Emerging Threats Quarterly Report
Small ruminant diseases

Annual Report: Quarter 1 - 2015
Date: Jan – Mar 2015

Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview</td>
<td>2</td>
</tr>
<tr>
<td>Issues &amp; Trends</td>
<td>3</td>
</tr>
<tr>
<td>Horizon Scanning</td>
<td>5</td>
</tr>
<tr>
<td>New &amp; Emerging Diseases</td>
<td>6</td>
</tr>
<tr>
<td>Changes in disease patterns and risk factors</td>
<td>10</td>
</tr>
<tr>
<td>Unusual diagnoses</td>
<td>16</td>
</tr>
<tr>
<td>APHA staff Small Ruminant publications</td>
<td>17</td>
</tr>
<tr>
<td>Other publications</td>
<td>18</td>
</tr>
</tbody>
</table>

Highlights

- Bluetongue in Europe
- Veterinary Antimicrobial Resistance and Sales
- Neospora in Sheep
- Anaemia in lambs secondary to administration of cow colostrum

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 third party Post Mortem providers. During January to March 2015, these services were provided by the Royal Veterinary College, the University of Bristol 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 gathered by APHA and SAC Consulting: Veterinary Services (SAC C VS) division of the Scottish Rural College (SRUC) from samples submitted for diagnosis to regional laboratories in the 1st quarter of 2015 compared to the equivalent quarter of previous years. It aims to identify emerging small ruminant disease related threats.

From September 2014 AHVLA introduced additional partner providers of subsidised post-mortem examinations (PMEs), together with new carcase collection sites and subsidised carcase transport arrangements, to support veterinary businesses in their diagnostic work. These include the Royal Veterinary College (RVC) serving an area of the East of England, University of Bristol serving an area of the South West England and SAC C VS St Boswells serving an area of the North East of England.

At the time of writing this report, submissions had been received at all centres, VIDA diagnostic criteria applied and incorporated into the database disease analysis review.

From February 2015 partner providers of subsidised post-mortem examinations commenced and include: the University of Surrey now or soon operating out of sites located in the North West, South West, South East, West Midlands and East of England and with Iechyd Da providing services to practitioners in Wales and operating out of Aberystwyth.

The production of the report is underpinned by a large quantity of surveillance data and information, compiled as part of the Defra Animal and Plant Health Directorate. Further information can be found on the APHA Vet Gateway: http://ahvla.defra.gov.uk/vet-gateway/surveillance/reports.htm

OVERVIEW

Weather:

The first half of January was very mild, but the second half was colder, with mostly quieter weather but some snowfalls at times, especially across high ground in the north. There were some sharp frosts with temperatures lower than at any time earlier in the winter or during the whole of last winter. The provisional UK mean temperature for February 2015 was 3.5 °C. Wintry conditions continued through March across Scotland’s mountains with extensive snow cover and blizzards at times at higher elevations.
Industry

Comments provided by Stephen Howarth EBLEX. Final figures from the June 2014 census confirm that the UK lamb crop was the largest since 2006, as the result of a larger breeding flock and better seasonal conditions. The breeding flock as at December 2014 is expected to have shown a small increase, continuing the recent trend. With conditions favourable at tupping, prospects for this year’s lamb crop look positive. However, there is still time for weather conditions or other factors to impact numbers, so a modest reduction in the lambing rate is currently forecast. If correct, this would mean little change in the 2015/16 lamb crop. With estimates suggesting a large carryover of lambs into 2015, slaughtering’s in the early part of the year are expected to remain well above last year’s levels, boosted further by an earlier date for Easter 2015. Growth in throughputs is likely to slow down relative to last year as we move towards the switch in seasons. Given the slow start to the 2014 production year, there may still be a rise in slaughtering’s in the third quarter of 2015 but, thereafter, numbers are forecast to be at or below current season levels. With only small changes expected in the trade balance, domestic output will be the main driver of UK supplies, so the amount of sheep meat available for consumption is set to rise again in 2015.

With only small changes expected in the balance of trade, with imports and exports remaining broadly in balance, domestic production will remain the main driver of supplies on the UK market. As a result, the amount of sheep meat available for consumption is forecast to rise by 3% in 2015, continuing the rising trend of the previous two years.

