Highlights in this issue:
- Equine Influenza in the UK
- Glanders (Burkholderia mallei) in Germany
- Focus article: Ragwort Toxicity

Important note:
The data presented in this report must be interpreted with caution, as there is likely to be some bias in the way that samples are submitted for laboratory testing. For example they are influenced by factors such as owner attitude or financial constraints or are being conducted for routine screening as well as clinical investigation purposes. Consequently these data do not necessarily reflect true disease frequency within the equine population of Great Britain.
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</table>
Welcome to the fourth quarterly equine disease surveillance report for 2014 produced by Department for Food, Environment and Rural Affairs (DEFRA), British Equine Veterinary Association (BEVA), Animal & Plant Health Agency (APHA) and the Animal Health Trust (AHT). Regular readers will be aware that this report collates equine disease data arising from multiple diagnostic laboratories and veterinary practices throughout the United Kingdom giving a unique insight into equine disease occurrence on a national scale.

**National disease occurrence**

**EQUINE INFLUENZA VIRUS (EII)**

The first outbreak of 2015 occurred in North Yorkshire on the 10th March 2015. The affected horse was an unvaccinated four-year-old Connemara mare that presented with clinical signs of pyrexia, inappetence, mild dry cough and mucopurulent nasal discharge for the preceding six days. Positive diagnosis was made by qPCR on a nasopharyngeal swab. There were three other horses affected out of 10 at the premises.

The outbreak has been reported by the text alert service **Tell-Tail** for UK equine practitioners sponsored by Merial Animal Health. This free of charge service alerts practitioners to outbreaks of equine influenza in the UK via text message. Equine veterinary practitioners can sign up for this scheme by registering at the following website [http://www.merial.co.uk](http://www.merial.co.uk). This service has also been offered to the members of the National Trainers Federation (NTF).

If you would like more information regarding outbreaks of equine influenza virus or would like to sign up for our sentinel practice scheme, please contact: equiflunet@aht.org.uk or follow the link to [www.equiflunet.org.uk](http://www.equiflunet.org.uk) for more information on equine influenza.

**EQUINE HERPES VIRUS-1 (EHV-1)**

**Equine Herpes Virus-1 (EHV-1) Abortion**

Three EHV-1 abortions have been confirmed since January up to 15th March 2015, all of them isolated cases.

On 9th January, one case of EHV-1 abortion was reported in Oxfordshire, England in a 10-year-old vaccinated Thoroughbred mare. EHV-1 was suspected on gross post mortem examination and confirmed by qPCR and histopathology. No other EHV abortions or suspected cases of EHV infection were detected on the premises. On 22nd January, another case of EHV-1 abortion occurred on a stud in Suffolk, England. The affected animal was a fully vaccinated Thoroughbred mare that had arrived on the premises in early January from the sales and was being isolated for the purpose of pre-export quarantine; consequently there were no in contact breeding animals. The positive diagnosis was made on the basis of post-mortem examination of fetal tissues and subsequent PCR testing and histopathological confirmation. The most recent case was confirmed in Berkshire on vaccinated Thoroughbred mare and positive diagnosis was made by histopathology and qPCR on fetal tissues on 9th February. The affected animal was a vaccinated Thoroughbred mare and positive diagnosis was made by histopathology and qPCR on fetal tissues.
Equine Herpes Virus-1 (EHV-1) Respiratory disease
On the 5th February 2015, a case of EHV-1 respiratory disease was confirmed on a premises in Cheshire. The affected horse was a six-year-old male, presenting with cough for the preceding three days. Another case of EHV-1 respiratory disease was reported in Devon on the 18th February. The affected animal was an 18-month-old colt that presented with serous nasal discharge and cough for the preceding two weeks. Positive diagnoses were made by qPCR on nasopharyngeal swabs. On 9th March, a case of EHV-1 respiratory disease was confirmed on a stud in Shropshire, England. The affected mare was a six-year-old sport horse that presented with clinical signs of pyrexia and profuse serous nasal discharge for the preceding three days. The mare was in isolation when the clinical signs commenced.

ATYPICAL MYOPATHY

Throughout 2014, there have been 158 clinical cases compatible with diagnoses of atypical myopathy in the UK communicated to the University of Liege, Belgium.

International disease occurrence

GLANDERS (Burkholderia mallei)

Germany
On 30th January 2015, the German Federal Ministry of Food and Agriculture reported one case of Glanders in Bippen, Osnabruck region. The subclinically affected horse had tested positive during routine pre-export serological testing in December 2014. Further tests were performed, ultimately confirming the positive result by PCR.

The affected holding was put under restrictions immediately following the receipt of the first positive results and horse was slaughtered on the 13th December to allow for post mortem examination and further testing. All other horses at the premises were serologically investigated during the following three weeks; all test results obtained were negative for Glanders.

