

WILDLIFE DISEASES IN THE UK

REPORTED IN THE YEAR 2006

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



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Cover photograph Mute swans (*Cygnus olor*) and geese being fed at a city lake in North West England where 25 birds, mainly swans, had died in recent weeks. There was concern in the local press that Avian Influenza virus may have been responsible however examinations at VLA excluded this and confirmed necrotic enteritis (clostridial infection and toxæmia) as the diagnosis. Necrotic enteritis in the birds was circumstantially linked to a combination of recent events including incursion of saline water into the lake, dredging the lake and feeding 5-10kg of grain per day to the birds (see page 6).

WILDLIFE DISEASES IN THE UK 2006

Report to Defra and to the OIE 2006

INTRODUCTION

1. The Wildlife Diseases Report for 2006, to Defra, and ultimately to the OIE is compiled as part of the Defra/VLA Diseases of Wildlife Surveillance scheme (VLADoWs: Project ED1600). The format is similar to that used in previous years.
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 2006. Data for 2005 is included for diseases where there is a longer diagnostic process or where the dataset for 2006 is not complete. Data for 2005 is also included if it was 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 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 the VLA with respect to wildlife, Defra, since 1998, has supported 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 2006 are presented in the lists and the tables of this Report, including West Nile Virus and diagnostic data from Avian Influenza 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 (web address on page 48) and are now being used and referred to by ecologists, biologists and veterinarians.
6. To make the data more accessible, explanatory notes on disease designations and specific incidents have been added. These notes are selective and not intended to be comprehensive. They have been compiled with the general reader in mind.

Compiled by: - VLA Wildlife Group January 2007

*Please send records of diagnosed diseases in wildlife to -
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E-mail: penrith@vla.defra.gsi.gov.uk

Notes

The OIE Wildlife Disease Report 2006

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 reportable 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 has for several years produced an official response to this questionnaire in the form of the annual OIE report.

Disease designations – ‘OIE Reportable Diseases’ and ‘OIE Wildlife Diseases’

OIE Reportable Diseases.

These are animal diseases of world-wide significance, due to the risks they pose to human health and national economies. The OIE previously had separated these conditions in two categories as ‘List A diseases’ and ‘List B diseases’. However the ‘Reportable Diseases List’ will now incorporate most of the old List A and B diseases, the remainder being classified as ‘OIE Wildlife List’ diseases.

Of the 44 OIE Reportable Diseases, 12 have been recorded in UK wildlife. They are-

anaplasmosis (*Anaplasma phagocytophila* infection),
avian chlamydophilosis (*Chlamydophila* sp. infection)
avian cholera (*Pasteurella multocida* infection)
avian influenza
avian tuberculosis (*Mycobacterium avium* infection)
duck plague (or duck virus enteritis/DVE)
leptospirosis
malignant catarrhal fever
myxomatosis
paratuberculosis (*Mycobacterium avium paratuberculosis* infection/Johnes disease)
rabbit haemorrhagic disease/RHD
bovine tuberculosis (*Mycobacterium bovis* infection)

Most of these diseases in UK wildlife are endemic, in that they are considered to exist in wild populations from year to year, and incidents are reported in most years. It should be noted that for several of these conditions, the form of the disease that we have in the UK in wildlife species, is not as severe as that found in other countries in the world. For example, anaplasmosis in UK wildlife is frequently a very mild condition that causes little disease in the species that are affected.

Swine fever and foot and mouth disease have occurred transiently in the UK in the present century, however neither were recorded in wildlife species.

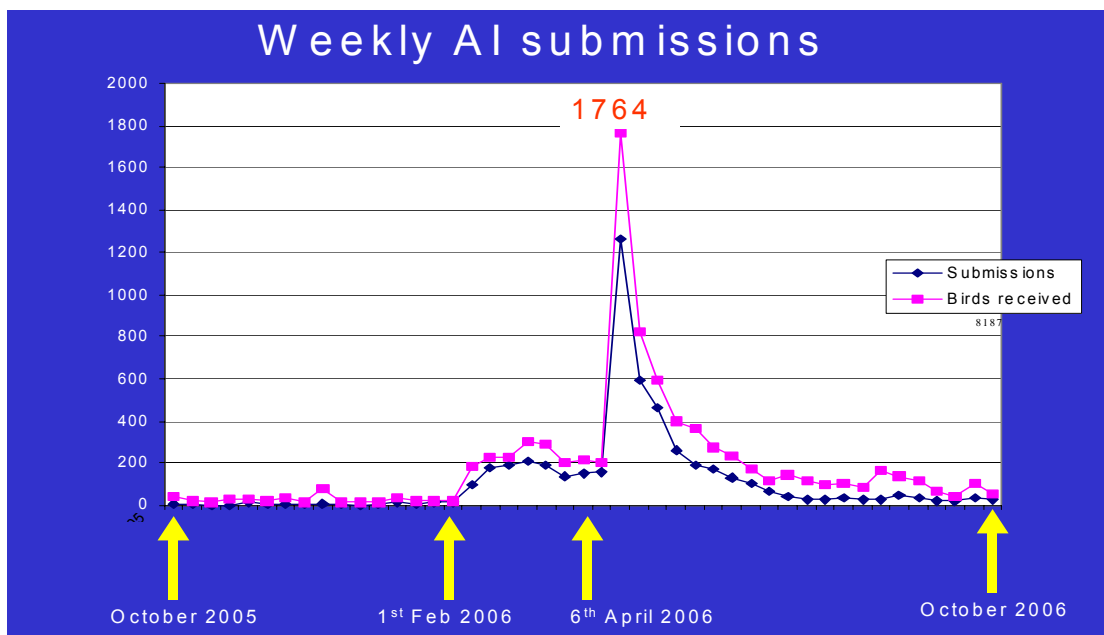
The status of diseases on the OIE Lists may vary. For example, diseases may be re-assessed should they change in nature and become more pathogenic (i.e. produce disease of greater severity), or infect new host species. Designations within countries may also vary. For example it has only become established relatively recently that European Bat Lyssavirus (EBL), a type of rabies virus, occurs in the British population of Daubenton’s bat (*Myotis daubentonii*). As a consequence of this finding, this disease now joins the UK Wildlife Disease List.

