Lamb 2</td>
<td>0.59</td>
<td>19.0</td>
<td>5.4</td>
</tr>
</tbody>
</table>

The milk replacer was analysed and found to contain levels of zinc, iron and manganese well below the amounts declared on the bag (table 2). The levels of crude protein, sodium, phosphorus and calcium were correct.

Table 2: Zinc, Iron and Manganese content of milk replacer

<table>
<thead>
<tr>
<th>Element</th>
<th>Analysis result (mg/kg DM)</th>
<th>Amount stated on bag (mg/kg DM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc</td>
<td>14.9</td>
<td>50</td>
</tr>
<tr>
<td>Iron</td>
<td>21.1</td>
<td>80</td>
</tr>
<tr>
<td>Manganese</td>
<td>9.15</td>
<td>30</td>
</tr>
</tbody>
</table>

A diagnosis of multiple dietary deficiencies due to failure to mineralise the milk replacer was made and the feed company confirmed that the mineral vitamin balancer had been omitted from that batch.

The Small Ruminant Expert Group was notified of this case and as there was suspicion of a problem with the milk replacer, all investigation centres were alert to the presenting signs in the event that further cases were identified.

Toxicity

The latest Chemical Food Safety Report can be found on the link below:


Lead poisoning

Lead poisoning was diagnosed in a one-month old Dartmoor lamb. This was the third lamb to be affected with similar clinical signs including abdominal pain, diarrhoea, malaise, anaemia and ataxia. In addition, two lambs were born with brachygnathia (pug like) and nervous signs and died soon after birth. The lambs were part of a flock of ewes with 159 lambs. The blood lead concentration of the lamb submitted for post mortem was 4.99 µmol/l. Marked renal pathology was also noted consistent with lead poisoning. The source of lead was considered most likely to be geochemical with soil ingestion by lambs being the route of exposure. There were apparently a lot of molehills in the field that they were grazing and lambs were seen to play around the mole hills and nibble at the soil. APHA advised that efforts were made to reduce soil exposure to the sheep, ideally in the first instance by moving them to better pastures. Field management such as flattening molehills, mole control programmes and reseeding bare
patches help to ensure a good sward of grass is present thereby reducing soil ingestion. Alternatively consideration could be given to keep the field for hay making only; hay is less likely to be contaminated with soil than silage. APHA advised the farmer to place the flock under a sixteen-week withdrawal after which a cohort of ewes and lambs should be blood tested for lead to establish what further risk management measures are required.

**Exposure to Elder (**Sambucus nigra**)**

A diagnosis of *Clostridium perfringens* type D enterotoxaemia was reached following post mortem examination of a goat carcase. The submitted goat was one of a group of three animals mostly housed for management reasons and occasionally let out to grazing. The carcase submitted was from an animal that had developed smooth green diarrhoea two days prior to submission with a short terminal malaise and drop in appetite. One other goat in this group, a heavily pregnant nanny goat, also developed diarrhoea. The only recent management change was that elder tree clippings were fed to the group 24 hours prior to the onset of diarrhoea. It is possible that this change in diet caused the diarrhoea and precipitated the growth of *Clostridium perfringens* type D and since the goats were not vaccinated against clostridial disease, they died to enterotoxaemia.

**Gamebird feed and ruminants**

Two incidents in quick succession have highlighted the risks to ruminants from gamebird feed. One incident involved medicated partridge feed being fed on moorland being co-grazed by sheep; the second involved medicated pheasant feed to which beef cows and calves had access. Unintended exposure to medicated feed is bad practice and unacceptable for many environmental and animal related reasons. These include:-

- Clinical disease and death due to unregulated access to grain based feed. This could potentially cause grain overload and clostridial enterotoxaemia.
- Clinical disease and death due to unregulated access to feed medicated with lasalocid causing ionophore toxicity.
- Unintended exposure of ruminants to medications in feed which were not intended to be fed to ruminants. This requires a prolonged withdrawal period to be set and observed.
- Exposure of ruminants to gamebird feed which contains fish protein and as such is a breach of the Animal by-Products Regulations.
- Failure to follow guidance recommendations for the use of medicated feed including those associated with antimicrobial resistance.

The clinical signs of ionophore toxicity in ruminants include sudden death, diarrhoea, respiratory signs and recumbency, and pathological findings include focal cardiomyopathy, skeletal muscle necrosis and pulmonary oedema.
Colleagues are advised to be alert to the problem at this time of year and to actively address the potential food chain issues by preventing further access. Information regarding what is in the feed is required. Please report suspected incidents to APHA’s National Toxicology Adviser, Jo Payne, Jo.Payne@apha.gsi.gov.uk at an early stage.