During the post-mortem examination of the affected horse, sporadical areas of hyperkeratosis and minor superficial scabs were observed on the head and legs. Histological examination of samples from these areas did not provide a clear indication of glanders infection and therefore PCR tests were performed, which confirmed the presence of Burkholderia mallei DNA.

Epidemiological investigations revealed that the affected animal had never been outside of Germany. Although indirect contacts with horses and people traveling to Brazil for competitions may have occurred, mentioned horses tested negative for glanders on several occasions. The source of infection is still unknown.

The event is considered as resolved, however movement restrictions apply to the affected holding under the Council Directive 2009/156/EC until six months elapse from the date of the slaughter of the affected animal.
EQUINE INFLUENZA VIRUS (EI)

France
The last quarter of 2014 presented a high equine influenza activity with six outbreaks confirmed in different areas of the country Ain (1), Gironde (2), Pyrénées-Atlantiques (2) and Seine-et-Marne (1). Horses affected were unvaccinated and presented with pyrexia, cough and nasal discharge.

That activity continued during the first two months of 2015 with another two outbreaks one in Maine-et-Loire and the other in Eure-et-Loire.

Ireland
On 8th December, seven premises were affected by equine influenza; three in Connaught, one in Munster and three in Leinster.

USA
In early December, equine influenza was confirmed in three horses in the Veterinary Teaching Hospital, Oregon State University. These were part of a group of several cases of the disease that had occurred at the hospital within recent weeks and which led to closure of the hospital for all but emergency cases.

EQUINE HERPES VIRUS-1 (EHV-1)

Respiratory disease
France
Four outbreaks of EHV-1 respiratory disease were reported in the last quarter of 2014 in Seine-et-Marne, Manche, Calvados and Hautes-Pyrénées.

Egypt
In November, an outbreak of EHV-1 respiratory disease was confirmed for the first time in Al Qahirah. Four horses in a group of 60 were affected with mild respiratory signs, fever and loss of appetite. One animal died during the course of disease on a premises with 480 Arabians. Positive diagnoses were made by qPCR during active surveillance of the disease undertaken in the country. Control measures undertaken included: quarantine, vaccination and disinfection of the premises.

Abortion
Belgium
On 12th February 2015, an outbreak of EHV-1 abortion was reported in the Courtrai region of Belgium. Two unvaccinated mares have aborted and positive diagnoses were made by PCR on fetal tissues.

France
On 14th January 2015, an outbreak of EHV-1 abortion was reported on a thoroughbred stud in Orne. There were two mares affected out of 40 in the stud.

On 2nd February 2015, another case of EHV-1 abortion was confirmed in Lot. Two further cases were reported on a separated premises in Calvados on the 18th February. Both mares were vaccinated thoroughbreds in large stud farms.

Japan
Five cases of EHV-1 abortion were reported between 29th October 2014 and 15th January 2015, affecting vaccinated thoroughbreds on five separate premises. Diagnoses were made by virus isolation.
**South Africa**
A case of EHV-1 abortion was confirmed in October 2014 by qPCR, after a mare aborted on a farm in the Western Cape Province of South Africa.

**Neurological Disease**

**USA**
During February 2015, five outbreaks of EHV-1 neurological disease were reported in several states: Virginia, Ohio, California, Minnesota, Oklahoma and New Jersey.

In the Ohio incident, two horses with fever and respiratory signs, one of which also exhibited neurological signs consistent with EHV-1, tested positive for the virus on nasal swabs. The second EHV-1 event involved a 14-year-old gelding on a boarding stable in Virginia. The affected horse became recumbent and was treated symptomatically while in isolation. The affected horse in California was 14 year-old quarter horse. The horse in Minnesota was euthanised after displaying clinical signs and poor response to treatment while held in isolation in a local veterinary practice. The event in Oklahoma involved a horse that exhibited neurological signs and tested positive for EHV-1 and nine other horses from the same premises that have spiked fevers. The most recent case occurred in New Jersey was diagnosed in a five-year-old horse that presented with severe neurological disease. Due to the severity of illness, the horse was euthanised.

**Belgium**
On 17th February 2015, an outbreak of EHV-1 neurological disease was reported in the Alken region of Belgium. Eleven horses out of 30 at the premises were affected presenting with pyrexia and ataxia. Four of them were euthanised on humane grounds. The positive diagnoses were made by PCR on blood samples. Another outbreak, epidemiologically link to the original outbreak was confirmed two days later in the Heers region. Two horses out of three at the premises presented with pyrexia. Quarantine restrictions were imposed on the affected premises.

On 23rd February 2015, a further outbreak of EHV-1 neurological disease was reported in the Alken region. Two horses out of 10 were affected on the premises presenting with fever and bladder paralysis. The positive diagnoses were made by PCR on blood samples. This outbreak is epidemiologically linked to original outbreak in Alken.

