



DEFRA / AHT / BEVA EQUINE QUARTERLY DISEASE SURVEILLANCE REPORT Volume 4, No.4: October – December 2008



Highlights in this issue:

- **News report: CEM in the U.S.A – reaction of the British horse industry**
- **The molecular epidemiology of strangles in the United Kingdom**

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.



TABLE OF CONTENTS

INTRODUCTION	3
VIROLOGY DISEASE REPORT FOR THE FOURTH QUARTER OF 2008	5
<u>EQUINE HERPES VIRUS ABORTION</u>	<u>6</u>
<u>EQUINE HERPES VIRUS NEUROLOGICAL DISEASE</u>	<u>6</u>
<u>EQUINE INFLUENZA</u>	<u>6</u>
BACTERIOLOGY DISEASE REPORT FOR THE FOURTH QUARTER OF 2008	7
<u>NEWS REPORT: CEM IN THE U.S.A – REACTION OF THE BRITISH HORSE INDUSTRY</u>	<u>8</u>
<u>FOCUS ARTICLE: THE MOLECULAR EPIDEMIOLOGY OF STRANGLES IN THE UNITED KINGDOM</u>	<u>10</u>
TOXIC & PARASITIC DISEASE REPORT FOR THE FOURTH QUARTER OF 2008	12
REPORT ON <i>POST-MORTEM</i> EXAMINATIONS FOR THE FOURTH QUARTER 2008	13
<u>EAST ANGLIA</u>	<u>13</u>
<u>HOME COUNTIES</u>	<u>14</u>
<u>SOUTH WEST</u>	<u>15</u>
<u>NORTHERN ENGLAND</u>	<u>16</u>
<u>SCOTLAND</u>	<u>16</u>
<u>NORTHERN IRELAND</u>	<u>17</u>
ACKNOWLEDGEMENTS	18



Introduction

Welcome to the fourth quarterly equine disease surveillance report for 2008 produced by DEFRA, BEVA and the Animal Health Trust. 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.

Defra news

New equine identification regulations will be introduced in England later this year to comply with EU Regulation 504/2008. Public consultation on the new regulations closed on 2nd February 2009. The new regulations will require all foals born after 30th June 2009 to be identified with a microchip and be issued with a passport by 31st December in the year in which they are born or within 6 months of birth, whichever is later. Failure to correctly identify animals under the new rules could lead to a fine of up to £5000. Equidae born before 1st July 2009 which at that date do not have a passport under the existing regulations will have to be identified with a passport and microchip by 31st December 2009. Passports issued before 1st July 2009 under the existing rules will remain valid and a new passport and microchipping will not be required. The new regulations will also require equidae to be accompanied by their passport at all times, with some exceptions (notably when stabled or at pasture or moved on foot where the passport can be retrieved within 3 hours). The new regulations also tighten the requirements for passports to be available and updated at the time of any treatment of equidae with veterinary products. The new regulations will cover all species of equidae, including exotic equidae such as zebra. Please see the Defra website for further information ([Click here](#)). The European Regulations will also be implemented in Scotland, Wales and Northern Ireland. Further details can be found on the devolved governments websites (Scotland [Click here](#); Wales [Click here](#) and Northern Ireland [Click here](#))

Defra has recently published a Qualitative Risk Assessment (QRA) for West Nile Virus in response to the ongoing outbreak of WNV in Italy. This risk assessment looks at the risk of incursion of WNV into the UK via various pathways. The report can be found on the Defra website ([Click here](#)).

On 18th December 2008 the EU Commission voted to establish a vaccine bank containing monovalent live attenuated vaccines against African Horse Sickness (AHS) virus. This permits 100,000 doses of each of serotypes 1, 2, 3, 4, 6, 7 and 8 to be held within the bank. Defra is supportive of this initiative and recognises that whilst the QRA for AHS ([Click here](#)) published in November 2008 assessed the risk of incursion of the disease into the UK as very low, the impact should it occur, could be significant. Vaccine contained within the bank will only be considered for use in emergency situation. More details regarding the AHS vaccine bank can be found on Defra's website ([Click here](#)).

A meeting between Defra and key equine stakeholders was held on February 9th. The meeting was focused on equine exotic diseases and was an opportunity for industry and government to share their views. The aim of the meeting was to increase understanding of equine exotic disease with the aim of allowing industry and government to work together to help reduce the likelihood of disease incursion into the UK and the impact of disease should it do so.