OIE The Wildlife Disease Report 2006

Avian Influenza surveillance in the UK

In response to the incidents of Avian Influenza virus H5N1 (AIV H5N1) infection in European Siberia in August 2005, the EU member states agreed to increase levels of surveillance for avian influenza virus in wild birds. Following meetings between Defra and ornithological organisations, an avian influenza surveillance programme was agreed in October 2005.

The graph below shows the weekly submission rate of wild birds found-dead to VLA for AIV examinations between October 2005 and October 2006. The increase in submissions during February and March 2006 reflects the isolations of H5N1 AI virus in continental Europe (Germany, France, and Scandinavia). The striking spike in submissions in early April follows the isolation of H5N1 (highly pathogenic avian influenza/HPAI) virus isolated in early April from a Whooper swan (*Cygnus cygnus*) found dead at Cellardyke, Scotland. Submissions of wild birds did not decline to base-line levels until the end of September 2006.



Diagnostic examinations were an important aspect of the avian influenza examinations in wild birds found-dead. They provided confidence in the surveillance data and alleviated concern by providing a diagnosis in many wild bird mortality incidents. Summary results from these examinations are given in this report. **References 10-13.**

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. Water birds primarily are infected and in some localities the bacterium may survive in the environment and be a source of infection to birds feeding there. Avian tuberculosis is usually fatal in birds.

Bovine tuberculosis – The relationship between infected wild animals, in particular badgers, and cattle is the subject of much research. Data from on-going investigations for bovine tuberculosis in wildlife are given in this report. **Refs 40-49.**

OIE The Wildlife Disease Report 2006

OIE Wildlife Disease List

This is the second 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 occur sporadically; 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. New and emerging diseases are reported regularly in UK wildlife and these require additional work to assess the potential risks these pose to man, domestic stock, the environment and the species affected.

2006 wildlife disease incidents of note

EBLV- 2 in a Daubenton's bat (*Myotis daubentonii*) from Oxfordshire

In September 2006, a female Daubenton's (*Myotis daubentonii*) bat tested positive for a bat variant of rabies virus: European bat lyssavirus type-2 (EBLV-2). The bat had displayed notable aggressive behaviour when handled, a characteristic clinical sign with rabies. Initial diagnostic tests proved positive using the mouse inoculation test in combination with the fluorescent antibody test. Partial sequencing of the nucleoprotein gene indicated that this viral sequence was most closely related to a previous EBLV-2 virus isolated from Sussex in 1996. These data suggest that this EBLV-2 sub-lineage is still circulating in southern England. **Refs 14-17**

Swan mortality incidents Several incidents of necrotic enteritis in whooper (*Cygnus cygnus*) and mute swans (*Cygnus olor*) were usually associated with feeding grain to these birds. At a swan rescue centre in Devon, 40 mute swans died from a group of 200 over a period of ten days. The swans were fed a mixture of grain and dried grass pellets. Affected birds showed minimal clinical signs and died quickly. Post-mortem examinations showed typical necrotic intestinal lesions and the causative organism, *Clostridium perfringens* was demonstrated. A separate incident occurred at a town lake in Lancashire, where 25 mute swans and one Canada goose (*Branta canadensis*) died. Again the disease was circumstantially linked to the feeding of up to 5-10 kg of grain/day to the large numbers of water birds present. In addition however the recent dredging of the lake and an influx of sea water were considered to be contributory factors. Losses stopped after these two events, and advice on provisioning the birds was given.

Sugar beet impaction Deaths of 25 gulls, mainly Black-headed gulls (*Larus ridibundus*) on a reservoir in East Lancashire prompted diagnostic and field investigations. The cause of death was severe impaction of the gastro-intestinal tract with sugar beet pulp, almost certainly feedstuff provided for local sheep. It is assumed that this ingested feedstuff swelled considerably when the birds drank at the reservoir, which they used as a night roost.

New bacterium associated with mortality in birds reported A new bacterium named *Suttonella ornithicola* was isolated from tits (*Paridae*) that died over several months in different localities in England. The cause of death in the birds, and the possible role of the bacterium, in the deaths is not clear at present. **Ref. 51.**

Pigeon trichomoniasis (canker) causing mass mortality incidents in wood pigeons

Outbreaks of oral trichomoniasis were reported in October in England causing high mortalities in wood pigeons (*Columba palumbus*). Incidents were recorded from Oxfordshire, Buckinghamshire, Wiltshire and Suffolk. Similar mass mortality incidents of trichomoniasis in wood pigeons during the autumn and winter months, across southern England, have been reported before (see Wildlife Quarterly Report 4.3, Feb 2003).

OIE The Wildlife Disease Report 2006

2006 wildlife disease incidents - continued

Mass mortality in redwings (*Turdus iliacus*) and thrushes Approximately 26 dead thrushes, mainly redwings, were found in gardens in a North Wales village. Death was caused by traumatic injury due to a severe storm during night migration. AIV was not detected in the tissues of these birds; or from the other avian mortality incidents investigated by VLA during 2006.

Red squirrel pox 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*). The current areas affected by the disease are primarily in the North of England. Grey squirrels probably appeared in Cumbria in northern England in the late 1990s, subsequently and predictably pox disease in red squirrels in the area followed in the wake of the appearance of the grey squirrels. Incidents of squirrel pox disease were identified in red squirrels from many areas in the North of England during 2006, including a case within a few kilometres of the Scottish border. Red squirrels, without pox, but with enteritis were also examined from this area, however in some of these animals a cause for the enteritis was not found.

Garden bird salmonellosis 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 was a significant increase in the reported numbers of deaths (Tables 16, 20, 21, 23 and 24). This may reflect the concerns about avian influenza, or it may be due to an increase in oesophagitis (see below) or salmonellosis. Salmonellosis has been recognised for many years and in 2005 the Garden Bird Health initiative was set up to investigate aspects of garden bird disease further (see pages 27-29).