**Equine Infectious Anaemia (EIA)**

**Germany**
On 12th December 2014, two separate outbreaks of Equine Infectious Anaemia were reported on premises in Aldesberg and Neunkirchen. Two affected horses out of 35 in Aldersberg and three affected out of 10 in Neunkirchen were confirmed. All infected animals were euthanased. Positive diagnoses were made by Coggins test. Measures undertaken included quarantine, screening, disinfection of the premises and humane destruction of affected animals.

**ATYPICAL MYOPATHY**

Throughout 2014, there were 114 clinical cases compatible with diagnoses of atypical myopathy that were communicated to the University of Liege and RESPE during 2014, excluding UK cases; Belgium (29 cases; 168 cases reported in 2013), France (48 cases; 97 cases reported in 2013), Germany (six cases; 51 cases reported in 2013), Ireland (28 cases; two cases reported in 2013) and The Netherlands (three cases; 22 cases reported in 2013).
DEFRA business

RED TAPE CHALLENGE

The review of the notifiable status of Equine Viral Arteritis and Contagious Equine Metritis concluded that both diseases remain notifiable in Great Britain with a potential for greater industry involvement of handling suspected and confirmed cases.

EQUINE IDENTIFICATION

Defra is working on proposals to implement the new EU legislation into domestic law by 2016. The new rules include provisions for every EU Member State to create a national central equine database and tighter controls for microchipping and the issuing of equine passports.

TRIPARTITE AGREEMENT

The revised TPA scheme was implemented in 2014 and worked successfully after a few initial difficulties experienced in the early stages. Feedback from users and also APHA is positive – APHA border checks confirmed good compliance with the new rules.

Focus article

In this report we are pleased to include the second of the focus articles written by Andy Durham, Liphook Equine Hospital, Hampshire, England. This article provides an overview of ragwort toxicity in the UK. We reiterate that the views expressed in this focus article are the author’s own and should not be interpreted as official statements of AHPA, BEVA or the AHT.

Access to all of the equine disease surveillance reports can be made on a dedicated page on the recently updated Animal Health Trust website at http://www.aht.org.uk/cms-display/AHPA_AHT_BEVA_equine_reports.html or via the BEVA and Defra websites at http://www.beva.org.uk/news-and-events/news France Equine Herpes Virus- 4 (EHV-4) Respiratory Disease & from the UK on Equine Influenza (EI)
The results of virological testing for October to December 2014 are summarised in Table 1 and include data relating to Equine Viral Arteritis (EVA), Equine Infectious Anaemia (EIA) and West Nile Virus (WNV) from the Animal & Plant Health Agency (APHA), Weybridge. The sample population for the APHA is different from that for the other contributing laboratories, as the APHA's tests are principally in relation to international trade (EVA and EIA). APHA now provides testing for WNV as part of clinical work up of neurological cases on specific request and provided the local regional APHA office has been informed.

Table 1: Diagnostic virology sample throughput and positive results for the fourth quarter of 2014

<table>
<thead>
<tr>
<th>Serological Tests</th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
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<tbody>
<tr>
<td>EVA ELISA</td>
<td>1525</td>
<td>66#</td>
<td>5</td>
</tr>
<tr>
<td>EVA VN</td>
<td>286</td>
<td>13#</td>
<td>2</td>
</tr>
<tr>
<td>AHVLA EVA VN</td>
<td>692</td>
<td>8#</td>
<td>1</td>
</tr>
<tr>
<td>EHV-1/-4 CF test</td>
<td>257</td>
<td>9*</td>
<td>1</td>
</tr>
<tr>
<td>EHV-3 VN test</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>ERV-A/B CF test</td>
<td>111</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Influenza HI test</td>
<td>203</td>
<td>4*</td>
<td>1</td>
</tr>
<tr>
<td>EIA (Coggins)</td>
<td>81</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>EIA ELISA</td>
<td>506</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>AHVLA EIA (Coggins)</td>
<td>123</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>AHVLA WNV (cELISA))</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Virus Detection</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EHV-1/-4 PCR</td>
<td>474</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>EHV-2/-5 PCR</td>
<td>76</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>EHV-3 virus isolation</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Influenza NP ELISA</td>
<td>19</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Influenza Directigen</td>
<td>157</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Influenza PCR</td>
<td>343</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>AHVLA Influenza PCR</td>
<td>156</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Influenza VI in eggs</td>
<td>17</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>EHV VI</td>
<td>32</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>EVA VI/PCR</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>AHVLA EVA VI/PCR</td>
<td>13</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>9</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

ELISA = enzyme-linked immunosorbent assay, VN = virus neutralisation, VLA = Animal Health Veterinary Laboratories Agency, CF = complement fixation, HI = haemagglutination inhibition, Coggins = agar gel immuno diffusion test, PCR = polymerase chain reaction, NP = nucleoprotein, VI = virus isolation, EVA = equine viral arteritis, EHV = equine herpes virus, ERV = equine rhinitis virus, EIA = equine infectious anaemia # = Seropositives include vaccinated stallions, * = Diagnosed positive on basis of seroconversion between paired sera ** = Seropositive due to vaccination
Equine Influenza Virus (EIV)

During this quarter, 18 outbreaks of equine influenza were reported in several counties of the UK. Virus characterisation carried out on the positive influenza samples at the AHT, has shown that they all belong to clade 2 of the Florida sublineage of H3N8 equine influenza. They share the amino acid substitution at position 144 of the HA protein, with other equine influenza viruses isolated in the UK in recent years.