**Issues & Trends**

**Diagnostic submissions**

Contributors of diagnostic submission data include APHA VI Centres, SAC C VS Disease Surveillance Centres and partner post mortem providers.
Partner post mortem providers in prior years were the Royal Veterinary College and University of Liverpool surveillance centres. Those partner post mortem providers contributing data for the first quarter (Q1 January-March) 2015 are the Royal Veterinary College, University of Bristol and SAC CVS St Boswells. Data from the University of Surrey and Iechyd Da will be included in future reports.

During Q1 our partner post mortem providers examined 3 goat carcase submissions and 23 sheep carcase submissions and these are included within the APHA Q1 figures (Fig 1). An annual comparison of carcase submissions for sheep and goats are also included. (Fig 2 & Fig 4). 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.

### Fig 1. Sheep Q1 submissions

<table>
<thead>
<tr>
<th>Jan-Mar</th>
<th>Non Carcase Submissions</th>
<th>Carcase Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APHA (SAC)</td>
<td>Total</td>
</tr>
<tr>
<td>2015</td>
<td>1,546 (4.6%)</td>
<td>995 (16.7%)</td>
</tr>
<tr>
<td>2014</td>
<td>1,620</td>
<td>931</td>
</tr>
<tr>
<td>2013</td>
<td>2,147</td>
<td>995</td>
</tr>
<tr>
<td>2012</td>
<td>2,241</td>
<td>1,123</td>
</tr>
<tr>
<td>2011</td>
<td>1,571</td>
<td>945</td>
</tr>
</tbody>
</table>

### Fig 2. Sheep Annual submissions

<table>
<thead>
<tr>
<th></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>2014</td>
<td>3,851</td>
<td>2,766</td>
</tr>
<tr>
<td>2013</td>
<td>4,506</td>
<td>2,691</td>
</tr>
<tr>
<td>2012</td>
<td>4,788</td>
<td>2,839</td>
</tr>
<tr>
<td>2011</td>
<td>3,819</td>
<td>2,367</td>
</tr>
<tr>
<td>2010</td>
<td>4,508</td>
<td>2,364</td>
</tr>
</tbody>
</table>

### Fig 3. Goats Q1 submissions

<table>
<thead>
<tr>
<th>Jan-Mar</th>
<th>Non Carcase Submissions</th>
<th>Carcase Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APHA (SAC)</td>
<td>Total</td>
</tr>
<tr>
<td>2015</td>
<td>96 (19.4%)</td>
<td>39 (40%)</td>
</tr>
<tr>
<td>2014</td>
<td>106</td>
<td>66</td>
</tr>
<tr>
<td>2013</td>
<td>118</td>
<td>93</td>
</tr>
<tr>
<td>2012</td>
<td>107</td>
<td>104</td>
</tr>
<tr>
<td>2011</td>
<td>120</td>
<td>89</td>
</tr>
</tbody>
</table>

### Fig 4. Goat Annual submissions

<table>
<thead>
<tr>
<th></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>2014</td>
<td>451</td>
<td>310</td>
</tr>
<tr>
<td>2013</td>
<td>486</td>
<td>328</td>
</tr>
<tr>
<td>2012</td>
<td>434</td>
<td>304</td>
</tr>
<tr>
<td>2011</td>
<td>459</td>
<td>267</td>
</tr>
<tr>
<td>2010</td>
<td>492</td>
<td>290</td>
</tr>
</tbody>
</table>
Blue tongue

Central Veterinary Institute the Netherlands has reported that it chanced upon a new species during its weekly surveillance of Culicoides attacking livestock in the Netherlands during the spring/summer of 2014. The species has a distinct dark wing pattern and has not been described before. *Culicoides scoticus* and *Culicoides obsoletus sensu stricto*, both belonging to the Obsoletus complex, are known to be a vector for Schmallenberg virus (SBV) and very likely Bluetongue virus (BTV). Up to now it is unknown whether this new species, temporarily called ‘dark obsoletus’, is also a possible vector for the above-mentioned viruses.

