GB small ruminant quarterly report
Disease surveillance and emerging threats


Highlights

<table>
<thead>
<tr>
<th>Highlights</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monepantel resistance</td>
<td>2</td>
</tr>
<tr>
<td>Angular Limb Deformities</td>
<td>3</td>
</tr>
<tr>
<td>Skin lesions on the heads of sheep</td>
<td>5</td>
</tr>
<tr>
<td>Negated Bluetongue cases in sheep</td>
<td>20</td>
</tr>
</tbody>
</table>

Contents

Introduction and overview.................................................................1
New and re-emerging diseases and threats ........................................2
Unusual diagnoses ..............................................................................2
Changes in disease patterns and risk factors ......................................8
Centre of Expertise for Extensively Managed Livestock ..........................18
Horizon scanning ..............................................................................19
Publications .......................................................................................22
Introduction and overview

This quarterly report reviews disease trends and disease threats for the third quarter of 2019 July to September. It contains analyses carried out on disease data gathered from APHA, SRUC Veterinary Services division of Scotland’s Rural College (SRUC) and partner post mortem providers and intelligence gathered through the Small Ruminant Species Expert networks. In addition, links to other sources of information including reports from other parts of the APHA and Defra agencies are included. A full explanation of how data is analysed is provided in the annexe available on GOV.UK https://www.gov.uk/government/publications/information-on-data-analysis

Issues & Trends

Weather

Most of this summer was dominated by warm and largely sunny weather, which allowed the conservation of good winter forage (Fig 1). However there were some severe thunderstorms with very heavy rainfall that led to localised flooding. In some areas such as the Derbyshire Peak District, Yorkshire Dales and parts of Scotland, heavy rain fell onto already saturated ground leading to further flooding and landslips, which have caused problems of access for some farmers, and there was significant disruption for local communities near the Toddbrook Reservoir

Fig 1: Summer 2019 mean temperature anomaly compared to 1981-2010 expressed as % of the average for 1981-2010 (left) and actual rainfall amount % of average 1981 -2010 (right)

The NADIS provisional fluke forecast for autumn 2019 is based on temperature and rainfall from May – September. Due to the very high levels of rainfall during September and above
average temperatures observed, this year’s forecast is currently predicting high risk in Scotland, northwest England & north Wales, moderate risk in Northern Ireland and low risk everywhere else. https://www.nadis.org.uk/parasite-forecast.aspx

Industry

Throughout Q3 2019 farm gate prices were in-line with the five-year average. Sheep meat production grew 6% year-on-year, to 81,000 tonnes, according to Defra data. The driving factor behind the increase was both higher numbers of lambs and cull ewes, as well as in increase in carcase weights. Good finishing conditions and solid grass growth as well as the uncertainty surrounding Brexit helped support the number of sheep produced.

Continuing the trend of recent times, imports were down 34%. Reflecting increasing production, exports grew 12%.

Rebecca Oborne, AHDB

New and re-emerging diseases and threats

Unusual diagnoses

Monepantel resistance in a sheep flock in Cornwall

Monepantel resistance has been confirmed on a mixed livestock and arable farm in Cornwall. The farm runs 1200 ewes and sells lambs over a long time period on a supermarket contract. They lamb in 3 batches of 400 due to restrictions on housing space. Grazing comprises blocks of permanent pasture some co-grazed with the cattle.

Suspicion of monepantel resistance first emerged in autumn 2018 when a worm egg count performed by the Private Veterinary Surgeon (PVS) revealed a count of 1020 epg. The shepherd was surprised at the result as this batch of sheep had been wormed with monepantel only 2 weeks previously. A post-drench sample from another batch of recently wormed sheep had a count of 880 epg and concerns of a possible treatment failure were reported to the product manufacturer. Further Faecal Egg Count Reductions Tests (FECRTs) were carried out on 15 individual samples, the first round had a pre-treatment average of 293 epg (0-1400) and the post treatment average was 400 epg (0-1200) showing no reduction in FEC overall. A repeat of the FECRT gave a pre-treatment average of 820 epg (300-1700) and a post treatment average of 686 epg (0-1350) giving an overall reduction of just 16%. Speciation of hatched larvae was carried out at Moredun and gave a result of 96% Cooperia spp.

Further FECRT were carried out in Autumn 2019 to follow up the previous suspicion of resistance and using different categories of wormer. Pre-treatment larval differentiation
results were 8% *Teladorsagia* spp., 50% *Trichostrongylus* spp., 2% *Haemonchus* spp. and 40% *Oesophagostomum/Chabertia* spp.

