

**Northern Ireland
Animal Disease Surveillance Quarterly Report**

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- Nutritional deficiencies in cattle
- Ovine and bovine abortion agents
- Listerial encephalitis in ruminants
- Porcine circovirus type 2 infection in pigs
- Mulberry heart disease in pigs
- Duck septicaemia
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ANIMAL DISEASE DIAGNOSTIC/SURVEILLANCE SERVICE

The main aims of the animal disease diagnostic service operated by DARD's Veterinary Sciences Division are to help protect animal and public health and promote the competitiveness of the agri-food industry, by identifying the causes of disease in diagnostic submissions to the Stormont and Omagh veterinary laboratories. Surveillance for notifiable, new or emerging diseases, and changing and changing trends in endemic diseases, is an important aspect of this service.

This report, for the first quarter of 2005, contains examples of the wide range of conditions identified in diagnostic specimens submitted to VSD's Disease Surveillance and Investigation Branch.

CATTLE

Respiratory diseases

Pneumonia was identified as the cause of death in 116 submissions for post-mortem examination (PME) during the first quarter of 2005. The most frequently identified pathogens were *Mycoplasma bovis*, which was detected in 16 cases using an antigen-capture enrichment sandwich ELISA, and *Pasteurella multocida*, which was cultured from 16 cases. *Mannheimia haemolytica* was isolated from 15, and *Haemophilus somnus* from 5 cases. Infectious bovine rhinotracheitis (IBR) virus antigen was identified in 3 cases submitted for PME.

Seven outbreaks of respiratory disease were investigated by testing of paired sera, taken three weeks apart, from acute and convalescing cattle. Rising antibody titres to *Mycoplasma bovis* were demonstrated in sera taken from 2 animals in one outbreak. In another outbreak, rising titres to bovine respiratory syncytial, bovine virus diarrhoea (BVD), parainfluenza-3 and IBR viruses were detected, underlining the multifactorial nature of bovine respiratory disease.

Infectious bovine rhinotracheitis virus was detected in nasal mucus submitted from an outbreak of respiratory disease. An appropriate vaccination strategy was implemented.

Alimentary diseases

JOHNE'S DISEASE

A total of 929 bovine blood samples from individual cattle in 146 herds, were submitted for serological testing for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) during this quarter. Seventy three samples (7.8%) were positive, while 11 (1.2%) gave inconclusive results by ELISA. One blood sample, submitted from a Limousin bull intended for sale, was strongly positive by the ELISA test, although this animal was clinically normal. A blood sample submitted from another bull that had chronic diarrhoea and illthrift was also positive by the Johne's ELISA. This animal was likely to be shedding high levels of MAP in faeces, and therefore to be a source of infection for other cattle in the herd.

Serological testing for Johne's disease was also carried out on several herds on a "herd" basis. In a few of these herds, a test and cull strategy using the Johne's ELISA test on all animals over two years of age is being successfully used to reduce the prevalence of infection. Significantly, several animals previously found positive by ELISA testing but which had not yet been culled, were confirmed positive by microscopic examination of faeces.

Microscopic examination for the presence of acid-fast bacteria was carried out on 173 bovine faecal samples. Acid-fast organisms typical of MAP were detected in three samples.

No cases of Johne's disease were identified in carcasses submitted for PME during this quarter.

BVD/MUCOSAL DISEASE

Five cases of mucosal disease were confirmed by PME of cattle carcasses, all submitted from farms in the west of the Province. The age ranged from 3 months to 2 years. One case involved a 3-month-old heifer that had been treated unsuccessfully for suspected salmonellosis and coccidiosis prior to submission. The post-mortem findings included typhlitis and colitis, and BVD virus was isolated from a blood sample taken prior to euthanasia.

In one herd with a history of calves born with deformed limbs and atresia ani, a blood sample from a yearling heifer was found to be negative for BVD virus

antibody but virus-positive. Subsequent sampling of a group of 54 yearling heifers on this farm detected 5 persistently infected animals. Forty seven of the 49 remaining heifers had sero-converted to BVD prior to sampling.

NEONATAL ENTERITIS

Enteritis was identified as the cause of death in 108 neonatal calves submitted for PME. Cryptosporidia was the most frequently identified enteric pathogen (24 cases) while rotavirus infection was detected in 13, coronavirus in 7 and *Salmonella* Dublin in 7 cases. *Escherichia coli* was detected in 10 cases - one of which was confirmed as *E. coli* K99. Two cases of coccidiosis were detected in 3-week-old calves.