In the next three years CVI continues its weekly *Culicoides* surveillance near livestock and horses. Besides information obtained of possible shifts in distribution and species of *Culicoides* during several years, the *Culicoides* collected can also be tested for the presence of SBV and BTV and possible other “new-emerging” arboviruses. [http://www.wageningenur.nl/en/Expertise-Services/Research-Institutes/Central-Veterinary-Institute/show/New-species-Culicoides-possible-vector-animal-diseases-in-the-Netherlands.htm](http://www.wageningenur.nl/en/Expertise-Services/Research-Institutes/Central-Veterinary-Institute/show/New-species-Culicoides-possible-vector-animal-diseases-in-the-Netherlands.htm)

Disease has been reported in the coastal regions of southern Croatia and Montenegro (BTV-4) and in mainland Italy (BTV-1) as far north as the Po river delta, south of the Alps. In the EU, several countries are recognising the risk of spread of BTV now the vector free period is coming to an end. Bulgaria has reported they have vaccinated over 75% of their sheep population, but very low numbers of cattle. Croatia has vaccinated over 78% of all sheep and cattle against BTV-4. Slovenia (where part of their territory was covered by the restriction zones in place for the Hungary outbreaks) has not vaccinated, but may allow it for preventive reasons or for trade purposes if the farmer is interested.
Veterinary Antimicrobial Resistance and Sales

This annual publication presents veterinary antimicrobial sales in the UK from 2009 to 2013 and antimicrobial resistance trends across England and Wales from 2011 to 2013.

This combined report is issued by the Veterinary Medicines Directorate. Data for the sales section are produced by the Veterinary Medicines Directorate. The total amount of antibiotics sold for sheep is small (less than three tonnes)
Data for antibiotic resistance section are produced and collated by the Animal and Plant Health Agency.

For sheep the report describes the pathogens and isolates with their resistance patterns which include:

- Pasteurella multocida, Mannheimia haemolytica, Bibersteinia trehalosi, Trueperella pyogenes
- Corynebacterium pseudotuberculosis, Streptococcus dysgalactiae, Yersinia pseudotuberculosis, Listeria monocytogenes, E. coli isolates in neonatal, pre-weaning and adult sheep,
- Erysipelothrix rhusiopathiae and Salmonella Typhimurium.

An example of the tables in the report is shown in Fig 5.

Of the bacteria that are of interest to human public health, none of the Salmonella spp. isolated from sheep were resistant to ciprofloxacin (fluoroquinolone).

Of E. coli isolates collected by scanning surveillance (obtained from diagnostic submissions and therefore may be pathogenic or commensal strains), greatest resistance to fluoroquinolones was observed in cattle, with 12% of isolates resistant to enrofloxacin. 4% of E. coli isolates from sheep were resistant to enrofloxacin, which was an increase from 0.6% in 2012.

Summary of pathogens isolated from sheep

Respiratory pathogens

Resistance was not detected to enrofloxacin or florfenicol in Pasteurella multocida, Mannheimia haemolytica, Bibersteinia trehalosi or Histophilus somni in cattle, sheep and pigs.

Pasteurella multocida – 19 isolates were identified over the three year period, multiple resistance was not detected,

Mannheimia haemolytica – 116 isolates were identified over the three year period, no resistance was detected.

Bibersteinia (Pasteruella) trehalosi – 81 isolates were identified over the three year period, multiple resistance was not detected. Four isolates were resistant to tetracycline. No other resistance was detected.

Trueperella pyogenes – 31 isolates were identified over the three year period, multiple resistance was not detected. Resistance was observed against tetracycline (25%) and trimethoprim/sulphonamide (38%), and one isolate was resistant to tylosin in 2011.

Corynebacterium pseudotuberculosis – 19 isolates were identified over the three year period, multi-resistance was not detected. No resistance was observed in 2013, although in 2011-2012 two isolates were resistant to tetracycline and one isolate was resistant to trimethoprim/sulphonamide.

Streptococcus dysgalactiae - 77 isolates were identified over the three year period, multiple resistance was not detected, and in 2011 all of the isolates tested were resistant to tetracycline, this figure declined to 85% in 2013. Resistance was also seen to tylosin in 4% (one isolate) each year. The isolates were susceptible to all of the other antibiotics tested.

Erysipelothrix rhusiopathiae - One isolate was submitted in 2012, which was resistant to trimethoprim/sulphonamide but susceptible to ampicillin, tetracycline and tylosin.

Listeria monocytogenes - 42 isolates were identified over the three year period, no multi-resistance was identified. In 2011 and 2012, 31 out of 32 isolates were resistant to cepalexin,
in 2013 the level of resistance observed reduced to 3/10. One isolate was resistant to tetracycline in 2012 but all other isolates were susceptible to the antibiotics tested.

**Yersinia pseudotuberculosis** – Three isolates were identified over the three year period, no resistance was identified.