<table>
<thead>
<tr>
<th>Lamb group (10 individual samples/group)</th>
<th>1 (Lev)</th>
<th>2 (BZ)</th>
<th>3 (Monepantel)</th>
<th>4 (ML – ivermectin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-dose EPG</td>
<td>750</td>
<td>550</td>
<td>50</td>
<td>350</td>
</tr>
<tr>
<td>Post-dose EPG</td>
<td>345</td>
<td>225</td>
<td>765</td>
<td>465</td>
</tr>
<tr>
<td>% reduction</td>
<td>54</td>
<td>59</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Resistance was confirmed in all 4 classes of wormer on this farm. The intention was to have carried out post-treatment speciation on all samples, unfortunately only the Levamisole group produced suitable samples: the other samples were too desiccated for examination. The levamisole group were 18% *Teladorsagia* spp. and 82% *Trichostrongylus* spp.

Heavy reliance on anthelmintic treatments appears to have been the reason behind the rapid development of resistance to a novel molecule on this farm. Analysis of the farm records revealed approximately 2,100 monepantel treatments per year for the last 3 years and some sheep had been treated twice or even three times with monepantel during the season. Fear of sheep scab had also resulted in multiple whole flock treatments with 2% Moxidectin. Land management has also played a part with lambs weaned on to the same block of land in repeated batches throughout the season, and the use of the “dose and move” strategy will have accelerated the development of resistance in the worms on this farm.

Recommendations going forward have included the use of more targeted treatments, rotational grazing with cattle where possible, sequential combination treatments with yellow and clear drenches and the limited use of Derquantel for emergency treatments.

**Angular Limb Deformities**

There were two separate unusual cases of limb deformities reported this quarter.

The first case involved the submission of two typically affected lambs to APHA Shrewsbury Veterinary Investigation Centre (VIC) over a two-month period. This Welsh mountain flock comprised approximately 70 ewes and there had been up to 11 affected lambs during the lambing season, sired by three different rams. One of the examined lambs was generally small with a short-legged “stocky” appearance. The second lamb had more marked skeletal changes with short limbs and medial limb angulation, which was particularly marked in the forelimbs (Figure 2). A range of diagnostic testing was done to investigate
possible causes including tests for Border disease virus, Schmallenberg virus, tissue manganese and tissue copper with normal or negative results for all. Chondrodysplasia and dwarfism was subsequently diagnosed on histopathology. Chondrodysplasias are uncommon in sheep, forms of heritable chondrodysplasias have been reported in Hampshire and Suffolk sheep (Spider lamb syndrome) and in Texel's in New Zealand (Dwarfism). In this case the involvement of three different rams suggested there could have been an as yet unidentified nutritional factor in addition to a possible heritable cause. Investigations are still underway.

![Image](image-url)

**Fig 2: Chondrodysplasia with dwarfism and marked medial angulation of the forelimbs**

The second case reported angular limb deformity affecting approximately 12-15 spring born lambs in Cumbria. A typical case was sent to APHA Penrith VIC for investigation. Initially one or two lambs appeared tender footed (2-3 week pre-submission) but, following dipping, more lambs from various fields became affected. Some responded to repeated antibiotic treatment but others did not. The lambs were grazing the same fields used in past years. The submitted lamb became recumbent two weeks prior to submission. It was unable to stand or walk and did not improve despite treatment. External examination on submission identified severe bilateral valgus of the fetlocks on both front and hind legs (Fig 3).
The joints were not thickened and the synovial fluid was clear. No significant pathogens were isolated on culture of internal organs or joint fluid. Liver copper, cobalt, selenium and manganese were considered within normal limits. The aqueous humour calcium was unremarkable and bone ash analysis results were considered mainly within expected parameters. Histological examination of one of the affected joints found fracture of the distal metatarsus III with attempts at repair by fibrosis (7-10 days old) and acute injury to the distal growth plate of the medial metatarsal (<1 day old). It also revealed early growth plate closure. Given that all four limbs were affected a nutritional issue and/or endoparasitism leading to abnormal bone development were considered as the most likely differentials. Advice was given on future monitoring of parasitic challenge, anthelmintic use, stocking density, nutrition of ewes and growing lambs. It was also highlighted that the lameness seen clinically may have been the manifestation of several different aetiologies and given the recent history of dipping in some of the cases a review of the dipping procedure was advised including both the method of sheep handling and dip hygiene. Following repeated talks with the private veterinary surgeon, it was confirmed that approximately six of all affected lambs had developed valgus and no new cases occurred following this submission.