Salmonella

Each year APHA presents data on Salmonella reports from livestock species in Great Britain (England, Wales and Scotland) collected and collated by the Department for Environment, Food and Rural Affairs (Defra) during 2015 and also provides data from previous years for comparative purposes. These reports are published on www.GOV.UK

In anticipation of the next publication it can be reported that there were 71 reports of Salmonella from sheep between January and June 2016, which is an increase of 25% relative to January – June 2015 (57 incidents). There were slightly fewer Salmonella 61:k1,5,(7) isolations compared with January - June 2015 (33 vs. 37 reports). Reports of S. Montevideo more than doubled (16 vs. 6 reports) during January – June 2016 compared with the same period in 2015. As a result, S. Montevideo became the second most commonly reported serovar from sheep, making up 23% of all reports compared with 11% in 2015. Compared with January – June 2015, reports of S. Dublin in sheep doubled (12 vs. 6 incidents) representing 17% of all Salmonella isolations in sheep. There were single incidents of S. Typhimurium DT104 and Salmonella 4,12:i:- DT193 reported from sheep during January – June 2016. There were no S. Enteritidis isolations in the first half of 2016, 2015 or 2014.

HORIZON SCANNING

International Disease Monitoring

Blue tongue

Disease situation reports are published on .GOV.uk webpages for Animal diseases: international and UK monitoring - GOV.UK. A summary of these assessments is included below but for complete information please refer to the assessments.


France has now reported a total of 288 outbreaks of BTV-8 and the restriction zones have not changed for several weeks.

There has been one case in a one-day-old calf in Haute Garonne, Southern France, which died and the carcase tested positive. The mother was clinically well. This is without doubt a case of trans-placental transmission and not active transmission directly to the calf itself.

There are no recent updates from the French Authorities on the disease situation. If infection was circulating widely, more clinical report cases could be expected. Current UK Met Office projections are for average summer temperatures, with no signal for an unusually hot summer at present in the UK or in France which would increase midge activity and virus replication.

Between September 2015 and April 2016, nearly 80 000 animals (99.7% cattle) have been tested for movement out of the zone. 570 farms reported suspect clinical cases, but only 13 farms had animals testing positive. Sheep (4 animals from 4 farms) showed clinical signs characteristic of BTV (discharge, irritation of the muzzle, face edema, salivation). One animal detected following a series of abortions (6) with nervous signs/torticollis (not typical) in newborn lambs. Mother and lambs BTV PCR positive Schmallenberg virus tests were negative.

Ct values varied between September and December 2015 at between 20 and 38. Values increased after January 2016 to between 30 and 35, and since April 2016, most samples have a higher than 35 Ct value. This is significant, as the likely infectivity of an infected animal decreases with a higher Ct value, so although cases are still being detected, they may not represent a significantly high risk of transmission of BTV at present.

Current opinion is that an animal with a Ct value below 32 is viraemic and may be infectious. The Ct value for a PCR represents the number of PCR cycles required for the test to produce a positive result (above a threshold of detection), so the higher the figure, the lower the level of viral RNA present in the sample.

Find out about the risk of bluetongue disease spreading into the UK in our video http://bit.ly/1T24Nfo

More about bluetongue transmission, clinical signs & path. in our 2nd video http://bit.ly/1rwWFKz

Bluetongue is a notifiable disease which can affect ruminant animals. Find out more on GOV.UK http://bit.ly/1WdzthR

NFU JAB Campaign launched 13th June and Farmer meetings have been held between 20th June – 20th July in the South East, South West, East Anglia, East and West Midlands


Vaccine is now available MSD Animal Health distributing CZ Veterinaria SA (CZV) bluetongue vaccine (BLUEVAC BTV8) and Zoetis - Zulvac® 8 Bovis and Zulvac® 8 Ovis. Both vaccines require two doses, three weeks apart with onset of immunity:

- Sheep: MSD – 20 days; Zoetis - 25 days,
- Cattle: MSD – 30 days; Zoetis - 25 days

Duration of immunity is one year.

There can be a transient rise in temperature following vaccination which may affect the fertility of breeding rams.

