GB Emerging Threats
Quarterly Report
Small Ruminant Diseases

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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.

editor: Amanda Carson, APHA Penrith
tel:  +44 (0) 1768 885295
fax: +44 (0) 1768 885314
e-mail: Amanda.carson@apha.gsi.gov.uk
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 fourth 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

On the whole the period from October to December was comparatively mild. October was dry with just 38% of average rainfall overall and the overall mean temperature was 9.8 degrees C but ranged for 22 to -5 degrees with the potential for ongoing midge activity in some parts (Fig 1). Given the resurgence of Schmallenberg leading to the birth of deformed lambs and confirmation of the disease in December 2016 this mild weather may have consequences for early lambing flocks sheep infected by midges during that susceptible period of early autumn.

November was also mild with temperature extremes ranging from 19 to –12 degrees C and near or slightly above average rainfall. December was also mild with a provisional UK mean temperature of 5.9 °C, which is 2.0 °C above the 1981-2010 long-term average.

Midges are vectors for both Schmallenberg virus and Bluetongue virus. This mild autumn has meant that by mid-December The Pirbright Institute was still reporting midge activity. The vector free period starts where there are fewer than five female midges with abdominal pigmentation caught/trapped per night. The pigmentation is an indication of age that means that the females have at least been out there for a few days.

The vector free period 2016/17 was declared in January 2017. Seasonal vector free periods for the past three years have been

17th December – 12th April (2015/16)
26th November – 14th April (2014/15)
14th January – 1st April (2013/14)

Temperature range limit for replication of BTV in midges is currently considered to be 12oC.
Industry

The fourth quarter of 2016 was a mixed one for the UK sheep sector. The weakness of the pound and tight supplies at the beginning of the period led to prices reaching a record level for the time of year in October and November. However, supplies began to rise as the period progressed. This combined with a decline in demand for sheep meat both domestically and a fall in prices in France led UK sheep meat prices to begin to fall again in December. This meant that by the end of the period prices had fallen below year earlier levels. Lamb prices were influenced by a decline in sales of sheep meat compared to the previous year this was driven by higher prices which led to a fall in the volume of sheep meat sold. Moving into 2017 a larger lamb crop in 2016 and lower slaughterings through the summer and autumn mean that there are likely to be more lambs carried over into 2017, increasing slaughterings in the first half of the year. The breeding flock in 2016 was thought to have been larger, however with ewes being in poorer condition and increased incidents of schmallenburg seen in lambing so far in 2017 the lamb crop may be to be smaller than that seen in 2016.

Mark Koslowski AHDB Beef and Lamb

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 2010-2015 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 INVESTIGATION

Schmallenberg virus (SBV)

SBV is not a notifiable disease. It was first detected along the Dutch/German border in 2011, and spread extremely rapidly reaching GB in 2012 and as far North as Finland. It is caused by an orthobunyavirus that is related to Akabane virus. Some orthobunyaviruses are however there is no evidence that SBV is zoonotic.

SBV is spread by Culicoides midges; like BTV, infection is very efficient midge to animal but, unlike BTV, is also spread very efficiently from animal to midge. This means that disease spread can be very rapid within and between herds and flocks even though the period an animal carries the virus (viraemia) is only 5-7 days compared to 14 days in BTV. Sheep, goats and cattle are affected.

Clinical signs: Most infection of adult animals is in apparent unless high levels of virus are generated, and more severe signs are seen in cattle than sheep. Adult cattle develop a fever, acute drop in milk (up to 50% of previous production which is recovered over about a week) and in some cases profuse diarrhoea affecting from a few to a large proportion of the herd. This acute infection passes through the herd in about 3 weeks, after which production recovers, but there are reports of drops in fertility (for example, increased number of services per conception). After experimental infection of thirty sheep, thirteen became viraemic; of these, only one
showed diarrhoea for several days and in no animal was fever recorded. The period of viraemia appeared to be of similar length to that reported for cattle; viral genome was detectable for about 3–5 days by using RT-qPCR (Wernike and others 2013)

The other main clinical signs are seen in near-term lambs and calves. The virus is teratogenic, i.e. it causes damage to the growing fetus resulting in arthrogryposis (twisted limbs and spine), hydranencephaly (brain deformities) leading to stillbirth or in some cases ‘dummy’ animals. This transplacental infection occurs more frequently in lambs and less frequently in calves. Typically small numbers of lambs and calves are affected, unless management practices have led to a high proportion of the flock or herd becoming infected in the early part of pregnancy- for example, the use of synchronised breeding in some pedigree sheep flocks led unfortunately to a few cases to incidents where 30% of lambs were affected.