**Skin lesions on the heads of sheep**

There were five cases this quarter of sheep with swollen heads or with skin lesions on the ears, caused by photosensitization or cellulitis as a result of a hepatopathy, cobalt deficiency or with an undetermined cause. In cases with head swelling Bluetongue is an important differential and is discussed under Horizon Scanning:

- Wales Veterinary Science Centre diagnosed cobalt deficiency and cellulitis as the cause of a swollen head in a 2 year old wether in August.

- APHA Carmarthen VIC investigated a case where 15 out of 50, 6–month-old lambs had ill thrift, diarrhoea, pyrexia and swollen heads. PGE was confirmed and
subcutaneous oedema was identified grossly which histology confirmed was due to photosensitization, the cause of which was uncertain.

- Cobalt deficiency, hyposelenosis and hepatopathy were diagnosed by APHA Penrith VIC in two lambs’ euthanased and submitted to investigate ill-thrift and poor condition in 450-500 post-weaned lambs in a group of 1,700. There was diarrhoea in some animals and some had presumptive photosensitisation of ears. The group had received two treatments of combined anthelmintic and flukicide recently, about one month apart. The livers of both lambs were pale with friable parenchyma and the ears of both lambs had multiple small crusty foci under normal hair and in one lamb there were larger areas of skin loss on the dorsal aspect. Histopathology suggested photosensitisation as the cause of the ear changes, and hepatic changes were consistent with a toxic injury.

- Hepatopathy was confirmed by APHA Thirsk VIC in a 5 month old lamb, one of a group of 46 lambs with weight loss and diarrhoea and “scabby ears” in some. On necropsy the lamb had a bronze liver, marked subcutaneous oedema and generalised icterus and histology confirmed a marked hepatopathy suggestive of a toxic insult.

- The University of Bristol Farm Animal Pathology Service (FAPS) reported crusty skin on the ears and weight loss and diarrhoea in a group of 230, 4 month old lambs, where approximately a quarter of the group were showing signs. PGE and pneumonia and a marginal cobalt were confirmed.

The cause of photosensitization in sheep is not always clear and may be multifactorial in some cases. Although not a common finding, some years seem associated with increased numbers of cases. These cases can be primary photosensitization, caused by the ingestion of certain plants or due to certain drug treatments, or can result from the aberrant metabolism of photodynamic pigment (due to a hereditary condition). Most cases in ruminant livestock occur secondary to liver dysfunction. A whole variety of liver diseases can result in photosensitization in ruminants, but when there is a group issue plant toxicity, forage fungal contamination, dietary factors that induce liver damage (such as cobalt deficiency) or hepatotoxicity due to certain treatments become more likely. There is a long list of plants, including some common plants such as clover, which can potentially induce primary or secondary photosensitization, and in some cases a combined effect with cobalt deficiency is possible. Increased cases in certain years may result from particular weather conditions that can influence both the quality and nature of the grass and other plant growth. The weather can also influence the availability of grass; a shortage of grass may encourage sheep to graze alternative plants that they may otherwise avoid, increasing the risk of plant toxicity.
Abomasal Emptying Defect in ewes

FAPS reported a case of abomasal emptying defect in a mixed breed ewe which had shown marked weight loss and some anorexia, leading to recumbency. Blood tests revealed anaemia (PCV 12%). The ewe was euthanased and submitted for post-mortem examination (PME) at which was found a markedly impacted abomasum with relatively dry content (Fig 4). The abomasal content weighed 8.3 kg of a total body weight of 49.5 kg (17% of body weight). No functional obstruction in the pyloric region was found suggesting a possible functional emptying defect due to innervation problems.

![Fig 4 Normal abomasal mucosa/no obstruction or abnormality at the pylorus (arrow)](image)

![Fig 5 Marked enlargement of the abomasum (arrow) compared to the rumen (asterisk).](image)

The Royal Veterinary College also reported a case where over a period of approximately six weeks a commercial farm encountered four fatalities due to Abomasal Emptying Defect in older Mule or Charolais ewes. They had a clinical history of subacute (days) to chronic (weeks) loss of condition, unresponsive to supplementary feed and subsequent deterioration resulting in death or requiring euthanasia. Post mortem examination in all four ewes were similar with a markedly enlarged and impacted abomasum containing rumen-like digesta (Fig. 5). In one ewe the weight of the abomasal contents equated to more than 20% of the body weight of the same ewe. The aetiology of this generally fatal disease is still unknown. It has been observed predominantly in Suffolk sheep, which were not present on the affected farm. There has been speculation about possible dysautonomia associated with unknown environmental toxins similar to grass sickness in horses but no cause has so far been identified. Interestingly, the affected farm has not had any similar cases in previous years.
Changes in disease patterns and risk factors

