GB Emerging Threats
Quarterly Report
Miscellaneous & Exotic Farmed Species Diseases

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Highlights

- Aberrant fluke in an alpaca lung
- Chondrosarcoma in a llama
- First case of Chronic Wasting Disease in European Union
- Emerging ‘Camel Prion Disease’ in Algeria

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 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 SACCVS. These providers contribute to the VIDA diagnoses recorded on the APHA FarmFile database and comply with agreed diagnostic criteria. To achieve a VIDA diagnosis, all testing must be carried out by a laboratory with ISO 17025 accreditation.
INTRODUCTION

This report contains analysis of disease data from APHA, SAC Consulting: Veterinary Services (SAC CVS) division of Scotland’s Rural College (SRUC) and partner post mortem providers (SAC CVS, University of Bristol Veterinary School, Royal Veterinary College, University of Surrey, Wales Veterinary Science Centre) from samples submitted in the first quarter of 2018 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 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) 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></th>
<th>Non Carcase Submissions</th>
<th>Carcase Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APHA</td>
<td>SAC</td>
</tr>
<tr>
<td>2014</td>
<td>92</td>
<td>13</td>
</tr>
<tr>
<td>2015</td>
<td>65</td>
<td>9</td>
</tr>
<tr>
<td>2016</td>
<td>66</td>
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<td>2017</td>
<td>61</td>
<td>19</td>
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<tr>
<td>2018</td>
<td>29</td>
<td>15</td>
</tr>
</tbody>
</table>

Carcase submissions to APHA and third party post-mortem providers for quarter 1 are greater than the preceding three years; however 2018 non carcase submissions have seen a comparatively dramatic drop in numbers. This may be due to agency changes in how postal samples are handled and the tests offered by APHA. SAC carcase submissions handled by SAC have increased and are at their highest for five years. Non carcase submissions are comparable to previous years. Overall both carcase and non-carcase submissions for quarter 1 are lower than the last five years.
Total diagnostic submissions for Quarter 1 for all years (2014-2018) 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>Sum:</th>
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<tbody>
<tr>
<td>Eastern England</td>
<td>108</td>
<td>46</td>
<td>11</td>
<td>165</td>
</tr>
<tr>
<td>Northern England</td>
<td>60</td>
<td>18</td>
<td>4</td>
<td>82</td>
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<td>Scotland</td>
<td>33</td>
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<td>Wales</td>
<td>32</td>
<td>3</td>
<td>2</td>
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<td>Western England</td>
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<td>23</td>
<td>8</td>
<td>159</td>
</tr>
<tr>
<td>Unknown</td>
<td>33</td>
<td>9</td>
<td>5</td>
<td>47</td>
</tr>
<tr>
<td>Sum:</td>
<td>394</td>
<td>137</td>
<td>38</td>
<td>569</td>
</tr>
</tbody>
</table>

As reported in previous quarters, Eastern and Western England have received the most Miscellaneous submissions over the past five years, followed by Northern England and Scotland. Deer are the most common species submitted by Scotland compared to alpaca in all other regions.

**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 2010-2017 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.

**ONGOING NEW AND RE-EMERGING DISEASE INVESTIGATIONS**

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

Intra-lesional trematode in adult alpaca lung

Fixed lung and liver tissue from an eighteen-month-old alpaca was submitted to APHA Penrith VIC for histological examination. Carcase submissions from the same premises in the previous month had diagnosed severe fluke damage in three animals. Evidence of both chronic and acute/subacute infection was seen, resulting in multiple deaths of breeding females on the holding. Animals were last treated with a flukicide in autumn, before housing in the winter. Histopathological examination of the fixed tissues in the subsequent submission revealed an eosinophilic hepatitis with diffuse portal fibrosis and biliary hyperplasia in the liver, confirming severe chronic fascioliasis. Interestingly, in the lung section necrosis and haemorrhage of the tissue with an intralesional trematode Fig 1 (Fasciola spp.), pleural fibrosis and mesothelial activation was seen. This pathology pattern suggested the source of the adult fluke was via trans pleural migration from the liver. No other lung pathology was seen and it was unsure whether this trematode was solitary or whether other lesions existed but were not sampled.

Following ingestion by the host, Fasciola hepatica metacercariae excyst in the duodenum and penetrate the intestinal wall, migrating into the peritoneal cavity. Usually these immature fluke then travel to and through the liver parenchyma, however occasionally can reach sites including lung, pancreas, lymph nodes, thymus, brain and even foetus in pregnant animals. In these exogenous sites they can sometimes undergo maturation, as occurred in this case. The exact aetiology behind this aberrant migration is unclear.