Approximately 42% of calves, less than two-weeks-old with enteritis, had inadequate levels of colostral antibodies as indicated by the zinc sulphate turbidity (ZST) test on clotted blood collected at PME. A total of 358 faeces samples were tested using the coronavirus ELISA. Coronavirus antigen was detected in 36 samples (10%). Of 343 faecal samples tested using the rotavirus ELISA, rotavirus antigen was detected in 103 (30%). Of 186 bovine faeces samples from neonatal calves that were tested by the *E. coli* K99 ELISA method, 5 (3%) were positive for this organism.

A faeces sample was submitted from a 6-week-old calf from a group of 4 to 6 week-old-calves that had diarrhoea and illthrift. Four calves had already died on this 150-cow dairy herd. *Salmonella* Typhimurium phage type DT104B was isolated from this sample. Appropriate public health advice was given.

TRAUMATIC RETICULOPERITONITIS

Traumatic reticuloperitonitis, thoracic abscessation and pleural adhesions were observed at PME in a 3-year old cow submitted in March. Tyre (or similar) wire was found in the reticulum. This cow had aborted the day before death and the wire had penetrated the heart.

Nutritional and metabolic diseases

A total of 486 blood samples from cattle from different farms were submitted for calcium analysis. Calcium concentrations below the normal range (2-2.8 mmol/L) were found in 21 samples (4%). Of 572 blood samples from cattle on different farms tested for magnesium, concentrations below the normal range (0.73-1.31 mmol/L) were found in 44 samples (8%). A press article on methods of control for hypomagnesaemia was issued in the spring.

Non-esterified fatty acid (NEFA) concentrations above the reference range (0-0.5 meq/L) were detected in 43 (22%) of 198 blood samples tested. Blood NEFA concentrations are a measure of fat mobilisation, and elevated concentrations indicate nutritional stress or negative energy balance. A total of 562 blood samples were submitted from cattle at various stages of production for beta-hydroxybutyrate (BHB) analysis. BHB concentrations above the reference range (0-1.5 mmol/L) were found in 30 samples (5%) indicating ketosis. Heparinised blood samples were submitted from 727 cattle from different herds for glutathione peroxidase (GPX) analysis. Erythrocyte GPX activities of less than 160 units/g of haemoglobin were detected in 61 samples (8%), indicating long-term selenium deficiency.

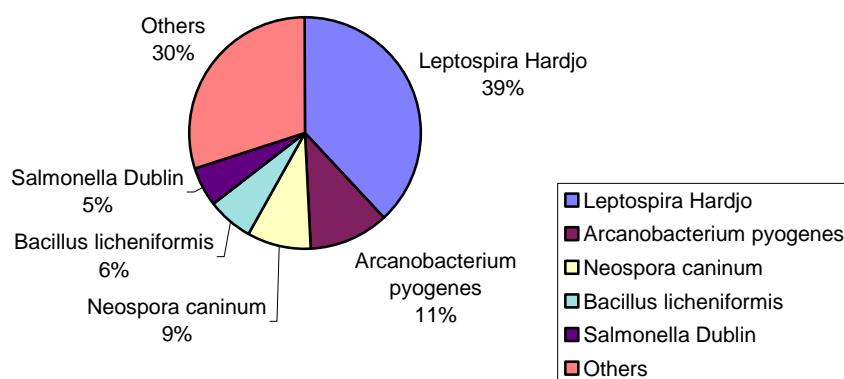
Of 637 blood samples submitted for copper analysis, concentrations below the reference range (8-16 $\mu\text{mol/L}$) were detected in 11 (2%) samples, indicating copper deficiency.

Reproductive and mammary diseases

ABORTION

Specimens from 212 cattle abortions were examined during the first 3 months of 2005. Recognised pathogens were detected in 113 (53%) of these cases. Of these, *Leptospira hardjo* was the most frequently identified pathogen (39%), while *Arcanobacterium pyogenes* (11%), *Neospora caninum* (9%), *Bacillus licheniformis* (6%), and *Salmonella* Dublin (5%) were the other most frequently detected pathogens (Fig. 1). In one herd that was experiencing a problem with stillborn calves, *Leptospira hardjo* antigen was detected in kidney, lung and adrenal gland of a foetal submission. This herd had been vaccinated for leptospira and the reason for this apparent breakdown of vaccinal protection is currently under investigation.