Equine grass sickness

In November 2006 the Horse Trust Awarded the Animal Health Trust's Epidemiology Unit a grant to develop and implement a nationwide surveillance scheme for equine grass sickness in the UK. This project is now well underway and the preliminary research findings were outlined in the quarterly disease report back in April 2008. Georgette Kluiters, the project's research assistant, would like to stress that this is an ongoing project and in order to maintain an accurate representation of the disease it is urged that all horse owners and vets report any cases of grass sickness they may encounter throughout 2009 to the scheme. This can be done by contacting Georgette directly either via email at georgette.kluiters@aht.org.uk, by phone on 01638 555664 or by visiting the scheme's website at www.equinegrasssickness.co.uk.

International disease occurrences

On 10th December 2008 the first of a series of 11 CEM cases among breeding stallions was detected in the United States of America. The situation is ongoing with tracing and screening of horses currently going on in 45 states of the U.S.A. As a consequence of this outbreak the HBLB Codes of Practice for venereal pathogens, including CEM, have undergone an interim update. More information is provided on the outbreak and the response in a short news article prepared by Franziska Wohlfender, DipVMS(Berne), Dr.med.vet.(Berne), FVH(equine), MRCVS from the Animal Health Trust's Epidemiology and Disease Surveillance Unit.

A total of 18 outbreaks of H3N8 equine influenza have so far been reported to the OIE from various regions of India since November 2008. The reported outbreaks have affected in excess of 18,000 animals and have involved 16 deaths ([Click here](#)). Further details on the characterisation of the causative equine influenza virus are awaited.

Focus article

In this issue Philip Ivens, MA VetMB CertEM (Int.Med.) MRCVS from the Royal Veterinary College presents some data from a research project that he is conducting in conjunction with the Animal Health Trust on the molecular epidemiology of strangles in the United Kingdom.

We reiterate that the views expressed in these focus articles are the authors' own and should not be interpreted as official statements of DEFRA, BEVA or the AHT.

Access to all of the equine disease surveillance reports can be made on a dedicated page on the Animal Health Trust website at http://www.aht.org.uk/equine_disease.html or via the BEVA and Defra websites at <http://www.beva.org.uk/> and <http://www.defra.gov.uk/animalh/diseases/vetsurveillance/species/horses/index.htm>

We would remind readers and their colleagues that a form is available on the AHT website for registering to receive reports free of charge, via e-mail, on a quarterly basis. The link for this registration form is available via http://www.aht.org.uk/equine_disease_registration.html



Virology Disease Report for the Fourth Quarter of 2008

The results of virological testing for October to December 2008 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 Veterinary Laboratories Agency (VLA), Weybridge. The sample population for the VLA is different from that for the other contributing laboratories, as the VLA's tests are principally in relation to international trade (EVA and EIA), although with recent Defra concessions VLA now provides testing for WNV as part of clinical work up of neurological cases on specific request and provided the local DVM has been informed.

Table 1: Diagnostic virology sample throughput and positive results for the fourth quarter 2008

	Number of Samples Tested	Number Positive	Number of Contributing Laboratories
<u>Serological Tests</u>			
EVA ELISA	1595	10 [#]	3
EVA VN	1144	566 [#]	3
VLA EVA VN	1977	35 [#]	1
EHV-1/-4 CF test	573	13 [*]	2
EHV-3 VN test	1	1	1
ERV-A/-B CF test	330	4 [*]	1
Influenza HI test	367	0 [*]	1
EIA (Coggins)	144	0	2
EIA ELISA	647	0	1
VLA EIA (Coggins)	2152	0	1
VLA WNV (PRNT)	3	0	1
Louping ill	0	0	0
<u>Virus Detection</u>			
EHV-1/-4 PCR	58	0	1
EHV-2/-5 PCR	7	4	1
Influenza NP ELISA**	256	1	2
Influenza Directigen	70	0	1
Influenza VI in eggs	0	0	1
EHV VI	221	1	1
EVA VI/PCR	1	0	1
VLA EVA VI/PCR	11	0	1
Rotavirus	21	2	3

ELISA = enzyme-linked immunosorbent assay, VN = virus neutralisation, VLA = 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
** = Regular readers may note a large increase in the number of NP ELISA tests performed in this year. This increase is largely due to new requirements for international equine movement. All horses travelling to Australia must now have 2 NP ELISA tests performed prior to travel. The figures above include tests performed for international trade purposes.