Fig. 1 Adult trematode within an area of alveoli surrounded by a rim of lytic necrosis.

This is thought to be the first reported case of aberrant fluke in an alpaca, although the condition has been previously reported in other species and humans following heavy trematode infestation.


Chondrosarcoma in a Llama

Bristol University received the carcase of a twelve-year-old castrated llama following sudden death, with no premonitory signs. The animal’s body condition was good with no evidence of ill thrift previously reported. At the post-mortem examination gross findings included multiple nodular pale cream red lesions throughout the viscera including the liver (Fig 2 & 3), kidney, spleen, on the abdominal wall, and within some thoracic lymph nodes. Histological findings of liver and kidney samples included sheets of pleomorphic spindle cells with high mitotic activity along with chondroid matrix formation interspersed with areas of tissue necrosis and haemorrhage. A diagnosis of multicentric chondrosarcoma was made.

Chondrosarcomas are malignant tumours which produce neoplastic chondroid and fibrillar matrix but never directly produce neoplastic osteoid or bone. These tumours can be primary; classified as either ‘central’ when formed from a primary bone source or ‘medullary’ when arising from the periosteum. Secondary tumours can also occur from malignant changes in osteochondromas. In this case no primary bone or cartilage tumour was found. Neoplastic metastasis can occur commonly affecting the lungs, kidney, liver and heart.

Reports of this condition are scarce in domestic animals apart from dogs, where they account for up to 10% of primary bone tumours. Flat bones including the nasal cavity, ribs and pelvis are most commonly affected. Reports have been published involving cases in cattle, goats and camels. There have been no previously documented cases in South American Camelids.

Fig 2. Liver massively expanded by round nodular lesions; lungs unaffected

Fig 3. Incised liver showing lesions throughout

**HORIZON SCANNING**

**CHRONIC WASTING DISEASE UPDATE-FIRST CASE IN EU**

The culling of zone 1 Nordfjella has now been completed, well before the target of May 2018, with a total of 2027 reindeer (*Rangifer tarandus tarandus*) destroyed. The total number of confirmed Chronic Wasting Disease (CWD) reindeer in this area is now 18. Using population size estimation and flock age composition the prevalence of disease in this region is thought to be around 1%. Screening programmes in other areas will continue and Nordfjella will now lie fallow for at least five years to prevent recrudescence of disease from environmental sources. In total over 40000 samples have been processed in the country as a whole, with 22 positive results detected so far. This includes the cases previously described in three moose (*Alces alces*) and one red deer (*Cervus elaphus atlanticus*) in other regions of Norway. It is thought that the type of prion disease detected in these animals is caused by a spontaneous mutation in the brain only and affects older animals of the cervidae species sporadically, as opposed to the cases of both brain and lymph disease seen in younger animals in Nordfjella.

Chronic wasting disease has been diagnosed in Finland for the first time as reported by the Finnish Food Safety Agency (Evira) on 8th March 2018. This is the first documented case in an EU member state. A fifteen-year-old moose (*Alces alces*) in the Kuhmo region of Eastern Finland, near to the Russian border died of what appeared to be natural causes. Testing carried out at an EU reference laboratory confirmed the findings. The type of CWD in this animal is similar to that documented previously (described as ‘atypical’) in Norwegian moose (*Alces alces*), and is not thought to be related to highly contagious ‘classical’ cases detected in reindeer in Nordfjella or in cervids in North America. Monitoring of the disease already occurs in Finland, however this will now be stepped up along with monitoring efforts in five other EU member states; Estonia, Latvia, Lithuania, Sweden and Poland. Exports of live reindeer from Finland has also been currently suspended, although they are known to roam over country borders. It is worth noting that 2500 samples have been tested for CWD in Finland since 2003, with no positive results previously detected.

Live reindeer are not imported to the UK. The risk of CWD introduction to the UK has been classified by the UK government as *Negligible* to *Very Low*.

[CAMEL PRION DISEASE IN ALGERIA](https://www.vetinst.no/en/)

Following slaughterhouse surveillance, an emerging prion disease has been detected in dromedary camels (*Camelus dromedaries*) in Algeria. Ouargla abattoir had noted an increase in camels displaying neurological signs over the last five years. Symptoms included behavioural changes such as aggression...
and anorexia with neurological signs such as ataxia, tremors and recumbency being seen as disease progressed.

