

WILDLIFE DISEASES IN THE UK

REPORTED IN THE YEAR 2004

REPORT TO
THE DEPARTMENT OF ENVIRONMENT, FOOD AND RURAL AFFAIRS
(Defra)
AND THE
OFFICE INTERNATIONAL DES ÉPIZOOTIES (OIE)



VLADIMIR

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Cover Photographs: Courtship bites and associated infections in foxes Aggressive biting in courting foxes with transmission of bacterial pathogens has been reported in the UK (see for example *Courtship and mortality in foxes*, Vet Record 1995, 136, 367). In this case examined early in 2004, a dog fox was bitten in the foreleg (photo 1). The seasonality, the perfect match of the bite holes with the superimposed teeth from another fox submitted at the same time (photo 2), and the orientation of the bite suggested that a vixen probably bit the dog fox whilst mounting, during courtship. The bitten fox developed a severe bacterial osteomyelitis (bone infection); and was found and shot in an emaciated and debilitated condition.

Bite wounds during courtship are thought to be the underlying reason behind the annual peak in fox rabies seen following the vulpine rut in continental Europe. It is therefore important that rabies vaccination programmes are timed to protect fox populations prior to the rut.

WILDLIFE DISEASES IN THE UK 2004

Report to Defra and to the OIE 2004

INTRODUCTION

1. The Wildlife Diseases Report for 2004, to Defra, and ultimately to the OIE is compiled as part of the Defra/VLA Diseases of Wildlife Surveillance scheme (ED1600: VLADoWs). The format is similar to that used in previous years since the first OIE Report in 1995.
2. This Report is a summary of diseases in free-living animals and wildlife investigated by government and non-government agencies, and independent workers, for the year 2004, together with some 2003 incidents that were not reported previously. The absence of a particular condition does not necessarily mean that it was not present.
3. Each incident has been numbered to allow for referencing. The majority of incidents refer to infectious diseases, however a few non-infectious incidents that were considered worthy of note have been added. Conditions not recorded in previous UK OIE Reports, or considered unusual, have been annotated by the letter 'N'.
4. Further to the key aims of both Defra and VLA with respect to wildlife, Defra now supports the VLA: Diseases of Wildlife Surveillance scheme (VLADoWs). The principal objectives of which are to investigate unusual wildlife mortality and to provide wildlife disease surveillance. Data from several Project investigations in 2004 are presented in the lists and the tables of this Report, including the West Nile Virus surveillance in wild birds.
5. In addition to informing the OIE and Defra, it is intended that these Reports, by updating the list of recorded diseases and by providing further information on UK wildlife disease, will also serve to inform other workers in the field. The Reports have been made available on the internet (see page 35) and are now being used by ecologists, biologists and veterinarians. Recent UK OIE Reports have been quoted in publications in this country and abroad.
6. This year, in order to make the data more accessible to others, some explanatory notes on disease designations and incidents have been added. These notes are selective and not intended to be comprehensive and have been compiled with the general reader in mind.
7. In this edition produced for the web the Report has been de-personalised.

Compiled January 2005

Please send records of diagnosed diseases of wildlife to

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Notes

OIE Wildlife Disease Reports – the OIE Questionnaire

The role of wildlife diseases and their potential importance for man, domestic animals, wildlife and the environment is being increasingly recognised world-wide. Regular surveillance is important for proof of national disease-freedom status as well as for detecting the emergence of significant diseases.

Wild animals function as components of ecosystems, however they may also, unfortunately, be reservoirs of OIE List A and B diseases, as well as other important diseases of domestic animals and humans. Consequently surveillance for known diseases of economic or public health importance amongst wildlife is beneficial to the national interest.

Since 1993, a Working Group on Wildlife Diseases of the OIE in Paris has collected information on wildlife diseases, distributing a questionnaire to all country CVOs (Chief Veterinary Officers). The UK government has produced an official response to this questionnaire, collating annual records of disease, since 1995.

OIE List A and B Diseases

List A Diseases.

These are animal diseases of world-wide significance, due to the risks they pose to human health and national economies. Of the 15 OIE list A diseases, only six have been recorded in the UK and none are endemic (normally present) here. Two (Swine fever and Foot and Mouth Disease) have occurred transiently in the UK in the present century, however neither were recorded in wildlife species. A third virus infection, Avian Influenza virus, has occurred in UK wildfowl but only as a non-pathogenic (non-disease causing) type.

Avian Influenza virus therefore is the only List A virus that has been recorded in the UK OIE Diseases of Wildlife Reports, the last record being in 2002, in a Knot (*Calidris canutus*).

List A Diseases – 2004 incidents of note - none

List B Diseases

List B diseases are also found in wildlife and pose risks to human health and national economy, but these are not currently considered to be as serious as the List A Diseases. There are currently 36 OIE list B diseases, of which approximately 10 could be considered endemic in the UK. Of these 10, some are recorded regularly in the OIE Report [Avian tuberculosis (*Mycobacterium avium* infection), bovine tuberculosis (*Mycobacterium bovis* infection), Duck Virus enteritis (DVE), myxomatosis and Rabbit Haemorrhagic Disease (RHD)] while others have occasionally appeared in recent reports [Avian cholera, avian chlamydiosis, leptospirosis and pseudotuberculosis].

The status and designation of diseases on the OIE lists may vary. Diseases may be re-assessed should they change in nature and become more pathogenic (i.e. produce disease of greater severity) or perhaps infect new host species for the first time. Designations within countries may also vary. For example it has only become apparent in recent years that the UK population of Daubenton's bat (*Myotis daubentoni*) may be endemically infected with European Bat Lyssavirus (EBL), a type of rabies virus. So this disease now joins the UK Wildlife Disease List.

List B Diseases – 2004 incidents of note -

Avian tuberculosis – This bacterial disease in wild birds is not uncommon in the UK and has been recorded for many years, and in many species. Waterfowl primarily are infected and in some localities the bacterium may survive in the environment and be a source of infection to birds feeding there. The disease is usually fatal.

Bovine tuberculosis – This disease in UK wildlife is the subject of much research and publicity. For a recent review of bovine tuberculosis in UK wildlife, please see reference 18, page 36. The 2004 Report shows no obvious new disease patterns. A large project looking at prevalence of infection in wild mammals, other than badgers, in the South West of England finished in early 2004

Avian chlamydiosis – Probably under recorded as an infection in wild birds, this disease is recorded sporadically. Pigeon strains of the causative organism (*Chlamydochlamydia*) are potentially zoonotic. Strains deriving from other wild birds are possibly zoonotic although this has not been established with certainty.

OIE Wildlife Disease List

This is the third of the OIE designated lists. In effect it is a general list and includes any disease that is infectious in nature (caused by virus, TSE agent, bacterial, fungal or parasitic infection) that can infect wild mammals, birds, reptiles or amphibians. Several of these conditions may affect more than one species, and many may also infect man and domesticated stock. It is difficult to summarise their significance, as this may vary from country to country; some may be of sporadic occurrence; some may infect animals but cause little recognisable clinical disease, while others (for example salmonellosis) have the potential to infect many species and cause severe disease. Over 50 examples of Wildlife Disease List conditions are presented in the questionnaire but this is by no means exhaustive. New conditions are reported each year in UK wildlife and these require additional work to assess their potential risks to man, domestic stock, the environment and the species affected.

