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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 third 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 3 (July to September) 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>July to September</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>26</td>
<td>5</td>
</tr>
<tr>
<td>2014</td>
<td>42</td>
<td>6</td>
</tr>
<tr>
<td>2015</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td>2016</td>
<td>29</td>
<td>4</td>
</tr>
<tr>
<td>2017</td>
<td>24</td>
<td>3</td>
</tr>
</tbody>
</table>

With the exception of 2014, APHA (including PPP) carcase submissions are comparable to previous years however non-carcase submission numbers are significantly reduced which is likely to be a reflection that more samples are being handled by external laboratories. SAC submissions, both carcase and non-carcase, are similar to the previous 4 years.

Of the 27 carcase submissions this quarter, 12 have been handled by APHA’s six Veterinary Investigation Centres, 12 by PPP and 3 by SAC.
Total diagnostic submissions for Quarter 3 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>106</td>
<td>37</td>
<td>7</td>
<td>150</td>
</tr>
<tr>
<td>Northern England</td>
<td>45</td>
<td>20</td>
<td>1</td>
<td>66</td>
</tr>
<tr>
<td>Scotland</td>
<td>30</td>
<td>40</td>
<td>7</td>
<td>77</td>
</tr>
<tr>
<td>Wales</td>
<td>32</td>
<td>17</td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>Western England</td>
<td>119</td>
<td>26</td>
<td>8</td>
<td>153</td>
</tr>
<tr>
<td>Unknown</td>
<td>50</td>
<td>9</td>
<td>2</td>
<td>61</td>
</tr>
<tr>
<td>Sum:</td>
<td>382</td>
<td>149</td>
<td>25</td>
<td>556</td>
</tr>
</tbody>
</table>

As in quarter 2 for all years (2013-2017) reported in the last emerging threats report (https://www.gov.uk/government/publications/exotic-and-farmed-species-disease-surveillance-reports-2017), Eastern and Western England has seen the greatest number of total submissions covered by this project over the last 5 years and these regions have also seen the greatest number of alpaca submissions reflecting their distribution throughout the country. Scotland followed closely by Eastern England then Western and Northern England has seen the most deer related submissions.

GB Diagnostic Submissions, Jul-Sept 2016 and 2017
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 (diagnosis not reached) or DNL (diagnosis not listed) analysis in Q3 2017, of new and (re)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

Systemic candidiasis in an alpaca

A 14-year-old alpaca was submitted to the Royal Veterinary College with a one week history of inappetance, depression, weakness and ataxia progressing to recumbency and a marked respiratory effort. A computed tomography (CT) scan revealed marked cranioventral lung consolidation and the alpaca was euthanased. A post mortem examination confirmed the presence of lung consolidation with multiple small white foci throughout and fibrin strands over the pleura. There were multiple deep but not perforating ulcers in compartment 3 (C3) of the stomach (see Fig 1 below). The cortices of both kidneys contained multifocal, wedge shaped pale cream areas radiating out from the corticomedullary junction to form subcapsular foci (renal infarcts). Culture of the lung yielded a mixed growth of predominantly Candida albicans. Histopathology confirmed the presence of fungal pseudohyphae and yeasts in the lungs, kidneys and C3 ulcers. It was postulated that the gastric ulceration, which is not uncommon in alpacas, was the primary lesion which was colonised with fungi with subsequent vascular spread to the lungs and kidneys. The unusual feature of this case was the cranioventral nature of the pneumonia despite it histologically, being of vascular origin. Systemic candidiasis in alpacas has been previously described (Kramer et al., 2008) with the same combination of C3 ulceration with embolic nephritis and pneumonia as in this case.
Endoparasitism in South American Camelids (SAC)

Endoparasitism involving SACs was identified as the cause of the clinical signs (including death) on 14 occasions by APHA VICs over the last 6 months. Carcases and faeces were submitted to investigate wasting (10/14), malaise (2/14) and being found dead (2/14). The majority of the animals were adults (11/14), 2 were post weaned and the age of one animal was unknown. Post mortem findings were variable but included subcutaneous oedema, pleural and peritoneal effusions, a lack of body fat, pallor, nodular mucosal changes in compartment 3 (C3) and enteritis. Total worm counts and worm egg/coccidial counts indicated that 7/14 cases were due to parasitic gastroenteritis (trichostrongyle type), 5 were due to haemonchosis and 2 due to fasciolosis. No cases of coccidiosis were diagnosed and no evidence of concurrent disease was identified on the cases submitted for post mortem. In one case involving ill thrift and poor condition in 4/30 female adult alpacas, analysis of faeces samples indicated high trichostrongyle worm egg counts of 1820 and 2850 eggs per gram in two of the four samples tested.