Equine Herpes Virus-1 (EHV-1) Respiratory Disease

On the 22nd October 2014, a case of EHV-1 respiratory disease was confirmed in a four-year old donkey on a premises in Devon, England. The donkey presented with profuse serous nasal discharge and sneezing. On the 28th November a separate outbreak of EHV-1 respiratory disease was also confirmed in Devon. There were five donkeys affected, all presenting with clinical signs of serous nasal discharge. Positive diagnoses were made by qPCR on nasopharyngeal swabs.
A summary of the diagnostic bacteriology testing undertaken by different contributing laboratories is presented in Table 2. For contagious equine metritis (CEM) all 28 HBLB approved laboratories in the UK contributed data.

**Table 2: Diagnostic bacteriology sample throughput and positive results for the fourth quarter 2014**

The positive MRSA cases experienced a three-fold increase when compared with the third quarter 2014 (2% vs 0.6%) however this figure was similar to last year during the same quarter (2% vs 1.7%).

<table>
<thead>
<tr>
<th></th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEMO (HBLB)</td>
<td>1750</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>CEMO (AHVLA)</td>
<td>682</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Klebsiella pneumoniae#</td>
<td>1735¹</td>
<td>2#</td>
<td>25</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>1737¹</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>Strangles*culture</td>
<td>3974</td>
<td>131</td>
<td>19</td>
</tr>
<tr>
<td>Strangles PCR</td>
<td>1609</td>
<td>265</td>
<td>6</td>
</tr>
<tr>
<td>Strangles ELISA</td>
<td>2093</td>
<td>603²</td>
<td>3</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>457</td>
<td>41</td>
<td>16</td>
</tr>
<tr>
<td>MRSA</td>
<td>391</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>335</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Clostridium difficile (toxin by ELISA or munochromatography)</td>
<td>353</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Borrelia (by ELISA)</td>
<td>85</td>
<td>19</td>
<td>3</td>
</tr>
<tr>
<td>Rhodococcus equi culture/PCR</td>
<td>117</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Lawsonia intracellularis** culture/PCR</td>
<td>254</td>
<td>65</td>
<td>4</td>
</tr>
</tbody>
</table>

CEMO = contagious equine metritis organism (Taylorella equigenitalis); HBLB = HBLB accredited laboratories; # =capsule type 1,2,5; APHA = APHA reference laboratory; *Streptococcus equi subsp. equi; MRSA = methicillin resistant Staphylococcus aureus. ** Lawsonia intracellularis identified using PCR applied to faeces; 1 reproductive tract samples only; 2 seropositivity may be attributed to disease exposure, vaccination, infection and carrier states.

APHA CEMO Data for the period October to December 2014

We are again pleased to include data relating to CEM testing from the Animal & Plant Health Agency (APHA), in this quarterly report. The sample population for the APHA is different from that for the other contributing laboratories as the APHA tests are principally in relation to international trade and/or outbreak investigations.

**Strangles**

Strangles remains endemic in the UK, especially among parts of the non-Thoroughbred horse population. Diagnoses are confirmed in the UK based on traditional culture of *S. equi* and qPCR on respiratory samples and/or seropositive using a serological ELISA.
APHA Salmonella results
Thirty-four samples were submitted fourth quarter 2014 to the Animal and Plant Health Agency (APHA) and of these 33 were positive. From the incidents involving strains typed by the APHA, the serovars/phagetypes reported were S. Typhimurium (10 samples; DT1 (2 samples), untyped (3 samples) and single incidents of DT41b, DT66a, U302, U323 and untypable), S. Newport (9 samples), monophasic Typhimurium variant S. 4,5,12:i:- (5 samples; 4 DT193 and 1 DT120), S. Enteritidis PT8 (2 samples), and single reports of S. Agama, S. Anatum, S. Bovismorbificans, S. Coeln, S. Indiana, S. Livingstone and a rough strain of Salmonella. Monophasic Salmonella Typhimurium DT193/120 and U323 are associated with pigs and cattle, U302 with pigs. DT1, DT66a and DT41b are likely to originate from wild birds. S. Newport is often associated with badgers and S. Enteritidis PT8 is typically associated with people.

For more information from APHA about Salmonella in Great Britain, please visit https://www.gov.uk/government/statistics/salmonella-in-livestock-production-in-great-britain-2013
A summary of diagnostic toxicosis and parasitology testing undertaken by contributing laboratories is presented in Tables 3 and 4, respectively. Results for toxicosis are based on histopathologically confirmed evidence of disease only (where applicable).