Syndromic analysis

Most common diagnoses Q3 2019

During Q3 2019 971 diagnostic submissions were received in GB.
During Q4 the age group (Fig 6) and presenting signs (Fig 7) of sheep from which samples/carcases were submitted with found dead and wasting the most common signs.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Submissions</th>
</tr>
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<tbody>
<tr>
<td>Adult</td>
<td>315</td>
</tr>
<tr>
<td>Mixed</td>
<td>24</td>
</tr>
<tr>
<td>Neonatal</td>
<td>3</td>
</tr>
<tr>
<td>Post wean</td>
<td>206</td>
</tr>
<tr>
<td>Prewean</td>
<td>92</td>
</tr>
<tr>
<td>Unknown</td>
<td>331</td>
</tr>
</tbody>
</table>

**Fig 6 Age group of submissions**

During Q3 2019 the 10 most common VIDA diagnoses made and age group of sheep (Fig 8) with presenting sign “wasting” (Fig 9).

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>WASTING</td>
<td>303</td>
</tr>
<tr>
<td>FNDDEAD</td>
<td>178</td>
</tr>
<tr>
<td>DIARRHOEA &amp; GIT</td>
<td>164</td>
</tr>
<tr>
<td>SKIN</td>
<td>75</td>
</tr>
<tr>
<td>UNKNOWN</td>
<td>61</td>
</tr>
<tr>
<td>MALAISE</td>
<td>31</td>
</tr>
<tr>
<td>NERVOUS</td>
<td>27</td>
</tr>
<tr>
<td>RECUMBT</td>
<td>29</td>
</tr>
<tr>
<td>REPRO</td>
<td>19</td>
</tr>
<tr>
<td>RESPIR</td>
<td>19</td>
</tr>
<tr>
<td>LAME &amp; MUSC_SKEL</td>
<td>18</td>
</tr>
<tr>
<td>ABORTION</td>
<td>12</td>
</tr>
<tr>
<td>EYE</td>
<td>7</td>
</tr>
<tr>
<td>Others</td>
<td>28</td>
</tr>
</tbody>
</table>

**Fig 7 Presenting signs of submissions**

<table>
<thead>
<tr>
<th>Presenting Sign</th>
<th>Adult</th>
<th>Mixed</th>
<th>Post wean</th>
<th>Prewean</th>
<th>Unknown/other</th>
</tr>
</thead>
<tbody>
<tr>
<td>WASTING</td>
<td>50</td>
<td>4</td>
<td>57</td>
<td>7</td>
<td>47</td>
</tr>
</tbody>
</table>

**Fig 8. Age group of submissions with wasting**

**Fig 9. Most common VIDA diagnosis with presenting sign wasting**
Syndromic alerts were raised this quarter for the following diseases:

Johne’s disease, PGE Haemonchus

Parasitology

PGE Haemonchosis

Incidents of parasitic gastro-enteritis (PGE) due to *Haemonchus contortus* were prominent in monthly reports this quarter. The graph Fig 10 shows that for the last three years incidents, as a percentage of diagnosable submissions in GB have been significantly more than in 2015 and 2016.

![Graph showing PGE Haemonchus incidents in GB as a % of diagnosable submissions 2007-2019](image)

**Fig 10. Q3 GB incidents of PGE Haemonchus in sheep as a % of diagnosable submissions 2007 - 2019**

Incidents were reported in Scotland as well as England (Fig 11). There were no incidents reported in Wales.

![Map showing location of PGE Haemonchosis incidents in Q3 2019](image)

**Fig 11 Location of incidents of PGE Haemonchosis in Q3 2019**
Haemonchus contortus is a parasite that is likely to be present on a large number of farms but it needs certain conditions to predominate. The weather, and in particular warmer temperatures, can allow the larvae to survive in greater numbers than the other GI parasites. It remains to be seen if this will become more common in GB if summers become warmer. Disease can be seen in adults as well as lambs. In the south of England this quarter disease was diagnosed in adults, elsewhere it was diagnosed in lambs. It is important to assess, in the light of diagnosis in lambs, whether ewes on that holding need to be treated, as we have seen incidents followed by disease in adult ewes at lambing time.

Liver Fluke

We continue to see the benefits of the drought in the summer 2018, followed by the relatively dry April and May with a lower incidence of chronic fluke, as a percentage of diagnosable submissions than has been identified in the last ten years (Fig 12), apart from in 2013. The summer of 2017 to 2018 had a high incidence of chronic fluke (Fig 13) and 2017 for acute fluke (Fig 13).