Fig. 1. Agents associated with bovine abortion cases in which one or more pathogens detected January to March 2005

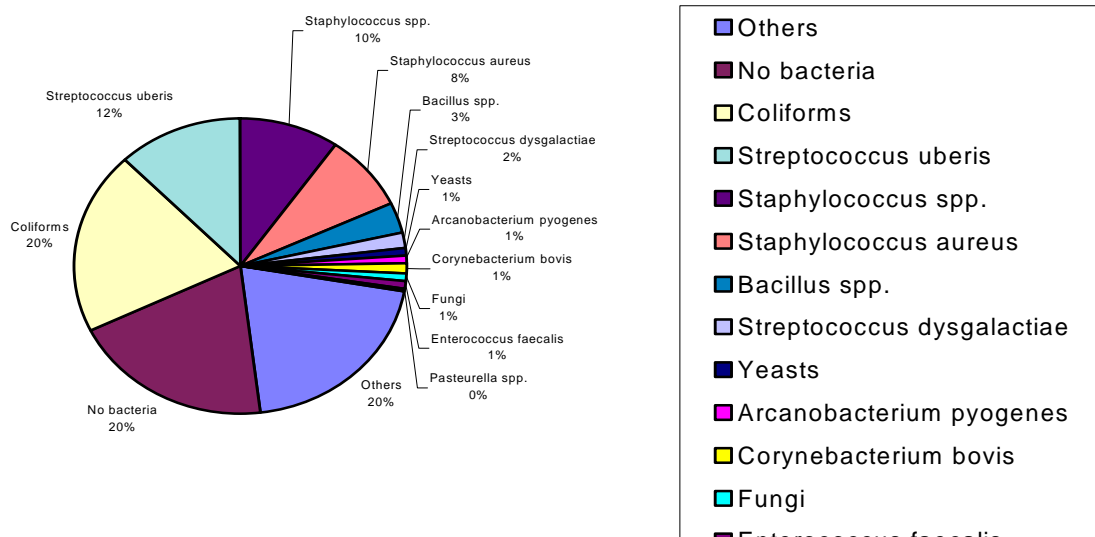


Among the other pathogens identified, *Yersinia pseudotuberculosis* was cultured in pure growth in a septicæmic pattern from foetal organs and abomasal contents of 2 bovine foetuses. Although more frequently associated with enteric disease, this organism can also cause sporadic abortions. *Yersinia enterocolitica* was cultured in pure growth from an organ pool and abomasal contents of one bovine foetus. This agent is also a recognised cause of sporadic abortion in cattle. Since it can cause significant gastrointestinal disease in humans, appropriate public health advice was given. Wild birds, rodents and apparently healthy sheep and cattle can act as reservoirs for *Yersinia enterocolitica*.

MASTITIS

Eight hundred and eighty nine bacterial isolates were made from milk samples submitted from cows with acute and chronic mastitis during this quarter. More than two bacterial species (suggestive of possible sample contamination in some cases) were cultured from 56 cases. The frequencies of isolation of bacterial species from the submitted milk samples are presented in Fig. 2.

Fig. 2. Relative frequency of bacterial isolates associated with mastitis



Pasteurella multocida was isolated from 2 milk samples submitted from cows with clinical mastitis. *Pasteurella* spp. and *Streptococcus uberis* were recovered from one case of subclinical mastitis. Although a common cause of mastitis in sheep, *Pasteurella* spp. are uncommon isolates from bovine mastitis cases, but occasionally cause outbreaks in individual herds. The most probable source is septicaemia or upper respiratory tract infection. However, once established in a quarter this infection can be very difficult to treat (despite favourable *in vitro* sensitivity test results), can spread from cow to cow at milking time and cause severe acute or chronic mastitis. Therefore culling is often recommended.

Nervous diseases

Samples from 12 suspect cases of botulism from 11 different herds were submitted for toxin testing during this period. Type D botulinum toxin was detected in gastrointestinal contents of 2 cases but no toxin was identified in samples from any of the other cases.

Analysis of a blood sample submitted from a one-month-old calf with hyperaesthesia and nervous signs indicated a magnesium concentration of 0.34 mmol/L (normal range 0.73-1.31 mmol/L). Although hypomagnesaemia is relatively rare in this age of calf, this case highlights the importance of including this condition in the differential diagnosis of nervous signs in young calves.

A blood sample submitted from a calf had an elevated lead concentration consistent with lead poisoning.