Of the 35 EVA VN positives detected by the VLA, 11 were from overseas requests, 14 were among export samples, two were import samples, one was a diagnostic sample and seven were private requests. The 11 semen samples received for virus isolation were all negative for EVA virus isolation after three passages in RK13 cell culture and negative for EVA by the one-tube RT-PCR. Four of these were diagnostic samples and seven were submitted for pre-export testing. The 2152 agar gel immuno diffusion tests for EIA (AGID; Coggins) were conducted for import or export purposes and they were all negative. The three samples tested for WNV using plaque reduction neutralisation test (PRNT) were all negative.

Virological Diagnoses for the Fourth Quarter of 2008

EHV-1 Abortion

One case of abortion due to EHV-1 infection was reported this quarter. The histopathological signs looked suspicious for EHV, but PCR has been consistently negative. Nevertheless immunostaining was positive for EHV-1 particularly in the liver. Tissues of the aborted Suffolk Punch fetus and placenta have subsequently been tested with a special PCR method based on the open reading frame 30 (ORF30). With the help of the ORF30 PCR, EHV-1 could be detected in fetal tissue but not in the placenta.

EHV-1 Neurological Disease

One outbreak of neurological disease due to EHV-1 infection was reported in a polo yard with about 60 ponies. Three ponies were affected showing neurological signs such as ataxia, urinary retention, urinary dribbling and head tremor. They have all been referred to a clinic for supportive treatment. From the nasal pharyngeal swab of one of the ponies EHV-1 was isolated in tissue culture. None of the ponies has been vaccinated against EHV-1/-4.

Equine Influenza

There was only one horse which gave a weak positive result on the equine influenza nucleoprotein (NP) ELISA this quarter. The horse was retested twice giving negative results both times and there were no other positives detected in the group. The horse in question was in transit from France. As the horse tested negative on two subsequent occasions, the initial weak positive result did not have an effect on the export.



Bacteriology Disease Report for the Fourth Quarter 2008

A summary of the diagnostic bacteriology testing undertaken by different contributing laboratories is presented in Table 2. For contagious equine metritis (CEM) 18 of 28 HBLB approved laboratories contributed data.

VLA CEMO Data for the period October to December 2008

We are again pleased to include data relating to CEM testing from the Veterinary Laboratories Agency (VLA), in this quarterly report. The sample population for the VLA is different from that for the other contributing laboratories as the VLA tests are principally in relation to international trade. No isolates were identified as CEMO positive by HBLB laboratories.

Table 2: Diagnostic bacteriology sample throughput and positive results for the fourth quarter 2008

	Number of Samples Tested	Number Positive	Number of Contributing Laboratories
CEMO (HBLB)	1262	0	14
CEMO (VLA)	2086	0	1
<i>Klebsiella pneumoniae</i>[#]	1257	3	13
<i>Pseudomonas aeruginosa</i>	1257	5	13
Strangles*	2227	135	15
Strangles PCR	1243	138	2
Strangles ELISA	1055	199	1
Salmonellosis	328	8	12
MRSA	114	1	5
<i>Clostridium perfringens</i>	83	6	4
<i>Clostridium difficile</i> (toxin by ELISA or immunochromatography)	76	2	3
<i>Cryptosporidium</i>	1	0	1
<i>Lawsonia intracellularis</i>**	26	7	1
<i>Borrelia</i>	13	4	1

CEMO = contagious equine metritis organism (*Taylorella equigenitalis*); HBLB = HBLB accredited laboratories; [#] =capsule type 1,2,5; VLA = VLA reference laboratory; **Streptococcus equi* subsp.*equi*; MRSA = methicillin resistant *Staphylococcus aureus*. ** *Lawsonia intracellularis* identified using PCR applied to faeces

Of the eight reported samples testing positive for *Salmonella* spp., the serotypes of five samples are known after further testing by the VLA. Those five samples are included in the total of 24 samples tested by the VLA: 19 *Salmonella* spp. positive isolates representing 14 incidents. Twice *S. newport* was identified. One sample was untyped and the remaining 16 were *S. typhimurium* of which the most prevalent was *S. typhimurium* 104 with 4 positives.



NEWS REPORT

CEM in the U.S.A – reaction of the British horse industry

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In the U.S.A. a total of 11 stallions and three mares have been confirmed as positive for *Taylorella equigenitalis*, the causative organism of contagious equine metritis (CEM), as of 27th February 2009. Testing was performed by the National Veterinary Services Laboratories (NVSL) and consisted of pathogen isolation on culture. On 10th December 2008 semen from a Quarter horse stallion which was being routinely tested prior to export to Europe revealed a positive result. Three other stallions standing at the same premises in Kentucky have subsequently tested positive. Another three stallions in Indiana, three in Wisconsin and one in Texas also tested positive to CEM. The positive stallions included a 13 year old Friesian stallion which was imported into the United States in late 2004 and is currently located in Wisconsin. He has been epidemiologically linked to one of the three positive stallions in Indiana which stood at the affected Kentucky stud farm in 2008. The positive mares were located in three States: one in California, one in Illinois, and one in Wisconsin. Two were bred by artificial insemination with semen from a CEM positive stallion and one was bred by natural cover to a positive stallion. None of the mares were bred by the same stallion.

