GB miscellaneous & exotic farmed species quarterly report
Disease surveillance and emerging threats
Volume 20: Q3 – July-September 2018

Highlights

| Fibromatous lesions of antler velvet in reindeer | 3 |
| Copper toxicity in an alpaca | 4 |
| Bovine TB in white tail deer, Michigan, USA | 7 |

Contents

Introduction and overview ................................................................................................................1
New and re-emerging diseases and threats ..................................................................................3
Unusual diagnoses ..........................................................................................................................4
Changes in disease patterns and risk factors ..............................................................................9
Horizon scanning ..........................................................................................................................9
Publications ....................................................................................................................................11
Introduction and overview

This quarterly report reviews disease trends and disease threats for the third quarter of 2018 July – 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

Diagnostic submission trends

Diagnostic submissions in Quarter 3 (July to September) 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>Jul-Sept</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>108</td>
<td>18</td>
</tr>
<tr>
<td>2015</td>
<td>47</td>
<td>16</td>
</tr>
<tr>
<td>2016</td>
<td>46</td>
<td>18</td>
</tr>
<tr>
<td>2017</td>
<td>26</td>
<td>19</td>
</tr>
<tr>
<td>2018</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

As reported in the quarterly surveillance reports since Quarter 2 2017, postal samples received by APHA have fallen compared to previous years, most likely due to changes in sample handling and testing offered by APHA. Carcase submissions during Q3 to APHA are higher than those in years 2015-2017 and have seen an increase of 45% on those received in Q3 2017. Non carcase miscellaneous species submissions to SAC have been traditionally lower than those to APHA however for the past two quarters of 2018, the numbers of non carcase submissions to the two have been almost equal.
Total diagnostic submissions for Quarter 3 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>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern England</td>
<td>82</td>
<td>34</td>
<td>7</td>
<td>123</td>
</tr>
<tr>
<td>Northern England</td>
<td>47</td>
<td>20</td>
<td>1</td>
<td>68</td>
</tr>
<tr>
<td>Scotland</td>
<td>31</td>
<td>33</td>
<td>6</td>
<td>70</td>
</tr>
<tr>
<td>Wales</td>
<td>30</td>
<td>16</td>
<td></td>
<td>46</td>
</tr>
<tr>
<td>Western England</td>
<td>104</td>
<td>22</td>
<td>6</td>
<td>132</td>
</tr>
<tr>
<td>Unknown</td>
<td>50</td>
<td>8</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td><strong>Sum:</strong></td>
<td>344</td>
<td>133</td>
<td>22</td>
<td>499</td>
</tr>
</tbody>
</table>

As described in previous reports, the highest number of alpaca submissions for Q3 over the last five years was submitted from Western followed by Eastern England reflecting their geographical distribution throughout Great Britain. Deer submission numbers are traditionally very similar between Eastern England and Scotland.
GB Diagnostic Submissions, Quarter 3 2017 and Quarter 3 2018

New and re-emerging diseases and threats

Please refer to the annexe on GOV.UK for more information on the data and analysis.
Unusual diagnoses

Fibromatous lesions of antler velvet in a reindeer

The University of Bristol received antler bone and velvet from an eight-year-old reindeer (*Rangifer tarandus*) from the North-East of England. The animal had been imported as a young bull from Norway and is part of a breeding herd. Each year proliferative abnormalities in the velvet of one antler have been noted, with the fast growing lesions usually removed to prevent secondary infection or fly-strike. Other animals in the herd have shown similar signs but have never seen repeated cases year on year. A piece of bony antler with an attached large pedunculated mass with overlying velvet was submitted for histopathology and findings included a hyperplastic dermatitis with superficial pyoderma and fibromatous hyperplasia. These findings, along with the case history and gross appearance are typical of a hyperplastic condition of reindeer antlers only reported in the UK. The paper referenced below describes five farms across the UK experiencing similar fibromatous lesions of antler velvet in reindeer between 2009 and 2012. The aetiology of the condition is unknown. Despite detailed investigations, papilloma virus and parapox virus have not been detected in cases so far. Only male entire animals have been reported with the condition, however unusually in this case the animal was castrated in spring 2018, shortly before developing typical antler lesions. This may suggest involvement of endocrine imbalances not experienced by hinds. Trauma due to coarse grazing/biting flies is another theory. It is unknown as to why cases have not been reported in Scandinavian countries with large reindeer populations.