Current situation

ProMED have described the recrudescence of SBV, in Europe, in Netherlands and Germany in October 2016. The Netherlands reported clinical signs of milk drop and diarrhoea in dairy cows and suggested that clinically affected cows have been PCR positive for SBV and have also shown evidence of seroconversion. In Belgium, abortion with fetal deformities of arthrogryposis (twisted limbs) and hydranencephaly was reported.

In November 2016 SBV virus was detected in a deformed calf in Cornwall and evidence of seroconversion as part of routine screening in cattle in the Midlands was reported. APHA data indicate no confirmed diagnosed cases of SBV in the UK in 2015.

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).

While SBV is currently categorised as endemic it is nevertheless important to confirm the presence of the virus and at this early stage how widespread this appears to be. In cases of deformed lambs, APHA is currently offering free SBV PCR tests (test code TC0905) on samples of fresh brain from affected animals by prior arrangement with a Veterinary Investigation Officer. A sample of 1 cm³ cerebral cortex or alternatively fresh brain stem is required for the test.

When investigating foetal lesions, colleagues are reminded to remain alert to the possibility of differential diagnoses other than SBV, including for example, the possibility of hydranencephaly induced by in utero infection with bluetongue virus (a notifiable disease) which must be reported to APHA.

APHA has also provided more information on SBV cases in lambs confirmed by APHA in England and Wales during December 2016 and January 2017 on the APHA Vet Gateway website: http://ahvla.defra.gov.uk/vet-gateway/schmallenberg/index.htm. This information will be updated to show new cases, by county, on a fortnightly basis.
Vaccination

Two vaccines were available in GB but, despite warnings, due to lack of uptake in previous years, neither is currently available. Although these vaccines could be brought back into production, there will be a lag during which animals will not be able to be vaccinated. Cattle, sheep and goat owners are strongly advised to consult their veterinary surgeon, to ensure that they have an active up to date flock health plan which includes provision for SBV, and that advice is sought to determine what their flock or herd SBV status is and what might be done to protect livestock from disease.

Uncertainties

The Small Ruminant Species Expert Group (SRSEG) is aware of anecdotal reports of the birth of deformed lambs, however without confirmation it will be difficult to measure the impact of the disease and inform decision making on vaccine requirements.

The SRSEG is also aware of reports of disappointing scanning results and empty ewes and SBV has been suggested as the cause. A review of the previous Schmallenberg virus infection in small ruminants (Lievaart-Peterson and others 2012) stated that “If infection of a naïve female would occur in early pregnancy, an increase in fetal deaths may be expected; increased proportion of female ewes returning to oestrus, as well as increased proportion of non-pregnant ewes lends support to this argument.”

As yet we have no clear evidence that SBV increases returns to service in either sheep or cattle. Those farmers reporting increased empty ewes need to investigate other potential causes including other infectious diseases, ram performance, diet changes, weather effects and/or parasitic infestations. It is clear that the impact on production needs to be quantified so that farmers can make informed decisions relating to vaccination, time of mating and other management factors.

Is this a recrudescence of disease or is a new incursion of disease from infected midges blown over from the continent? It is difficult to know the answer to this. In pregnant sheep, the gestational period of susceptibility for the occurrence of foetal abnormalities is estimated to be between 35 and 42 days (Lievaart-Peterson and others 2015; Sedda and Rogers 2013); Therefore, those cases seen in January are likely to have resulted from infection of the ewe in September consistent with a time of midge activity.