Garden bird oesophagitis Several groups reported further losses due to this condition, which was first described in 2005 (Refs. 26, 29, and page 29). The number of species of passerines affected by the disease increased in 2006. Oesophageal lesions in affected birds similar to those seen in garden bird salmonellosis were noted, but the condition is now thought to be caused by infection with the trichomonad parasite. At present it appears that risks of disease are probably confined to bird species. Oesophagitis may be less seasonal than salmonellosis although workers reported frequent incidents with high losses (epidemic mortality) during August and September 2006.

(WIREDs) Wildlife related emerging diseases The acronym WIREDs has been used to reflect the recognition of wildlife as a potential source of new and emerging diseases. Whether these diseases pose a risk to human and domestic stock health, or reflect significant changes in the environment, requires assessment by investigation and surveillance.

Table 1 Avian Influenza virus (AIV) surveillance in wild birds

There are three approaches to AIV surveillance in wild birds as indicated by the 3 parts to Table 1 below.

AVIAN INFLUENZA (AI) SURVEILLANCE IN LEGALLY CAUGHT AND RELEASED BIRDS IN GREAT BRITAIN DURING 2006			
Number of birds (submissions) investigated	Primary laboratory tests for screening of samples	Positive AI result and species of bird	Comments
2,904 birds (84 submissions) from England, Wales and Scotland.	Examination of cloacal and oropharyngeal swabs by RT-PCR for AIV matrix (m) gene and egg inoculation, if required.	H6N1 Teal (<i>A.crecca</i>) H5N3 Teal (<i>A.crecca</i>) H5N3 Mallard (<i>A.platyrhynchos</i>) H6N2 Teal (<i>A.crecca</i>) H10N7 Mallard (<i>A.platyrhynchos</i>) H5N? Teal (<i>A.crecca</i>) H5N? Mallard (<i>A.platyrhynchos</i>) H5N? Whooper swan (<i>Cygnus cygnus</i>)	All isolates were low pathogenic avian influenza (LPAI) viruses. Three samples were positive by PCR, but AI virus could not be isolated.
AVIAN INFLUENZA (AI) SURVEILLANCE IN LEGALLY SHOT WILDFOWL IN GREAT BRITAIN DURING 2006			
Number of birds(submissions) investigated	Primary laboratory tests for screening of samples	Positive AI result and species of bird	Comments
659 birds (198 submissions) from England, Wales and Scotland.	Examination of cloacal and oropharyngeal swabs by RT-PCR for AIV matrix (m) gene and egg inoculation, when required.	H1N1 Wigeon (<i>A.penelope</i>) H8N4 Teal (<i>A.crecca</i>) H6N8 Pink-footed goose (<i>A.brachyrhynchos</i>) H9N2 Mallard (<i>A.platyrhynchos</i>) H5N? Mallard (<i>A.platyrhynchos</i>) H5N? Teal (<i>A.crecca</i>)	All isolates were LPAI viruses. Two samples were PCR positive, but AI virus could not be isolated.
AVIAN INFLUENZA (AI) SURVEILLANCE IN WILD BIRDS FOUND DEAD IN GREAT BRITAIN DURING 2006			
Number of birds (submissions) investigated	Primary laboratory tests for screening of samples	Positive AI result and species of bird	Comments
8,259 birds from England and Wales (5,837 submissions). 1,116 birds from Scotland (737 submissions)	Post mortem examination and analysis of cloacal and oropharyngeal swabs by RT-PCR for AIV matrix (m) gene and egg inoculation, when required.	*H5N1 Whooper swan (<i>Cygnus cygnus</i>). HPAI H11N9 Mallard (<i>A.platyrhynchos</i>) H2N3 Mallard (<i>A.platyrhynchos</i>) H6N8 Greylag goose (<i>Anser anser</i>)	*A highly pathogenic H5N1 isolate from a dead whooper swan found in the sea near Fife, Scotland was the only HPAI virus found in the UK during 2006. All other isolates were LPAI viruses.

This report is based on database analysis, including preliminary data, of all recorded scanning and targeted AI wild bird surveillance submissions made to the VLA from Great Britain during 2006.

OIE REPORT ON UK WILDLIFE DISEASES, 2006 : OIE REPORTABLE DISEASES

Bovine tuberculosis (*Mycobacterium bovis* infection)

Table 2 Examinations of found-dead (including road traffic accidents) badgers in Wales in 2006

Data supplied by VLA Weybridge and Defra

County	Collected	No. with samples cultured	No. M.bovis positive
ANGLESEY	1	1	0
BRIDGEND	2	2	0
CAERPHILLY	3	3	0
CARDIFF	5	5	0
CARMARTHENSHIRE	56	56	9
CEREDIGION	31	31	1
CONWY	5	5	0
DENBIGHSHIRE	9	9	0
FLINTSHIRE	18	18	0
GWYNEDD	37	37	0
MONMOUTHSHIRE	25	25	7
NEATH PORT TALBOT	5	5	0
NEWPORT	4	4	0
PEMBROKESHIRE	63	62	8
POWYS	172	171	27
RHONDDA CYNON TAFF	1	1	0
SWANSEA	8	8	2
TORFAEN	2	2	1
VALE OF GLAMORGAN	6	6	0
WREXHAM	6	6	0

The above badgers were collected as part of the Welsh Found Dead Study, which aims to provide information on bovine tuberculosis (bTB) in Wales. The study ran from October 2005 to May 2006. Only data from 2006 animals is included in this table.

Table 3

Examination of Found Dead (including road traffic accidents) badgers in England in 2006

County	Collected	No. with samples cultured	No. M.bovis positive
LANCASHIRE	6	5	0
CUMBRIA	2	2	0

The above badgers were collected to gather information on the presence of *Mycobacterium bovis* infection in badgers (and deer) found dead in the vicinity of newly confirmed cattle TB breakdowns of obscure origin occurring in areas of low TB incidence. This collection is ongoing.