Semen from the CEM-positive stallions has been widely used across the U.S. and also in Canada. As a consequence of the contact tracing 45 U.S. states and six states in Canada (Alberta, Ontario, Quebec, New Brunswick, Saskatchewan and British Columbia) are testing for CEM. As of 27th February 2009 there were no CEM positive cases in Canada. A total of 84 exposed or positive stallions in 16 U.S. states and 530 exposed or positive mares in 44 U.S. states have been located so far. Another nine exposed horses, eight mares and one stallion, are still actively being traced in the U.S. All positive horses, and all exposed horses that have been located, are currently under quarantine or hold order. Testing and treatment protocols are being put into action for all located horses. Treatment consists of topical cleansing with disinfectants and systemic antibiotics. The source of the outbreak(s) is still inconclusive.

For additional information please visit the following web-sites:

<http://www.oie.int>

<http://www.aphis.usda.gov>

<http://www.inspection.gc.ca>

In the UK, isolation of the contagious equine metritis organism (CEMO) is notifiable by law. In confirmed cases, Defra will initially ask breeders and veterinary surgeons to comply with the HBLB Code of Practice. The British horse industry has reacted to the current CEM-outbreak in the U.S. by issuing an update of the HBLB Code of Practice, which is reproduced below:



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INTERIM UPDATE TO HBLB CODES OF PRACTICE ON CEM – JANUARY 2009

The United States Department of Agriculture has reported the isolation of *Taylorella equigenitalis*, the cause of Contagious Equine Metritis (CEM), from multiple horses in multiple states of USA and in Canada. As a result, the Horserace Betting Levy Board's (HBLB) Codes of Practice sub committee make the following recommendations for the 2009 season:

- All mares imported into the participating countries (France, Germany, Great Britain, Ireland and Italy), who have been in North America (USA and Canada) since 1st January 2008 are considered 'high risk'.
- Two clitoral swabs (fossa and sinuses) should be taken at least seven days apart and an endometrial swab taken during an oestrus period prior to covering.
- Full culture results (aerobic and microaerophilic) should be obtained from an HBLB Approved Laboratory (GB) or other National Approved Laboratories in France, Germany, Ireland or Italy.
- Swab results should be obtained before covering and mare that has been in North America after 1st January 2008.

The HBLB Codes of Practice are available online at <http://www.hblb.org.uk/sndFile.php?fileID=21>

Copies are also available on request from equine.grants@hblb.org.uk or telephone 020 7259 8375



FOCUS ARTICLE

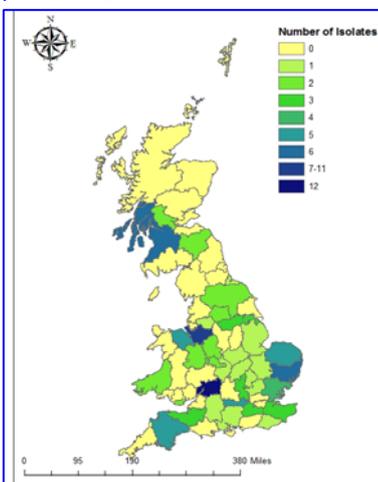
The molecular epidemiology of strangles in the United Kingdom

Philip Ivens MA VetMB CertEM (Int.Med.) MRCVS, Royal Veterinary College, UK

Streptococcus equi is the causative agent of strangles and is one of the most commonly diagnosed and important infectious disease of horses world-wide. The disease is characterised by pyrexia followed by profuse nasal discharge and abscessation of the lymph nodes of the head and neck. The majority of infected horses recover from strangles and eliminate *S. equi* over a 4–6 week period. However, up to 10% of recovered horses continue to shed *S. equi* intermittently for prolonged periods after clinical signs have resolved. It is increasingly recognised that sub-clinical carriage of *S. equi* is fundamental to the persistence of this infection between outbreaks.