It is not possible to know at this stage if this represents a new incursion of SBV from infected midges blown over from the continent, or recrudescence of disease already present in GB. While atmospheric dispersion modelling (http://www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/n/q/dispersionleaflet_bluetongue1.pdf) for Bluetongue showed the potential for midge incursions during September 2016, epidemiological information from affected farms needs to be gathered to enhance our understanding of SBV infection in sheep flocks and help us predict when future epizootics might occur. A collaborative approach between farmers, their vets, industry and APHA in surveillance of this disease is vital.
Salmonella

Scanning Surveillance has identified cases of *Salmonella* Typhimurium DT104 occurring in Wales with a cluster of five cases in sheep and one in cattle on the Island of Anglesey.

The first incidence occurred at the end of July where twenty six ewes had died over a period of time in a flock of 240 on a farm in Anglesey. Post mortem examination was carried out at the Wales Veterinary Science Centre (WVSC) and revealed liquid gut contents and the congestion of the brain with haemorrhage around the medulla but no evidence of a parasite burden. *S.* Typhimurium phage type DT104 was cultured from gut contents.

Three weeks later a neighbouring farm of 300 ewes also lost four sheep, two of which had been scouring. Again *S.* Typhimurium DT104 was cultured from gut contents.

Farm visits were carried out by an APHA VIO from Shrewsbury to both farms and salmonella was cultured from water around a spring on the first farm and from the river bank where the ewes drank on the second. Advice was provided on the zoonotic aspects of salmonella. The sheep had moved pasture and there had been no further losses.

In late October two further holdings on Anglesey submitted carcases to WVSC, on one farm 5 ewes had died and on the other 25 lambs died. In both cases *Salmonella* Typhimurium DT104 was identified.

APHA vets contacted the veterinary practitioners on Anglesey to raise awareness and to advise that APHA would screen all faecal samples sent in from the island for salmonella. Eleven submissions from 10 Anglesey premises were submitted to APHA VIC from cattle and sheep have been cultured for Salmonella regardless of reason for submission. Additional testing did not reveal further cases however it adds to our surveillance of Antimicrobial Resistance (AMR).

To date *S.* Typhimurium has been identified in sheep on 5 farms, in cattle on one farm and in 4 horses on two premises on Anglesey. It is unusual to see salmonella causing clinical disease in sheep at this time of year and investigations into the possible nationwide recrudescence of this potential epidemic *Salmonella*-type for animals and people are ongoing. Stress factors would include gathering that may prevent sheep accessing food and water which in turn can alter the gut pH and allow salmonella to proliferate and attach to the gut wall, antibiotic therapy and overcrowding may also be contributory influences. Movement of carrier animals, people and equipment between farms is the main means of introduction of infection to farms, but it can also be spread by wild and feral animals or via shared watercourses or contaminated feed ingredients.

Provision of optimal nutrition and access to clean water, effective parasite control, and management practices that eliminate long periods without feed or water will minimise the risk of salmonellosis outbreaks in animals and attention to hygiene will reduce the zoonotic risk. Attention should be placed on biosecurity to reduce the risk of spread.

Whole genome sequencing is planned on a panel of selected isolates to investigate the relationship of isolates across animal species, geographically, to feed isolates or other
information and APHA have been keeping Public Health Wales and Public Health England informed through the Human animal infections and risk surveillance group (HAIRS).


The latest HAIRS report can be found here:


Sheep scab

There have been anecdotal reports from farmers and practising vets for a number of months of potential lack of efficacy of macrocyclic lactones (MLs) in the sheep scab mite (Psoroptes ovis). The APHA Parasitology Champion has been aware of three recent reports (since November 2016) of a higher level of suspicion that this may be occurring. The latest of these was discussed at the Small Ruminant Expert Group (SRSEG) monthly telephone conference.

In one case Sheep scab due to Psoroptes ovis was diagnosed after the submission of wool and scab samples from two different groups of sheep on the same holding. Live Psoroptes mites were seen in both samples. This was a concern as there had been seemingly correct whole flock use of various macrocyclic lactones with no clinical improvement after treatment and live mites seen in skin scrapes from various groups.

A suspected lack of efficacy for the ML treatments was reported to the Veterinary medicines Directorate (VMD). The farmer subsequently arranged for the sheep to be dipped with an OP dip and an improvement was seen.