Many thanks to Aidan Foster at University of Bristol and FPM Ltd for the details and photos of this case.
Copper toxicity in an alpaca

The carcase of an adult alpaca was submitted for examination after a 24-hour history of malaise, anorexia, laboured breathing and colic prior to death. This animal was from a holding with 23 alpacas grazed in two groups with supplementary proprietary compound feed. Examination revealed good levels of body fat with multifocal areas of icteric subcutaneous oedema with icteric fluid also noted in the pericardial sac. The liver was pale and mottled with a nutmeg appearance. Multifocal, round, pale, flat lesions were scattered over the diaphragmatic surface and extended shallowly into the parenchyma. Oedema of the lungs was also noted. Toxic, metabolic, fungal, bacterial and neoplastic causes were all considered in the investigation of this hepatopathy. Bacterial cultures and parasitology were unremarkable and therefore histopathology commenced. Severe diffuse chronic fibrosing cholangiohepatopathy with hepatocyte necrosis and atrophy was diagnosed.
Rhodanine specific staining for copper indicated high levels in the liver, further confirmed by biochemistry results of 21800 µmol/kg dry matter in liver tissue (reference range 300-5000µmol/kg). The most likely cause of this chronic toxicity was overfeeding of concentrates, something which may be more of an issue this year following dry weather and poor grass growth earlier in the season. Haemolytic crisis is not thought to be a common clinical sign, unlike in other ruminants. A paper detailing gross findings very similar to this case may be of interest.


![Figure 3: Multifocal, round, pale lesions scattered over the surface of the liver. Histologically these lesions represented hepatocyte necrosis.](image)

### Congenital heart defects in camelids

Two cases of congenital heart defects in alpacas were diagnosed by APHA’s partner post-mortem providers in the third quarter of 2018. The first case was that of a three-year-old alpaca noted to be staggering and in poor condition. A heart murmur was present on clinical examination. Following deterioration in condition euthanasia was carried out and post-mortem examination found a ventricular septal defect. Ventricular septal defects are the most common congenital heart condition seen in camelids with the size and location of the defect dictating how well the animal is likely to tolerate this condition.

The second case was seen in a two-week-old male alpaca cria. This animal was seen to be lying down more than usual and was found under a fence with a temperature of 40.5°C before dying. Following submission for post-mortem examination, a truncus arteriosus,
otherwise known as common arterial trunk was diagnosed. In this condition, a single vessel stemming from the aorta acts as the outlet for both the left and right ventricles, overriding a ventricular septal defect existing between chambers. Due to increased pressure in the right ventricular chamber, thickening of the muscular ventricle wall is also seen. The pulmonary artery, which would normally carry blood from the right ventricle to the lungs has no direct connection to the chamber. Circulatory collapse usually leads to death early on in life in affected animals.

Figure 4: Truncus arteriosus leaving left ventricle leading to aorta – pulmonary arteries come directly off aortic trunk, not right ventricle (arrow)
Congenital heart defects appear to be overrepresented in alpacas compared to other livestock species. In the paper referenced below by Stieger-Vanegas et al., 2016, the prevalence of these conditions between 2011 and 2014 in necropsied alpacas was 1.5%, a figure which is on par with others detailed in literature. Many crias with congenital heart defects will have more than one abnormality present. Reasons for overrepresentation in alpacas are not definitively known. The most plausible explanation given the hereditary component to the majority of congenital heart defects would be due to the relatively small gene pool available to breeders in many countries with non-native camelid populations following historical import of small numbers of animals. Congenital heart defects should be considered in any camelid presenting with hypoxaemia, dyspnoea or poor growth rates. Thorough clinical examination along with echocardiography can be used to aid identification of defects.

Many thanks to Mick Millar at University of Bristol for photos and case details.


Changes in disease patterns and risk factors

Please refer to the annexe on GOV.UK for more information on the data and analysis.