### Table 3: Diagnostic toxicosis sample throughput and positive results for the fourth quarter 2014

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass Sickness</td>
<td>39</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>Hepatic toxicoses</td>
<td>32</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Atypical myopathy</td>
<td>76</td>
<td>52</td>
<td>9</td>
</tr>
</tbody>
</table>

*Includes contributing laboratories with no cases submitted

### Table 4: Diagnostic parasitology sample throughput and positive results for the fourth quarter 2014

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Endoparasites</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ascarids</td>
<td>3863</td>
<td>49</td>
<td>18</td>
</tr>
<tr>
<td>Cyathostomes</td>
<td>2019</td>
<td>593</td>
<td>10</td>
</tr>
<tr>
<td>Dictyocaulus</td>
<td>95</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Strongyles</td>
<td>3870</td>
<td>1717</td>
<td>26</td>
</tr>
<tr>
<td>Tapeworms (ELISA based testing)</td>
<td>16</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Tapeworms (Faecal exam)</td>
<td>1826</td>
<td>66</td>
<td>9</td>
</tr>
<tr>
<td>Trichostrongylus</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Strongyloides</td>
<td>2814</td>
<td>616</td>
<td>16</td>
</tr>
<tr>
<td><em>Oxyurus equi</em></td>
<td>275</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Fasciola</td>
<td>129</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td>Coccidia</td>
<td>153</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Cryptosporidia</td>
<td>107</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>VLA Theileria equi (CFT)*</td>
<td>79</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>VLA Theileria equi (IFAT)**</td>
<td>269</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>VLA Theileria equi (cELISA)**</td>
<td>411</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>VLA Babesia caballi (CFT)*</td>
<td>79</td>
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<td>1</td>
</tr>
<tr>
<td>VLA Babesia caballi (IFAT)**</td>
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<td>17</td>
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<tr>
<td>VLA Babesia caballi (cELISA)**</td>
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<tr>
<td><strong>Ectoparasites</strong></td>
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<tr>
<td>Mites</td>
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<tr>
<td>Lice</td>
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<tr>
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<tr>
<td>Dermatophilus</td>
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</tr>
<tr>
<td>Candida</td>
<td>226</td>
<td>19</td>
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</tbody>
</table>

*Complement Fixation Test; CFT suspect/positive samples are tested in IFAT test
**Indirect Fluorescent Antibody Test; ***competitive Enzyme-linked immunosorbent assay; positive cELISA results are not undergoing confirmatory testing
Grass sickness surveillance data (http://www.equinegrasssickness.co.uk/)

The nationwide EGS surveillance scheme was established in spring 2008 to facilitate the investigation of changes in geographical distribution and incidence of the disease in Great Britain. Data gathered by this scheme is collated in a strictly confidential database.

Overall, a total of 59 equine grass sickness (EGS) cases were reported during 2014. Seven cases of EGS were reported during the fourth quarter of 2014 (October – December), of which four occurred in England and two occurred in Scotland. Location was not reported for the remaining case. Only two affected premises had a history of previous EGS cases.

Cases comprised four mares, two geldings and one colt, with a median age of 6.4 years (range 2.25 – 25 years). Affected breeds were Welsh breeds (n=2), Cob/Cob cross (n=2), Highland (n=1), Sports Horse (n=1) and Draught cross (n=1).

Four cases were reported to have acute EGS and two cases were reported to have subacute EGS. One case was diagnosed with chronic EGS, which was reported to have survived to date. Diagnostic information was provided for six cases, of which four were diagnosed based on veterinary assessment of clinical signs alone. Diagnosis of one acute case was made at laparotomy without histopathology, and diagnosis of a second acute case was confirmed at post mortem examination including histopathological examination of ganglia.

The EGS vaccine trial recruitment is still ongoing, to request further details about the trial and how to enrol clients with eligible horses/ponies contact the EGS vaccine trial team at the Animal Health Trust (email equinegrasssickness@aht.org.uk or telephone 01638 555399).
Introduction
When a horse owner, or even a veterinarian, is asked to name a type of liver disease seen in the horse, then the initial response is almost invariably "ragwort poisoning", implying a widely held belief that the disease is prominent. From where does this supposition come? Why is the disease so prominent in our minds? Is it because the disease is genuinely very common? Is it because the bright yellow flowers have such visual impact? Is it an historic vestige from the days when the only horses that were biopsied/autopsied (i.e. causation confirmed) were end stage cirrhosis cases amongst which ragwort toxicity was indeed common?

In 2014, several investigations of the actual impact of ragwort on the equine industry were made for different reasons and from various perspectives. Although it would be wrong to say that all questions have now been answered, the results of the various investigations have been interesting and informative to a certain degree. This short article attempts to review these various recent findings and help put ragwort toxicity into perspective.