OIE REPORT ON UK WILDLIFE DISEASES 2006: OIE REPORTABLE DISEASES

Table 4 Bovine tuberculosis in wildlife other than badgers

Project SB4510, 2006 data supplied by VLA Truro

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

<i>Species</i>	Number examined	Number positive for <i>Mycobacterium bovis</i> (Bovine tuberculosis) with County locations	Number positive for <i>Mycobacterium avium</i>
Wild Red Deer (<i>Cervus elaphus</i>)	12	6 (Somerset - 5) (Devon - 1)	1
Park Red Deer	7	3 (Somerset - 1) (Devon - 2)	0
Wild Fallow Deer (<i>Dama dama</i>)	17	15 (Gloucestershire – 12) (Worcestershire – 2) (Monmouthshire – 1)	0
Park Fallow Deer	4	2 (Gloucestershire – 2)	0
Roe Deer (<i>Capreolus capreolus</i>)	12	3 (Gloucestershire – 2) (Somerset – 1)	0
Stoat (<i>Mustela erminea</i>)	1	0	0
Mink (<i>Mustela vison</i>)	1	0	0
Fox (<i>Vulpes vulpes</i>)	1	0	0
Otter (<i>Lutra lutra</i>)	2	0	0

Notes – Results are confirmed by culture. As these examinations take weeks to complete, the results above are provisional, as at 19 January 2007 giving an indication of the year's data. The complete dataset for 2006 is given in the CVO's report.

Table 5 A survey of culled wild deer in Cornwall, Devon and Somerset

Species	Number examined	<i>M. bovis</i> positive	<i>M. avium</i> positive
Red	32	0	0
Fallow	44	0	1
Roe	68	0	1
TOTAL	144	0	2

OIE REPORT ON UK WILDLIFE DISEASES 2006: OIE REPORTABLE DISEASES

Bovine tuberculosis in wildlife other than badgers, Project SB4510

Table 6 A survey of culled wild deer in the Cotswold area began at the end of the year:-

Species	Number examined	<i>M. bovis</i> positive	<i>M. avium</i> positive
Red		0	0
Fallow	3	0	0
Roe	1	0	0
TOTAL	4	0	0

Table 7 One Roe deer carcass was examined under the “hotspot” survey:-

Species	Number examined	<i>M. bovis</i> positive	<i>M. avium</i> positive
Roe	1	0	1
TOTAL	1	0	1

Table 8 A cull of park deer was carried out in the Cumbria ‘hotspot’ area:-

Species	Number examined	<i>M. bovis</i> positive	<i>M. avium</i> positive
Fallow	16	11	1
TOTAL	16	11	1

Bovine tuberculosis in badgers from CSL study areas

Central Science Laboratory Wildlife Ecology Team

During 2006 the Central Science Laboratory's Wildlife Disease Ecology team continued studies on bovine tuberculosis in badger populations by capture, clinical sampling and release.

Results for the period January to August 2006 inclusive are as follows -

Woodchester Park study area (a high density, undisturbed site)

Trapped badgers = 165; Culture positives = 5 (3.93%);

Found dead = 12; Culture positives = 2 (16.6%)

South Gloucestershire study area (a lower density, previously culled site)

Trapped badgers = 52; Culture positives = 3 (5.77%)

Found dead = 2; Culture positives = 0 (0%)

SURVEYS continued**Table 9 2006 Rabies Surveillance – Free-Living Species.**

Data supplied by Rabies and Wildlife Zoonoses Group, VLA Weybridge
Refs. 14-21.

Species	Number Examined	Locality	Test	Result
Fox (<i>Vulpes vulpes</i>)	1	UK	Rabies FAT on brain smears and virus isolation by RTCIT and MIT.	Negative
Bats	845	UK	Rabies FAT on brain smears. RT-PCR, RTCIT and MIT on <i>M.daubentonii</i> and <i>E.serotinus</i> bats plus all biting /scratching cases.	844 Negative 1 Positive (see below)

Table 10

2006 Rabies Surveillance – Free-Living Species. Bat Speciation				
Bats –		UK	All tested by rabies FAT on brain smears. All bats with history of human exposure, and <i>M.daubentonii</i> and <i>E.serotinus</i> bats confirmed negative by RT-PCR, RTCIT and MIT.	844 negative 1 positive (<i>M.daubentonii</i> , Oxfordshire)
<i>Rhinolophus hipposideros</i> ,	7	From 92 counties		
<i>Myotis daubentonii</i> ,	23			
<i>M. mystacinus / brandt</i> ,	27			
<i>M. nattereri</i> ,	23			
<i>M.bechsteinii</i>	1			
<i>Myotis species ?</i>	1			
<i>Pipistrellus pipistrellus</i> ,	607			
<i>P. nathusii</i> ,	2			
<i>P. pygmaeus</i>	8			
<i>Pipistrellus species ?</i>	1			
<i>Nyctalus leisleri</i> ,	7			
<i>N. noctula</i> ,	3			
<i>Plecotus auritus</i>	121			
<i>P. austriacus</i>	3			
<i>Eptesicus serotinus</i>	10			
<i>Unidentified</i>	1			
Total	845			

SURVEYS

Table 11 West Nile Virus (WNV) surveillance in wild birds and free-living game birds 2001 – 2006, England, Wales and Scotland

2001 – 2006

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). Most birds in 2006 also examined for Avian Influenza virus (see Table 1).

Number of Wild Birds Examined. 2001-2006	Number of wild species	Results of brain histopathology (2006)	Virus Isolation For WNV	WNV PCR
2001 – 80 2002 – 235 2003 - 675 2004 - 295 2005 - 282 2006 - 300	113 (species from all the major bird families)	Brains from several birds were examined as part of WNV and Avian Influenza investigations. These 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 Lists.
3. 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

The help of SAC, Vic Simpson, RSPB, BTO, RSPCA Wildlife Centres, Gower Bird Hospital and independent wildlife hospitals is particularly acknowledged.

Table 12 Brucella Isolates and serology results from marine mammals, 2006

All data supplied VLA Weybridge

Note : 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*). Samples from Britain only included.