Livestock keepers should discuss vaccination and place orders with their vet. Is it an option which would benefit their business.
In Belgium there exists a Health Fund or Sanitary Fund which is a kind of solidarity Fund to which farmers have to contributed on yearly basis regarding their biosecurity risk. The Health Fund is used to finance disease surveillance and eradication programs, or refund farmers for compulsory slaughter (e.g bovine tuberculosis). The money in the Fund is steered by federal government with a big influence by farmers organisations and is now also used to fund the BTV-8 vaccination campaign. Sanitel is the unique federal databank which vets must be registered with and to which they must record vaccine doses used. Only Vets can administer the vaccine. The uptake is very good – in some regions ~80% of the farms have been vaccinated.

VIOs and partner PME providers have been reminded that the brain of all bovine, ovine, caprine and camelid foetuses and young animals up to one year (bovines) or six months (ovine, caprine and camelid) of age to be examined grossly (in situ should be adequate for this purpose). Any with porencephaly or hydranencephaly should be reported as suspect cases of Bluetongue.

- BTV in-utero infection can cause porencephaly (cavitation of the cerebrum) and hydranencephaly (an extreme form of this where the cerebral cortices are obliterated and the lateral ventricles dilate to fill the space).
- Both of these result in destruction of the brain tissue – as opposed to hydrocephalus which is a result of obstruction to the outflow of CSF, leading to dilation of the ventricles and crushing of the cortices.

BTV Surveillance UK

Since May 2016 APHA have investigated 31 report cases for Bluetongue in GB: Differentials have included photosensitisation with crusting of the muzzle. One non-negative lab result in a cow (ELISA) was negated on PCR and due to previous vaccination of the animal.

In the UK, in June, a serological survey of ~200 randomly picked dairy herds across the Southeast and East of England were tested using the ID VET™ milk ELISA on bulk milk samples, for antibodies to BTV to ascertain the background level of BTV-seropositive cattle and whether this would be a useful as an early warning system for BTV-8 incursion. The results showed a high proportion of herds (80%) tested positive for BTV antibodies. The test sensitivity is ~30% at 1% within herd seroprevalence and specificity for BTV antibodies is very high (99%). These results suggest that there is a high level of residual between-herd seropositivity in dairy cattle in these regions. There are four possible reasons for this, either alone or in combination:

- Animals are still present in the dairy herd which were infected with BTV during the 2007 / 2008 epizootic;
- Animals are still present in the dairy herd which were vaccinated against BTV during or after the 2008 - 2011 vaccination campaign in the UK;
- Animals have been imported into the herds from either areas with circulating BTV or from areas where vaccination was carried out;
There has been undiagnosed circulating disease in the herds since, or after the 2007/2008 epizootic.

The findings from the BTV bulk milk survey must be treated with caution. This does not imply that there is protective immunity in the dairy herd in the study areas. Each positive result could be caused by a few or even just one animal having an antibody titre due to past infection or vaccination and contributing to the bulk sample. The level of antibody itself cannot be determined from this single test and a positive result should not be taken as a sign for protective immunity of the herd. Some proportionate investigations will be carried out to ascertain the likely source of antibody positive animals within these herds.

BTV is notifiable. If suspected you must report it immediately to the Duty Vet at APHA:
- England: 03000 200 301
- Wales: 07000 780144
- Scotland: Nearest APHA Office

Diagnostic submission trends

Contributors of diagnostic submission data include APHA VICs, SAC C VS Disease Surveillance Centres and partner postmortem providers. It is worth noting that a submission may be comprised of a number of carcases submitted for examination, therefore these do not represent a count of carcases received.

Sheep Diagnostic Submissions Throughput

Table 3 shows the diagnostic submissions for Q2 for carcases, foetuses and other submissions from sheep. A comparison is provided to show the percentage of Q2 2016 submissions compared to the previous 2 years and previous 5 years.

Sheep submissions were higher in the previous 5 years as reflected by the 2016 v Prior 5 years 56% comparison for England. This probably reflects the closure of APHA VICs during that period. Since the introduction of the new post mortem service the comparison for the last two years 94% for England reflects that submission number are maintained but at a lower rate.