Horizon scanning

**Bovine tuberculosis in white-tailed deer in Michigan, USA**

Paul Bartlett, an epidemiologist at Michigan State University presented at the Official Veterinarian conference, held in September on Bovine TB in white tailed deer in Michigan. According to Michigan Department of Natural Resources this is an ‘emerging disease’ with the white tailed deer population of Michigan acting as a disease reservoir and hampering eradication efforts. The first case of TB in deer was reported by a hunter in 1975. The second was found in 1994. Michigan has been testing white-tailed deer for TB since 1995, the longest established TB wildlife survey in the world. Approximately 80% of TB positive deer appear to exist as an established population in one small area of high animal density in Michigan’s Lower Peninsula. Dr Bartlett described the most likely transmission route between cattle and deer as ingestion of infected feed. A large percentage of the core TB positive area is private owned and hunting of deer is both popular and an utilised control option. Since the mid 1990’s, prevalence of TB infection has fallen by over 50% which is largely thought to be down to hunting. Reports in local media have been issued by the authorities to increase awareness of hunters to the clinical signs and pathology of TB. Free of charge testing is offered for TB in culled deer. Incentives are also being given to farmers to increase biosecurity of cattle farms and land owners receive incentives for letting hunters gain access.

Although this disease has been present in Michigan for many years, the increase in media reports in recent months appears to be related to the start of the Michigan hunting season and as a response to a photo of TB lesions in a deer thorax which has become viral on social media.


State of Michigan-Emerging Disease Issues
https://www.michigan.gov/emergingdiseases/0,4579,7-186-76711_78153-425908--00.html

Pro-Med PRO/AH/EDR> Bovine tuberculosis - USA (03): (MI) bovine, cervid, alert
Published Date: 2018-10-12 Archive Number: 20181012.6086231
http://www.promedmail.org/post/6086231
First case of Anthrax in Bison in British Columbia, Canada

Thirteen bison (species not mentioned) from a herd of 150 have died due to Anthrax in the first recorded case of the disease in British Columbia, Canada. Anthrax, caused by *Bacillus anthracis*, a spore-forming bacterium is highly contagious and often presents as sudden death in livestock such as cattle, sheep and bison. The soil on the farm, near Fort St. John, is the same as that in the Peace River region of Northern Alberta, where Anthrax in livestock has been previously reported along with the Canadian Prairies. Anthrax has not been recorded in livestock in British Columbia previously. The climatic conditions this year did prompt the Beef Cattle Research Council to warn of Anthrax outbreaks in Canada a few months ago. Spring flooding risked soil disturbance and surfacing of deep spores, with high temperatures and low rainfall over the 2018 summer period facilitating spore survival. In this case the exact source of spores is not known and may be either from pasture, or from forage contaminated with soil containing spores. The remaining animals have been moved from the feeding ground and a vaccination is available to help protect against disease. Exposed animals can be treated successfully if the disease is diagnosed early.

PRO/AH/EDR> Anthrax - Canada: (BC) bison. Published Date: 2018-10-25 Archive Number: 20181025.6112385 http://www.promedmail.org/post/6112385
Publications


Anaemia is commonly diagnosed in South American Camelids with underlying causes including endoparasites, gastric ulcers, infectious causes and trace element deficiencies. This paper describes the case report of an immature male llama (*Lama glama*) diagnosed with anaemia secondary to haemonchosis at the University of Veterinary Medicine, Hannover. Detail is provided around the method of diagnosis and characterisation of the anaemia, along with an in depth description of the treatment given, including blood transfusion. In this case of a highly regenerative anaemia, treatment was successful and the llama re-joined the flock after 31 days. This paper acts as a useful reference guide for practitioners investigating anaemia in camelids.


This paper is an epidemiological study of Cryptosporidium, Giardia and Enterocytozoon in Australian alpacas (*Vicugna pacos*). Faeces samples were collected from a total of 81 different herds representing 1421 alpacas over six Australian states. PCR testing was carried out and one or more of the above pathogens was detected on 18.5% of farms tested. On three farms evidence of Cryptosporidium was detected; *G. duodenalis* on six (7.4%) and *E. bieneusi* on eight. Individual alpaca faecal DNA samples were analysed and it was found that animals under six months of age were more likely to carry these enteropathogens. The authors have concluded that young crias are likely to act as reservoir hosts for other alpacas and for humans.