Species	No received	Isolation by culture	Serologically positive	Positive by both methods	Submitted from
Harbour porpoise (<i>Phocaena phocaena</i>)	52	0	11	0	VLA Truro VLA Starcross Inverness (SAC)
Risso's dolphin (<i>Grampus griseus</i>)	2	N/A	0	0	Inverness (SAC)
Bottlenose dolphin (<i>Tursiops truncatus</i>)	2	1	2	1	VLA Truro
Common dolphin (<i>Delphinus delphis</i>)	18	2	4	1	VLA Truro VLA Starcross Inverness (SAC)
Striped dolphin (<i>Stenella coeruleoalba</i>)	2	0	1	0	VLA Truro, Inverness SAC
Atlantic White sided dolphin (<i>Lagenorhynchus actus</i>)	3	N/A	3	0	Inverness SAC
White beaked dolphin (<i>Lagenorhynchus albirostris</i>)	4	N/A	3	0	VLA Starcross Inverness (SAC)
Grey seal (<i>Halichoerus grypus</i>)	8	0	0	0	VLA Truro Inverness SAC
Common seal (<i>Phoca vitulina</i>)	2	N/A	1	0	Inverness SAC
Northern Bottlenose whale (<i>Hyperoodon ampullatus</i>)	3	0	0	0	London Zoo VLA Truro Inverness SAC
Humpback whale (<i>Megaptera novaeangliae</i>)	1	N/A	N/A	0	VLA Truro
Blainsville's beaked whale (<i>Mesoplodon densirostris</i>)	1	N/A	0	0	Inverness SAC

Notes:

Brucella spp. confirmed as a marine mammal strain by PCR was cultured from milk/mammary fluid from a Bottlenose dolphin suggesting that maternal transfer of infection may be possible. *Brucella* spp. confirmed as a marine mammal strain by PCR was cultured from both tissues and parasitic lungworms from a common dolphin.

Table 13 Brucella Isolates and Serology Results from Wildlife 2006

Species	No received	Isolation by culture	Serologically positive	Positive by both methods	Submitted from
Otter (<i>Lutra lutra</i>)	92	0	4	0	VLA Truro
Brown hare (<i>Lepus europaeus</i>)	11	0	N/A	0	VLA Bury

Four female European otters were found weakly sero-positive by the c ELISA. One juvenile and an adult were found dead in an emaciated condition, two further adults were road traffic accidents. Otter tissues submitted from VLA Truro may have originated from locations throughout the UK. In total, VLA Weybridge received 102 samples from wild species.

Overview

Tissues including sera and body fluids originating from captive and free ranging wildlife including marine mammals are assessed for evidence of *Brucella* species under the Surveillance programme SB 4100. Samples may be submitted from a range of locations and sources including conservationists, zoos, dolphinariums, veterinarians, researchers and those involved with the rescue and rehabilitation of marine mammals. In addition to ensuring the UK remains *Brucella* free by monitoring wildlife, the source of sample material is essential for test development and validation. The range of classical and molecular diagnostic and characterisation capabilities undertaken provide a greater degree of strain identification which is important for epidemiological and evolutionary purposes.

Table 14 Surveillance of wild deer in England for Chronic Wasting Disease (CWD) 2003-2006

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 transmissible spongiform encephalopathy (TSE) 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 was started in 2003. The results reported here are from 2003 – 2006. They came from wild deer, either hunter-shot or road kills. A Defra funded project (TS1516) has now been initiated following the recommendation of the European Food Safety Authority that targeted surveillance should be undertaken in European cervids.

The species examined were as follows:

2006	
Species	Number examined
Roe <i>Capreolus capreolus</i>	1
2005	
Roe	5
Muntjac <i>Muntiacus reevesi</i>	3
2003-2004	
Roe	189
Red <i>Cervus elaphus elaphus</i>	22
Fallow <i>Dama dama</i>	66
Muntjac	13
Not known	14
Results	No evidence of prion disease observed in the material examined.

Tissues collected in 2005 and 2006 were examined by immunohistochemistry and BioRad ELISA.

Table 15 Salmonella isolates from wildlife examined by VLA during 2006

This 2006 data set is incomplete at the time of producing this report. Data provided by the Salmonella surveillance Team, CERA, VLA Weybridge. Project FZ2000.

Salmonella serotype	phage type/DT	Isolated from	Incidents	Comment
<i>Salmonella enteritidis</i>	20	Hedgehog	1	
<i>Salmonella enteritidis</i>	11	Hedgehog	1	
<i>Salmonella typhimurium</i>	56 variant	Otter	1	Haemorrhagic enteritis
<i>Salmonella typhimurium</i>	56* variant	Garden birds, Greenfinch, Siskin, House Sparrow, Bullfinch	22	Isolation usually associated with disease
<i>Salmonella typhimurium</i>	56 variant	Tawny owl	1	
<i>Salmonella typhimurium</i>	56*	Garden birds, Bullfinch, Siskin	4	Usually associated with disease
<i>Salmonella typhimurium</i>	40*	Garden birds; Greenfinch, House sparrow, Siskin.	10	Usually associated with disease
<i>Salmonella typhimurium</i>	41	Water birds; Mute swan, Gull sp. Coot Kingfisher	4	
<i>S. typhimurium</i>	93	Gull species	1	
<i>S. typhimurium</i>	193	Mute swan	1	
<i>S. typhimurium</i>	1	Gull species	1	
<i>S. typhimurium</i>	Un-typable	Common Guillemot Gull species	1 1 1	
<i>Salmonella</i> 4,12:D:-, <i>infantis</i> , <i>montivideo</i> , <i>schwarzengrund</i> , <i>senftenberg</i> , <i>typhimurium</i> 41		Mainly Mute swans, also Mallard and Canada geese	1 incident, 7 salmonella isolates	7 salmonella isolates from one incident at a sewage lagoon. Suspect botulism incident.
<i>Salmonella</i> 4,12:-:-		Mute swan	1	
<i>Salmonella newport</i>		Mute swan	1	
<i>Salmonella montevideo</i>		Mute swan	1	

Quality statement regarding the data: -

-data were the output of ad-hoc data retrieval from the VLA 'Farmfile' database: -research project isolates were excluded, -isolates from game birds were excluded, -data refer to UK,

Note – The majority of these isolates were from garden passerines (garden birds) with garden salmonellosis. * *S typhimurium* phage types 40, 56 and 56 variant are particularly associated with finches and other passerine species of garden birds. Incidents of disease are usually linked to the provision of garden bird feeds and feeders. These 3 phage types may infect other domesticated animals (cattle, horses, pigs), pets (dogs and cats) and wild mammals (otter) in the UK. For a list of recent isolates of these *S typhimurium* phage types in other animal species, see VLA Wildlife Quarterly Report 8.2 -

(<http://www.defra.gov.uk/corporate/vla/science/science-end-survrep-qtlyw.htm>).