Pathology Service Survey
An email survey was conducted by this author amongst UK pathology services in February 2014. Just two questions were asked:
- How many equine hepatic samples do you see in a year?
- How many do you see with megalocytosis?

Fourteen pathology services in England and Scotland were selected on the expectation that they would attract significant numbers of equine submissions, and responses were received from 10 of them. Five of 10 services provided data from 2013 only, and the other five provided data collected between 2008-2013.

In total information was received relating to 865 liver samples examined between 2008 and 2013. Approximately 682 hepatic samples were examined in 2013 by all pathology services combined. Of the total 865 liver samples examined between 2008-2013, 72 (8.3%) were found to have megalocytosis and therefore considered to be affected by ragwort toxicity. This corresponded to 57 megalocytosis-positive samples per annum. The median proportion of megalocytosis-positive samples per service was 8.0% (range 5.4-29.4%) of all liver submissions (Figure 1).
Survey of BEVA membership

Four questions were asked regarding ragwort toxicity as part of a more extensive online survey in June 2014 solicited via the BEVA e-newsletter.

- Have you seen any cases of suspected Ragwort toxicity in the last 12 months? Yes/No

For those who answered Yes, three further questions were posed:

- How many cases of suspected ragwort toxicity have you seen in the last 12 months?
- How many of these cases died or were euthanased?
- In how many of these suspected cases was Ragwort toxicity confirmed either by biopsy or at autopsy?

Of 303 respondents, 124 (41%) confirmed that they had seen cases of suspected ragwort toxicity in the last year, and 179 (59%) had not. Of the 124 respondents that had seen cases of suspected Ragwort toxicity in the last 12 months, further information was forthcoming from 120. These 120 respondents had seen, 403 cases of suspected Ragwort toxicity (median 2 cases per respondent, range 1-30) (Figure 2). Of the 403 reported cases of suspected Ragwort toxicity, 199 (49%) had died or were euthanased. Of the 403 cases suspected to have Ragwort toxicity, 122 (30%) were later confirmed as such. The median confirmation rate amongst members was 20% (range 0-100%).
Blue Cross National Equine Health Survey
The 2014 National Equine Health Survey (NEHS) coordinated by the Blue Cross and Professor Josh Slater (Royal Veterinary College) posed many health related questions to horse owners including some regarding ragwort control and management. The survey found that 1,509/3,342 (45%) respondents did not have ragwort on their property and a further 1,026/3,342 (30%) spent less than 1 hour per week on ragwort control.

British Horse Society and DEFRA Horse Owner Survey
An online survey was conducted by the BHS, and supported by DEFRA, in July and August 2014 specifically to gain views from horse owners about the perceived threat of ragwort toxicity. The majority (84%) of 13,963 respondents had seen ragwort in horse fields during the previous week. Just over a thousand respondents were responsible for land management and 93% of those took preventative measures to control ragwort although only 18% spent more than one week per annum controlling the weed. 85% of respondents spent under £100 per annum on control measures. The vast majority of all respondents (>97%) felt that more should be done to control ragwort in the UK.

About 19% (2712) of respondents knew of a horse that had been suspected of suffering from ragwort poisoning (over an unspecified period) although this was only confirmed in 580 (21%) (clearly individual cases could have been reported multiple times here). Mortality rate was reported as 39%. 165 respondents had owned or kept a horse that had died from suspected ragwort poisoning (over an unspecified period) with 50 suspected and 41 confirmed cases reported over the previous year.

Conclusions drawn collectively from the surveys
The four surveys referred to above drew perspectives from veterinary diagnosticians and from horse owners and carers. Despite these differing perspectives there were some remarkable similarities and a few differences in outcomes.
There was some disagreement between the two owner surveys in terms of the frequency with which ragwort is present on equine pastures with the NEhS suggesting 55% of horse pastures contain ragwort compared with 84% in the BHS survey. However, in this respect it is probably relevant that the the BHS survey was likely to have attracted respondents with a particular interest in ragwort and therefore may have overestimated the overall figure. However, the time spent by land managers on ragwort control was reasonably consistent between the two surveys. Assuming a “week” to comprise 7 x 10 hour days, the NEhS estimated that 75% of respondents spent <1.4% of working time controlling ragwort. By comparison the BHS survey found that 72% of people spent less than <1.9% of time (1 week per annum) controlling ragwort. Less than £100 per annum was spent on ragwort control by 85% of BHS respondents.

Thus the overall indication was that although more than half of equine pastures contain ragwort, relatively little time and money is spent controlling the weed by horse-carers. Despite this, almost all BHS respondents felt that more needed to be done to control the weed, presumably as a result of a perception of a significant negative health impact on horses.

Three of the 4 surveys attempted, in different ways, to estimate the approximate clinical importance of ragwort toxicity in horses. More than half (59%) of veterinary surgeons who completed the BEVA survey had not seen any suspected ragwort toxicity cases during the previous 12 months.