It should also be noted that care must be taken not to discount the clinical significance of low faecal egg counts in SACs. There is some suggestion from post mortem examinations carried out within APHA that total worm counts and gross pathology in alpacas which have succumbed to parasitic gastroenteritis may not always be reflected in faecal worm egg counts. However, it is important that any decision to use anthelmintics is based on both clinical and parasitological evidence from a given individual. Other factors to consider with the use of anthelmintics include ensuring camels are included in any parasite control for mixed species grazing and adherence as far as possible to the principles outlined in Sustainable Control of Parasites in Sheep (SCOPS – see link below) to minimise the onset of anthelmintic

Reference
resistance. It needs to be recognised that anthelmintic use in camels is presently ‘off license’ and their appropriate use should be thoroughly researched.

http://www.scops.org.uk/

**Systemic Streptococcal infection in alpaca**

SAC V CVS reported a case of systemic infection with *Streptococcus equi* subspecies *zooepidemicus* in a two-year-old female alpaca which presented with dyspnoea and died a short time later. The carcase was in good body condition but a severe fibrinopurulent pleurisy, peritonitis and pericarditis was found at post mortem examination. *S.equis* spp *zooepidemicus* (*S. zooepidemicus*) was isolated in pure culture from the lungs and in a mixed, but profuse growth from the abdomen. This organism is the aetiological agent of ‘alpaca fever’ in Peru and is one of the most important diseases in SAC in South America. Morbidity may be as low as 5-10% but mortality of those affected is usually between 50-100%. Predisposing factors for the systemic form include stressors such as malnutrition and unfavourable weather. Acute and subacute infections tend to occur in young animals with systemic infections often resulting in polyserositis (Jones, M. 2002) and sometimes meningitis. Localised infections can also occur and chronic abscessation is more common in adults. Infection with this organism can cause disease in a variety of animal species including cattle, sheep, pigs, monkeys and humans. It is the most frequently isolated opportunistic pathogen of horses associated with inflammatory airway disease in Thoroughbred racehorses, uterine infections in mares and ulcerative keratitis. Recently, several cases of acute fatal haemorrhagic pneumonia in dogs have been attributed to *S. zooepidemicus* infection.

**References**


**Enclosed and captive deer survey 2017**

The British Deer Society (BDS) is creating a register of all enclosed or otherwise captive deer of any species in the UK. It will be the first comprehensive list of its kind, and will be an invaluable asset. Uses, among many other benefits, will include advising the public of where they can view deer, recording endangered species, or allowing BDS to react quickly to outbreaks of diseases affecting deer. More information and the survey form can be found at


**HORIZON SCANNING**

**Adenovirus haemorrhagic disease (AHD) in cervids in Washington**

Promed reports that ADH has been documented for the first time by the Washington State Department of Fish and Wildlife. Dead fawns have been found throughout July and August 2017. The disease was reported earlier in the year in Oregon (see Emerging threats report quarter 2 2017- link below). It is relatively common in California and other western states and was first identified in California in 1994.
Update on Chronic Wasting Disease

Norwegian news sources have reported that since April 2016 approximately 25,000 wild cervids in Norway have been tested for chronic wasting disease (CWD). Seven wild reindeer (*Rangifer tarandus*) from the mountains of south-central Norway, and 3 moose (*Alces alces*), 300-400 km east of the reindeer, near the Swedish border, have been found to be infected with CWD. The moose cases appear to be unrelated to the reindeer cases and have been detected as part of the surveillance programme. A single red deer (*Cervus elaphus*), a species indigenous to the UK, has also been reported as positive; it was 200 km from the reindeer area and 200-300 km from the moose cases. This is the first recorded case in this species in Europe. Accordingly there now appear to be at least 3 distinct foci of CWD in Norway.

The prions from the reindeer cases are similar to North American CWD, and may have been imported with biological products. The type of prion found in the moose show a different immunohistochemical pattern to the reindeer and may be a spontaneous mutation. The full test results of the red deer are not yet available.

Map legend: Hjort – red deer, Elg – moose/elk, Villrein –reindeer/caribou
PUBLICATIONS OF INTEREST (APHA staff in capitals)


This letter describes an atypical presentation of myxoma virus infection in a wild rabbit with plaque-like lesions up to 2 cm in diameter in the subcutis over the lumbar region.Externally, the coat appeared normal. No lesions were present around the eyes, face, ears, genitals, anus or elsewhere as might be expected with typical myxomatosis cases. It also describes a classically presented myxomatosis case from the same location a couple of months later. Analysis of the orthopox-like virus particles by PCR in the second case confirmed the presence of a myxoma virus and sequencing showed it to be identical to that in the index case. Histopathology of the two cases was very similar. The letter raises awareness that myxomatosis in rabbits can present as a non-lethal skin condition without the classical lesions of the disease.


This paper describes the first reported case of disseminated toxoplasmosis in a camel. An 11-yr-old dromedary camel (*Camelus dromedarius*) at a zoo in south Florida presented with diarrhoea while being treated with enrofloxacin and dexamethasone for a chronic skin condition. The animal became increasingly debilitated, developed hemorrhagic diarrhoea, declined rapidly and died despite aggressive fluid therapy and supportive care. Histologic examination revealed intralesional protozoal tissue cysts consistent with *Toxoplasma gondii* in the intestines, lungs, and liver, as well as lymphoid depletion of the spleen suggesting immunosuppression.


This study examines prion excretion and shedding by testing faeces and urine in wild cervids (elk, mule and white tailed deer) at set times after oral inoculation in an attempt to evaluate the temporal patterns, species and genotype specific factors which may be involved. No clinical signs of Chronic Wasting Disease (CWD) were shown by the animals but all three species were shown to excrete prions by 6 months post inoculation. Faecal samples were consistently positive for CWD prions (88%) and more likely to be positive than urine (28%). Cervids with certain genotypes encoding for prion proteins were more susceptible and more likely to excrete prion proteins (94%) than cervids with less susceptible genotypes (64%). All cervids with prion positive urine also had prion positive faeces however the converse was not true. The study indicated that prion excretion in the faeces, and to a lesser extent in the urine, may be an important means of depositing prions in the environment acting as an indirect source of infection for the transmission of CWD.