Avian Influenza surveillance during 2006 allowed salmonella examinations on waterfowl on a much larger scale than previously. Several *Salmonella typhimurium* 41 isolates were found in water birds however at present the clinical or epidemiological significance of these is not clear. The sewage lagoon incident (above) is a notable exception to the overall impression that salmonella infection was infrequent in water birds.

Table 16 *Salmonella* status of wild birds in Scotland October 2005 to September 2006
Data supplied by SAC

Bird species or group	Number screened for <i>Salmonella</i>	Number negative for <i>Salmonella</i>	Number positive for <i>Salmonella</i>
Anatidae (ducks, geese and swans)	312	312	0
Alcidae (auks)	50	49	1
Blackbirds (<i>Turdus merula</i>)	18	18	0
Columbidae (pigeons and doves)	46	45	1
Corvidae (crow family)	19	19	0
Fringillidae (finches)	192	138	54
Gannets (<i>Morus bassanus</i>)	10	10	0
Laridae (gulls)	19	19	0
Oystercatchers (<i>Haematopus ostralegus</i>)	10	10	0
Passeridae (sparrows)	14	10	4
Raptors	13	13	0
Others	53	52	1
Total	756	695	61

Table 17 Salmonella wildlife vectors on pig and poultry farms, 2006

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.

Wildlife Species	County / England	No. faecal samples positive for salmonella/ No. samples taken	Serotype and phage types ND = phage type not determined.
House mouse (<i>Mus musculus</i>)	Derbyshire	1/2	enteritidis 4(1)
	Dorset	0/4	
	Gloucestershire	2/6	enteritidis 4(1), ND
	Hampshire	0/1	
	Hampshire	6/20	Bulked tissues 4(5), ND
	West Sussex	3/4	enteritidis ND
	Shropshire	0/1	
Beetles (not identified)	Dorset	0/3	
	West Sussex	0/1	
Wild Birds (not identified)	Essex	0/2	
	Hereford & Worcester	0/1	
Cat (<i>Felis silvestris</i>)	Devon	0/1	
Brown rat (<i>Rattus norvegicus</i>)	Berkshire	7/7	enteritidis 4(3) 4b(1) ND(3)
	Devon	2/10	enteritidis ND
	Hampshire	0/3	
Totals		21/66	

Table 18 Wildlife Infectious Diseases Group, University of Liverpool

Wildlife Infectious Diseases Group, University of Liverpool, Leahurst Veterinary Teaching Hospital, Neston, Wirral CH64 7TE

Wildlife Species Affected	Disease / Infection	Numbers affected / dead / in group (if known)	Method of Diagnosis	County Location + Comment
Field vole (<i>Microtus agrestis</i>)	<i>Anaplasma phagocytophilum</i> infection	5%	PCR for the presence of <i>Anaplasma phagocytophilum</i> DNA	Kielder Forest, Northumberland
				5% of field voles monitored in and around Kielder Forest tested positive by PCR. The prevalence of <i>Babesia microti</i> in the same animals was approximately 30%, but could extend up to 70%, depending on season.
Wild birds, over 100 different species	<i>Salmonella</i> , <i>Campylobacter</i> and <i>E.coli</i> * infection	*Over 2000 birds sampled, <i>E.coli</i> was the most prevalent, followed by <i>Campylobacter</i> spp and <i>Salmonella</i>	Faecal culture	Large number of sites in North West England
				<i>Salmonella</i> was found rarely and in seemingly healthy birds. The genes associated with pathogenicity in <i>E.coli</i> were found to be present by PCR in a portion of the <i>E.coli</i> isolates.
Red squirrel (<i>Sciurus vulgaris</i>)	Pox virus	16 deaths	Gross pathology, histopathology and PCR	North West England
				Other diagnoses included lymphoma, coccidiosis, cat bites, road traffic accidents, bacterial and hepatozoan pneumonias.
Red squirrel	Pox virus	6 deaths	Gross pathology, histopathology and PCR	North East England
				Other diagnoses included lymphoma, coccidiosis, cat bites, road traffic accidents, bacterial and hepatozoan pneumonias.
Roe deer (<i>Capreolus capreolus</i>)	<i>Babesia divergens</i> and <i>Anaplasma phagocytophilum</i> infection	The prevalence varies seasonally, peaking at about 25%	PCR	Kielder Forest, Northumberland
				Ongoing survey of tick borne infections in wildlife.
Approximately 2600 faecal samples, 40% from rodents, 34% wild birds, 19% cattle and 7% other wildlife collected during a cross-sectional study	<i>Campylobacter</i> spp infection	<i>Campylobacter</i> spp were present on all farms. The prevalence of infection differed by farm, animal species and season	Culture + PCR	Six cattle farms in Cheshire, July 2004 – May 2005.
				Further molecular characterisation is ongoing, but preliminary results indicate <i>C. jejuni</i> , <i>C. coli</i> , <i>C. hyointestinalis</i> and <i>C. fetus</i> are present mainly in the cattle, and a small number of rodent samples.