Those veterinary surgeons who had seen suspected cases typically each saw approximately two cases per annum suggesting that suspected ragwort toxicity is not commonly seen in equine practice. An important underpinning diagnostic principle is that ragwort toxicosis can only be confirmed by histopathologic examination of biopsy or autopsy specimens. What exactly defined a “suspected case of ragwort toxicity” was not clear in the surveys. Presumably suspected cases were primarily or exclusively cases where blood test results indicated liver disease although why exactly ragwort was considered the aetiologic agent is unclear given that ragwort toxicity demonstrates no specific clinical signs or serum biochemical analytes that enable its differentiation from other more common causes of liver disease. Failure to survive liver disease might have been a reason for suspecting ragwort toxicity retrospectively given the generally accepted relatively poor outcome associated with ragwort toxicity. Indeed mortality was reported in 39% of suspected cases in the BHS survey and in 49% in the BEVA survey. Other reasons may have been partly based in evidence of ragwort present in pasture or forage or from previous confirmed cases on the same premises; or may have been entirely speculative and based on a pre-conception that ragwort is a common cause of liver disease in horses creating a ”self-fulfilling prophecy”!

Whatever the reasoning behind suspicion of ragwort in causation of disease it is noteworthy that it was confirmed in only 30% of cases in the BEVA survey and 21% of cases in the BHS survey. This would suggest that the term “suspected ragwort toxicity” has little real meaning, and should not be used unless good epidemiologic reasoning for its suspicion can be established. The pathology survey clearly indicates that simple evidence of liver disease in a horse is not enough for a suspicion of ragwort involvement as fewer than 1 in 12 liver biopsy and autopsy specimens examined showed supportive evidence of ragwort toxicity. Three of the surveys reported actual numbers of confirmed ragwort toxicity cases in the UK during the previous year with 57, 122 and 41 confirmed cases in the pathology, BEVA and BHS survey respectively. These figures are all likely to underestimate the true prevalence of ragwort toxicity both due to lack of participation of some relevant potential respondents and also the failure to attempt to confirm some ragwort toxicity For example it is possible, or even probable, that there may be a demographic group of horses prone to ragwort toxicity that are less likely to be subject to biopsy or autopsy Nevertheless ragwort toxicity appears to be rare in horses
and ponies subject to a reasonable degree of professional veterinary care and is probably deserving of the apparently relatively low financial and work input previously described by horse owners above.

The overall impression from all 4 surveys is that ragwort is a very common weed but only a minority of horse owners spend significant time trying to control it. Despite this ragwort toxicity is an rarely encountered problem in UK horses subject to veterinary care. The main caveat of these conclusions regards demographic bias. It is possible that there is a more susceptible population of horses that has been excluded/omitted by these surveys. Furthermore, a justification or recommendation for relaxation in ragwort control would be a risky strategy as it is possible that the apparently low prevalence of ragwort toxicity in horses might be as a result of generally effective pasture management that, if relaxed, might lead to an increase in toxicity cases. Further investigation may be warranted to explore further questions such as this.

2 http://www.bhs.org.uk/~/media/BHS/Files/PDF%20Documents/BHS%20Defra%20Ragwort%20Summary%20Research%20Report%202014.ashx

Ragwort histopathology: What pathologists can see
Jennifer Stewart, BS, DVM, DACVP, MRCVS. Animal Health Trust, Newmarket, UK

Acute ragwort poisoning, though uncommon, may be seen histologically ranging from multifocal to extensive necrosis without further injury. Haemorrhage associated with the hepatic necrosis is common. The distribution of hepatic necrosis in these cases resembles that caused by numerous other hepatotoxins, and is therefore non-specific. In acute toxicities caecal and colonic oedema and infarction may also be observed at post-mortem examination in some cases.

Chronic toxicity results in the more ‘classical’ presentation of bridging fibrosis, nodular regeneration, biliary hyperplasia, and megalocytosis. Megalocytosis appears as enlarged hepatocytes and nuclei. This feature is a hallmark of pyrrolizidine alkaloids, whose toxic metabolites bind to DNA and prevent successful mitoses. Megalocytosis was found experimentally to develop over the course of 14 weeks following 2 weeks’ exposure. By 6 months post-exposure, the megalocytosis was considered the most prominent feature, and is the feature most associated with pyrrolizidine alkaloid toxicity. Regenerative nodules are typically small due to the lowered number of hepatocytes capable of successful mitosis. Similarly, biliary hyperplasia is anticipated to represent a response to the general regenerative stimuli.

Figure 1: Arrows indicate biliary hyperplasia. Stars indicate megalocytosis
**East Anglia**

A total of 78 cases were examined including 63 aborted fetuses and fetal membranes.

Of the 63 aborted fetuses examined, placentitis was identified in three cases, placental insufficiency in seven cases and umbilical cord torsion in 37 cases. Congenital malformation was found in two cases. The cause of abortion could not be determined in 14 cases. No EHV abortion this quarter.