However, the rainfall during the quarter has been above average which may yet still have implications towards the end of the year. Work done by NADIS has classified the risk has been classes as high for the north and west of England and Wales, plus Scotland and low for the remainder. (https://www.nadis.org.uk/parasite-forecast/)

Fig 12. Q3 GB Incidents of Chronic fasciolosis in sheep as a % of diagnosable submissions 2015-2019

There has been a single case of acute fluke from a sheep in the North East of England this quarter, however cases of acute fluke could still occur and vigilance by farmers with prompt investigation of illness and unexplained deaths is recommended.
Enteric disease

Johne’s disease

There was a statistically significant increase in the percentage of diagnosable submission diagnosed with Johne's disease for the current quarter compared to 2018. Twenty one were diagnosed in GB this quarter compared to ten in 2018. The biggest increase was seen in Scotland (Fig 14). This may be due to increased awareness of “iceberg diseases”. A breakdown of the presenting/clinical signs are provided in Fig 15 and the age category of diagnosed submissions are shown in Fig 16.

Fig 13. Q3 GB Incidents of Acute Fasciolosis in sheep as a % of diagnosable submissions 2015-2019

Fig 14. Q3 GB Incidents of Johnes disease in sheep as a % of diagnosable submissions 2015-2019
Fig 15. Presenting/clinical signs recorded for VIDA cases diagnosed with Johne’s Disease 2002 - Oct 2019

Metabolic disease

Pine / Cobalt deficiency

Cobalt deficiency was diagnosed in 8% of diagnosable submissions for this quarter, compared to 3% in the same quarter of 2018 (Fig 17).

Fig 17. Q3 GB incidents of Pine/Cobalt deficiency sheep as a % of diagnosable submissions 2007 - 2019

VIDA data for the years 2002 – 2019 (up to October 2019) shows the seasonal distribution of Pine/Cobalt deficiency (Fig 18)
Pregnancy toxaemia in a goat

An adult female goat with wasting and ataxia prior to death. Grossly the carcase was in poor bodily condition with near full-term foetuses in utero. A harvested aqueous humour sample showed markedly raised BHB levels compared to the regarded normal blood reference range, and total worm counts indicated a moderate infestation of *Teladorsagia* spp (Table 1). It is likely that the worm burden added to the negative energy balance of late gestation in this case.

Table 1 Biochemistry and Total worm counts

<table>
<thead>
<tr>
<th>Test</th>
<th>Units</th>
<th>Goat 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHB (Aqueous Humour)(‡)</td>
<td>mmol/l</td>
<td>17.9</td>
</tr>
<tr>
<td>Calcium (Aqueous Humour)(‡)</td>
<td>mmol/l</td>
<td>1.7</td>
</tr>
<tr>
<td>Abo/C3 <em>Teladorsagia/Ostertagia</em> spp. twc</td>
<td>1400</td>
<td></td>
</tr>
<tr>
<td>Abo/C3 Immature / L4 twc</td>
<td>1100</td>
<td></td>
</tr>
<tr>
<td>SI - <em>Trichostrongylus</em> spp. twc</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

Systemic disease

**Bibersteinia trehalosi septicaemia**

*Bibersteinia trehalosi* is carried in the tonsils of healthy sheep. Disease outbreaks are common in Q3, can cause significant mortality rates. Pathogenesis of *Bibersteinia trehalosi* remains uncertain but involves:
Multiplication bacteria in the tonsils occurs under the influence of poorly understood factors.

Subsequent development of necrotising lesions in the pharynx and upper alimentary tract.

Bacterial emboli from lesions travel in blood stream to lungs and other organs.

Further multiplication and toxin release causes death of the animal.

Primary lesions may occur in the stomachs and intestines, with emboli then passing to the lungs by the liver and portal system.

Disease is often precipitated by mixing of groups, dietary changes, transport or bad weather; many of which can coincide. A pasteurella vaccine booster given prior to known stressful events will help to minimise the risk of losses.

There was a slight increase in the percentage of incidents diagnosed in England & Wales, but a decrease in Scotland and for GB overall (Fig 19). Figure 20 show the age category recorded for this disease.

