GB Emerging Threats
Quarterly Report
Miscellaneous & Exotic Farmed Species Diseases

Quarterly Report: Volume 19 : Q1
January to March 2017

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VIDA diagnoses are recorded on the APHA FarmFile database and SAC Consulting 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 CVS 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 CVS 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, Wales Veterinary Science Centre and SAC CVS. 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.

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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 first quarter of 2017 compared to the equivalent quarter of previous years. It aims to identify emerging miscellaneous and exotic farmed species 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 Policy Implementation Directorates. Further information can be found at http://ahvla.defra.gov.uk/vet-gateway/surveillance/index.htm.

OVERVIEW

Diagnostic submission trends

Diagnostic submissions in Quarter 1 (January to March) 2013-2017 for alpacas, llamas and farmed deer – the APHA figures include submissions to partner post mortem providers (PPP) as detailed above. Other miscellaneous and exotic species may also be received in small numbers.

<table>
<thead>
<tr>
<th>January to March</th>
<th>Carcase Submissions</th>
<th>Non-Carcase Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APHA</td>
<td>SAC</td>
</tr>
<tr>
<td>2013</td>
<td>76</td>
<td>8</td>
</tr>
<tr>
<td>2014</td>
<td>46</td>
<td>5</td>
</tr>
<tr>
<td>2015</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>2016</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>2017</td>
<td>25</td>
<td>6</td>
</tr>
</tbody>
</table>

Carcase numbers this quarter to APHA (including PPP) are comparable to the previous two years but less than in 2013 and 2014. SAC CVS numbers have traditionally been lower than APHA but both the carcase and non-carcase submission numbers are comparable to the earlier years on the table above. Non-carcase submissions have increased over the previous two years but are lower than in 2013 and 2014.

Of the 31 carcase submissions received in the first quarter of 2017, 14 have been handled by our partner post mortem providers (PPP).
Total diagnostic submissions for Quarter 1 for all years (2013 -2017) for each main species covered by this report and also for each main geographical area.

<table>
<thead>
<tr>
<th>All Years</th>
<th>ALPACA</th>
<th>DEER</th>
<th>LLAMA</th>
<th>SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern England</td>
<td>174</td>
<td>55</td>
<td>16</td>
<td>245</td>
</tr>
<tr>
<td>Northern England</td>
<td>71</td>
<td>23</td>
<td>3</td>
<td>97</td>
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<tr>
<td>Scotland</td>
<td>35</td>
<td>32</td>
<td>10</td>
<td>77</td>
</tr>
<tr>
<td>Wales</td>
<td>42</td>
<td>4</td>
<td>2</td>
<td>48</td>
</tr>
<tr>
<td>Western England</td>
<td>184</td>
<td>28</td>
<td>10</td>
<td>222</td>
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<tr>
<td>Unknown</td>
<td>29</td>
<td>10</td>
<td>4</td>
<td>43</td>
</tr>
<tr>
<td>Sum:</td>
<td>602</td>
<td>152</td>
<td>45</td>
<td>799</td>
</tr>
</tbody>
</table>

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 SAC CVS 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.

There was no evidence from DNR or DNL (diagnosis not listed) analysis in Q1 2017, of new and emerging disease in the species covered by this project.

ONGOING NEW AND RE-EMERGING DISEASE INVESTIGATIONS

There are no on-going investigations of potential new or (re)emerging diseases.
UNUSUAL AND INTERESTING DIAGNOSES

Endocarditis and concurrent fasciolosis in alpacas

A female alpaca showing recumbency, pain and pale mucous membranes was euthanased by the private veterinary surgeon and submitted to APHA Bury St Edmunds for post mortem examination. It was the second animal to die from a group of 20 recently purchased animals. Post mortem examination identified subcutaneous oedema, severe ascites, hydrothorax and hydropericardium. The liver was very firm with an irregular surface and showed a moderate number of variably sized 2mm to 1.5cm green/yellow semi-solid purulent material well demarcated areas throughout. The heart was globose shaped with a firm apex and a small area of adhered fibrin on the epicardium. A 2cm diameter green/brown necrotic mass was present on the endocardium of the left ventricle below the left atrio-ventricular valve (Fig 1). Parasitology identified a trichostrongyle type egg count of 260 eggs per gram but no fluke eggs. A Ziehl Neelsen smear of the liver failed to detect any evidence of acid fast organisms. Cultures of the heart lesion were sterile. Histopathology of the heart and liver showed severe, chronic, fibrinous endocarditis with mineralisation and severe, multifocal to coalescing, chronic active, histiocytic and lymphoplasmacytic necrotising hepatitis respectively. The histopathological lesions observed in the liver were consistent with chronic hepatic fasciolosis caused by infection with *Fasciola hepatica*. Advice regarding monitoring the rest of the group for endoparasites was given.