Three cardiovascular cases were examined in which an aneurysm, thrombosis and rupture of the uterine artery with subsequent exsanguination were diagnosed.

Four musculoskeletal cases were examined; two fractures, osteomyelitis due to MRSA infection and a chronic laminitis case were reported.

A single respiratory case was reported, in which pulmonary collapse was diagnosed.

Three neoplasia cases were investigated, in which an haemangiosarcoma, neoplasia of the ethmoidal region and a lymphoma with eosinophilic granuloma were diagnosed.

Two horses were examined following gastrointestinal disease; single cases of colon volvulus and grass sickness were reported.

Two neglect cases were investigated in which severe emaciation and a joint tumour were identified.

**Home Counties**

Twelve cases were reported.

Four cases of gastrointestinal disease were reported; single cases of jejunal volvulus, rupture caecum with secondary fibrous peritonitis, fibrinonecrotising typhlocolitis likely due to clostridial infection and large colon impaction.

A single cardiac case was reported in which sudden death due to arrhythmias was suspected.

A single neurological case was investigated; in which spinal compression at the level of C3-C5 was diagnosed.

Two musculoskeletal cases were examined, one solar penetrating wound and an atypical myopathy case.

A single neoplasia case was examined, in which a mesenteric lymphoma was found.
One **hepatic case** was examined; the horse presented chronic icterus however the liver did not present abnormalities. Idiopathic persistent hyperbilirubinaemia was suspected.

A single **respiratory case** was examined; in which multinodular pulmonary fibrosis was diagnosed but negative for EHV-5.

A single **neglected case** was investigated in which severe cyathostominosis was identified.

**Northern England**

*No Post Mortem examinations were reported this quarter.*

**South West**

*Ten cases were examined.*

One **aborted fetus** was examined in which cord torsion and mild placentitis were found.

Two cases of **gastrointestinal disease** were investigated; colitis and impaction with subsequent colitis were reported.

A **cardiovascular case** was examined in which an aneurysm was found.

Three **musculoskeletal cases** were examined, two with chronic hoof problems and single cases of laminitis and osteoarthritis.

A single **respiratory case** was examined; in which a tracheal collapse was found.

Two **hepatic cases** were examined including one case of hepatopathy and another case of hepatic lipidosis.

**Scotland**

*Ten post-mortem examinations were carried out.*

Four **gastrointestinal cases** were reported. Single cases of large colon volvulus and epiploic foramen, in addition to two cases of peritonitis, were diagnosed.

Two **musculoskeletal cases** were examined; a callus in an old fracture site and a comminute ischial fracture with secondary haemoabdomen were identified respectively.

A single **respiratory case** was examined in which pharyngitis was found.

A **vascular case** was investigated in which vasculitis and angioedema were found.

One **hepatic case** was examined. A severe hepatopathy with marked ascites was confirmed.

Last case investigated was a horse with **Pituitary Pars Intermedia Dysfunction** (PPID).

**Northern Ireland**

*No cases were reported.*
ACKNOWLEDGEMENTS

This report was compiled by the Animal Health Trust. We are extremely grateful to the following laboratories for contributing data for this report.

All laboratories contributing to this report operate Quality Assurance schemes. These schemes differ between laboratories, however, all the contagious equine metritis testing reported was accredited by the Horserace Betting Levy Board with the exception of the AHVLA, which acts as the reference laboratory. We would also like to acknowledge the contribution of the Horserace Betting Levy Board CEMO-scheme.

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Animal Health Trust Diagnostic Laboratory
Animal Health and Veterinary Laboratory Agency
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Axiom Veterinary Laboratory
Beaufort Cottage Laboratories
Biobest Laboratories
Bushy and Willesley (B & W) Equine Group Ltd.
CAPL LTD Laboratory
Capital Diagnostics, Scottish Agricultural College
Carmichael Torrance Diagnostic Services
Chine House Veterinary Hospital
Dechra Laboratories
Donnington Veterinary Group
Endell Veterinary Group Equine Hospital
Hampden Veterinary Hospital
IDEXX Laboratories
JSC Equine Laboratory
Lab Services Ltd
Liphook Equine Hospital
Minster Equine Veterinary Clinic
Newmarket Equine Hospital
Oakham Veterinary Hospital
The Donkey Sanctuary
The Royal Veterinary College
Three Counties Equine Hospital
Torrance Diamond Diagnostic Services (TDDS)
University of Edinburgh
University of Glasgow
Valley Equine Hospital

We would welcome feedback including contributions on focus articles and/or case reports to the following address:

Animal Health Trust
Lanwades Park, Kentford, Newmarket, Suffolk CB8 7UU
Telephone: 01638 750659  Fax: 01638 555659
Email: equinesurveillance@aht.org.uk  Website: www.aht.org.uk