**Skin disease**

**Orf in a vaccinated flock**

Two limbs were submitted from a lamb with suspect orf infection, despite a vaccination program being in place on the farm. One limb had raised brown lesions with verrucose surfaces ranging from 1.5cm to 3cm in diameter. These lesions were on the cranial left and right sides of the leg around the level of the fetlock joint and just above the coronary band. The second limb had two similar lesions in the vicinity of the fetlock joint. Testing of scab material was positive for parapoxvirus, confirming orf. In addition both *Clostridium* spp and *Fusobacterium necrophorum* were identified by anaerobic bacterial culture. Histopathology showed marked multifocal hyperplastic pustular dermatitis, again...
confirming orf infection. Further investigation into was carried out with the vaccine manufacturer and the private vet who reported the incident to the Veterinary Medicines Directorate (VMD) as suspected lack of efficacy.

**Fly strike in a lamb**

Fly strike was diagnosed in a pre-weaned lamb submitted from a lowland lamb finisher farm located in East Anglia.

A group of 85 pre weaned lambs with their 70 dams were at pasture. In the previous 7 to 10 days six lambs had died. A few lambs in the group had soiled rears. The submitted six-month-old lamb was found recumbent and lethargic on the morning of submission. The lamb died, with froth at the mouth, whilst in transit for veterinary attention. The cause of death was severe myiasis (blow fly strike) affecting a wide circumference around the rib cage (Fig 21). Numerous maggots (Fig 22), measuring up to 5 mm in diameter which had penetrated the skin and entered the sub cutis at numerous points were observed in this area.

There was no apparent reason for flies to be attracted to this lamb; it did not have diarrhoea. The fleece was dry but there had been heavy rainfall in the preceding days.

In the UK, strike is caused primarily by the green bottle fly, *Lucilia sericata*, which seeks decomposing matter to lay her eggs. Carcasses, dirty back ends, foot rot lesions and open wounds are all good candidates for egg laying sites.

The rate of development of wandering larvae and pupae in the ground is strongly temperature dependent with little or no development below about 9°C. Changing climate patterns in the UK have meant the blowfly season is starting earlier, lasting longer, and becoming increasingly more difficult to predict.

![Fig 21. Large alopecic area with inflammation](image1)

![Fig 22. Maggots present on skin](image2)
Nervous disease

Louping ill

In contrast to last quarter the % of diagnosable submissions of Louping ill this quarter are significantly decreased. Only 1 case was reported across the whole of GB (0.36%) compared to 10 cases (2.74%) in 2018 (Fig 23). This quarter has traditionally been the time of peak diagnoses, particularly in Scotland, however not a single incident was recorded by SRUC. There have been fluctuations in the numbers of Louping ill diagnoses over the last twelve months due to the variable climatic conditions in 2018/2019. The changes in temperature and humidity over this time has resulted in a move away from the more usual monthly peaks and troughs of tick activity seen in previous years. The Small Ruminant Species Expert Group will continue to monitor Louping Ill and it will be interesting to see if there is a return to a more typical pattern of tick activity in 2020 and if the lack of an available vaccine is of significance.

Cerebro-cortical necrosis (CCN)

There was a general, but not significant, increase in incidents of CCN in sheep as a percentage of diagnosable submissions this quarter (Fig 24). This increase was seen only by SRUC (6.56% in 2019 compared to 4.12% in 2018). Diagnoses by APHA remained static.
Fig 2. Q3 GB Incidents of CCN in sheep as a % of diagnosable submissions 2015 – 2019

Cases of CCN were described in the APHA Surveillance Report in the Vet Record September 2018 a toll free link is available at; https://veterinaryrecord.bmj.com/content/183/13/404.full?ijkey=a.n0ieEOQHusQ&keytype=ref&siteid=bmjjournals

Urinary disease, reproductive disease, respiratory disease musculoskeletal disease – No trends identified this Quarter.

Salmonella

Salmonella in Livestock Production in GB 2018 has been published on Gov.uk https://www.gov.uk/government/publications/salmonella-in-livestock-production-in-great-britain

Reports of *Salmonella* from sheep in 2018 were similar to both 2017 (109 vs. 110 isolations) and 2016 (108 isolations) (Fig 25)

*Salmonella enterica* subspecies *diarizonae* serovar 61:k:1,5,(7) (and variants) remained the most common serovar (58 isolations; 53.2% of total sheep isolations).

*Salmonella Typhimurium* was the second most commonly reported serovar from sheep during 2018 (15 isolations; 13.8% of total reports from sheep) and S. *Dublin* was the third most common (13 isolations; 11.9% of total isolations from sheep). *Salmonella Montevideo*, which was the second most common serovar in sheep during 2017, fell to the fourth most common in 2018 (9 isolations; 8.3% of total sheep isolations).
As in 2017, there were no isolations of *Salmonella* from goats during 2018. The last report of *Salmonella* from goats was in 2016 (*S. Coeln*) and prior to that the previous isolations were in 2014 (*S. Anatum*) and 2010 (*S. Dublin*).