**E. coli** – 473 isolates were identified over the three year period. 
**Neonatal** – 368 isolates were identified from neonatal sheep over the three year period. The proportion of multi-resistant isolates increased over the period 2011-2013; 31%, 38% and 54% respectively. Highest resistance was seen to tetracycline, increasing from 56% in 2011 to 75% in 2013. Resistance also increased over the three years to ampicillin (53%-62%), streptomycin (43-55%), spectinomycin (39-59%), trimethoprim sulphonamide (21-31%), florfenicol (4-17%), neomycin (11-19%) and enrofloxacin (0-3%). Resistance was also seen to amoxicillin/clavulanic acid (18-28%), apramycin (1-2%), and ceftazidime (1-4%), although resistance to these antibiotics did not increase each year.

**Pre-weaning** – 56 isolates were identified from pre-weaning sheep over the three year period. In 2011 multi-resistance was seen in 18% of isolates, but was not observed in 2012 or 2013. The numbers of isolates tested against each antibiotic were low. No resistance was seen to apramycin, ceftazidime or enrofloxacin.

**Adult** – 50 isolates were identified from adult sheep over the three year period. Multiple resistance was observed. Highest resistance each year was seen to tetracycline (8-16%) and ampicillin (6-12%).

**Salmonella** – 238 isolates were identified over the three year period. In 2011 87% of isolates were fully susceptible to all antibiotics and this increased to 94.5% in 2013. Highest levels of resistance were seen to streptomycin, which ranged from 12% in 2011 to 2.2% in 2013. Resistance to ampicillin was 6% in 2012 and reduced to 2.2% in 2013. 4% of isolates were resistant to tetracycline and sulphonamide compounds in 2011 and this reduced to 2.2% in 2013. 1% of isolates were resistant to nalidixic acid and chloramphenicol in 2011 but no resistance to these antibiotics was observed in 2013.

Fig 5. Susceptibility of *E. coli* isolates in neonatal, pre-weaning and adult sheep in 2013
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 SAC was harmonised from 2007. In this report GB data from the third quarter of 2014 is compared with the data from the equivalent quarter in 2013 and has also been compared with pooled data for the five previous years.

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.

Analysis of Diagnosis Not Reached (DNR)*

There are no indications of any new or emerging disease syndrome. There were statistically significant increases as described below, but further investigation has not revealed any evidence of a new and emerging disease.

**Sheep Quarter 1:**
- There was no significant change in overall %DNR for GB for the 1st quarter 2015 (23.3%) compared to equivalent previous quarters (24.4%).
- There were no significant changes for APHA figures (23.9 to 23.9%) and neither for SAC (25.6 to 22.2%) for this quarter.
- There were significant increases for the presenting signs “Reproduction” and “Skin” for GB. See Table 1. below.

The early detection system showed no exceedance of DNR threshold values for the 1st quarter 2015 when compared to data from the previous 5 years for submissions received at APHA laboratories in England and Wales.

**Goats Quarter 1:**
- There was no significant change in the overall %DNR; 24.0% for prior years compared to 26.8% for 2015.
- There were no significant increases for any of the presenting signs or syndromes.

**Analysis of DNR by syndrome and presenting sign**

**Table 1: Syndromes / presenting signs showing a significant increase in %DNR for sheep for the 1st quarter 2015 compared to the equivalent quarter 2014 for GB**
GB Small Ruminant Disease Surveillance quarterly report
Q1 Jan - Mar Date May 2015

Presenting sign “Reproductive” in sheep
Significant increase in GB figures for quarter 1 as shown in table 1. There was an equivalent significant increase for APHA figures. In three quarters of the cases involved (GB figures) blood samples only were submitted and these cases should have been marked as limited testing and is being addressed. There are therefore no indications of a new or re-emerging threat.

Syndrome and Presenting sign “Skin” in sheep
Significant increases in GB figures shown in table 1. This is an ongoing trend seen for quarter 4 and the annual figures last year. There were equivalent significant quarterly increases for SAC figures (presenting sign and syndrome) and for APHA figures (syndrome only). Increased testing for sheep scab in Scotland and the increased cost of the skin package (APHA cases) are likely to have played a role. Further analysis of the cases revealed that in 6/6 of the APHA submissions involved, the full skin package had not been requested and should therefore have been marked as limited testing. In 7/10 of the SAC cases a reason was listed that could explain why a diagnosis was not reached despite reasonable testing. There are therefore no indications of a new or re-emerging threat.