Lack of ML efficacy in sheep scab control is of significant concern to the sheep industry and the veterinary profession, and also the public: firstly, there is no in vitro test for ML resistance to scab mites available currently so evidence is lacking; secondly, the options to treat scab are limited to injectable MLs or organophosphate dips which must be used according to the manufacturers instructions to ensure safety and protect the environment; thirdly, use of injectable MLs could also have an impact on the development of resistance to MLs in gut nematodes; lastly and by no means least the impact on animal health and welfare of uncontrolled sheep scab could be considerable.

Mitigating actions: 1. the incident has been reported to the VMD as a suspected lack of efficacy; 2. awareness has been raised through the SRSEG, the Sheep Health and Welfare Group and the Small Ruminant Quarterly Report; 3. The development of an in vitro test is at an early stage by the University of Bristol who are working with the Moredun Institute and colleagues in Belgium.

APHA are liaising with the University of Bristol who are developing an in vitro test for possible Psoroptes ovis resistance to macrocyclic lactones and samples of mites were sent from this
incident. If practitioners suspect a lack of efficacy they should report this to the VMD and discuss with an APHA VIO about submitting mites to facilitate further studies.

UNUSUAL DIAGNOSES

Achrondroplasia in Cheviots

The University of Bristol investigated a case of achrondroplasia in lambs born from Cheviot ewes. At least 20 lambs from a flock of 200 Cheviot ewes showed deformities including variable absence of hooves (ectrodactyly), missing tails and small heads with protruding eyes (Fig 2 - 5) The lambs had been sired by 2 North Country Cheviot rams. Achrondroplasia of the Cheviot is a recognised (likely recessive) genetic condition (Wray and others 1971) Although a genetic test has been developed it is awaiting commercial development (Matika and others 2016). Congenital deformities occurring in as large a number of cases as this has the potential to result in significant welfare problems, along with the potential financial impact to the flock of possibly unviable or poorly viable lambs, or lambs with a limited market value, particularly in a pedigree flock.

Fig 2 Lamb with missing tail

Fig 3 Lamb with missing hoof

Fig 4 Lamb with hoof deformity

Fig 5 Lamb with missing hooves

Pictures courtesy of Owain Jenkins, Delaware Veterinary Group, Castle Cary
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

Parasitic gastro-enteritis (PGE) generally accounts for 20% of diagnosable sheep submissions submitted annually to APHA. The peak of these diagnoses is seen in the third or forth quarters of the year when levels of pasture contamination have increased and often farmers are less aware of the possibility of PGE as a disease. Incidents in the last quarter of 2016 were similar to that seen in 2015 (Fig 6).

PGE was also recorded in combination with *Mannheimia haemolytica* or *Bibersteinia trehalosi* bacterial infections, cobalt deficiency and also in some cases of acute and chronic fasciolosis. It was noted that in some cases benzimidazole anthelmintic resistance was likely in the incidents diagnosed.

![Graph](Vertical bars represent 95% confidence limits)

Fig 6. GB incidents of PGE in sheep as a % of diagnosable submissions Q4 2004-2016

There were also incidents recorded of PGE haemonchosis (due to *Haemonchus contortus*) and PGE nematodirosis (due to *Nematodirus battus* or other *Nematodirus* sp.) in this last quarter of 2016 but numbers were small and not significantly different from previous years.

Nasal bots

Nasal bots (larvae of *Oestrus ovis*) were identified in an adult Jacob ewe with signs of respiratory disease and wasting. Post mortem examination confirmed a sinusitis due to the nasal bot, but with no significant concurrent lung pathology. Although known to be endemic the number of diagnosed cases of *Oestrus ovis* is low, possibly because infection is usually not
associated with production limiting or particularly damaging clinical signs. Occasional cases can develop complications such as nervous signs due to tracking bacterial infection from the sinuses, or from aberrant larval migration. In rare cases larvae have been inhaled into the lungs, leading to foreign body pneumonia.