Western blot analysis and histopathology showed PRP^{sc} prion changes in brains of three affected animals and the lymph nodes of one with characteristic brain neurodegenerative pathology. These findings were not present in a clinically well animal. Molecular typing showed differences between this prion disease and BSE and scrapie. This condition has been designated as ‘Camel Prion Disease’ (CPD). Retrospective analysis showed prevalence of disease in camels entering Ouargla abattoir was 3.1% in 2015-2016, with only animals over eight-years-old affected. Anecdotal reports from breeders suggest the disease may have been around since the 1980s, with disease duration reportedly being between three to eight months.

Infectious and naturally occurring prion diseases were previously only thought to affect Bovidae and Cervidae families. This finding in members of the Tylopoda family, which also includes alpacas and llamas, extending the spectrum of species susceptible to natural TSE infection. It is still unknown whether CPD is infectious however in other prion diseases with lymphoid involvement, such as Chronic Wasting Disease and scrapie, horizontal transmission is an important aspect of disease pathogenesis.

Both the source of infection, and whether the condition is confined to the Ouargla region is unknown. Camels are utilised as sources of milk and meat by millions of families along with commercial farming systems across a wide geographical area spanning Northern and Eastern Africa, the Middle East and Asia. They are often herded and travel long distances spanning country borders, meaning tracking the disease distribution may be difficult. Further urgent work needs to be carried out to assess the risks of this disease to human and animal health and the economic impacts it may have. These findings will be published in Emerging Infectious Disease in June.

There are no trade links between the UK and Algeria involving camels. The disease introduction risk has therefore been classified as Negligible. http://www.promedmail.org/post/5746593


PUBLICATIONS OF INTEREST


This article provides up to date information on the Rabbit Haemorrhagic Disease virus variant 2 situation in the United Kingdom. RHDV 2 was first identified in France in 2010, before spreading through the majority of mainland Europe, Canada and Australia. The first UK cases were reported in 2014. Animals of all ages can be affected with large outbreaks documented in rescue centres, breeding populations and in pets. Awareness of the disease has increased since the first cases, however many sudden deaths in rabbits are still not documented or investigated. This paper describes the clinical signs, gross pathological findings and differential diagnoses for RHDV2. Diagnostic techniques and preventative measures are also described. The authors give a thorough review into the available vaccines on the market in the UK and the limitations and uses for each. This paper highlights the need for correct diagnosis and appropriate vaccination in the control of disease spread.

This paper describes the prevalence of the above conditions in a sample of 175 alpaca from 15 different New Zealand farms, along with 31 samples received as routine submissions at a diagnostic laboratory. 170 blood smears were examined for presence of Mycoplasma haemolamae (Mhl), along with PCR testing of 206 samples. 195 submissions were tested for BVD with both antibody ELISA and viral PCR methods carried out. Worm egg counts were performed on 143 samples. Results of Mhl PCR testing show a prevalence on 0.97% (2/207 blood samples positive) although no presence of organisms were detected on blood smear. BVD viral RNA was not found in any tested samples, although positive antibody levels were identified in 2.1% (four animals from three farms). The most significant finding detailed in this paper was the presence of gastrointestinal parasites. 38.5% samples tested had 0 eggs per gram. 23% of samples had a worm egg count of or above 250 eggs per gram, with Haemonchus the most common species detected. This mirrors observations of the UK SAC population, that parasitic gastroenteritis is a common finding.


This review paper provides a concise and simple overview into gastrointestinal ulcers in both SACs and ruminants. The authors start by providing a simple classification system for diagnosis of ulcers, something which is difficult and often overlooked in live animal cases. The paper provides prevalence and mortality data for abomasal ulcers in various life stages and management systems of cattle and sheep, however highlights the lack of data and anecdotally high prevalence recorded in SACs. This area could benefit from further research and case data compilation. Clinical signs in both ruminants and camelids are non-specific and difficult to identify in the live animal. The authors go on to describe various possible diagnostic aids which apply to both species. These include a detailed physical examination, ultrasound examination, faecal occult blood testing, haematological parameters relating to blood loss and pepsinogen and gastrin levels in blood. It is worth noting that pepsinogen and gastrin levels are also influenced by gastrointestinal parasite challenge and along with the fact no reference range exists for SACs, are very difficult to interpret. Overall this paper details the many gaps in research of abomasal and C3 ulcers in camelids, a condition seen commonly by practitioners. It does however highlight the many similarities between ruminants and SACs in reference to aetiology, clinical signs and treatment options, something which is important to bear in mind when approaching a case.


This paper describes an occupancy modelling approach to detect prion shedding in deer saliva along with the covariates which may impact on prion shedding or detection. Saliva transmission is thought to be a significant method of horizontal infection in CWD spread across America and the Nordfjella region of Norway. It is also a readily available sample in live animals compared to the traditional testing methods performed on brain and lymph tissue.