OIE Wildlife List – 2004 incidents of note

Fulmar (*Fulmarus glacialis*) mass mortality (incident 04/64) Over a six week period during March 2004 tide-line mortality probably involved several hundred birds. This was recorded not only on UK beaches but also on the beaches of other North Sea countries. Published accounts listed in this Report indicate that a complex sequence of events may have been responsible and a summary is provided in the VLA Wildlife Quarterly Report (WQR), 6.1 (web address, page 35). It is interesting to note that similar fulmar mortality was reported in populations of this species in the Pacific Ocean, however a link between this and the Atlantic/North Sea mortality is not apparent.

Breeding failure in sea bird colonies (04/70,71) Breeding failures were reported at several UK coastal colonies. Samples are infrequently submitted for examination for several reasons; most notably because eggs and chicks are not produced. Two associated incidents are included in this report. One involved a Little tern (*Sterna albifrons*) colony which experienced total failure however only one chick was found for examination. The underlying problem from the published accounts listed, appears to be insufficient food in the form of fish, particularly sand-eels. Productivity estimates for six species at five colonies published by the Seabird Group (Newsletter 98, October 2004) showed five species at five sites with the worst productivity since monitoring began.

Red squirrel parapox (incident numbers 04/41-42) This disease is of conservation importance and is currently threatening the English and Welsh populations of the red squirrel (*Sciurus vulgaris*). The pox virus is carried by the expanding population of the otherwise healthy grey squirrels (*Sciurus carolinensis*). Mountainous areas in the North of England had been considered as physical barriers to the northerly movement of grey squirrels however the population has managed to get over, or around, these areas in the last five years, and predictably pox disease in red squirrels has followed in the wake of the appearance of the greys. Incidents of parapox were identified in reds from several new areas across the North of England during 2004. It is anticipated that the first red squirrel pox disease in Scotland will soon occur. Examinations at VLA suggest that affected red squirrels die from secondary bacterial septicaemia, however occasional sero-positive animals have been found. It is assumed that these animals have had the disease and recovered, but were left in such a poor condition that they quickly succumbed to other diseases.

Brown hare (*Lepus europaeus*) coccidiosis (04/36-38) This disease is caused by an intestinal protozoan parasite, and is recorded in most years. Significant mortality may be triggered by large populations of susceptible young during damp autumns, and this is the probable explanation of at least some of the incidents reported this year.

Grey seal (*Halichoerus grypus*) bacteria (04/52) A species of bacterium new to science was cultured from wounds from grey seals in Scotland and Cornwall. The published reference gives the description of the new organism. See also Wildlife Quarterly Report (WQR) 6.2, web address page 35.

Seal finger *Mycoplasma phocacerebrale* infection (04/57-58) is the suspected cause of seal finger in man. The organism lives in the mouths and respiratory tracts of seals and human infection may occur following a seal bite. Seal workers should take suitable preventative precautions as the condition causes severe pain and may result in digit amputation. References 7-9, page 36.

Avian botulism (04/65, 66) Avian botulism occurs relatively frequently in the UK and may cause significant mortality in waterbirds in particular (see 2002 OIE Report, pages 1-2). It is generally accepted that humans are resistant to the botulism types that affect wild birds. These 2004 incidents were unusual because one species predominantly was affected, and mortality occurred over a short period of time. See also WQR 5.4

Garden bird mortality (page 18) This is the term used to describe deaths in garden birds (often near bird feeders) caused by *Salmonella typhimurium* (phage type 40 and 56) infections. These (phage) types appear to be relatively specific to finches and other garden birds, but human infection and pet (cats) infections are also potentially possible. Compared to last year, there appears to be a slight increase in the reported deaths in some species (tables 13, 14), but this may fall within the normal variation seen with this disease. This condition has been recognised for many years.

OIE REPORT ON UK WILDLIFE DISEASES, 2004 - **OIE LIST 'A' DISEASES**

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|---|------------------|---------|----------|--------------------|---------|
| No List 'A' diseases reported | | | | | |
| During 2004, there was no wild bird Avian Influenza virus surveillance undertaken in the UK | | | | | |

OIE REPORT ON UK WILDLIFE DISEASES, 2004 - **OIE LIST 'B' DISEASES**
MAMMALS

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|---|--|--|------------|---|---|
| NOTE Other List B diseases in mammals are given in Tables 1, 2, 3 and 4. The diseases listed below, do not appear in those tables. | | | | | |
| NOTE Atypical <i>Brucella</i> spp. in marine mammals are given on Tables 8 and 9. These isolates do not conform, using classical techniques, to the recognised species of <i>Brucella</i>. | | | | | |
| 04/1 | Roe deer (<i>Capreolus capreolus</i>) | <i>Mycobacterium avium</i> infection in mesenteric lymph nodes. No visible lesions | N England | 1 shot | Necropsy and bacteriology |
| 04/2 | Badger (<i>Meles meles</i>) | <i>Mycobacterium bovis</i> infection | N. Ireland | 3 | Necropsy and histopathology |
| 04/3 | Rabbit (<i>Oryctolagus cuniculus</i>) | Myxomatosis | S England | 50 plus. At wildlife reserve. Two outbreaks March and October | Clinical history, no laboratory confirmation. |
| 04/4 | Rabbit | Myxomatosis | N England | Estimated at 1000s | Clinical history |
| 04/5 | Rabbit | Myxomatosis | N England | 2 | Clinical history |
| 04/6 | Rabbit | Myxomatosis See table 16 | E England | 62 | Clinical history |
| 04/7 | Rabbit | Myxomatosis | N England | 3 | Clinical history |
| 04/8 | Rabbit | Myxomatosis | S. England | 5 | Clinical history |
| 04/9 | Rabbit | Myxomatosis. Death caused by predator attack | N England | 30 plus from population of approx. 1000 | Necropsy |
| 04/10 | Rabbit | Viral haemorrhagic disease (and concurrent hepatic coccidiosis) | N England | 20 plus. Mainly young | Necropsy and histopath. |

OIE REPORT ON UK WILDLIFE DISEASES, 2004 - **OIE LIST 'B' DISEASES**
BIRDS

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|---|---|---|-------------------------------|--|--|
| <u>OIE LIST 'B' DISEASES</u> BIRDS | | | | | |
| 04/11 | Greylag goose (<i>Anser anser</i>) Mallard (<i>Anas platyrhynchos</i>) Pochard (<i>Aythya ferina</i>) Shelduck (<i>Tadorna tadorna</i>) Mute swan (<i>Cygnus olor</i>) Coot (<i>Fulica atra</i>) Moorhen (<i>Gallinula chloropus</i>) Jackdaw (<i>Corvus monedula</i>) Black headed gull (<i>Larus ridibundus</i>), Woodpigeon (<i>Columba palumbus</i>) Tawny Owl (<i>Strix aluco</i>) | Avian tuberculosis | Wildfowl reserve in S England | 2 5 1 1 (25 in total) 1 3 3 2 2 3 1 1 | Necropsy and Ziehl Neelsen (ZN) staining of lesions for tuberculosis organisms |
| 04/12 | Whooper swan (<i>Cygnus cygnus</i>) | Avian tuberculosis | N England | 1 | Necropsy and staining |
| 04/13 | Mute swan, Woodpigeon | Avian tuberculosis | Scotland See table 15 | 1,1 | Necropsy and microbiology |
| 04/14 | Shelduck (<i>Tadorna tadorna</i>) | Duck virus enteritis | S England | 1 | Necropsy and virology. Associated with small outbreak in captive birds |
| 04/15 | Feral pigeon (<i>Columba livia</i>) | <u>Paramyxovirus 1</u> | N England | Several feral pigeons and racing pigeons | Necropsy, histopath. and virology |
| 04/16 | Feral pigeon (<i>Columba livia</i>) | <u>Paramyxovirus 1</u> Endemic infection possibly present in pigeon population in Swansea city | Wales | 2. Others reported but not submitted | Necropsy and virology |
| 04/17 | Woodpigeon (<i>Columba palumbus</i>) | <u>Paramyxovirus 1</u> | S England | 1 | Necropsy, and virology |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **OIE LIST 'B' DISEASES**