* When a VIDA diagnostic code is assigned to a specific submission, the decision has to be made if it meets the stated diagnostic criteria. If the criteria are not met, it is marked as “Diagnosis Not Reached” or DNR. If it is a DNR, the next step is then to decide if this was due to limited testing or if reasonable testing had been done. If it is deemed that reasonable testing had been done, there may be reasons why a diagnosis could not be reached and this should be recorded and can include inappropriate disease phase, treatment, inconclusive results, or other reasons. Typical examples of such submissions include; coccidiosis cases where speciation was not done and Johne’s cases in live sheep where the test results may be inconclusive. However, in some cases there is no apparent reason to explain why a diagnosis could not be reached and these are the submissions, if present in significant numbers, which may indicate new and emerging disease.

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 scale of the charts varies and therefore care must be taken when comparing individual charts.

SYSTEMIC AND MISCELLANEOUS DISEASES
No statistically significant changes for diseases examined.

*Bibersteinia trehalosi septicaemia*
There was an increase for GB for this quarter, with 3 recorded incidents compared to none the equivalent previous quarter (Fig 6). Quarter one always has the lowest number of cases of the year and is linked to a relative lack of susceptible age group lambs (between 6-9 months age) this time of year.
ALIMENTARY TRACT DISEASES

No statistically significant changes for diseases examined.

**Rotavirus**

No significant increase recorded but the number of incidents for the 1st quarter has remained high for the previous three year (Fig 7).

Rotavirus was diagnosed 10 times in March from submissions submitted to Shrewsbury alone, often in very young lambs only a few days old. On one farm the lambs from yearlings and triplets were reported to be worse affected. The individual pens used after lambing had an earth floor so although they were cleaned out between sheep they did not dry out completely. In another submission over half the lambs were affected in a pedigree Texel flock.

**Yersiniosis in a commercial dairy goat herd**

Depression, anorexia, enteritis and significant milk drop were seen in a large commercial dairy goat herd. After 3 weeks nearly all 1000 milking goats had been affected. Some developed conjunctivitis with associated lymph node enlargement. Thankfully both enteritis and conjunctivitis responded to penicillin injections. Only groups receiving a TMR were affected suggesting that the disease was feed mediated. A flock of several hundred starlings were known to feed and defecate on the TMR silage. Histopathology suggested bacterial enteritis and Yersinia was suspected. *Yersinia pseudotuberculosis* was isolated from faecal samples and conjunctival swabs. Wild birds and rodents can carry Yersinia in their faeces. A farm visit was carried out by a Penrith VIO who discussed the zoonotic implications. It was strongly advised to prevent wildlife access to the feed stuffs. Concurrent Yersinia conjunctivitis and enteritis has been described before in UK goat herds - Wessels, ME, Payne, J, Willmington, JA, Bell, SJ, Davies, IH. 2010 *Yersinia pseudotuberculosis* as a cause of ocular disease in goats *Veterinary Record;*166:22 699-700.
RESPIRATORY DISEASES
No statistically significant changes for diseases examined.

OPA/Jaagsiekte
The number of incidents for OPA/Jaagsiekte occurring in the Q1 follows an increasing trend over the previous three years (Fig 8). Ovine pulmonary adenocarcinoma (OPA) was diagnosed on 14 occasions by APHA and on 24 occasions by SRUC. During February seven of these diagnoses were made at St. Boswells. Possible explanations for this could include investigation of thin, barren ewes following scanning or increased problems with weight loss and death associated with the stress of advancing gestation and poor winter nutrition.

Fig 8: Annual incidents of OPC/Jaagsiekte for GB as a % of diagnosable submissions 2004-2015

(Vertical bars represent 95% confidence limits)

URINARY DISEASES
No statistically significant changes for diseases examined.

BLOOD, LYMPH AND CIRCULATORY DISEASES
No statistically significant changes for diseases examined.

SKIN DISEASES
No statistically significant changes for diseases examined.

Sheep Scab
Scientists at Moredun have developed a novel diagnostic blood test for sheep scab infestation, which is now being carried out by APHA. Sheep scab, caused by the mite *Psoroptes ovis*, is one of the most important parasitic diseases of sheep in the UK and is a notifiable disease in Scotland. During the early stages of sheep scab, infestations are not obvious and animals often appear clinically normal. This sub-clinical stage can last for several weeks during which animals can act as a source of infection for other sheep. For control or eradication programs to be successful, it is crucial that all infested animals are identified as quickly as possible, including sub-clinical cases and this is now possible using the new Moredun blood test.