Although strangles has a high welfare and economic cost to the equine industry, very little is so far known about the temporo-spatial and molecular epidemiology of the disease. Strangles is not notifiable in the UK and there are few published data on the geographical locations of strangles outbreaks in the UK and, although it is speculated that they may exist, it is not known whether geographical ‘hot spots’ of disease occur. Since the beginning of 2008 the Animal Health Trust (AHT) and Royal Veterinary College (RVC) have been collecting data to conduct some preliminary studies on the temporo-spatial and molecular epidemiology of strangles in the UK.

‘DNA fingerprinting’ techniques such as multilocus sequence typing (MLST) have been used widely in epidemiological surveillance of bacterial infections, such as those caused by *Staphylococcus aureus*, enabling quick and reliable differentiation of different bacterial strains. However, *S. equi* isolates collected from several continents and spanning a period of 27 years were all found by MLST to be sequence type (ST)-179 or a single locus variant ST-151, suggesting that this method does not have sufficient discriminatory power to study the molecular epidemiology of *S. equi* infection. Variability in a surface protein of *S. equi* called the M-protein (SeM) has recently been found, making the gene encoding SeM potentially suitable for single locus sequence typing (SLST), another molecular epidemiological tool. In human medicine, SLST of the M-protein of the Lancefield group A streptococcus *Streptococcus pyogenes*, has been used to study the epidemiology of this pathogen and in disease surveillance.



A pilot study conducted by the AHT and RVC applied SLST molecular SeM typing to 95 *S. equi* isolates submitted to the AHT’s diagnostic laboratory during 2008. This preliminary study has provided some provisional evidence for qualitative temporal and geographical clustering of related outbreaks that might be consistent with regional differences in occurrence of strangles in the UK, although obvious caution is required in interpretation of these pilot data from only a single testing laboratory.

Figure 1: County-level distribution of veterinary practices submitting 95 *S. equi* positive clinical isolates examined by the AHT diagnostic laboratory during 2008.



It is emphasised, however, that the way that these data have been collected (i.e. from only a single laboratory) means that they cannot be taken to indicate the likely relative frequency of strangles occurrence in individual counties but more likely reflects biases in the submission to the laboratory that collected the isolates.

The 95 SeM typed *S. equi* samples were collected from 92 horses on 78 premises and were submitted from 53 veterinary practices. The median age of affected horses was 9 years old and they were of a mixture of breeds and genders. The 95 *S. equi* isolates represented 18 different SeM alleles, with the most frequent being SeM-9 and SeM-7, which were distributed throughout the UK. Less frequently identified alleles were restricted to defined geographical areas. At a more local level it was possible to see apparent phylogenetic clustering and clear differentiation of outbreaks based on these clusters (Figure 2, which shows colour coding of SeM alleles that share greatest sequence identity).

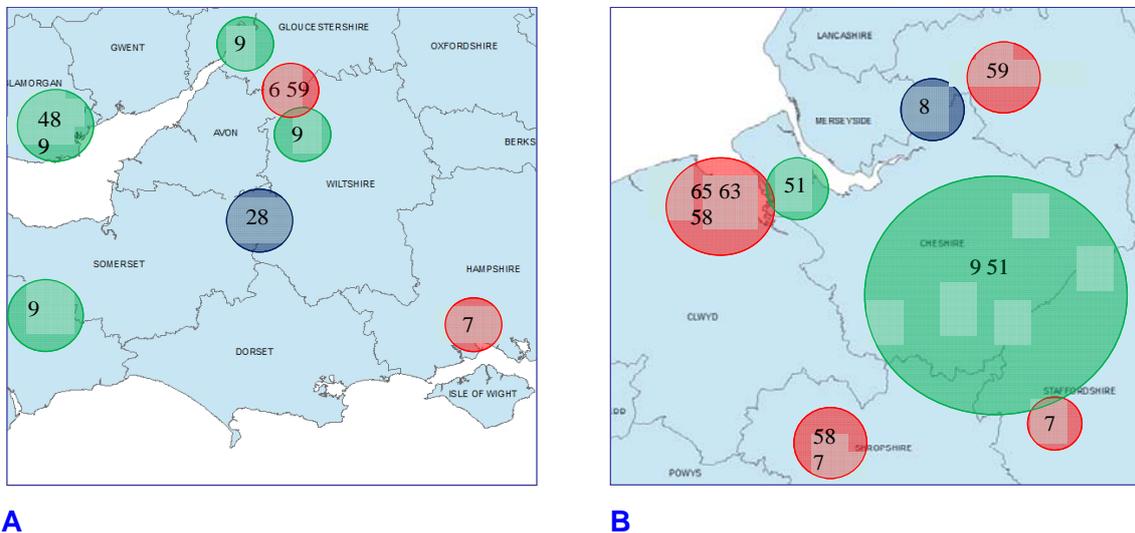


Figure 2: Evidence for temporal and spatial clustering or exclusion of *S. equi* SeM types in A) south west and B) north west England in 2008

These data demonstrate the discriminatory capability of SeM typing as some outbreaks in relatively close geographical proximity were clearly associated with different alleles, precluding any likely epidemiological link between them. For example, a SeM-8 outbreak in Cheshire was unrelated to a SeM-59 isolate recovered by a vet in Greater Manchester or other SeM-9 and SeM-51 isolates recovered from Cheshire (Figure 2 B).