LISTERIOSIS

Three cases of listeriosis were diagnosed at PME during the first quarter of 2005. One case was a two-year-old Friesian heifer that had calved approximately one week prior to the onset of clinical signs which included pyrexia, lethargy, dysphagia, anorexia and "standing in a huddled position". Treatment was unsuccessful and the animal was euthanased approximately 4 days after the onset of clinical signs. The post-mortem findings included dilated and impacted oesophagus, the presence of several boluses of silage in the nasal turbinate bones, purulent rhinitis and a foul-smelling purulent metritis. Histopathological lesions typical of listeriosis were observed in the brainstem.

Skin diseases

Approximately 50% of a group of 50 animals that had been de-horned in May 2004 developed chronic discharging wounds at the de-horning sites and inappetence which persisted for a considerable time despite repeated treatment. Two animals died in late 2004 and some members of the group had a persistent foul-smelling discharge 7 months after de-horning. Swabs submitted from the wounds yielded cultures of *Pseudomonas* spp. and *Corynebacterium jeikeium*. The latter organism is a known opportunistic pathogen of immunocompromised human patients but is rarely identified in veterinary subjects. Resistance to many antibiotics is a key characteristic of this species.

Other diseases

MALIGNANT CATARRHAL FEVER

A 15-month-old Friesian bull, one of 3 cattle that died suddenly in an intensive beef-fattening herd of 374 cattle in the west of the Province, was submitted for PME in February. Gross findings included erosions and ulcers of the buccal mucosa and oesophagus and perithymic oedema. Histopathological lesions consistent with malignant catarrhal fever (MCF) were observed in brain and lymph node tissues. A visit to the farm confirmed close contact between this group of fattening bulls and store lambs. Other housed cattle on the farm shared an air space with periparturient ewes. A second carcass submitted from this farm for PME, had an enlarged and oedematous thymus with enlarged intra-thoracic lymph nodes, also suggestive of MCF.

A 3-year-old cow that had died suddenly in another herd was submitted for PME in March. Post-mortem findings included tracheitis, stomatitis and lymphadenitis, particularly affecting the head lymph nodes. Histopathological lesions suggestive of MCF were observed in tissues of this animal.

VSD introduced a serological test for MCF last year and is currently working on the development of a PCR test. It is hoped that, when fully developed, this test will be extremely useful for confirmation of MCF cases and differentiation from cases that have lesions resembling foot-and-mouth disease.

CLOSTRIDIAL DISEASES

Twenty-one cases of blackleg and 7 cases of Black disease were confirmed by PME during the first quarter of 2005. Prompt vaccination of cohort animals was recommended.

MYCOPLASMA ARTHRITIS

Mycoplasma bovis was isolated from a sample of synovial fluid submitted from a cow with a history of chronic recurrent pneumonia, mastitis and polyarthritis. Antibodies to *Mycoplasma bovis* were found in clotted blood samples submitted from 4 other animals in this herd.

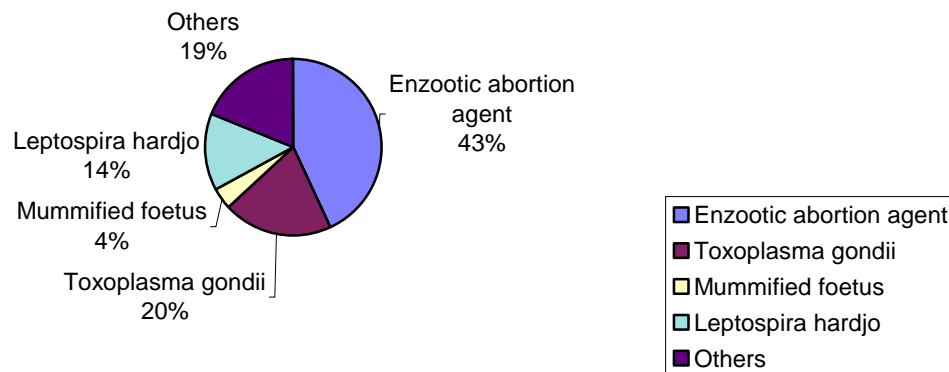
SHEEP

Reproductive diseases

ABORTION

Specimens from 240 ovine abortions were examined during the quarter. Recognised pathogens were detected in 184 (77%) cases. Of these, chlamydial enzootic abortion agent (EAE) was the most commonly identified pathogen (43%). Toxoplasma was identified in 20% and *Leptospira hardjo* in 14% (Fig. 3).