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|-------------|--|---|---------------------------------|---|--|
| BIRDS | | | | | |
| 04/18 | Collared dove (<i>Streptopelia decaocto</i>) | <u>Paramyxovirus 1</u> Including interstitial nephritis | E England | 1 submitted, 5 dead | Necropsy, virology and histopath. |
| 04/19 | Robin (<i>Erithacus rubecula</i>) | Ornithosis (<i>Chlamydophilosis</i>) | E England | Several garden birds found dead over 3 weeks. 1 submitted. | Necropsy, Histopath., stained preparations See Ref 26 |
| 04/20 | Collared dove | Ornithosis | Scotland See table 15 | 2 | Necropsy, microbiology |
| 04/21 | Blackbird (<i>Turdus merula</i>), Chaffinch (<i>Fringilla coelebs</i>), Dunnock (<i>Prunella modularis</i>) | Avian cholera (<i>Pasteurella multocida</i> infection) | Scotland See table 15 | Not given, probably individual birds | Necropsy, microbiology |

OIE LIST 'B' DISEASES - *Mycobacterium bovis* infections (bovine tuberculosis)

***Mycobacterium bovis* infections in UK wildlife, 2004**

Data supplied by VLA Weybridge and Defra

Table 1 Examinations of RTA (Road Traffic Accident) Badgers, England, 2004

| | |
|--|------|
| RTA badgers collected in 2004 (suitable for post-mortem) | 1154 |
| Number of above cultured so far | 914 |
| Number of above <i>M. bovis</i> positive | 140 |

All culture positive RTA badgers have been confirmed by spoligotyping

Table 2 Results of an intensive field study of *M. bovis* infection in badgers carried out in Gloucestershire, England, 2004

Data supplied Central Science Laboratory

Badger, live-capture results

| | <u>Badgers</u> |
|--------------------------------|----------------|
| Negative | 74 |
| Elisa positive only (serology) | 42 |
| Culture positive | 7 |

Culture results represent microbiological culture of clinical samples (i.e. sputum, faeces, urine or swabs of wounds and abscesses)

Badger post-mortem results

| | |
|---------------------|-----|
| Negative | 20 |
| Elisa positive only | n/a |
| Culture positive | 4 |

Culture results represent microbiological culture of tissue samples.

OIE LIST 'B' DISEASES - *Mycobacterium bovis* infections - continued

***Mycobacterium bovis* infections in UK wildlife, 2004**

Table 3 Wildlife species (cadavers) from South West England examined for *M. bovis* infection – excluding badgers

Data supplied by Central Science Laboratory

This project ended early in 2004.

| Cadavers examined during 2004 | | | |
|--|--|----------|----------|
| | | Negative | Positive |
| Otter (<i>Lutra lutra</i>) | | 1 | 0 |
| Wood mouse (<i>Apodemus sylvaticus</i>) | | 1 | 1 |
| Polecat (<i>Mustela putorius</i>) | | 2 | 0 |

Table 4 Bovine tuberculosis in wildlife other than badgers.
Project SB4510

Animals examined from counties in England primarily, also Wales and Scotland

Data supplied by VLA Truro

| Species | Number examined | Number positive for <i>Mycobacterium bovis</i> (Bovine tuberculosis) | Number positive for <i>Mycobacterium avium</i> |
|--|------------------------|---|---|
| Wild Red Deer (<i>Cervus elaphus</i>) | 33 | 28 | 0 |
| Fallow Deer (<i>Dama dama</i>) | 19 | 12 | 0 |
| Roe Deer | 24 | 1 | 1 |
| Fox (<i>Vulpes vulpes</i>) | 1 | 0 | 0 |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **WILDLIFE DISEASE LIST**

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|-----------------------|------------------------------------|--|-----------------|---|--|
| <u>MAMMALS</u> | | | | | |
| 04 / 22 N | Fox (<i>Vulpes vulpes</i>) | Severe staphylococcal osteomyelitis due to intraspecific bite | N England | 1 Shot. Emaciation probably as a result of bite wound | Necropsy radiography bacteriology See cover |
| 04 / 23 | Fox | Mange | S England | several | Clinical history |
| 04 / 24 N | Badger | RTA with concurrent adiaspiromycosis (soil fungus) pneumonia | E England | 1 | Necropsy and histopathology This condition may appear similar to tuberculosis |
| 25 | Badger | Blow fly miasis | Scotland | 1 affected | Parasitology |
| 04 / 26 | Otter | Salmonellosis in debilitated animal. <i>Salmonella</i> Dublin from lungs and liver | S England | 1 | Necropsy and bacteriology |
| 04 / 27 | Otter | Septic bite wounds. Mixed bacterial growth from viscera | S England | 2. Emaciation and death probably as a result of bite wounds | Necropsy and bacteriology |
| 04 / 28 | Otter | Septicaemia. Pasteurella-like bacterium isolated in septicaemic distribution | S England | 1 | Necropsy and bacteriology |
| 04 / 29 | Otter | Pyloric ulcers <i>Salmonella typhimurium</i> PT 56 variant from intestine | Scotland | 1 found dead | Necropsy and bacteriology |
| 04 / 30 | Fallow deer (<i>Dama dama</i>) | White muscle disease suspected. High muscle enzyme and low selenium concentrations | Central England | 2 fawns affected with inco-ordination and recumbency | Blood biochemistry and response to selenium treatment |
| 04 / 31 | Red deer (<i>Cervus elephus</i>) | Haemorrhagic enteritis Clostridial infection suspected | S England | 1 | Necropsy and culture, toxins not detected |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **WILDLIFE DISEASE LIST**

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|-----------------------|---|---|------------|--|---|
| <u>MAMMALS</u> | | | | | |
| 04 / 32 N | Roe deer | Enteritis due to suspected attaching and effacing <i>E. coli</i> infection | S England | 6-10 sickly, diarrhoeic fawns 1 submitted | Necropsy, histopathology, bacteriology (untypable <i>E. coli</i>) |
| 04 / 33 | Roe deer | Nervous signs. Shot Probable metabolic disease associated with pregnancy | N. England | 1 | Necropsy and histopathology |
| 04 / 34 | Roe deer | Chronic severe liver fluke and abscesses | N England | 2 | Necropsy and parasitology |
| 04 / 35 | Roe deer | Neoplasia. Liver adeno-carcinoma | N England | 1 | Necropsy and histopath. Ref 36 |
| 04 / 36 | Brown hare (<i>Lepus europeus</i>), Leveret | Coccidiosis with concurrent <i>Yersinia pseudotuberculosis</i> enteritis | S England | 1 submitted. Mortality not reported | Necropsy, Histopathology bacteriology and parasitology |
| 04 / 37 N | Brown hare | <i>Yersinia pseudotuberculosis</i> septicaemia (from liver lymph tissue and kidney). Concurrent high coccidial oocyst and Trichostrongyle worm egg counts. | S England | Several deaths reported in a high density population | Necropsy, bacteriology and parasitology |
| 04 / 38 | Brown hare | Coccidiosis. <i>Eimeria europaea</i> , <i>E. hungarica</i> , <i>E. leporis</i> and <i>E. robertsoni</i> identified. These species implicated in outbreaks of hare coccidiosis | E England | Faecal samples submitted from field necropsy of young animals. At least 6 deaths | Parasitology on sample from suspect coccidiosis. 76,000 oocysts/g. |
| 04 / 39 | Red squirrel (<i>Sciurus vulgaris</i>) | Haemorrhagic enteritis with associated Adenovirus particles | N England | 1. 3 affected from a conservation programme | Necropsy and electron microscopy of intestinal content |
| 04 / 40 | Red squirrel | Parapox infection with staphylococci and <i>Listeria monocytogenes</i> cultured from liver | N England | 1 | First case of squirrel pox in new area with significant secondary bacterial infection |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **WILDLIFE DISEASE LIST**