**Acute fasciolosis**

Incidents of acute fasciolosis in the fourth quarter of 2016 were increased from the same period last year, but not significantly (45 incidents of acute fluke diagnosed (9.6% of diagnosable submissions) in 2016 compared to 27 incidents in Q4 of 2015 (7.7% of diagnosable submissions). This is, however, significantly more than in the same quarter of 2014. There was little difference between England and Wales and Scotland. (Fig 7) The annual diagnoses of acute fasciolosis show a similar trend. This will be due at least in part to the wetter summer generally experienced in 2016 than 2015

![Graph showing GB incidents of acute fasciolosis as a % of diagnosable submissions Q4 2004-2016](image)

*Fig 7. GB incidents of acute fasciolosis as a % of diagnosable submissions Q4 2004-2016*

Incidents of acute fasciolosis were recorded in western veterinary investigation centres (VICs) throughout October, November and December 2016. Black disease due to *Clostridium novyi* infection was additionally recorded in a small number of unvaccinated flocks together with acute fasciolosis. There were a number of instances where concerns about triclabendazole inefficacy (the only flukicide treatment for acute fasciolosis) were raised by the investigating veterinary investigation officer (VIO). These were reported or the veterinary surgeon was advised to report these to the VMD as suspect adverse reactions. The treatment of acute fasciolosis will become increasingly difficult if weather conditions (i.e. warm and wet summers) that are conducive to transmission continue.

**Chronic fasciolosis**

This showed a similar trend to that observed in acute fasciolosis in quarter 4 of 2016 (Fig 8). Concerns were raised also about Triclabendazole inefficacy in a number of investigations. Oxyclozanide toxicity (a flukicide active only against adult fluke) was deemed a likely diagnosis in one investigation during this period and reported to the VMD. Many of the flukicides marketed for sheep have narrow safety margins if overdosed, or repeated too frequently, or can cause death if administered wrongly, so care has to be advised in fluke treatment.
New test for *Fasciola hepatica* serology for both cattle and sheep

APHA have introduced a new test for *F. hepatica* serology. The test code will remain the same (TC678) and will be carried out at APHA Weybridge. The test is produced by IDEXX and is an indirect ELISA which can be used to detect antibodies to *F. hepatica* in both bovine and ovine serum. It is said to have a specificity of 100% and sensitivity of 99%. APHA validation is ongoing. Results are expressed as a percent positive compared to positive and negative control sera. Antibodies can be detectable a number of weeks before eggs are present in the faeces and in experimental situations can persist for 12 weeks following successful treatment, where reinfection does not occur. Positive results therefore indicate that an animal has been infected by *F. hepatica*. It does not indicate whether infection is current, nor does the size of the response correlate with the numbers of adult parasites present or the faecal egg count (Reichel, 2002). Bearing these points in mind, it can be used as a sensitive aid to diagnosis or to monitor fluke exposure on individual farms by sampling first year grazing animals.

Systemic disease

Septicaemic pasteurellosis due to *Bibersteinia trehalosi*

This disease continued to be a common diagnosis reported by all the centres in vaccinated and unvaccinated lambs. There was an increase in the percentage diagnosed (see fig 9) but it was not a statistically significant change from the equivalent previous quarter.

Many cases had concurrent PGE that may have contributed to the severity of the outbreaks. Systemic *Bibersteinia trehalosi* infections typically affect six- to nine-month-old lambs with outbreaks usually occurring between October and December; however it can also be seen in adult animals. Control is best achieved by vaccination; however, PGE, stress and/or poor nutrition can cause animals to become susceptible despite appropriate vaccination. Where a diagnosis is made in vaccinated animals this should be reported to the VMD as a suspected lack of efficacy to a veterinary medicine.

[https://www.vmd.defra.gov.uk/AdverseReactionReporting/Default.aspx](https://www.vmd.defra.gov.uk/AdverseReactionReporting/Default.aspx)
Nervous disease

Spinal cord compression following vaccination

VIC Shrewsbury reported two similar cases of neurological disease in ewes following vaccination.