Fig. 3. Agents associated with ovine abortion January to March 2005



Among the other pathogens identified, *Listeria ivanovii* was isolated from two aborted fetuses submitted from one flock and *Yersinia pseudotuberculosis* from a foetus from another flock. This organism is occasionally associated with sporadic abortion in sheep.

SUSPECT ADVERSE REACTION TO PROCAINE ANAESTHETIC

A 2-year-old pedigree Beltex ewe which died suddenly during caesarean section was submitted for PME following suspicion of an adverse reaction to

the local anaesthetic procaine. Severe pulmonary oedema and apparent laryngeal obstruction, due to swelling of the laryngeal mucosa, was observed at PME, supporting the possibility of an allergic reaction. This suspect adverse reaction was reported to the Veterinary Medicines Directorate by the veterinary practitioner.

Nutritional and metabolic diseases

Serum calcium and magnesium concentrations were assessed in blood samples submitted from 30 periparturient ewes in different flocks. Calcium concentrations were found to be below the normal range (2-2.8 mmol/L) in 11 (37%) samples while magnesium concentrations were below the normal range (0.73-1.31 mmol/L) in 4 samples (12%). In one example a primiparous one-year-old ewe was submitted for PME. Analysis of vitreous humour yielded a calcium concentration of 1.27mmol/L suggesting, in the absence of other significant findings, hypocalcaemia as the cause of death. Magnesium concentrations in vitreous humour were normal in this case.

Of 239 blood samples submitted from sheep in different flocks for copper analysis, concentrations in 2 samples (0.8%) were below the normal range (8-20 μ mol/L). Two ewes submitted from one flock for PME, 2 months apart, were both found to have copper toxicity. Post-mortem findings of icterus and dark kidneys, consistent with an acute haemolytic crisis following copper toxicity, were observed in both carcasses. Elevated liver and kidney copper concentrations were found in both cases, confirming copper toxicity.

Erythrocyte glutathione peroxidase (GPX) activities were analysed in 244 blood samples from sheep from different flocks. Low erythrocyte GPX activities (less than 270 units/g Hb) were found in 10 samples (4%) indicating long-term selenium deficiency.

Alimentary diseases

JOHNE'S DISEASE

A blood sample was submitted from a 3-year-old ewe with a history of illthrift. Biochemical analysis revealed a low albumen concentration consistent with illthrift and elevated urea levels. Antibodies to *Mycobacterium avium* subspecies *paratuberculosis* (MAP) were detected by ELISA. In another case, 5 blood samples were submitted from 3-year-old ewes with a history of illthrift and poor body condition. Antibodies to MAP were detected by ELISA in one of these samples.

A number of ELISA-positive rams from different flocks were also detected. Acid-fast organisms, morphologically consistent with MAP, were subsequently identified in the faeces of some of these animals, confirming Johnes disease.

ABOMASAL DISPLACEMENT

A 2-year-old ram that died with a history of coughing was submitted for PME. Evidence of a right-sided displacement of the abomasum, megaloesophagus and oesophageal obstruction were observed. The abomasal displacement was considered to be the primary lesion with consequent oesophageal obstruction and dilatation.

PARASITIC DISEASES

Five cases of coccidiosis were identified at PME of several 2 to 4-week-old lambs. A mixed infection of coccidia and cryptosporidia was detected in one case. Cryptosporidia may exacerbate the effects of coccidial infection.

A faeces sample, submitted in February from a 2-year-old ewe with a history of scouring and ill thrift, had 7,200 strongyle eggs per gram.

No cases of nematodirosis were identified in March 2005. The Veterinary Sciences Division's meteorological forecasting system predicted that the main risk period for this disease would occur in mid-April 2005 and a warning press release was issued.

Respiratory diseases

Mannheimia haemolytica was the respiratory pathogen most commonly isolated from post-mortem cases in which pneumonia was identified as the cause of death.

Pulmonary adenomatosis ("jaagsiekte") was identified in 12 post-mortem submissions.

Nervous diseases

Histopathological lesions of encephalitis and the early stages of abscess formation were observed in the brain of a sheep that had nervous signs. *Mannheimia haemolytica* type A2 was cultured from the brain.