The test detects host antibodies to a specific protein found only in the sheep scab mite, which means that the test can accurately detect that an infestation is due to the scab mite and not another ectoparasite. The test can detect infested animals at an early stage and before the onset of clinical symptoms, which will be important in the effective control of the parasite.

APHA currently offers veterinary surgeons ectoparasitic examinations of skin scrapings taken from sheep. It is hoped that integrating the results of the skin scrapings with this new blood test will provide a more powerful and reliable diagnostic service for sheep scab.
REPRODUCTIVE DISEASES
No statistically significant changes for diseases examined.

A full analysis of all the diagnoses will be done in the second quarter when all the data of the current breeding/lambing season are available.

Fetopathy due to Schmallenberg virus
No confirmed cases of Schmallenberg affected lambs had been recorded in GB for this quarter, but there were sporadic reports of deformed lambs with changes suspect for this virus. However, submitted carcasses or submitted brain tissues, both fixed and fresh, have shown no evidence of virus or typical histopathological changes.

Fetopathy due to Coxiella burnetii
Fetopathy due to Coxiella burnetii was diagnosed in a small flock of 17 pedigree Zwartble ewes where two aborted or gave birth to dead lambs. It was diagnosed on two submitted lambs, which belonged to a set of triplets of which one was born alive and apparently healthy and two were born dead. Appropriate information was provided to the private veterinarian and the farmer.

Fetopathy due to Chlamydophila abortus (Enzootic abortion in ewes –EAE) with unusual presentation
EAE is usually the most common cause of abortion detected in sheep by APHA each year. Typically it causes late term abortions and weak live lambs without maternal deaths or overt clinical signs of disease in aborting ewes. Penrith reported two submissions from the same farm where the abortion material consisted of decomposing, partly mummified placentae and foetuses. Smears of placenta proved positive for Chlamydophila sp. and this was confirmed by PCR. This is an unusual presentation as mummification is mainly associated with Toxoplasmosis. Vaccination to reduce these infections is available.

Fetopathy due to Bibersteinia trehalosi and Toxoplasma
Bibersteinia trehalosi was identified from three foetuses from a lowland flock where 7/250 ewes aborted. Abortions and lambings with one rotten lamb and one live were reported across all age groups. The ewes were vaccinated against both EAE and toxoplasma. The ewes were fed silage and a home mix of barley. Two of the submitted placentas had knobly speckled cotyledons with brown intercotyledonary areas. The submitted lambs had full wool cover and no visceral lesions. Testing of the placental tissue was positive for toxoplasmosis and mixed flora of Bibersteinia trehalosi and Streptococcus spp was cultured from all three foetuses. It is uncertain if the Bibersteinia trehalosi played an active role in the abortions.

MUSCULO-SKELETAL DISEASES
No statistically significant changes for diseases examined.

NERVOUS DISEASES
No statistically significant changes for diseases examined.

Cerebro-cortical necrosis (CCN)
No significant changes.

Louping ill
No significant changes.
Listerial encephalitis

There have been no significant changes to the number of diagnoses of Listerial encephalitis made by GB during this quarter when compared to the same quarter in 2014 (Fig 9). However, of interest is the difference between diagnoses made by SAC and APHA during 2015 compared to 2014. For example, APHA has seen a decrease in diagnoses with 21 cases (1.88%) recorded in 2014 compared to 3 cases (0.34%) in 2015. Conversely, SAC reported an increase in cases – 11 cases (4.55%) in 2014 versus 17 cases (6.72%) in 2015.

Fig 9: Incidents of Listerial encephalitis in Sheep as % of diagnosable submissions in Q1

PARASITOLOGY

Acute fasciolosis

There was little acute fasciolosis in this quarter, for the second year in succession. This continues the trend for the last two quarters where there was a low incidence of acute fasciolosis. The number of infective metacercariae on the pasture was not sufficient to cause acute fasciolosis on most sheep holdings during the autumn and winter (Fig 11).

Fig 11: Incidents of Acute fasciolosis in Sheep as % of diagnosable submissions in Q1

Chronic fasciolosis

In contrast to acute fasciolosis, the percentage diagnosis for chronic disease remained similar to the same quarter last year (Fig 12). Assuming that farmers have treated over the autumn and winter, the data suggests that some of this has not been effective. It means that fasciolosis
could become a problem on these farms. Rainfall has a direct effect on the success of the liver fluke life cycle (Taylor, 2012) and there has been a lower than average rainfall in most areas for the last two years. If there is an increase in spring and summer rainfall this year, there could be a resurgence of infection.