The first case involved a group of 100 Texel ewes from which nine animals developed forelimb weakness and neurological signs within a week of receiving ML treatment and vaccination against lameness. Two were examined post-mortem. In one there were multiple small areas of abscessation at the level of the atlas extending towards the vertebral canal at C2, with superficial haemorrhage and oedema which contained a 1cm diameter abscess. The second had an area of thickened oedematous tissue with haemorrhage extending from the back of the head to 5cm along the neck. The prescapular lymph nodes were enlarged. Bacterial cultures identified a *Corynebacterium* sp and a *Staphylococcus* sp from the affected tissues. Histopathology of the tissues revealed a pyogranulomatous myositis, probably a reaction to the vaccine adjuvant; and wallerian-like degeneration of the spinal cord, thought to be a result of a compressive injury. The cause of the neurological signs was therefore most likely a result of the spinal cord compression due to the extension of inflammation seen at the level of C2.

In the second case, foreleg weakness and low head carriage was described in six ewe lambs from a group of 500. Four of the ewe lambs had died. The group had again been recently wormed and vaccinated against lameness. Clinical examination of two recumbent animals identified dullness, slow PLR and menace responses, with negative proprioception but positive sensation in the forelegs and hind limb hyperextension. Following euthanasia, post-mortem examination found multi-locular abscessation and necrosis of the neck musculature adjacent to the atlanto-axial joint with extension into the joint space. The meninges and connective tissues around the atlanto-occipital joint were swollen. There was enlargement of the regional lymph nodes. These findings were consistent with introduction of infection or necrotising substance by injection and tracking of this reaction into and around the spinal canal was likely to have resulted in musculoskeletal pain and affected CNS function.

These cases highlight the importance of correct injection technique and hygiene during routine vaccination procedures.
Listerial encephalitis

Although cases of Listerial encephalitis were slightly decreased this quarter, examination of the annual data has revealed an overall increase in cases this year when compared to 2015 (Fig 10. 82 cases (2.49%) were recorded in 2016 versus 46 cases (1.54%) in 2015. This was a result of a significant increase in diagnoses made by APHA who reported nearly three times the number of cases this year compared to 2015 – 50 cases (2.36%) in 2016 compared to 18 (0.96%) in 2015. Diagnoses by SAC CVS remained static. Listerial encephalitis is often associated with the feeding of silage.

![Graph showing annual incidents of encephalitis listeria as a % of diagnosable submissions](image)

**Fig 10. Annual Incidents of encephalitis listeria as a % of diagnosable submissions**

**Enteric disease, Urinary disease, Skin disease, Metabolic disease, Reproductive & Mammary disease, Respiratory disease, Musculo skeletal disease**

No statistical significant increases for any of the diseases monitored

**Zoonoses**

Monitoring the field occurrence of appropriate animal diseases can highlight the potential for zoonotic transmission and provide a sentinel for human, environmental and foodborne health risks. These reports, which primarily relate to farmed animal species, summarise the surveillance activities of the APHA and SACCVS for zoonoses and infections shared between man and animals in Great Britain, using data gathered by the network of VICS.

The most recent report provides a summary of cases between July and September 2016 and compares the findings with the same quarter (Q3) in the preceding three years. It is intended only as a general guide for veterinary and public health professionals to the diagnosed occurrence of animal-associated infections in predominantly farmed animal species in GB.

Zoonotic risks to pregnant women

The Government recently advised that pregnant women should avoid close contact with farmed animals that are giving birth. Two advisory documents were sent to all practices via the APHA VIC Newsletters which included information about chlamydiosis, toxoplasmosis, listeriosis, and Q fever. A link to further information is here: https://www.gov.uk/guidance/pregnancy-advice-on-contact-with-animals-that-are-giving-birth

Chemical Food Safety

Suspected oxyclozanide poisoning was again diagnosed in various groups of sheep following dosing. Initially three sheep were found dead after 450 were dosed and then there were two subsequent deaths after two other groups of 110 sheep were dosed. All deaths occurred within 24 hours of dosing. Post mortem examination at APHA Penrith VIC of one shearling (year old sheep) was carried out. The post mortem pathology noted was primarily gastrointestinal but the weight of the sheep was substantially less than the weight that the sheep had been dosed for supporting that the sheep had been overdosed. The potential adverse reaction was again reported to VMD. APHA reminded the farmer to follow data sheet recommendations and to weigh animals prior to dosing. The farmer was reminded of his duty to protect the food chain.