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|---------------|---|---|-----------------------------------|---|---|
| 04 41 | Red squirrel | Parapox infection Parapox seropositive. | N England | 2 | Necropsy and Electron Microscopy. First squirrel pox cases in new areas |
| 04 42 | Red squirrel | Red squirrel parapox seropositive. No pox lesions. Poor body condition, | N England | 1 | Necropsy, Parapox serology. |
| 04 43 | Red squirrel | <i>Pasteurella multocida</i> septicaemia, probably from bite wound | N England | 1 | Necropsy and bacteriology |
| 44 | Grey Squirrel | Blow fly miasis | N England | 1 affected | parasitology |
| 04 / 45 | Hedgehog (<i>Erinaceus europaeus</i>) | Cryptosporidiosis. Concurrent parvo virus infection of uncertain clinical significance | N England | several | Necropsy, electron microscopy and histopath. |
| 04 / 46 | Hedgehog | Helminthiasis Capillariasis – 23 animals affected. <i>Crenosoma sp.</i> 19 animals affected | S England Wildlife rescue unit | Affected animals-mortality not recorded | Clinical history, parasitology |
| 04 / 47 | Pipistrelle bat (<i>Pipistrellus pipistrellus</i>) | Found dying. <i>Morganella morganii</i> cultured from liver abscess | S England | 1 | Necropsy and bacteriology. <i>M morganii</i> not a recognised pathogen |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **WILDLIFE DISEASE LIST**

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|------------------------------|---|---|------------------------|---|---|
| <u>MARINE MAMMALS</u> | | | | | |
| 04/48 | Harbour porpoise (<i>Phocaena phocaena</i>) | Killed by Bottle-nosed dolphin (<i>Tursiops truncatus</i>) attack | S England | 1. This behaviour previously reported Ref. 27 | Necropsy. |
| 04/49 | Harbour porpoise | Dystocia and uterine rupture | S England | 1 | Necropsy |
| 04/50 | Common Dolphin (<i>Delphinus delphis</i>) | Extensive pneumonia, pleurisy | S England | 1 | Necropsy Bacteriology |
| 04/51 | Common Seal (<i>Phoca vitulina</i>) | Severe lungworm infestation. <i>Brucella</i> sp isolated | N England | 1 seal pup | Necropsy culture. <i>Brucella</i> association with lungworm Ref. 30 |
| 04/52 N | Grey seal (<i>Halichoerus grypus</i>) | <i>Streptococcus halichoeri</i> sp.nova isolated from bite wounds to skin | S England and Scotland | 6 affected. Mortality not known, some recovered. | Bacteriology New species of bacterium Ref. 25 |
| 04/53 | Grey seal | Trauma, rupture of mesenteric vessel and <i>E. coli</i> septicaemia | S. England | 1 | Necropsy Microbiology |
| 04/54 | Grey seal | <i>Bordetella bronchiseptica</i> rhinitis and pneumonia | S. England | 1 | Necropsy Microbiology |
| 04/55 | Grey seal | Pyothorax. Culture results not recorded | S. England | 1 | Necropsy Microbiology |
| 04/56 | Seal (species not specified) | <i>Mycoplasma phocidae</i> from lung. | Scotland | 1 | Bacteriology PCR, DGGE |
| 04/57 | Seal (species not specified) | <i>M. phocacerebrale</i> from nasal discharge | SW England | 1 affected | Bacteriology |
| 04/58 N | Seal (species not specified) | <i>M. phocacerebrale</i> from chin wound | SW England | 1 affected | Bacteriology PCR, DGGE |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **WILDLIFE DISEASE LIST**

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|---------------------|---|---|---|--|--|
| <u>BIRDS</u> | | | | | |
| 04/59 | Mallard (juvenile), Mute swan (juvenile) | Helminthiasis (<i>Acuaria uncinata</i>) infestation | S England | 1 6 | Necropsy |
| 04/60 | Mute Swan | Necrotic enteritis | W England | 4 | Necropsy. Similar to 03/96, 03/99. Ref. 23 |
| 61 | Mute Swan | Aspergillosis | S. England | 1 | Necropsy |
| 04/61 | Whooper Swan (<i>Cygnus Cygnus</i>) | Necrotic enteritis | N England | 2 | Necropsy. Similar to case 04/64 |
| 04/62 | Whooper swan | Aspergillosis | Scotland | 1 | Necropsy |
| 04/63 | Whooper swan | Lead poisoning (gunshot ingestion) | Scotland | 6 | Necropsy |
| 04/64 | Fulmar (<i>Fulmaris glacialis</i>) | Tide-line mortality. Starvation. Over a period of 4-6 weeks. Some birds found inland. Multi-factorial mortality suspected | E England, also similar mortalities in France, Belgium and other North Sea coasts | 40 necropsied Estimated 500 dead in Norfolk and several thousand in Europe. | Necropsy and extensive laboratory testing See Refs. 1, 2 |
| 04/65 | Common gull (<i>Larus canus</i>), Black-headed Gull | Avian botulism (suspected), concurrent asymptomatic infection with Newcastle Disease virus (non-pathogenic) | N England | Approx 70 | Necropsy wide range of microbiology, histopath. and virology |
| 04/66 N | Common gull (<i>Larus canus</i>), Black-headed Gull, Mediterranean Gull (<i>L melanocephalus</i>) | Avian botulism (suspected). Toxin not detected, but clinical history entirely typical | N England Same location as previous incident, 6 weeks later | >1000. 987 bodies collected including 3 Mediterranean gulls | Necropsy wide range of microbiology Histopath. |
| 04/67 | Herring gull (<i>Larus argentatus</i>) | Suspected avian botulism | S England | several | Clinical history |
| 04/68 | Black-headed gulls | Suspected avian botulism | E England | 43 | Clinical history. On flooded fields |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **WILDLIFE DISEASE LIST**