This work and Philip Ivens' scholarship in Equine Medicine and Equine Infectious Diseases at the RVC is generously supported by Intervet/Schering-Plough Animal Health.



Toxic and Parasitic Disease Report for the Fourth Quarter 2008

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 fourth quarter 2008

	Number of Samples Tested	Number Positive	Number of Contributing Laboratories
Grass Sickness	4	0	2
Hepatic toxicoses	9	1	2
Atypical myopathy	1	1	1

Table 4: Diagnostic parasitology sample throughput and positive results for the fourth quarter 2008

	Number of Samples Tested	Number Positive	Number of Contributing Laboratories
<u>Endoparasites</u>			
Ascarids	872	31	9
Cyathostomes	1381	280	12
Dictyocaulus	665	2	7
Strongyles	1413	202	13
Tapeworms (ELISA based testing)	15	5	3
Tapeworms (Faecal exam)	1357	16	9
Trichostrongylus	30	12	1
Strongyloides	1371	18	12
Oxyuris equi	68	1	2
Fasciola	104	6	1
Coccidiosis	34	1	1
<u>Ectoparasites</u>			
Mites	479	1	12
Lice	237	4	10
Ringworm	473	157	14
Dermatophilus	254	16	10
Candida	15	1	1



Report on Post Mortem Examinations for the Fourth Quarter 2008

East Anglia

Sixty three cases were examined inclusive of 42 aborted fetuses

Of the aborted fetuses examined this quarter, acute or chronic umbilical cord torsion was suspected as the precipitating cause in 20/42 cases.

A thoroughbred fetus aborted at 9 months gestation was found to have a 20cm long umbilical hernia, which contained the entire small intestine, large parts of the colon, and portions of the spleen and stomach. This same fetus had additional malformations involving the eyes, forehead and hind limbs.

A thoroughbred fetus aborted at 256 days gestation exhibited severe, multifocal, necrotising hepatitis. Molecular tests for EHV-1 and -4, and immunohistochemistry for *Leptospira spp.*, were negative. Immunohistochemistry for EHV antigens revealed weak positive staining in the liver. It was thought that this fetus may have survived EHV infection earlier in gestation, but succumbed subsequently to liver damage.

One thoroughbred fetus was aborted within an intact allantochorion at approximately 9 months of gestation. Histology showed a marked placentitis, and *E. coli* was cultured from fetal heart blood, fetal stomach and allantochorion.

Premature placental separation was reported in another aborted fetus, and two more cases of placentitis were detected but no further details are known.

A thoroughbred fetus was aborted at approximately 240 days of gestation, concurrent with severe peritonitis in the mare. The main finding during the fetal *post mortem* was a large mass arising from the pleural surface of one lung. Histologically, the pleural mass was found to be a poorly differentiated primary embryonal neoplasm, and there was multifocal to diffuse mineralisation and degeneration in the allantochorion.

Six other thoroughbred fetuses were examined, but no definite cause of the abortion could be identified. A further nine aborted fetuses were submitted for EHV clearance only; all were found to be negative.

An eight month old thoroughbred colt with a of four months history of progressive ataxia was found to have moderate, chronic, myelin and axonal degeneration in the cervical spinal cord at the level of C4. The location of the lesion at C4 is notable as C3-C5 and is one of the most common sites of Wobbler's syndrome in yearlings.

Chronic spinal cord compression was diagnosed in one horse following gross *post mortem* examination and histology.

An 11 year old Friesian cross gelding was euthanized because of progressive severe ataxia, slight head tremor and slight holding of the head to the left. The cause of the neurological signs was not determined by gross *post mortem* examination or by histological examination of randomly selected samples of CNS. However, infectious causes were excluded.

Lethal white syndrome was reported as the cause for one neonatal death.