Table 18 Wildlife Infectious Diseases Group, University of Liverpool, continued

Wildlife Infectious Diseases Group, University of Liverpool, Leahurst Veterinary Teaching Hospital, Neston, Wirral CH64 7TE

Wildlife Species Affected	Disease / Infection	Numbers affected / dead / in group (if known)	Method of Diagnosis	County Location + Comment
Seven species of bat	Haemoparasites from the Order Piroplasmida and genera <i>Bartonella</i> and <i>Trypanosoma</i>	60 bats sampled. Piroplasmida species, probably <i>Babesia vesperuginis</i> detected in six <i>Pipistrellus</i> species, <i>Bartonella</i> infection detected in five bats belonging to four different species	PCR and blood smears	Cornwall, South West England
				Partial characterisation of these infections suggested that they were caused by two distinct and novel <i>Bartonella</i> species. <i>Trypanosoma dionisii</i> was detected in one <i>Pipistrellus</i> species.
Field voles	Cowpox infection	426 out of 569 (75%) tagged field voles tested positive for Cowpox antibodies on at least one occasion	Immuno-fluorescence assay serology	Four sites in Northern England between January and late July 2006. Each animal was caught between one and six times with a mean of 1.77 captures. The percentage that tested positive varied between sites, ranging from 68% (n = 117) to 84% (n = 162). Sero-prevalence also varied between months ranging from a high of 91% in early March, to a low of 53% in early June when new susceptible juveniles appeared in the population.

* VTEC *E.coli* (*E.coli* bacteria possessing toxins) have been identified in 5 of 6 farms. Different combinations of genes (*eae*, *vt1*, *vt2*) were present in bacterial isolates from a variety of different animals including wildlife and cattle. *E. coli* 0157 was isolated from 1 farm, but was only isolated from cattle. Only 4 *Salmonella* spp. were isolated - from a wood mouse (*Apodemus sylvaticus*), a rat (*Rattus norvegicus*) and a bovine animal.

Table 19 Diseases diagnosed in wild birds submitted to SAC Veterinary Services in 2006

Disease/infection	Species affected	Details
Avian botulism (suspected or confirmed)	Immature herring gull	July
<i>Salmonella</i> Typhimurium DT 40 or 56 variant	House sparrow, greenfinch, chaffinch, siskin, goldfinch, dunnock, brambling	January, February, March, November, December
<i>E coli</i> O86 profile	Chaffinch, goldfinch, greenfinch, siskin	March, April, May, June, December
<i>Yersinia pseudotuberculosis</i>	Starling, chaffinch, house martin	January, February, October
Presumed starvation	Numerous species, especially guillemots and razorbills in April	Especially guillemots and razorbills in April
Trauma	Numerous species, especially blackbird, chaffinch, mallard, gannet, mute swan, whooper swan	All months
Pericarditis, perihepatitis, airsacculitis	Rook, magpie, carrion crow	January, July
Spirochaetosis/hexamitosis	Feral pigeon	October
Avian tuberculosis OIE Reportable Disease	Feral pigeon, oystercatcher, greylag goose, pink-footed goose, mute swan	January, February, March, April, May, July
Paramyxovirus 1 (suspected or confirmed) OIE Reportable Disease	Feral pigeon	February, March
Trichomoniasis in pigeons / doves (suspected or confirmed)	Woodpigeon, collared dove,	January, August, October, November
Trichomoniasis in garden birds (suspected or confirmed)	Chaffinch, greenfinch, bullfinch, dunnock, goldfinch, house sparrow	January, February, May, June, July, August, September, October, November, December
Avian pox	House sparrow, woodpigeon	February, May, September, December
Aspergillosis	Black grouse, gull, blackbird, mute swan, guillemot, greylag goose, whooper swan	January, March, April, May, June, July
Helminthiasis	Buzzard, mute swan	February, March
CNS of unknown aetiology	Starling, house sparrow	May, June
Lead poisoning	Whooper swan	April
Isolation of Highly Pathogenic Avian Influenza H5N1 virus OIE Reportable Disease	Whooper swan See page 5 and Table 1	Submitted in March, isolated in April

Table 20 Dead birds found in gardens or near bird feeders, 2006
Phoned reports from the public to the RSPB

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

	2005	2006
Total number of reported incidents	236	1311
Incidents involving greenfinches, house sparrows, chaffinches, siskins and goldfinches	203	1101
Incidents involving collared doves and wood pigeons (many of which will be trichomoniasis incidents)	28	111

Notes

1. Further data for the most frequently affected species in these incidents are given in the Table below. The majority of these incidents are attributable to garden bird oesophagitis and garden bird salmonellosis.
2. Many garden bird mortality incidents will involve deaths of more than one species.

Table 21 Species of bird affected See note above

Species	No of reported incidents / species		Reported mortality / species. (max mortality/incident)		Average incident mortality / species	
	2005	2006	2005	2006	2005	2006
Greenfinches	96	912	505	5126 (60)	5.3	5.6
House sparrows	47	120	153	328 (20)	3.3	2.7
Chaffinches	13	280	47	1116 (75)	3.6	4
Goldfinches	6	78	11	238 (20)	1.8	3.1
Siskins	2	37	4	144 (11)	2	3.9
Blackbirds	12	23	33	43 (5)	2.7	1.9
Feral pigeons, Collared doves, Woodpigeons (probable trichomonas)	28	111	71	262 (12)	2.5	2.4

Notes While these data from phoned reports, without diagnosis, from the general public are difficult to interpret, it can be seen that Greenfinches remain the species most frequently reported, however nationally, the population of this species is not noted to be declining. There was a significant increase in the number of reports in 2006 compared to 2005. The reasons for this are probably multifactorial and will primarily reflect concerns about avian influenza in wild birds, but also include the apparent increase in garden bird oesophagitis incidents (see page 7) and publicity about garden bird deaths. **See refs 26 and 29.**

Table 22 Fox parasite surveys

Information from Central Science Laboratory, York:-

Foxes – heart and lungs examined for parasites at CSL Sand Hutton, York during 2006. Study undertaken by a Royal Veterinary College veterinary student, under supervision of WEMH team at CSL.