The Quarterly APHA Chemical Food Safety Newsletter can be found via the link:


TSE

Bovine TB in non-bovine species


The data show that for the reporting period 3 sheep were submitted to APHA laboratories for post mortem examination due to suspected TB. These animals came from 2 flocks in England which have been placed under restrictions. Culture results from these cases are pending. A more recent case in Wales is also awaiting culture results.

HORIZON SCANNING

International Disease Monitoring

Blue tongue

France has reported over 200 outbreaks in January 2017, almost the same as December 2016; the reports are likely to be a result of pre-movement testing in cattle. All of the new outbreaks were in cattle. Elsewhere, Italy continues to report BTV-4 in the North of the country, while the same strain is also being reported in the Balkans. Cyprus has reported more outbreaks of BTV-8 serotype which is most likely to have originated in the Middle East (Fig 11).
APHA has reduced the risk level to low, which reflects the seasonal decrease in temperature in the region and wind direction.

![Fig 11. BTV in Europe 2016](image)

**Centre of Excellence in Extensively Managed Livestock**

In July 2016 the Animal and Plant Health Agency (APHA) held its first conference to discuss issues faced in monitoring the health and welfare of extensively managed livestock. It was also an opportunity for contributions to be made to the development of a Centre of Expertise in the surveillance of this livestock sector.

The conference brought interested parties together from a broad range of backgrounds to share information, identify issues and develop collaborative ways of working. Fifty five delegates attended the event at the University of Bristol, including industry, academia, retail, government and veterinary representatives.

The focus was primarily on cattle and sheep that are kept in such a way that they are not easily inspected for signs of ill health, or significantly altered production.

The Centre is based at APHA Carmarthen Veterinary Investigation Centre, which continues to provide in-depth pathology and disease investigation services; it is also a hub and part of the wider surveillance networks and activities for the timely detection of disease threats in Great Britain. Working in partnership is integral to its future success.

Interactive workshop sessions at the conference were designed to collect information and opinions from all delegates. A strong theme that emerged was that analyses of data must take into account what producers want and need. There also needs to be improved access and
sharing of data that is already collected. It was agreed that a key objective was the need to engage with farmers who do not interact with any diagnostic system and rarely engage with their private veterinary surgeon.

The project plan for the ongoing development of the Centre of Expertise will be completed by spring 2017. Outcomes from the conference will help develop future projects to enhance scanning surveillance in extensively managed livestock. The full report from the conference is available on the APHA Vet Gateway.

Further interesting reading:

- Preliminary survey of lamb losses (black loss) in Highland sheep flocks. Tongue SC, Pritchard I, Watson D, Hosie BD [http://openaccess.sru.ac.uk/handle/11262/11130](http://openaccess.sru.ac.uk/handle/11262/11130)

**Diagnostic submission trend**

**Throughput**

Fig 12 tabulates the diagnostic submissions in Q4 for sheep and Fig 13 for goats, as numbers for the current quarter and expressed as percentages of the submission numbers for the average of the preceding two (‘Prior2’) and five (‘Prior5’) years. In sheep Q4, carcase submissions in northern and eastern England to APHA and partner PME providers have reduced compared with the prior five years, but in northern England have maintained levels similar to those of the prior two years. It is unclear why there are fewer in northern England as free carcase collection is available. In eastern England engagement with surveillance and access to PME may have influenced fewer submission numbers; however, with free carcase collection becoming available in the area it is anticipated that carcase submissions may improve. Submissions of abortion material are few during this quarter. Other submissions do not show an increase; the decline continues. In Scotland submission numbers are more stable. For goats Q4, total submission numbers are declining in England but increasing in both Scotland and Wales.