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|---------------------|--|--|-----------|--|---|
| <u>BIRDS</u> | | | | | |
| 04/69 N | Redshank (<i>Tringa totanus</i>) Turnstone (<i>Arenaria interpres</i>) | Suspected PTFE (polytetrafluorethylene poisoning) based on typical clinico-pathology | N England | 61 found dead under ventilation shafts of factory making PTFE fibres | Necropsy, histopathology microbiology |
| 04/70 | Little tern (<i>Sterna albifrons</i>) chick | Probable exposure, no feed in stomach | N England | 100% chick mortality in colony. | Necropsy and microbiology. Possibly related to breeding failure in other North Sea seabird colonies. Refs 3-6 |
| 04/71 | Guillemots (<i>Uria aalge</i>) Razorbill, (<i>Alca torda</i>) Fulmar | Suspected starvation | N England | 37 1 1 | Tide-line deaths. Grossly under weight, crops empty Refs 3-6 |
| 72 | | | | | |
| 73 | Kestrel (<i>Falco tinnunculus</i>) | Egg-peritonitis and septicaemia | S England | 1 | Necropsy only |
| 74 | Kestrel | Granular stomatitis due to <i>Eucoleus</i> sp. hairworms | Scotland | 1 | Necropsy, parasitology |
| 75 | Tawny Owl (<i>Strix aluco</i>) | Egg-peritonitis | N England | 1 | Necropsy |
| 04/76 | Tawny Owl (juveniles) | Trichomoniasis | S England | 2 | Necropsy and microbiology |
| 04/77 | Tawny Owl | Oral capillariasis | N England | 1 affected. Responded to treatment | Microscopy from oral lesion |
| 04/78 | Tawny Owl | Chronic aspergillosis | S England | 1 | Necropsy and microbiology |
| 04/79 | Collared dove (<i>Streptopelia decaocto</i>) | Trichomoniasis | S England | 7 | Necropsy and microbiology |
| 04/80 | Wood pigeon (<i>Columba palambus</i>) | Trichomoniasis | S England | 2 | Necropsy and microbiology |
| 04/81 | Wood pigeon | Trichomoniasis | S England | 4 | Necropsy and microbiology |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **WILDLIFE DISEASE LIST**
 BIRDS cont'd

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|-------------|---|--|---|---|--|
| 04/82 | Feral pigeon (<i>Columba livia</i>) | Trichomoniasis | S England | 50-150, 6-7 deaths per day at peak | Clinical history |
| 04/83 | Greenfinch | <i>Salmonella typhimurium</i> (<i>Stm</i>) (Garden bird mortality – <u>GBM</u>) | Wales | 12 | Necropsy and bacteriology |
| 04/84 | Greenfinch | GBM <i>Salmonella typhimurium</i> pt 56 | Wales | 3 | Necropsy and bacteriology |
| 04/85 | Greenfinch | GBM <i>Salmonella typhimurium</i> | Wales | 25, one bird submitted | Necropsy and bacteriology |
| 04/86 | Chaffinch (<i>Fringilla coelebs</i>) | <i>Yersinia pseudotuberculosis</i> Infection | SW England, found dead in a chicken run | 1 | Necropsy and bacteriology |
| 04/87 | Chaffinch OIE List B disease | <i>Pasteurella multocida</i> Avian cholera, probably from cat injury | Scotland | 1 | Necropsy and bacteriology |
| 04/88 | Greenfinch and goldfinch | GBM <i>Stm</i> pt 40 isolated from one bird <i>Stm</i> pt 56 from the second | N England | 2 one of each species | Necropsy and bacteriology |
| 04/89 | Goldfinch | GBM <i>Stm</i> pt 56 | N England | 4 | Necropsy and bacteriology |
| 04/90 | House sparrow (<i>Passer domesticus</i>) | Poxvirus infection | Wales | 2 1 examined | Necropsy and virology |
| 04/91 | Blackbird | 7 found dead together in area of 4 sq. metres. Good condition. No diagnosis | E England | 7 | Necropsy virology. No significant findings |
| 04/92 | Blackbird | <i>Acanthocephala</i> sp. and <i>Syngamus</i> sp. infections. Starvation | N. Ireland | Several deaths 2 submitted | Necropsy and parasitology |

OIE REPORT ON WILDLIFE DISEASES, 2004 - **WILDLIFE DISEASE LIST**
 BIRDS cont'd

| INCIDENT NO | SPECIES AFFECTED | DISEASE | LOCALITY | REPORTED MORTALITY | COMMENT |
|-------------|--|--|-----------------|---|--|
| 04/93 N | Starling (<i>Sturnus vulgaris</i>) | Unknown. Birds with nervous signs found below large roosts | SW England | 40 found from 650,000 bird roost | Necropsy, virology and histopathology. No significant findings |
| 04/94 | House martins (<i>Deliochon urbica</i>) | Conjunctivitis, possibly mycoplasma infection (not <i>M. gallisepticum</i>) | Central England | 20 affected, 50% mortality. All at a wildlife rescue hospital | Mycoplasma culture from conjunctival swabs |

Amphibians

| | | | | | |
|-------|---|--|-----------|-------------------|---|
| 04/95 | Toad (<i>Bufo bufo</i>) | Otter? predation with inversion of toxic skin and removal of hind legs | Scotland | Approximately 100 | Necropsy |
| 04/96 | Common frog (<i>Rana temporaria</i>) | Suspected iridovirus infection | S England | several | Clinical history and appearance of skin |

SURVEYS

Table 5 West Nile Virus (WNV) surveillance in wild birds and free-living game birds 2001 – 2004, England, Wales and Scotland

2001 – 2004

Wild bird submissions received diagnostic examinations. Brain and viscera (kidneys), in all, were examined by WNV PCR. Tissues were also examined for WNV by virus isolation (cell culture).

| Number of Wild Birds Examined. 2001-2004 | Number of wild species | Results of brain histopathology | Virus Isolation For WNV | WNV PCR |
|--|-------------------------------|--|--------------------------------|----------------|
| 2001 – 80 2002 – 235 2003 - 675 2004 - 295 <u>Total - 1285</u> | 87 | Brains from birds from 14 submissions were examined. Encephalitis due to PMV 1 was seen in 3, encephalitis and hydrocephalus in a magpie, no lesions in the remainder (several botulism cases predictably had no brain lesions). All 14 brains also examined by WNV PCR and Virus isolation for WNV | All negative | All negative |

NOTES

1. Examinations are part of the VLA Diseases of Wildlife Surveillance Scheme, ED1600
2. Diagnostic data from some of the birds examined also appears in the Wildlife List.
4. Data from free-range poultry and captive birds kept in outside aviaries not shown

No evidence of West Nile virus infection has been found from VLA surveillance, to date

5. The help of SAC, RSPB, BTO, RSPCA Wildlife Hospitals and independent wildlife hospitals and veterinary surgeons is particularly acknowledged.

SURVEYS cont'd

Table 6 2004 Rabies Surveillance – Free-Living Species.
Data supplied by Rabies Unit, VLA Weybridge

| Species | Number Examined | Locality | Test | Result |
|----------------|------------------------|-----------------|--|---|
| Fox | 1 | UK | Rabies FAT on brain smears and RT-PCR | Negative |
| Bats | 760 | UK | Rabies FAT on brain smears and RT-PCR. RTCIT and MIT on biting/scratching incidents. | Negative – 758 Positive – 2 (see below) |

Table 7

| <u>2004 Rabies Surveillance – Free-Living Species. Bat Speciation</u> | | | | |
|--|-----|------------------|---------------------------------------|---|
| Bats – | 760 | UK | Rabies FAT on brain smears and RT-PCR | Negative x 758 |
| <i>Rhinolophus hipposideros,</i> | 14 | From 86 counties | | Positive x 2, - Daubenton's bat (<i>Myotis daubentonii</i>), in Northern England and Southern England. Also tested by RTCIT and MIT FAT and RT-PCR, |
| <i>Myotis daubentonii,</i> | 24 | | | |
| <i>M. brandt,</i> | 0 | | | |
| <i>M. mystacinus,</i> | 17 | | | |
| <i>M. nattereri,</i> | 14 | | | |
| <i>Pipistrellus pipistrellus,</i> | 554 | | | |
| <i>P. nathusii,</i> | 2 | | | |
| <i>Nyctalus leisleri,</i> | 1 | | | |
| <i>N. noctula,</i> | 11 | | | |
| <i>Barbastella barbastellus,</i> | 1 | | | |
| <i>Plecotus auritus</i> | 88 | | | |
| <i>Plecotus austriacus</i> | 1 | | | |
| <i>Eptesicus serotinus</i> | 8 | | | |
| unknown | 25 | | | |

Table 8 Brucella Isolates and Serology Results from Marine Mammals

All data supplied by VLA Weybridge

Note 1: These isolates are atypical *Brucella* spp. and do not conform, using classical techniques, to the recognised species of *Brucella* (e.g. *B. abortus*, *B. melitensis*, *B. ovis*, *B. suis*).