Table 3. Sheep Submissions by Country for Q2 2016
Goat Diagnostic submissions throughput

Goat submissions

Table 4 shows that carcase and non carcase goat submissions are lower that sheep submissions and have remained relatively stable for the last two years

Table 4 Carcase and non carcase Goat submissions Q2 2016

<table>
<thead>
<tr>
<th>Apr-Jun</th>
<th>Non Carcase Submissions</th>
<th>Carcase Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APHA</td>
<td>SAC</td>
</tr>
<tr>
<td>2016</td>
<td>116</td>
<td>44</td>
</tr>
<tr>
<td>2015</td>
<td>118</td>
<td>39</td>
</tr>
<tr>
<td>2014</td>
<td>126</td>
<td>135</td>
</tr>
<tr>
<td>2013</td>
<td>128</td>
<td>133</td>
</tr>
<tr>
<td>2012</td>
<td>124</td>
<td>109</td>
</tr>
</tbody>
</table>

Diagnostic Sheep & Goat submissions by syndrome

Fig 11 shows the profile of syndromes for all sheep diagnostic submissions for Q2 and fig 12 for goats, determine whether the balance is changing over time. The syndrome comes entirely from the classification to which the VIDA diagnosis code belongs; for unknown these represent all diagnostic codes where the disease type is unknown or the diagnosis is not applicable.

For Q 2 there has been little change in the syndromic trends for sheep. The reduction in the unknown category for goats reflects improvements to the data provided by submitting veterinary surgeons.

Fig 11: Graph showing percentage of sheep diagnostic submissions by syndrome Q2
Fig 12: Graph showing percentage of Goat diagnostic submissions by syndrome Q2

Maps

The map (fig 13) summarises surveillance coverage for sheep for both Q1 and Q2 2016. The map has 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 of scanning surveillance activities in England and Wales. It summarises the number of holdings with at least one diagnostic submission, welfare complaint or clinical suspicion of exotic disease as a proportion of all holdings of that species type within each county. Submission data include submissions to the diagnostic laboratories of APHA and contracted private providers of PM services. Diagnostic submissions to the Scottish Agricultural College (SAC) from holdings in England and Wales are also included. Data are limited to those holdings that could be georeferenced.

Demographic data on the underlying population of holdings by species is based on the work of the Livestock and Demographic Data Groups and are derived from Sheep and Goats: Agricultural Survey extracts from 2014.
Fig 13: Spatial distribution of Small Ruminant diagnostic submissions and health and welfare alerts Q1 & Q2 2016
Publications of interest

Sheep and goats papers published by APHA staff January - March 2016

Fernandez S; Galapero J; Rey J; Javier-Perez C; Ramos A; ROSALES R; AYLING R; Alonso JM; Gomez L (2016) Investigations into the seasonal presence of mycoplasma species in fattening lambs. Veterinary Journal 212, 80-82.

Graham AL; Nussey DH; Lloyd-Smith JO; Longbottom D; Maley M; Pemberton JM; Pilkington JG; Prager KC; SMITH L; Watt KA; Wilson K; McNeilly TN; Brulisauer F (2016) Exposure to viral and bacterial pathogens among Soay sheep (Ovis aries) of the St Kilda archipelago. Epidemiology and Infection 144 (9) 1879-1888.


Other publications of interest


Fernández-Aguilar X; Cabezón Ó; Colom-Cadena A; Lavín S; López-Olvera JR (2016) Serological survey of Coxiella burnetii at the wildlife–livestock interface in the Eastern Pyrenees, Spain. Acta Veterinaria Scandinavica 58 (1) 1-5

Gill J; Haydon TG; Rawdon TG; McFadden AMJ; Ha H-J; Shen Z; Feng Y; Pang J; Swennes AG; Paster BJ; Dewhirst FE; Fox JG; Spence RP (2016) Helicobacter bilis and Helicobacter trogontum: infectious causes of abortion in sheep. Journal of Veterinary Diagnostic Investigation 28 (3) 225-234


Kuley R; Smith HE; Janse I; Harders FL; Baas F; Schijlen E; Nabuurs-Franssen MH; Smits MA; Roest HIJ; Bosser A (2016) First complete genome sequence of the Dutch veterinary Coxiella burnetii strain NL3262, originating from the largest global Q fever outbreak, and draft genome sequence of its epidemiologically linked chronic human isolate NLhu3345937. Genome Announcements 4 (2)

Ortiz-Pelaez A; Arnold Me; Vidal-Diez A (2016) Epidemiological investigations on the potential transmissibility of a rare disease: the case of atypical scrapie in Great Britain. Epidemiology and Infection 144 (10) 2107-2116
References


MILLAR, M., BELL, S., GILBOA, Y. A. & CARSON, A. (2016) Transient agalactia in ewes. Veterinary Record 179, 21-22