This study looks into questionnaire responses of 97 Australian alpaca (*Vicugna pacos*) farmers current worm control protocols. 20 farms from the group were further selected to assess anthelmintic efficacy utilising both faecal egg count reduction testing and a multiplex PCR method to identify worm species. 63% of respondents considered worms to be a major health concern in their alpacas, with 89% using anthelmintics as part of their control plan. Over half of respondents kept alpacas with cattle or sheep. Given the lack of licensed products in camelids, typically the anthelmintic dose rate administered was that licensed for sheep. *Haemonchus* spp. were the most commonly resistant species followed by *Trichostrongylus* spp. All 20 farms showed resistance to fenbendazole given at
7.5mg/kg body weight with an average overall fecal egg count reduction of 36%. The efficacy of oral ivermectin was also low and for the first time resistance to moxidectin was reported in 46% of farms. Multiple anthelmintic resistance was also common with most resistant to fenbendazole, closantel and ivermectin. The most effective combination of anthelmintics was reported to be levamisole, closantel, albendazole and abamectin.


This study investigates the most common causes of mortality in farmed bison (*Bison bison*) herds in Western Canada. 42 herds partook in the study with herd sizes ranging from between 28 to 5500. Necropsies using a study protocol were carried out on 217 animals with samples submitted to a diagnostic laboratory for further testing. The majority of deaths (40.8%) were due to pneumonia with *Mycoplasma bovis* the most commonly isolated causative organism. Gastrointestinal abnormalities including ostertagiosis, coccidiosis and bacterial disorders was second at 12.7% followed by mineral abnormalities at 9.8%. Most animals that had biochemical mineral analysis carried out were marginally deficient in at least one mineral. In nine animals copper deficiency was the cause of death. On the other hand, copper toxicosis accounted for eight deaths. Malignant catarrhal fever (MCF) accounted for 8.5% of deaths, however 75% of these occurred on just two units. Further analysis of MCF cases suggested herd size, sheep flock size and distance of bison from sheep were all contributing factors with farms within 1km of a sheep flock boundary fence most at risk. The overall mortality risk was less than 3%.


Samples from 684 rabbits in 11 different European countries were tested for two Rabbit Haemorrhagic Disease virus types (RHDV/RHDVα and RHDV2) between January 2015 and June 2017. A total of 261 samples were positive with four positive to RHDV/RHDVα and 257 positive for RHDV2. RHDV/RHDVα positive samples originated from Germany and the Netherlands. RHDV2 positive samples were detected in rabbits from Germany, Great Britain, Luxembourg, the Netherlands, Spain, Switzerland, Poland, Belgium, Austria, Sweden and Finland. In total 220 samples were tested from Great Britain. Zero were positive for RHDV/RHDVα whilst 54 (24.5%) were positive for RHDV2. This study further supports previous literature suggesting RHDV2 is overtaking RHDV in prevalence in Europe.
Statement regarding use of this material

The material in this report has been compiled by the Animal and Plant Health Agency (APHA) Surveillance Intelligence Unit in collaboration with the APHA Surveillance and Laboratory Services Department. Images are governed by Crown Copyright except where specifically acknowledged to have been provided by others external to APHA. Use of material directly from the report is acceptable so long as APHA (or others where specifically indicated) is acknowledged as the owner of the material. This does not include use of the APHA logo which should excluded, or used only after permission has been obtained from APHA Corporate Communications (apha.corporatecommunications@apha.gsi.gov.uk).

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v.3. To view this licence visit www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ or email PSI@nationalarchives.gsi.gov.uk

This publication is available at https://www.gov.uk/government/collections/animal-disease-surveillance-reports

Any enquiries regarding this publication should be sent to us at SIU@apha.gsi.gov.uk

http://apha.defra.gov.uk/vet-gateway/surveillance/index.htm

The Animal and Plant Health Agency (APHA) is an executive agency of the Department for Environment, Food & Rural Affairs, and also works on behalf of the Scottish Government and Welsh Government.