Six cases of listeriosis were detected at PME of submissions from 4 farms during the first 3 months of 2005. A history of silage feeding accompanied all of these submissions. In one example, histopathological lesions of encephalitis, associated with microabscess formation were observed in brainstem of 2 ewes submitted in February. Near-term twins or triplets were present in the uteri and both ewes also had ketosis, presumably secondary to the brain disease.

Skin diseases

Sheep scab was identified in wool samples which were submitted from 3 batches of lambs presented for slaughter to an abattoir. These lambs had pruritis, wool loss, hyperkeratosis and erythema. *Psoroptes ovis* mites were detected in all three samples.

Sheep biting lice (*Damalinia ovis*) were identified in wool samples submitted from a batch of ewes with pruritis and wool loss.

Extensive cellulitis over the flanks was detected in a six-week-old lamb that was submitted for PME following vaccination the previous week. *Corynebacterium* spp. were isolated in pure culture from the lesions and the use of a contaminated needle or syringe was suspected.

Periorbital orf was diagnosed in a 2-year-old ewe. This animal presented with intense pruritis, severe periorbital erythema and oedema, and significant self-inflicted abrasions (see Fig. 5). The lesions also affected the lips and caused obvious pain. Aujeszky's disease virus was not isolated and no evidence of viral encephalitis was observed by histopathology.

Fig. 5. Periorbital orf in a two-year-old ewe



PIGS

Reproductive diseases

Specimens from 6 porcine abortions were examined in the first quarter of 2005. In one example, 5 pig foetuses were submitted from an aborted litter in February. An antibody titre (1/256) to *Toxoplasma gondii*, detected in foetal blood, was indicative of toxoplasma infection.

Respiratory diseases

Proliferative and necrotising pneumonia and lymphadenopathy were detected in a 10-week-old pig submitted for PME. Porcine circovirus (PCV2) type 2 antigen was identified in lung and lymphoid tissues of this animal. Fluorescent antibody tests for porcine reproductive and respiratory virus (PRSV) were negative.

Porcine circovirus type 2 infection was also detected in 16 post-mortem submissions during the first quarter of 2005. Pathological findings consistent with postweaning multisystemic wasting syndrome (PMWS) were observed in several of these cases.

Other diseases

MULBERRY HEART DISEASE

Mulberry heart disease was identified on 3 farms in the west of the Province. One case involved 21-day-old unweaned pigs that had very good conformation and were of a fast-growing genotype. Gross and histopathological lesions consistent with mulberry heart disease were observed at PME, although the creep feed had already been supplemented with vitamin E. Research at the Veterinary Sciences Division has previously indicated that factors other than dietary vitamin E deficiency are important in the pathogenesis of mulberry heart disease. The other two outbreaks involved older, weaned pigs and typical gross lesions of hydropericardium and streaky myocardial haemorrhages were observed at PME. Histopathological changes consistent with mulberry heart disease were also observed in both of these cases.

Nervous diseases

Aujeszky's disease was identified in a batch of pigs submitted for PME from the west of the Province. Some sows were off feed and several one-month-old pigs had died suddenly. Aujeszky's disease virus (ADV) antigen was detected by immunofluorescence in samples of brain tissue and histopathological examination revealed a non-suppurative encephalitis with intranuclear inclusion bodies, typical of Aujeszky's disease.

BIRDS

Poultry

Mannheimia haemolytica was isolated from lung and spleen of a broiler breeder submitted for PME. 30 birds had died in this flock over 3 days and a significant drop in egg production was also noted. The submitted material tested negative for Newcastle disease, infectious laryngotracheitis, avian influenza and infectious bronchitis viruses.

A batch of 6 ducks was submitted for PME with a history of torticollis, meningitis and death. One of these ducks had severe fibrinous encephalitis and *Riemerella anatipestifer* (agent of duck septicaemia; notifiable) was isolated. Enlarged livers and spleens were found in the other 5 ducks and *Salmonella* Brandenburg was isolated.

Cage and aviary birds

GALLAH COCKATOO

Proventricular dilatation syndrome was identified in a Gallah cockatoo submitted for PME. As the name suggests, a dilated proventriculus was observed and the histopathological changes were typical of this syndrome.

HORSES

Respiratory Diseases

Four cases of strangles were confirmed by culture of *Streptococcus equi equi* from submitted swabs. In one example, a charcoal swab taken from a discharging, swollen submandibular lymph gland in a 10-year-old male horse yielded a pure growth of this organism, confirming a diagnosis of strangles.