Fig 12: Incidents of Chronic fasciolosis in Sheep as % of diagnosable submissions in Q1

Parasitic gastro-enteritis
There was a significant increase in incidents of parasitic gastro-enteritis (PGE) diagnosed this quarter (Fig 10) compared to same quarter in previous years (139 incidents this quarter, 20.2 % of diagnosable submissions in GB). This is likely due to a continuation of cases in older lambs in the last quarter of 2014 and reflects little exposure over the previous drier summer until the wetter winter.

Where washes of the gastro-intestinal tract were carried out both *Teladorsagia* and *Trichostrongylus* spp were detected in the abomasum and small intestines. There was also often a history of recent treatment with a benzimidazole anthelmintic. Resistance is most common to this class of anthelmintic with varying surveys suggesting over 80% of farms have detectable resistance.

Fig 10: Incidents of Parasitic gastro-enteritis in Sheep as % of diagnosable submissions in Q1
GOAT DISEASES

Zoonotic Disease
An unusual presentation of toxoplasma abortion is suspected in a 180 milking goat herd. The herd has been closed for eight years and there are cats on the farm which have free access to the goat sheds. The herd experienced a high rate of abortion in the 2013 kidding season, a trend which has continued in 2014 and now also into 2015. The clinical picture is abortion of autolytic and mummified foetuses; foetal membranes are rarely recovered. In 2013 laboratory investigations identified high antibody titres for Toxoplasma gondii in roughly 50% of goats sampled, although a rise in titre was not confirmed by paired serology. T. gondii vaccination was subsequently given to all goats on the farm in late 2013 and in 2014. In 2014 high antibody titres against T. gondii were again identified in aborting goats (1/1024 and above in four animals sampled).

The clinical picture this year remains the same, and unusually, some of the goats have now aborted in consecutive seasons. This year a vaccinated goatling has also aborted. Despite comprehensive abortion investigations which have ruled out common abortifacient agents, the cause remains unknown.

Histology has identified changes in the foetal brain consistent with hypoxia (likely the result of placental insufficiency), and evidence of infectious exposure in utero. Foetal samples tested negative for Toxoplasma and Neospora on PCR; however this does not preclude the possibility of T. gondii-associated abortion. There is some recent experimental evidence in sheep that T. gondii can result in abortion in the absence of typical placentitis and foetal encephalitis, and this is considered a possible explanation for the abortions experienced in this herd.

NUTRITIONAL DISEASE

Whilst ad-lib hay is an important component of a goat’s diet, ad-lib concentrate feeding can be problematic, as highlighted by the cases below.

University of Bristol diagnosed severe fatty liver in two dry goats that died without premonitory signs in a 700 dairy goat herd. Goats were housed all year round and fed a nutritionist formulated cake and hay, both ad-lib. Lactating goats consumed 2.5 to 3 kg of cake and dry goats 0.5 kg per day. At post mortem examination the liver was friable, pale and greasy and floated in formalin. There were two near-term fetuses in the uterus. There were large amounts of fat in the carcase and aqueous humour testing confirmed severe ketosis (14.30 mmol/l). Ad-lib feeding in an extended dry period (the goat had not kidded for a year) was thought to be responsible.

A castrated adult male goat which became inappetant and died 48 hours later was submitted to RVC. Post mortem examination noted the animal was in excessively good body condition, and there was marked fibrinous cystitis and hydronephrosis with a few urinary calculi present. The oesophagus, and to a lesser extent the caecum and abomasum, were ulcerated. A high vitreous humour urea level supported a diagnosis of urolithiasis with cystitis and hydronephrosis and secondary uraemia. This animal was reportedly the bully of the group and hence overeating likely accounted for its body condition; eating large amounts of concentrates is a known risk factor for this condition in male goats.
UNUSUAL DIAGNOSES

Ethylene Glycol poisoning
Ten out of a group of 26 ewe lambs had died following signs that included pyrexia, blindness, head pressing, recumbency and opisthotonus before death. They had been let into an area with long grass and contained old machinery sheds with disused tractors and farm implements. Lead poisoning was suspected as broken batteries were present, however blood samples were tested for lead and were <0.15 µmol/l - Background level. A post mortem examination at Shrewsbury revealed marked pallor of the renal cortex and darkening of the medulla and aqueous humour urea levels were 192.99mmol/L (ref range serum 2.6-6.6mmol/L) suggesting a nephropathy. Histological examination of the kidney revealed crystal nephropathy raising the possibility of oxalate toxicity as a consequence of exposure to ethylene glycol, or to oxalate containing plants such as Chenopodium, Oxalis, Rumex and Rheum species. A farm visit was conducted and several anti-freeze/ethylene glycol containers containing liquid were present in the grazed field. A food safety report was made. As far as we are aware ethylene glycol toxicity in sheep has not been reported before in the UK.