Note 2: Samples received from GB only. (More have been received from abroad).

| Species | No received | Isolation by culture | Serologically positive | Positive by both methods | Submitted from |
|--|--------------------|-----------------------------|-------------------------------|---------------------------------|--------------------------|
| Harbour porpoise (<i>Phoca vitulina</i>) | 34 | 2 | 3 (weak pos) | 1 | VLA Truro |
| As above | 5 | 5 | N/A | N/A | Inverness Scotland (SAC) |
| Risso's dolphin (<i>Grampus griseus</i>) | 1 | 0 | 0 | 0 | VLA Truro |
| Bottlenose dolphin (<i>Tursiops truncatus</i>) | 1 | 0 | 0 | 0 | VLA Truro |
| Common dolphin (<i>Delphinus delphis</i>) | 12 | 1 | 1 | 0 | VLA Truro |
| Striped dolphin (<i>Stenella coeruleoalba</i>) | 1 | 0 | 1 | 0 | VLA Truro |
| Grey seal (<i>Halichoerus grypus</i>) | 7 | 0 | 4 | 0 | VLA Truro |
| Common seal (<i>Phoca vitulina</i>) | 1 | 1 | 0 | 0 | VLA Penrith |
| Fin whale (<i>Balaenoptera physalus</i>) | 1 | 0 | 0 | 0 | VLA Truro |

Most but not all marine mammals have been tested serologically. More recently this year other body fluids besides blood and pericardial fluid were tested serologically.

Table 9 Brucella Isolates and Serology Results from Wildlife

| Species | No received | Isolation by culture | Serologically positive | Positive by both methods | Submitted from |
|---------------------------------------|--------------------|-----------------------------|-------------------------------|---------------------------------|-----------------------|
| Otter (<i>Lutra lutra</i>) | 48 | 0 | 1 | 0 | VLA Truro |
| Brown hare (<i>Lepus europaeus</i>) | 1 | 0 | N/A | N/A | VLA Winchester |
| Brown hare | 1 | N/A | 0 | N/A | VLA Winchester |
| Brown hare | 1 | N/A | 0 | N/A | VLA Langford |

Otter tissues and serology were submitted from VLA Truro via a retired veterinary colleague. This year they may have originated from various locations throughout the UK.

The serologically positive otter was an adult female found in a weak and malnourished state with stomach ulcers.

Brucellosis has been recorded in brown hares from continental Europe. Hares are examined for the bacterium in Britain, however no isolations have been made in the small number examined to date.

Summary

VLA Weybridge received marine mammal tissues for analysis originating from a total of 106 animals between the dates of 1/1/2004 – 17/12/2004.

Fifty-one samples received between the dates (as above) originated from wildlife. The samples originated from 8 species of marine mammals and 2 wildlife species.

As in previous years, the majority of marine mammal samples available for analysis originated from harbour porpoises and common dolphins.

Table 10 Surveillance of wild deer in England for Chronic Wasting Disease (CWD)

Carried out by the Veterinary Laboratories Agency.

Chronic wasting disease (CWD) is a degenerative disease affecting primarily the nervous system in farmed and wild deer in the USA and Canada. It is a TSE (a transmissible spongiform encephalopathy) caused by an unusual prion agent and is related to BSE and Scrapie. The condition has not been reported in Europe but a small surveillance project has been started. The results reported here were from examinations of five sets of tissue, including brain, that might contain prions. They came from wild deer, either hunter-shot or road kills.

The species examined were as follows:

| Species | Number examined |
|-----------------------------------|---|
| | |
| Roe <i>Capreolus capreolus</i> | 189 |
| Red <i>Cervus elaphus elaphus</i> | 22 |
| Fallow <i>Dama dama</i> | 66 |
| Muntjac <i>Muntiacus muntjak</i> | 13 |
| Not known | 14 |
| Total | 304 |
| Results | No evidence of prion disease observed in the material examined. |

Tissues were examined using monoclonal antibody P89. A positive CWD control supplied by the US Department of Agriculture was incorporated into the study.

Table 11 **Salmonella wildlife vectors on pig and poultry farms, 2004**
Data from VLA Weybridge

Poultry and pigs may be infected with salmonella bacteria. Wildlife species living in and around the pig and poultry houses may also become infected. The infected wild species usually do not show disease, however they may act as vectors, transmitting infection, usually in their faeces, to domesticated animals and contaminating the environment. This project aims to study the infection and epidemiology of salmonella infection in the wildlife, and to assess their potential significance as disease vectors.

| Species | County / England | No. faecal samples positive for salmonella/ No. samples taken | Serotype |
|--|-------------------------|--|---|
| House mouse <i>(Mus musculus)</i> | Hampshire | 16/33 | enteritidis 4(4), 7(2), not tested (10) |
| | Lancashire | 0/5 | - |
| | Suffolk | 0/2 | - |
| Beetles (not identified) | Berkshire | 0/2 | - |
| | Lancashire | 0/1 | - |
| Wild Birds (not identified) | Berkshire | 2/2 | enteritidis 4(2) |
| | Dorset | 0/7 | - |
| | Norfolk | 0/5 | - |
| | Somerset | 0/5 | - |
| Flies (not identified) | Hampshire | 3/4 | 4(2), 7(1) |
| Brown rat <i>(Rattus norvegicus)</i> | Berkshire | 3/4 | enteritidis 4, 6, RDNC |
| | Dorset | 0/1 | - |
| | Oxfordshire | 4/6 | enteritidis 6(4) |
| | Somerset | 0/1 | - |
| | Sussex | 0/5 | - |
| Fox | Dorset | 0/1 | |
| Totals | | 28/84 | |

Table 12 - Wildlife disease surveillance, Northern Ireland 2004

| Species Affected | Disease / Infection | Numbers affected | Method of Diagnosis | County location |
|--|----------------------------|-------------------------|-----------------------------------|------------------------|
| Badger | Trauma | 26 | Necropsy | T,L,D,A |
| Badger | Bovine tuberculosis | 3 | Necropsy, histology | D,A |
| Hare | Shot, stomatitis | 2 | Necropsy, bacteriology, histology | A |
| Rabbit | Coccidiosis | 3 | Necropsy, histology | A |
| Seal | Parasitic pneumonia | 3 | Necropsy, histology, parasitology | D,A |
| Seal | Trauma | 1 | Necropsy | D |
| Seal | Septicaemia, hepatitis | 1 | Necropsy, bacteriology, histology | D |
| Seal | Malnourished/ abandoned | 1 | Necropsy | D |
| Swan | Emaciated | 1 | Necropsy, bacteriology | D |
| Swan | Parasites | 1 | Necropsy, parasitology | D |
| Swan | Cardiomyopathy | 1 | Necropsy, histology | Ar |
| Swan | Coccidiosis | 1 | Necropsy, parasitology | D |
| Counties A - Antrim, D – Down, L – Londonderry, T – Tyrone, Ar- Armagh | | | | |

Table 13 Dead birds found in gardens or near bird feeders, 2004
Phoned reports from the public to the RSPB

Data supplied by RSPB

Bird mortality incidents were reported from most English counties, Wales, Scotland and Northern Ireland.

| | |
|--|-----|
| 2004 - | |
| Total number of reported incidents | 169 |
| Incidents involving greenfinches, house sparrows, chaffinches, siskins and goldfinches | 157 |
| Incidents involving collared doves and wood pigeons (many of which will be trichomoniasis incidents) | 14 |

Notes

1. Further data for the most frequently affected species in these incidents are given in the table below; many of these incidents are attributable to *Salmonella typhimurium* infection ('garden bird mortality').