![Fig 25. Isolations of most common Salmonella serovars](image)

**TSE**

Cases of TSE disease found in sheep from passive surveillance have been recorded since 1993. The UK started active surveillance in sheep in January 2002.

In active surveillance, the number of sheep sampled in the testing programme has varied each year. It has included:

- a sample of fallen sheep over 18 months of age.
- a sample of healthy slaughtered sheep over 18 months of age.

Cases which have been identified from flocks in the Compulsory Scrapie Flock Scheme (CSFS) are shown separately.

The APHA attempt to trace all cases of scrapie back to their natal (birth) flock so that it can confirm disease on the appropriate premises and control measures can be applied. In some cases this can take time. Where a final decision has not been made on where to confirm disease, the case is included in the number of pending cases.

Statistics on the active disease surveillance of transmissible spongiform encephalopathies (TSEs) and the Compulsory Scrapie Flock Scheme have recently been updated on Gov.uk

There has been a confirmed case of scrapie in sheep for the first time since 2015 identified through the sheep Fallen Stock Survey.

A Summary of Sheep TSE statistics can be found here:


A summary of Goat TSE cases can be found here:


Poisoning

The most recent quarterly newsletter for on farm chemical food safety has just been published on Gov.UK.


Copper toxicity

Copper toxicity was diagnosed as the cause of death of a 9-month-old ram. Three pedigree Charolais shearling rams had been recently purchased. All three were put in a grazing paddock separate from the main flock. They were being fed grass only, with no supplementary feed given. They were all fully vaccinated against clostridial disease. This ram was found dead with no premonitory clinical signs reported. PME revealed a jaundiced carcase and discoloured red urine. The kidneys were black and the liver parenchyma deep orange. The gross findings were consistent with chronic copper poisoning.

<table>
<thead>
<tr>
<th>Test</th>
<th>Ref range</th>
<th>Units</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper (Kidney)</td>
<td>0-787</td>
<td>µmol/kg DM</td>
<td>2310</td>
</tr>
<tr>
<td>Copper (Liver)</td>
<td>314-7850</td>
<td>µmol/kg DM</td>
<td>29900</td>
</tr>
</tbody>
</table>

The liver copper concentration is equivalent to 638 µmol/kg WM. APHA advised the farmer to only provide forage and not to feed any supplementary concentrates or provide copper supplements to the remaining two purchased rams for at least a couple of weeks. The other rams are intended for breeding purposes and not for the food chain. The rest of the ewe flock was unaffected.
Photosensitisation in lambs

A weaned lamb was submitted for PME to investigate the cause of death. The lamb was part of a group of 46 lambs, and had died on the afternoon of submission, following a short period of malaise and recumbency prior to death. Others in the group were slightly thin and scoured. The group had been drenched the previous day with a combination albendazole and selenium and cobalt drench. The farmer noticed that some of the lambs had scabby ears. The lambs had been weaned approximately one month prior to submission and moved onto a number of different fields with the most recent having a notable amount of clover in the sward. Well known photosensitising plants include bog asphodel (Narthecium ossifragum) and St John’s wort but these were not present on the pasture. There were a few potential risk factors identified and these included a low cobalt status, exposure to clover and recent treatment with an oxyclosanide flukicide (see also under Horizon scanning Bluetongue). For more information on photosensitization the following link is considered informative:

https://www.msdvetmanual.com/integumentary-system/photosensitization/overview-of-photosensitization

Centre of Expertise for Extensively Managed Livestock

During Q3 2019 there were 180 diagnostic submissions for hill sheep in GB and the top ten VIDA diagnoses made for these are shown in Fig 26.

![Fig 26. GB Q3 Top 10 VIDA diagnoses for “Hill Sheep”](image)

The most common presenting sign for submissions from hill sheep was wasting (Fig 27)
Fig 27. GB Q3 presenting signs for “Hill Sheep” submissions

A focus article on the Centre of Expertise for Extensively Managed Livestock will appear in the December edition of the Veterinary Record which describes the work of the centre. Toll free links to all focus articles are available:

Horizon scanning

Bluetongue

In October, there were a small number of reports of BTV-8 in Switzerland (3), BTV-4 in Italy (6), and BTV-16 in Greece (1) see Fig 28. For more information, see the updated situation assessment, at:
Fig 28. Bluetongue disease in Europe May – November 2019

Risk assessments have determined that the risk of BTV incursion into the UK remains low, nevertheless we must remain vigilant to this threat and early detection is vital.