![Fig 1 Heart of alpaca showing mural endocarditis on left ventricular wall](image)

Endocarditis has been recorded nine times by APHA as the cause of death in camelids (eight alpacas and one llama) over the last five years (2012-2017 inclusive) according to VIDA diagnoses. Five of these cases had evidence of concurrent or previous fasciolosis. A study by APHA (Schock 2009) looked at 12 alpacas with endocarditis, nine of which had mural endocarditis involving the right ventricle and in the three remaining animals lesions were seen in the left ventricle. *Fasciola hepatica* eggs were detected in seven alpacas whilst the remaining animals had liver lesions suggestive of fasciolosis. There were no consistent bacteriological findings in the APHA cases with *E.coli* and *Streptococcus* species being recovered in some cases. The latter described study concluded that endocarditis commonly affects the mural endocardium in British alpacas, with valvular involvement probably occurring later in lesion development. It was proposed that chronic fasciolosis may predispose alpacas to mural and later valvular endocarditis by favouring opportunistic bacterial infections in association with endocardial damage caused by toxaemia due to liver damage. It should therefore be borne in mind that endocarditis maybe a life threatening sequel to liver fluke infection.

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**Analysis of Reindeer submissions from 01/04/16 to 31/03/17**

Reindeer submissions, both carcase and non-carcase, were investigated over the last year to 31/03/17. A total of 64 submissions were received of which 17 were for monitoring purposes (in which no clinical signs were observed in the animals sampled) and these will not be examined further. Of the 47 diagnostic submissions (including carcases) a diagnosis was reached in 20 cases (42%) and included nine cases of parasitic gastroenteritis (PGE), four of hypocuprosis/hypocupreamia, two of ruminal acidosis, one each of cobalt deficiency, fasciolosis, fungal pneumonia, rumen fluke and purulent meningitis. Eleven of the diagnostic submissions were carcases and a diagnosis was reached in nine (81%) of these. The primary presenting sign in the 47 diagnostic cases included 20 cases with diarrhoea, 14 with wasting, 5 with unknown signs, 4 found dead, 3 with malaise and one with musculoskeletal signs. The majority of the cases (26/47) were over a year of age, seven were under a year of age and in 14 cases the age was not given.

This brief analysis provides some useful information:

- A diagnosis is much more likely to be reached if a carcase is submitted.
- Endoparasitism (PGE, rumen fluke and fasciolosis) was diagnosed in over half the cases (11/20) in which a diagnosis was made.
- Trace element deficiencies constituted 5/20 (25%) and acidosis 2/20 (10%) of diagnostic cases.
- Diarrhoea (20/47) and wasting (14/47) are the most common presenting signs which correlates well with the most common diagnoses.

If the clinical signs, history and relevant laboratory testing fail to yield a diagnosis in cases of chronic ill thrift, the possibility of Chronic Wasting Disease (CWD) should be considered. Suspect cases of CWD should be reported to APHA; further details are available through the following link: https://www.gov.uk/guidance/chronic-wasting-disease. CWD, a transmissible spongiform encephalopathy (TSE) of deer, elk and moose, is a notifiable disease and is not thought to be present in the UK.

**HORIZON SCANNING**

**Chronic Wasting Disease (CWD) update – Norway’s proposed management plans**

The Norwegian Scientific Committee for Food Safety presented a report (see links below) at the end of March 2017 on CWD in Norway, in which they recommended the removal of the entire reindeer herd in the Nordfjella region, where in 2016 three CWD infected individuals had been identified. This view is in line with the Norwegian Veterinary Institute’s previously stated scientific opinion as to the best course of action. This cull would constitute about 2000 reindeer or nearly 6% of the country’s wild population. The deer’s habitat will then be quarantined for at least 5 years to prevent reinfection. The first CWD case occurred in reindeer in March last year followed by two cases in moose near Selbu, 40km from Trondheim and 300km from the first case followed by a further two reindeer cases in the Nordfjella region. The food safety advisory panel also recommended increased surveillance around Selbu but no culling of moose as yet. The report comments that current data suggests the presence of two different strains of CWD in Norway. The strain that affects moose appears unusual and might be a novel CWD strain (referred to as ‘atypical’ in the report), whereas the strain detected in reindeer appears very similar to that previously recognized in North America. The moose cases appear to differ from “classical” CWD with regard to lesion profile, distribution, and pattern and type of abnormal prion proteins. The elevated age (13 and 14 years) of the two affected moose and the absence of other
positive cases in the area are also consistent with the theory that this could be a form of “atypical CWD”. It has been suggested that due to the solitary nature of moose, the likelihood of transmission is lower than with the reindeer which are more gregarious and therefore may have an increased risk of transmission. Further characterization of the CWD strains, experimental transmission and detailed analysis of this work is ongoing.