2. Many garden bird mortality incidents will involve deaths of more than one species.

Table 14 Species of bird affected See note above

| Species | No of reported incidents / species | Reported mortality / species. (max mortality/incident) | Average incident mortality / species |
|---------------------------------------|---|---|---|
| Greenfinches | 81 | 583 (39) | 7.2 |
| House sparrows | 42 | 197 (50- exceptional) | 4.6 |
| Chaffinches | 18 | 44 (7) | 2.4 |
| Goldfinches | 20 | 46 (7) | 2.3 |
| Siskins | 35 | 206 (30) | 5.8 |
| | | | |
| Collared doves (probable trichomonas) | 13 | 49 (11) | 3.7 |

Table 15

Avian wildlife diseases in Scotland- 2004

Diseases diagnosed in wild birds submitted to SAC Veterinary Science Division, Avian Health Unit, Auchincruive, Ayr, Scotland, in 2004

| Disease/infection | Species affected | Details |
|--|---|--|
| Avian botulism (suspected or confirmed) | Miscellaneous species of gull | May, August, September |
| <i>Salmonella</i> Typhimurium DT 40 or 56 variant | House sparrow, siskin, greenfinch, chaffinch, goldfinch, great tit, dunnock, tree sparrow | January, February, March, November, December |
| <i>Yersinia pseudotuberculosis</i> | Feral dove | December |
| <i>E coli</i> O86 | Greenfinch, siskin | March, April, May |
| Lead poisoning | Mute swan | July. Lead shot in gizzard |
| Presumed starvation | Buzzard, chough, guillemot, | January, March, September, October, November |
| Trauma | Chaffinch, woodpigeon, eider, siskin, starling, dunnock, greenfinch, barn owl, whooper swan, fulmar | January, February, March, April, July, September, November, December |
| Avian tuberculosis OIE List B disease | Woodpigeon, mute swan | May, September |
| Squamous papilloma | Chaffinch | January |
| Arthritis of unknown cause | Woodpigeon | August, November |
| Chlamydiosis OIE List B disease | Collared dove | January, November |
| Helminthiasis - hairworms | Kestrel, chough | February, October |
| Tongue worms in airsac. Cause of death starvation. | Guillemot | November |
| Helminthiasis – <i>Syngamus trachea</i> | Chough | October |
| Trichomoniasis (presumptive) | Woodpigeon, buzzard | July, November |
| Pox | Dunnock | November |
| Aspergillosis | Guillemots | November |

Table 15 continued

Avian wildlife diseases in Scotland- 2004

| Disease/infection | Species affected | Details |
|---|-------------------------|----------------------|
| Necrotic enteritis associated with <i>Clostridium perfringens</i> | Mute swan | May, June, September |
| CNS of unknown aetiology | Starling | May |
| <i>Pasteurella multocida</i> infection OIE List B disease | Blackbird, dunnoek | February, March |

Wildlife infections
2004 Report by Wildlife Disease Group,
University of Liverpool

The group does not undertake surveillance routinely, and the following comprises data from targeted epidemiological studies, together with some brief surveys undertaken as part of the undergraduate projects, for example in Veterinary Conservation Medicine.

***Mycobacterium* infections**

Work continues on the epidemiology of *Mycobacterium microti* infections in voles, particularly field voles (*Microtus agrestis*) on the Northumbria/Scottish borders. The prevalence varies with season and population, and according to the diagnostic procedure used. Cross sectional studies, based on necropsy and culture, continue to suggest prevalences of 0-10%, with older voles in Spring being most likely to be affected. The host range in sympatric species includes bank voles (*Clethrionomys glareolus*) and wood mice (*Apodemus sylvaticus*), although at much lower prevalences.



Figure: 3 TB (*M. microti*) in the lungs of a field vole (*Microtus agrestis*).

Cowpox virus

Cowpox virus is the only member of the genus *Orthopoxvirus* known to be endemic in Great Britain. The virus (detected by antibody and PCR) circulates mainly in wild voles (*M. agrestis* and *C. glareolus*) and also in wood mice (*A. sylvaticus*). It probably also circulates in yellow necked mice (*A. flavicollis*) as antibody has also been found in this species in mainland Europe. Antibody is occasionally found in wild house mice (*Mus musculus domesticus*) and rats (*Rattus norvegicus*), but these are probably accidental hosts, as are humans, cats and, very rarely, cattle. Infection in the reservoir hosts is geographically widespread, and found in both wild and farmed habitats.

The prevalence varies with host species, population size and time of year – most adult field voles have been infected at some point in their lives (as determined by antibody studies), and the peak of infection (and therefore risk of transmission to domestic animals and man) is in the late summer and autumn.

Clinical disease is not seen in wild rodents, unlike in many accidental hosts, although infection does appear to affect fecundity.

Other rodent viruses

Serological and as yet unpublished PCR detection and virus isolation studies confirm our recent observation (Blasdell et al, 2003) that wood mice *Apodemus sylvaticus* are the main host of the γ -herpesvirus murid herpesvirus-4 (MuHV-4; also called MHV-68), at least in N England. MuHV-4 has a ubiquitous presence in *Apodemus spp* although spill-over into bank voles (*C. glareolus*) and perhaps individual house mice (*M. domesticus*) can also occur. Other species of *Apodemus* have been shown to harbour their own specific but highly related strains of MuHV-4.

Unpublished PCR detection and isolation studies have identified a novel γ -herpesvirus species in field voles (*Microtus agrestis*), tentatively called field vole herpesvirus 1 (FVHV-1) that is only distantly related to MuHV-4. Likewise, in collaboration with Bernhard Ehlers (Robert Koch Institutue, Berlin), another novel γ -herpesvirus of *M. domesticus* has been identified but has not yet been isolated.

Red squirrels (*Sciurus vulgaris*) from the colony at Formby are submitted for necropsy when found dead. There were six red squirrel deaths over the autumn 2003 in the area around Formby due to infection with the squirrel poxvirus. There was one fatality recognised as due to squirrelpox in 2004.

Anaplasma

Anaplasma phagocytophilum, the causative agent of tick-borne fever in ruminants has previously been reported in roe deer and rodents (bank voles and wood mice). Cross sectional and longitudinal studies undertaken around Kielder Forest in Northumberland have demonstrated that field voles (*M. agrestis*) also appear to be competent hosts for *A. phagocytophilum*. Prevalence of infection, detected by PCR of rodent blood samples, is generally low, with less than 5% of individuals testing positive, although this fluctuates with season. No obvious clinical signs are associated with infection in these rodents.

A survey of roe deer blood samples, collected in collaboration with the Forestry Commission, found *A. phagocytophilum* DNA in over 10% of roe deer in the area.

Ongoing studies aim to determine the relative importance of deer and rodents in the epidemiology of *A. phagocytophilum* infections.

Babesia

Babesia microti, the cause of human Babesiosis, also circulates in small mammal communities. Longitudinal studies of field voles demonstrated that as many as 50% of individual rodents tested positive by PCR for *B. microti* DNA. Infection appears to be persistent, with many individuals remaining positive for several months.