Neospora in sheep
A new-born lamb with deformities suspected to be due to in-utero Schmallenberg virus (SBV) infection was submitted to Carmarthen for post mortem examination. The cervical spine had a tendency to twist so that the head pointed back over the shoulders and arthrogryposis involved both shoulder joints and all hind limb joints. The hind legs appeared elongated and the spinal cord was reduced in diameter. Examination of the brain did not detect hydranencephaly (a presentation associated with Bluetongue teratogenesis). SBV RNA was not detected in brain by RT-PCR and the dam tested seronegative for SBV. Histological examination revealed a severe protozoal panmyelitis and encephalitis with intrallesional protozoa. There was also a multifocal non-suppurative myositis with occasional associated protozoal forms. Immunohistochemistry detected Neospora caninum with extensive intense labelling of intrallesional tachyzoites and tissue cysts in the brain and spinal cord. There was no histological evidence of any virally induced changes. N. caninum infection in sheep is rare and investigations are ongoing on this farm. This is the first record of arthrogryposis associated with N caninum myelitis in sheep. There are many possible causes of arthrogryposis in sheep and this case illustrates the limitations of diagnosis of SBV-induced abnormalities by gross examination alone.

Neuroaxonal Dystrophy in Zwartble sheep
Over the course of one month, three Zwartble ewe lambs were presented for investigation of unusual progressive neurological signs. The clinical signs reported included ataxia, with forelimbs more severely affected, slight flexion in the fetlock joints, recumbency and appearing to strain to pass urine. One lamb was presented live and was reluctant to walk, with arching of the back, head tremor, wide based stance and intermittent weight bearing on the points of the claws of the hind limbs. Gross post mortem examination was unremarkable in all cases and brain and spinal cord were examined histologically. Neuroaxonal dystrophy (NAD), characterised by intense spheroid formation with variable astrogliosis was detected particularly in medullary nuclei and also in spinal grey matter, together with sparse Wallerian degeneration and sparse spheroid formation in white matter mainly in thoracic spinal segments. A review of submissions to APHA in the previous 10 years found two further cases of NAD in sheep with Zwartble breeding, in addition to the two cases recorded earlier in the year. Interestingly further cases were also identified at Thirsk. NAD has been reported as a familial or suspected familial disease in several sheep breeds and is likely to have a genetic basis. Examination of the breeding records by the owner is ongoing.
Anaemia secondary to administration of cow colostrum was thought to be the cause of death in mule cross lowland lambs. Seven had died from a group of 200. The submitted lamb was three weeks old and one of twins. The carcase was pale and slightly jaundiced, with moderate liver enlargement, marked mesenteric lymph node enlargement and enlarged, pale and firm kidneys. The pallor and jaundice seen are consistent with haemolytic anaemia due to an auto immune reaction following administration of cow colostrum.

BVD in sheep
A two-day-old lamb was submitted alive for post mortem examination. The animal was displaying full body tremor. The brain was examined post euthanasia and it looked grossly normal. All other body systems were unremarkable. PCR for BVD virus on brain tissue was positive for BVD type I. A small percentage of Border disease cases are recognized as being caused by BVD virus. This is an important consideration for cattle eradication programmes.

Welfare
Colleagues in the field service investigated a case of short tail docking in sheep (Fig 13).

Guidance on Sheep & Goat Welfare can be found on the following link https://www.gov.uk/sheep-and-goat-welfare
It states that: If possible, tail docking should be avoided. This practice is only acceptable when not doing it will cause welfare problems relating to dirty tails and fly strike. This must be done by a competent person and sufficient tail must be retained to cover the sheep’s anus or vulva.

Fig 13. Tail docked unacceptably short

APHAs staff Small Ruminant publications Jan – March 2015


Other publications


HAWKINS, SAC, SIMMONS, HA, Gough, KC, Maddison, BC. (2015) Persistence of ovine scrapie infectivity in a farm environment following cleaning and decontamination Veterinary Record 176 (4) 99