Equine herpesvirus-1 (EHV1) antigen was detected in a lung lavage sample submitted in February from a horse with respiratory signs. The use of EHV-1 and -4 monoclonal antibodies in the immunofluorescence test suggests that this virus was EHV1. No bacteria were cultured from the lavage sample.

Other Diseases

FISTULOUS WITHERS

Clotted blood samples submitted from 2 horses with fistulous withers were tested for antibodies to *Brucella abortus*. Although low SAT and EDTA titres were detected, the CFT tests were negative and the titres were not therefore considered significant.

A 2-day-old full-term foal with a history of progressive tachypnoea was euthanased and submitted for PME in March. Gross and histopathological findings consistent with acute respiratory distress syndrome were observed. No significant bacteria were cultured from this case.

Azalea poisoning was considered as the likely cause of death of a 3-year-old donkey submitted for PME. Gross findings consistent with left-sided heart failure and massive pulmonary oedema were observed at PME. Plant material found in the stomach of this animal was identified as azalea.

Reproductive diseases

REPRODUCTIVE BACTERIOLOGY

A total of 439 swabs were submitted for contagious equine metritis (CEM) culture during the quarter. *Taylorella equigenitalis* was not isolated from any swab. However, swabs from 8 mares were positive for *Klebsiella pneumoniae*. Seven of these isolates were submitted to the Animal Health Trust at Newmarket for capsule typing. The isolates from 4 mares were capsule type K5/K7 while capsule type K2 was isolated from one mare and clinically insignificant capsule types (i.e. not types 1, 2 or 5) were recovered from 2 mares.

Capsule types 1, 2 and 5 of *Klebsiella pneumoniae* are considered to be equine venereal pathogens that may be sexually transmitted, as described in the Horserace Betting Levy Board Codes of Practice. Mares identified as carrying one of these capsule types become "high risk" mares under Appendix 1 of the Code of Practice. They remain high risk until 3 sets of negative swabs have been taken at three different oestrus periods in each of two years. Mares which have visited any premises on which *K. pneumoniae* capsule types 1, 2 or 5 have been isolated in the past twelve months also become "high risk".

In vitro antibiotic sensitivity testing indicated that all of these *K. pneumoniae* isolates were sensitive to amoxicillin + clavulonic acid, cephalexin, enrofloxacin, gentamycin and tetracycline but resistant to amoxicillin, ampicillin, erythromycin and lincomycin. Five isolates were resistant to trimethoprim-potentiated sulphonamide combination, while one isolate (capsule type not determined) was resistant to neomycin. One mare remained positive for *K. pneumoniae* capsule type K5/K7 on 4 occasions, despite antibiotic treatment based on the results of *in vitro* sensitivity testing.

Pseudomonas aeruginosa was isolated from one equine reproductive tract sample during this quarter.

EQUINE VIRAL ARTERITIS SEROLOGY

A total of 518 blood samples were tested for antibodies to equine viral arteritis (EVA) virus during this quarter. This is a significant increase on the 308 samples tested during the corresponding period in 2004. Twenty-two samples were found to be antibody-positive this quarter compared with 21 during the corresponding period last year. Many of these positive sera came from horses known to have been vaccinated or previously identified as antibody-positive.

FISH

Salmon parr with a history of anaemia and increased mortality since October 2004 were submitted for PME. Gross and histological findings consistent with phagocytolytic erythrocyte inclusion body syndrome were observed at PME. Examination of tissue sections from affected fish by electron microscopy revealed a toga-like virus.

SALMONID ALPHAVIRUS

Four hundred and seven sera from 30 cases were tested for antibodies to salmonid alphavirus (SAV). Antibodies to SAV were detected in 67 samples from 8 cases. Twenty one samples from 7 cases were found to be viraemic by virus isolation.

WILDLIFE

Badger road traffic accident survey

During this quarter, post-mortem examinations were carried out on 31 badgers. Of these, acid-fast organisms morphologically consistent with *Mycobacterium bovis* were observed by microscopic examination of tissues from 7 badgers. However, these organisms have not yet been confirmed by other methods. As cultures are incubated for up to 84 days, tests are ongoing in the majority of cases received during this quarter.

Wild birds

Avian tuberculosis was diagnosed in a teal submitted for PME. Shotgun pellets were found in the carcass of a buzzard submitted under the Wildlife Incident Investigation Scheme.

CANINE

A greyhound suspected of having been poisoned was found to have a gastric torsion on PME.