Three gastrointestinal cases were examined. The first animal showed a colonic infarct. The second animal was diagnosed with small intestinal epiploic entrapment and strangulation. The third case was a nine year old gelding which underwent surgery for the repair of a mandibular fracture. He developed diffuse diarrhoea and pyrexia soon after surgery, collapsed and died. The *post mortem* examination revealed severe haemorrhagic colitis and enterocolitis complicated by septicaemia.

A three year old Warmblood colt was examined after collapsing and dying within minutes after an intramuscular injection with Penicillin (administered for the treatment of respiratory disease). The only significant gross findings were haemorrhage and myonecrosis of varying intensity at sites of intramuscular injections. It was thought that death in this case was most likely due to an anaphylactic-type reaction, secondary to inadvertent intravascular injection of procaine penicillin, or other hypersensitivity.

A three year old Grevy's zebra was sent for *post mortem* examination. It was the second zebra that died at the same zoo within a 4 day period. It was found to be thin, have a severe colonic ascarid infestation, gastric ulceration, evidence of a skeletal myopathy and periodontal disease. A vitamin E/selenium deficiency was considered as a possible underlying cause for skeletal muscle lesions.

A seven year old thoroughbred stallion collapsed on the gallops post exercise. Gross *post mortem* examination found severe, extensive, bilateral pulmonary haemorrhage, considered to be of significant severity to account for the sudden death of the horse. The cause of death remained undetermined in a two year old thoroughbred colt that also collapsed on the gallops. Due to the absence of significant pathological findings, the most likely cause of death was considered to be fatal cardiac arrhythmia.

In two further cases cardiac disease was recorded. This included an animal with aortic vulvulitis and left sided cardiac failure and another with septic endocarditis.

Focal streptococcal abscessation in the spleen and adjacent structures secondary to ingestion and gastrointestinal perforation of a wire foreign body was found in a six year old Irish cob gelding.

Single cases of lymphoid leukaemia, chronic extensor tendon infection with abscessation, chronic laminitis, perilaryngeal oedema with bacterial infection, myofibre necrosis of respiratory muscles, subcutaneous haemorrhages and uterine artery haemorrhage in a parturient mare were also reported.

Home Counties

Thirteen cases were examined this quarter

Three neurologic cases were reported. These comprised an eight year old Warmblood gelding with instability of vertebrae C7-T1 (wobbler); a six year old male Irish Sport horse with left laryngeal hemiparalysis; and a ten year old thoroughbred cross mare with a cholesteatoma.



Four gastrointestinal cases were examined. A 14 year old Warmblood mare was found to have strangulation of the small intestine by a pedunculated lipoma. Two geldings, six and 15 year old respectively, were found to have acute toxæmia. A 15 year old polo pony mare was found to have colonic perforation by a wire with subsequent suppurative peritonitis.

Two cases of neoplastic disease were seen, one that involved a 31 year old pony mare with a pituitary adenoma, and a 35 year old Palomino mare with a squamous cell carcinoma of the tonsils.

One musculoskeletal case was examined. A ten year old male Connemara was found to have chronic-active mixed tendonitis and tenosynovitis.

Chronic liver failure and hepatic encephalitis was confirmed through *post mortem* examination in a 28 year old mare.

Two welfare cases were reported: A 6 month old Cob cross and an aged pony mare both showed severe intestinal parasitism and secondary infections.

South West

Nineteen cases were examined during this quarter

No cause of death was found in an ataxic donkey also showing additional neurological signs.

Seven gastrointestinal cases were seen. These comprised one case of caecal infarction (suspected parasitic/ thromboembolic), one case of intestinal herniation through the epiploic foramen; one case of gastric impaction, rupture and peritonitis; a case of gastric impaction and ulceration; a donkey with gastric stasis; and finally two donkeys with typhlocolitis.

One respiratory case was found to be aspiration pneumonia with ulcerative tracheitis.

No cause of death was found in a horse that collapsed on the gallops (suspected ventricular arrhythmia).

Three musculoskeletal cases were reported, one of which was a fibrinous arthritis.

One donkey was diagnosed at *post mortem* with a focal cholangiocarcinoma.

Three welfare cases were reported including an emaciated donkey (ecto- and endoparasits/ hepatopathy), a thin donkey with dental disease which died because of gastrointestinal disease and a recumbent animal which had to be euthanized and where no cause was identified.

Furthermore two cases of sudden death with an unknown cause were reported.



Northern England

Seven post mortem examinations were reported in this quarter

The cases examined included two cases of gastric rupture, three cases of intestinal ruptures at surgery, one case of large colon infarction, and a case with haemothorax of unknown aetiology.