The cull is due to start in August and until the operation begins wildlife rangers will be patrolling to prevent animals from leaving or entering the herd's 2000-square-kilometer habitat.


http://www.wildlifedisease.org/wda/Portals/0/Forums/NORWEGIAN%20VETERINARY%20INSTITUTE%20CWD%20MARCH%202017.pdf

http://www.vkm.no/dav/66fc31f0ba.pdf


Chronic Wasting disease (CWD) Research Project

The British Deer Society (BDS) is engaged in a new research project with the Roslin Institute, University of Edinburgh, to perform DNA typing of deer found in Britain to establish the extent of their susceptibility to CWD. It is hoped that this will assist with modelling how CWD might develop in the UK and is an essential precursor to disease surveillance and monitoring to determine the future reaction to the presence of CWD. The second stage of the project is to see if, under laboratory conditions, CWD can be multiplied in samples representing the major gene variants which may allow the identification of potentially resistant groups or species. Analysis of previously collected samples is underway however fresh samples of certain populations from Exmoor, the Lake District, Midlands and East Anglia are now required. For more details see the BDS website link below:
https://www.bds.org.uk/

Anon (2017) **Chronic Wasting Disease research - samples needed.** Deer – The Journal of the British Deer Society Spring 2017 Vol 18 number 3, 6

**PUBLICATIONS OF INTEREST (APHA staff in capitals)**


This paper reviews zoonotic diseases that have been identified in South American camelids (SACs) in England and Wales, and which pose a potential risk to human health. SACs are classified as livestock but are also treated as pets and often have regular contact with humans. The importance of surveillance is highlighted in continuing to capture information on infections in SACs for the protection of both public and animal health.


The severity of tuberculosis (TB) caused by *Mycobacterium tuberculosis* in humans seems to be influenced by nutritional factors such as vitamin D3 intake however this relationship has been not been studied in other mammals infected with *Mycobacterium bovis*. This work attempted to assess if wildlife reservoirs of *M. bovis* show different levels of TB severity depending on the level of vitamin D found in serum after supplementation with vitamin D3. The study group consisted of twenty wild boar and twenty red deer: half of each group were supplemented with a vitamin D3-enriched food, whereas the remaining animals received no supplementation. TB diagnosis was carried out in each animal based on microbiological isolation of *M. bovis* and infected animals were classified as having localized or generalized TB depending on the location and dissemination of the lesions. Serum levels of vitamin D2 and D3 were also determined in each animal. Levels of vitamin D3 found in both, supplemented wild boar and red deer, were significantly higher than those found in the non-supplemented animals. Interestingly, higher levels of vitamin D3 were observed in animals suffering localized TB when compared to animals with generalized TB suggesting that vitamin D3 concentration correlates negatively with TB severity in these wildlife reservoirs.

3) Hoen, M.T (2017) **Tuberculosis in camelids – present situation and tests.** Veterinary Times 47 (12), 12-16

This article looks at the symptoms of tuberculosis in camelids, the epidemiology, the different mycobacterial species which have been isolated and the testing options and costings for the serology.


This article looks at various neurological disorders with brief descriptions on various case studies. Topics covered include developmental and congenital diseases which are relatively uncommon in camelids, traumatic spinal injuries which are more common especially in the cervical region due to their anatomy, and bacterial problems such as meningitis, meningoencephalitis and discospondylitis. Viral conditions such as louping ill and EHV-1, toxic and metabolic disease, for example CCN, and neoplastic conditions are all discussed. Diagnostic tools and where relevant, treatments are also discussed.


Schmallenberg virus (SBV) emerged in Europe in 2011 and in Sweden in 2012. Recent testing did not detect the virus in Swedish domestic animals. The aim of this study was to investigate whether SBV has
circulated, and is still circulating among wild cervids in Sweden. Sampling of moose, red deer, fallow deer and roe deer was undertaken in three time periods - before the 2012 vector period, after the 2012 vector period and after the 2015 vector period. This work showed that SBV circulated among wild cervids during the vector season of 2012 but three years later, no SBV-antibodies were detected in animals born after the vector season 2013. The likely absence of SBV circulation in Sweden may be due to the annual occurrence of a vector-free season due to climate conditions.

This study analysed various samples including serum, nasal swabs, bronchiolar lavage and lung collected from culled healthy deer (96 red deer, 19 fallow and 46 roe). Serological test identified positive reactions to Mycoplasma bovis in one sample and to Mycoplasma capricolum subsp. capripneumoniae in three samples; however, these three samples were negative by immunoblotting. Other antibody and antigen detection tests demonstrated negative results. It was concluded that currently wild cervids in Poland do not play a significant role in transmitting mycoplasma infections to domestic animals, but they remain a potential risk.