Negated Bluetongue cases in sheep

During 2019 APHA received 8 reports of suspected BTV in sheep. The main presenting signs that aroused suspicion were swelling of the head, discharge of nasal mucous, drooling and crusting around the mouth and nose and fetal abortions with porencephaly or hydranencephaly.

Fortunately all suspected cases where samples were sent to The Pirbright Institute for testing proved to be negative. APHA have followed up on some of these cases and have offered free post-mortem examination (PME) of any animals that died.

In one case two ewes had aborted and an aborted lamb was found to have hydranencephaly at PME and was reported as a suspect BTV case. The rest of the flock (90%) had lambed normally. BTV was negative and testing for Schmallenberg virus was carried out and also found to be negative. Unfortunately this could not rule out Schmallenberg as the cause, almost 50% of sheep cases can have cleared the virus by the time they are born. Dam antibodies could have provided further supportive evidence.
A second case involved a single animal in a small flock presenting with a dramatic swelling of the head (Fig 29). The attending private vet reported the case and administered anti-inflammatory medication pending the arrival of the APHA field vets. The swelling of the head was in fact unilateral and had begun to respond to the anti-inflammatory by the time of the APHA field vet’s arrival and therefore an allergic reaction was considered most likely to be the cause and the case negated on clinical grounds.

Fig 29. Swollen face in a sheep reported as suspect BTV

A third case involved 4 sheep in a group of 40 breeding ewes that presented with swelling of the heads, cloudy nasal discharge and crusting on the ears (Fig 30)

BTV testing was negative however a PME was carried out on a ewe that subsequently died. Initial biochemistry suggested a hepatopathy and negative liver fluke ELISA ruled out fascioliasis as a cause of oedema in the face. Further histopathological investigations are continuing.

A significant fact is that this group of sheep had very recently been treated with a fluke and worm combination product containing oxyclozanide. The APHA Surveillance Report in the Veterinary Record (2016) described a similar case of swollen heads in ewes following treatment with an oxyclozanide containing product.

The data sheet for the product used cautions that rarely, sheep may show an anaphylactic reaction with swelling of the head.

Weighing of stock before worm and fluke treatments is essential to ensure effective dosing (not overdosing) and preventing inadequate dosing of groups of sheep which is a known risk factor in the development of anthelmintic resistance. Combination oxyclozanide and
levamisole products require frequent mixing during the dosing to prevent possible settling out of the suspension.

The incident was reported to the VMD as a suspected adverse reaction. In such cases the standard 28 day meat withdrawal period is applied (usually 5 days for this product) to those animals showing clinical signs. Colleagues are advised to be aware of the potential reactions to oxyclozanide given the wider use of such products at this time of year.

Publications

**APHA Staff**

Daniel R; Evans C; Cookson R; Pugh K; CARSON A; Wessels M (2017) Pathological observations of tick-borne fever and intercurrent bacterial infections in lambs. *Proceedings of the Sheep Veterinary Society Volume 41* 33.

Melville L; Van Dijk J; MITCHELL S; Morrison A; Innocent G; Bartley D (2017) Patterns and resistance levels in Nematodirus battus. *Proceedings of the Sheep Veterinary Society Volume 41* 63.


**Other publications of interest**


Fogarty ES; Swain DL; Cronin GM; Trotter M (2019) A systematic review of the potential uses of on-animal sensors to monitor the welfare of sheep evaluated using the Five Domains Model as a framework. Animal Welfare 28 (4) 407-420

Hilke J; Strobel H; Woelke S; Stoeter M; Voigt K; Grimm L; Meilwes J; Punsmann T; Blaha I; Salditt A; Rohn K; Bastian M; Ganter M (2019) A comparison of different vaccination schemes used in sheep combining inactivated bluetongue vaccines against serotypes 4 and 8. Vaccine 37 (39) 5844-5853


Orihuela, A. & Ungerfeld, R. (2019) Tail docking in sheep (Ovis aries): A review on the arguments for and against the procedure, advantages/disadvantages, methods, and new evidence to revisit the topic. Livestock Science 230


Sozzi E; Lavazza A; Gaffuri A; Bencetti CF; Prosperi A; Lelli D; Chiapponi C; Moreno A (2019) Isolation and full-length sequence analysis of a pestivirus from aborted lamb fetuses in Italy. Viruses 11 (8) 744 https://doi.org/10.3390/v11080744


References

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