Scotland

Fifteen horses for post mortem examination and 33 single samples (including biopsies) were submitted in this quarter. Please note that only the significant findings are reported in the following paragraph.

A five month old, male Clydesdale foal was submitted for gross *post mortem* examination following post-anaesthetic ataxia. The most significant lesion was severe, multifocal to coalescing, acute myelomalacia and haemorrhage in the T12-sacrum region, which was considered consistent with post-anaesthetic myelomalacia.

A six year old Warmblood mare submitted for *post mortem* examination presented with a 22x15x12cm, firm to hard mass extending laterally, medially and dorsally from the body of the right mandible. Histological features of the mass were consistent with invasive neoplasia, most likely of epithelial origin. Squamous cell carcinoma was the main differential diagnosis; however, some cytological features were not entirely typical of this neoplasm, with areas of the mass displaying features more suggestive of ameloblastoma.

A ten year old thoroughbred gelding presented with severe, diffuse, acute, necrotising and ulcerative typhlitis and colitis, following an unrelated surgical procedure and NSAIDs administration. Subcutaneous oedema, and pulmonary haemorrhages and oedema were also noted, suspected to have occurred due to increased vascular permeability secondary to septicaemia/toxaemia and fluid therapy. The aetiology of the colitis remains unclear. Bacteriology of the large and small intestines yielded no pathogenic bacteria. Possible causes may include clostridial infections and salmonellosis, although the administration of NSAIDs cannot be ruled out as contributing to disease.

Additional *post mortem* cases included three cases of acute, and one case of sub-acute, grass sickness; one case of disseminated malignant melanoma; a case of fibrino-proliferative synovitis and arthritis; one case of severe chronic laminitis, and one case of myonecrosis and cellulitis.

Nine muscle biopsies were examined: Diagnoses included two cases of equine polysaccharide storage myopathy, one case with mild myopathic changes and one case of neurogenic muscular atrophy. Remaining muscle samples did not show significant pathological changes.



Skin biopsy submissions comprised one case of superficial perivascular dermatitis, a lipoma and a case of eosinophilic granuloma. Oral biopsies comprised a case of acanthomatous epulis, and an epithelial tumour, respectively. Biopsy tissue from a sinus mass indicated the presence of an organising haematoma. A round cell tumour, mostly probably lymphoma, was diagnosed in a biopsy submission from the palate. Other diagnoses from various submitted specimens included suppurative fungal keratitis; eosinophilic enteritis; suppurative peritonitis; mild, diffuse, chronic enteritis.

Northern Ireland

Eight equine post mortem cases were examined during this quarter.

The cases examined included three equine feti in which no significant pathogens were detected and the cause of abortion was not established.

A yearling filly was submitted for *post mortem* examination with a history of weight loss and loose faeces. The carcass was in poor body condition and slightly oedematous. The large intestine was distended with very fluid contents. There were many lymphatic nodules along the mesenteric attachment and the mucosa had a slightly frosted appearance with cyathostomes embedded in it. Cyathostome profiles were evident in the mucosa on histology, along with a mixed inflammatory infiltrate including eosinophils.

An adult pony died after a sudden onset illness and was submitted for *post mortem* examination. The carcass was very congested. Petechial haemorrhages were present on the serosal surfaces of the small intestine and intestinal contents were fluid and dark brown in colour. There were ecchymotic haemorrhages in the mesenteries. The liver was firm, fibrous and yellow in colour. Histology of the liver showed haemosiderosis and heavy peri-lobular fibrosis with numerous encapsulated eosinophilic foci (possibly parasitic). The haemosiderosis was confirmed by Perls' stain.

An eight year old standard bred stallion was examined *post mortem* after showing clinical signs of colic. A single tear, approximately 30cm long, with haemorrhages at the edges, was found along the greater curvature of the stomach. Stomach contents were found in the peritoneum and there was extensive fibrinous peritonitis. In a similar case, the cause of sudden death in a six-month-old foal was found to be gastric rupture with resultant fibrinous peritonitis. Approximately 20kg of forage and whole grains were found in the peritoneum. A tear, approximately 25cm in length, was present in the greater curvature of the stomach with haemorrhages along the edges.

A two year old donkey in poor body condition was examined *post mortem*. On gross examination there was atrophy of the cardiac fat, extensive subcutaneous oedema and fluid, bloody small and large intestinal contents. On histology of the liver there was mild centrilobular vacuolation of hepatocytes. No parasitic ova were detected. These post-mortem findings would suggest dietary insufficiency.



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**We would welcome feedback including contributions on focus articles
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