<table>
<thead>
<tr>
<th>Q4</th>
<th>Carcase</th>
<th>Foetus/Stillborn</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern</td>
<td>54</td>
<td>98%</td>
<td>73%</td>
<td>3</td>
</tr>
<tr>
<td>The Midlands</td>
<td>38</td>
<td>152%</td>
<td>114%</td>
<td>1</td>
</tr>
<tr>
<td>Eastern</td>
<td>8</td>
<td>57%</td>
<td>49%</td>
<td>18</td>
</tr>
<tr>
<td>Southern</td>
<td>66</td>
<td>174%</td>
<td>113%</td>
<td>15</td>
</tr>
<tr>
<td>Wales</td>
<td>77</td>
<td>197%</td>
<td>165%</td>
<td>8</td>
</tr>
<tr>
<td>Scotland</td>
<td>181</td>
<td>104%</td>
<td>94%</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>424</td>
<td>123%</td>
<td>101%</td>
<td>32</td>
</tr>
</tbody>
</table>

Fig 12. Sheep submissions throughputs, Q4 2016 compared with the prior two and five years, by country and region
Fig 13. Goat Submissions throughputs, Q4 2016 compared with the prior two and five years, by country

Annual comparisons are also made for sheep Fig 14 and goats Fig 15. For both sheep and goats there continues to be an overall decline in total submissions in England, an increase in Wales while Scotland remains relatively stable.

Fig 14. Sheep Annual submissions throughputs 2016 compared with the prior two and five years, by country and region

Fig 15. Goat Annual submissions throughput 2016 compared with the prior two and five years by country.

The SRSEG will continue to monitor these trends and update of surveillance submissions is to be presented to the Veterinary Risk Group for review in spring 2017.

Maps

The map (Fig 16) shows submissions for sheep and 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.

Submission data was extracted from the VIDA database in order to include submissions to the diagnostic laboratories of the SAC CVS from holdings in England and Wales and are limited to those holdings that could be georeferenced. Please note that it is not currently possible to include Scottish data.

Demographic data on the underlying population of holdings by species is based on the work of the Livestock and Demographic Data Groups and derived from Sheep and Goats: Annual Inventory extracts as at December 2015. The submission ratio for each species is the proportion of holdings that submitted **at least one** carcase or diagnostic sample in the reference period over all sheep holdings in the spatial unit county.

**Fig16. Spatial distribution of Small Ruminant submissions Q1 – Q4 2016**
Future enhancements are planned to incorporate data on other sources of surveillance information, from within and external to APHA, such as statutory disease notifications, inspection visits or submissions to other diagnostic laboratories.

**Publications of interest**

**Sheep and goats papers published by APHA staff (in Caps) January - March 2016**

CARSON A 2016
How the veterinary investigation service will meet industry needs.

DANIEL RG; CARSON A; Evans C; Cookson R; Wessels M 2016
Pathological observations of tick-borne fever and intercurrent bacterial infections in lambs.
Veterinary Record Case Reports 4 (2)

Georgiadou S; ORTIZ-PELAEZ A; SIMMONS MM; WINDL O; DAWSON M; Neocleous P; Papasavva-Stylianou P 2016
Goats with aspartic acid or serine at codon 146 of the PRNP gene remain scrapie-negative after lifetime exposure in affected herds in Cyprus.
Epidemiology and Infection 145 (2) 326-328.

LEARMOUNT J; STEPHENS N; BOUGHTFLOWER V; BARRECHEGUREN A 2016
The development of anthelmintic resistance with best practice control of nematodes on commercial sheep farms in the UK.
Veterinary Parasitology 229, 9-14.

SIMMONS MM; CHAPLIN MJ; KONOLD T; Casalone C; BECK KE; THORNE L; EVERITT S; FLOYD T; CLIFFORD D; SPIROPOULOS J 2016
L-BSE experimentally transmitted to sheep presents as a unique disease phenotype.
Veterinary Research 47:112.

**Other publications of interest**


LALOY E; BRAUD C; BRÉARD E; KAANDORP J; BOURGEOIS A; KOHL M; MEYER G; SAILLEAU C; VIAROUGE C; ZIENTARA S; CHAI N (2016) Schmallenberg virus in zoo ruminants, France and the Netherlands (letter). Emerging Infectious Diseases 22 (12) 2201


PHYTHIAN, CJ., CRIPPS, PJ., GROVE-WHITE., D. MICHALOPOULOU, E., DUNCAN, JS. (2016) Inter-observer agreement for clinical examinations of foot lesions of sheep VETERINARY JOURNAL, 216 189-195


References