Enteric zoonotic bacteria and antibiotic resistance

Cross sectional studies of faeces from wild mammals and birds on farms continued to demonstrate high prevalences of *Campylobacter* spp in all hosts tested. Molecular studies (*fla*-typing, PFGE and MLST) suggested that some strains are indistinguishable from those isolated from cattle and/or humans, but many appear to circulate mainly in wildlife groups.

VTEC, including O157, were isolated from wildlife faeces, but only rarely compared to isolation rates from cattle.

Antibiotic resistance in normal *E. coli* was, however, widespread, and was found even in faeces from rodents on uninhabited islands where there was little opportunity for contact with antibiotics or animals treated with them. The resistance is often, although not always, associated with those genes most frequently found in resistant isolates from domestic animals and human beings. Shared PFGE-types, with similar resistance patterns and resistance genes were found in both livestock and house mice in intensive pig and poultry units, but very different prevalences and patterns were seen in wild rodents and livestock on dairy farms and other more extensive systems, suggesting that excretion by farm animals can be a source of resistance for wildlife in close contact, but that resistance strains are maintained, and have an epidemiology independent of farmed stock, in many other rodent populations. A brief study of antibiotic resistant *E. coli* in the guts of wild birds (collected through the VLA survey of birds for WNV) found that corvids had the highest prevalence of resistance: 84% of samples had at least one *E. coli* resistant to ampicillin and/or trimethoprim, 36% to chloramphenicol, 24 % to nalidixic acid, half of which were also resistant to ciprofloxacin, and 80% to tetracycline. Most isolates were resistant to more than one antibiotic. Antibiotic resistance was less common in other birds, including raptors and song birds.

Salmonellosis was rarely diagnosed in most wildlife species – although one rat was found to be excreting *S. Typhimurium*, *E.coli* O157 and multiresistant *E. coli*. A student project based on 27 road-kill badgers found salmonellae in three: one isolate was untypable, but two were *S. Ajiobo* serogroup G – possibly the first report of this agent in badgers. A previous study in the same area, but based on latrines rather than individual badgers, found *S Reid* to be the most common serovar isolated (Wilson et al, 2003).

References: listed at end of report, page 38 – under The Wildlife Disease Group, University of Liverpool

Table 16 Data from the RSPCA Wildlife Hospital, Kings Lynn, Norfolk

| Species Affected | Disease / Infection | Numbers affected, not necessarily dead | Method of Diagnosis |
|-------------------------|---|---|--|
| Hedgehog | <i>Salmonella enteritidis</i> enteritis/ septicaemia | 29 | Clinical findings, selective culture |
| Hedgehog | <i>Crenosoma striatum</i> lungworm | 231 | Clinical signs and faecal smear examination |
| Hedgehog | Capillariasis – pulmonary and/or intestinal | 196 | Clinical signs and faecal smear examination |
| Collared dove | Trichomoniasis | 6 | Microscopic confirmation of lesions |
| Mute swan | Lead poisoning | 12 | Clinical signs and blood levels of lead |
| Rabbit | Myxomatosis OIE List B disease | 62 | Clinical signs |
| Collared dove | Subcutaneous haemorrhage secondary to tick attachment | 18 | Clinical findings, seasonal annual recurrence. Cause unknown |
| Blackbird | Coccidiosis | 6 | Faecal smears |
| Fulmar | Starvation see 04/64 | c500 | Various procedures |
| Muntjac | Colibacillosis <i>E coli</i> K99 | 1 | History, culture and necropsy |

Table 17 **Louping-ill and squirrel parapox wildlife sero-surveillance undertaken by the Moredun Research Institute.**

| Disease / infection | Species affected | Numbers affected | Method of diagnosis | Locality |
|----------------------------|---|---|---|---|
| Louping ill | Red grouse (<i>Lagopus lagopus scoticus</i>) | 1909 sera tested, 155 sero-positive (8%) No disease seen | Haemagglutination inhibition serology | Various locations, in Scotland and Northern England |
| Louping ill | Mountain hare (<i>Lepus timidus</i>) | 674 sera tested, 145 sero-positive (22%) No disease seen | Haemagglutination inhibition serology | Various locations in Scotland and Northern England |
| Louping ill | Red deer (<i>Cervus elaphus</i>) | 66 sera tested, 17 sero-positive (26%) No disease seen | Haemagglutination inhibition serology | Various locations, in Scotland and Northern England |
| Louping ill | Roe deer (<i>Capreolus capreolus</i>) | 17 sera tested, 10 sero-positive (59%) No disease seen | Haemagglutination inhibition serology | Various locations, in Scotland and Northern England |
| Disease / infection | Species affected | Numbers affected | Method of diagnosis | Locality |
| Squirrel parapox | Grey squirrels (<i>Sciurus carolinensis</i>) | 603 sera tested, 257 sero-positive (43%) No disease recorded | ELISA to measure antibody against red squirrel poxvirus | Various locations in England and Scotland |
| Squirrel parapox | Red squirrels (<i>Sciurus vulgaris</i>) | 32 sera tested 5 sero-positive (16%) | ELISA to measure antibody against red squirrel poxvirus | Various locations in England and Scotland |
| Possible endotoxaemia | Reindeer | 1 | Histopathology | Invernesshire |

Abbreviations :

| | |
|------------|---|
| Defra | Department of Environment, Food and Rural Affairs |
| OIE | Office International des Epizooties |
| VLA | Veterinary Laboratories Agency |
| VLADoWs | VLA Diseases of Wildlife Surveillance Scheme |
| SAC | Scottish Agricultural Colleges |
| RSPB | Royal Society for the Protection of Birds |
| BTO | British Trust for Ornithology |
| RSPCA | Royal Society for the Prevention of Cruelty to Animals |
| CSL | Central Science Laboratory (Defra) |
| N | Selected diseases that are new to the UK OIE Report, indicating a new pathogen, new host species or a previously unreported disease |
| WNV | West Nile Virus |
| PRNT | Plaque reduction neutralisation test (WNV serological test) |
| DGGE | Denaturing Gradient gel Electrophoresis |
| FAT | Fluorescent antibody test |
| ELISA | Enzyme linked immuno-assay |
| PCR | Polymerase chain reaction (test) |
| ZN | Ziehl Nielsen |
| Rabies MIT | Mouse inoculation test |
| RTCIT | Rabies tissue culture inoculation test |

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ACKNOWLEDGEMENTS

The compiler of this Report wishes to thank the contributors sincerely:-

Colleagues at VLA Regional Laboratories:- Aberystwyth, Bury St Edmunds, Carmarthen, Langford, Luddington, Newcastle, Penrith, Preston, Shrewsbury, Starcross, Sutton Bonnington, Thirsk, Truro and Winchester

Colleagues at VLA Weybridge departments:- Virology, Food and Environmental Safety, Statutory and Exotic Bacteria, Scientific Services Unit and the Centre for Epidemiology and Risk Analysis

VLA Lasswade

Scottish Agricultural Colleges

National Wildlife Management Team, Rural Development Service, Defra

Moredun Research Institute

Veterinary Services Division, Belfast

Central Science Laboratory

Wildfowl and Wetlands Trust, Glos

RSPCA Wildlife Hospital, Taunton

RPCA Wildlife Hospital, Norfolk

Royal Society for the Protection of Birds

Wildlife Veterinary Investigation Centre, Truro

Gower Bird Hospital

British Trust for Ornithology