95 foxes collected from England and southern Scotland (Borders region)	Sample storage	Method	Prevalence	Geographical distribution
<i>Crenosoma vulpis</i>	Frozen – 20C	Cardiac dissection. Tracheal scrapes for larvae. Lung perfusion technique followed by pulmonary dissection of vascular and bronchial trees.	10%	Widespread
<i>Capillaria (Eucoleus) aerophila</i>	Frozen – 20C		61%	Widespread
<i>Angiostrongylus vasorum</i>	Frozen – 20C		8%	Restricted to SE England and the Midlands
<i>Dirofilaria immitis</i>	Frozen – 20C		No evidence of infection found	

Fox *Trichinella* survey CSL, York

Tissues of 3000 foxes (*Vulpes vulpes*) collected in Great Britain have been examined by modified pepsin digest assay by the CSL for *Trichinella*, all with negative results.

Wildlife Veterinary Investigation Centre Disease List, 2006**Table 23****Wildlife Veterinary Investigation Centre, Truro, Cornwall TR4 8PB.**

SPECIES AFFECTED	DISEASE/ Cause of death	LOCALITY	NUMBERS AFFECTED	COMMENT
Otter (<i>Lutra lutra</i>)	<i>Pseudamphistomum truncatum</i> bile fluke	Norfolk, Dorset, Somerset, Devon, Cambridge, Wiltshire	10/92	PME, gall bladder and mucosal scrape
Mink (<i>Mustela vison</i>)	<i>Pseudamphistomum truncatum</i> bile fluke		0/9	PME, gall bladder and mucosal scrape
Bat (various species)	Rabies monitoring		0/27	FAT and RCIT (Table 9)
Stoat (<i>Mustela erminea</i>)	<i>Skrjabinogylus</i> sp.	Devon, Cornwall	2/4	PME and microscopy
Fox (<i>Vulpes vulpes</i>)	Ascarid nematodes	Cornwall	1/4	PME
Fox (<i>Vulpes vulpes</i>)	<i>Sarcoptes scabiei</i>	Cornwall	1/4	PME
Fox (<i>Vulpes vulpes</i>)	<i>Angiostrongylus vasorum</i>	Cornwall	1/4	PME
Pine Martin (<i>Martes Martes</i>)	<i>Hepatozoon</i> sp.	Isle of Skye, Scotland	1/1	Histopathology
Red Squirrel (<i>Sciurus vulgaris</i>)	<i>Hepatozoon</i> sp.	Isle of Wight, England	3/13	Histopathology
Red Squirrel (<i>Sciurus vulgaris</i>)	<i>Toxoplasma</i> sp.	Isle of Wight	1/13	Histopathology
Red Squirrel (<i>Sciurus vulgaris</i>)	<i>Capillaria hepatitis</i>	Isle of Wight	1/13	Histopathology
Rabbit (<i>Oryctolagus cuniculus</i>)	Hepatic coccidiosis	Cornwall	1/3	Histopathology
Rabbit (<i>Oryctolagus cuniculus</i>)	Myxomatosis		0/3	PME
Whiskered bat (<i>Myotis mystacinus</i>)	Renal coccidiosis	Cornwall	1/1	Histopathology

WILDLIFE VETERINARY INVESTIGATION CENTRE DISEASE LIST

- continued

Table 24 Wildlife VI Centre Truro, Cornwall TR4 8PB.

SPECIES AFFECTED	DISEASE	LOCALITY	NUMBERS AFFECTED	COMMENT
BIRDS				
Greenfinch * (<i>Carduelis chloris</i>)	<i>Salmonella</i> sp. (untyped)	Cornwall, Devon	3/24	PME & culture
Greenfinch * (<i>Carduelis chloris</i>)	<i>Trichomonas</i> sp.	Cornwall, Devon, Somerset	16/24	PME, microscopy & culture
Greenfinch (<i>Carduelis chloris</i>)	Intestinal coccidiosis	Cornwall, Somerset	5/24	PME and microscopy
House sparrow * (<i>Passer domesticus</i>)	<i>Salmonella</i> sp. (untyped)	Cornwall, Devon, Somerset	3/6	PME & culture
House sparrow * (<i>Passer domesticus</i>)	<i>Trichomonas</i> sp.	Cornwall, Devon, Somerset	2/6	PME, microscopy & culture
Bullfinch * (<i>Pyrrhula pyrrhula</i>)	<i>Salmonella</i> sp. (untyped)	Cornwall	2/6	PME & culture
Bullfinch * (<i>Pyrrhula pyrrhula</i>)	<i>Trichomonas</i> sp.	Cornwall	2/6	PME, microscopy & culture
Goldfinch * (<i>Carduelis carduelis</i>)	<i>Salmonella</i> sp. (untyped)	Cornwall	1/4	PME & culture
Goldfinch (<i>Carduelis carduelis</i>)	<i>Yersinia pseudotuberculosis</i>	Cornwall	1/4	PME & culture
Goldfinch * (<i>Carduelis carduelis</i>)	<i>Trichomonas</i> sp.	Cornwall	1/4	PME, micros- copy & culture
Siskin* (<i>Carduelis spinus</i>)	<i>Salmonella</i> sp. (untyped)	Somerset	1/2	PME & culture
Siskin (<i>Carduelis spinus</i>)	<i>Trichomonas</i> sp.	Cornwall	1/2	PME, micros- copy & culture
Chaffinch (<i>Fringella coelebs</i>)	<i>Yersinia pseudotuberculosis</i>	Cornwall	1/7	PME & culture
Chaffinch * (<i>Fringella coelebs</i>)	<i>Trichomonas</i> sp.	Cornwall, Somerset	3/8	PME, microscopy & culture
Robin (<i>Erithacus rubecula</i>)	<i>Pasteurella multocida</i> OIE Reportable Disease	Cornwall	1/1	PME & culture
Yellowhammer (<i>Emberiza citronella</i>)	<i>Trichomonas</i> sp.	Cornwall	2/2	PME, microscopy & culture
Dunnock (<i>Prunella modularis</i>)	<i>Trichomonas</i> sp.	Cornwall	1/1	PME, microscopy & culture
Wood Pigeon (<i>Columba palumbus</i>)	<i>Trichomonas</i> sp.	Cornwall	1/1	PME, microscopy & culture

Table 24 (Continued) - Data supplied by Wildlife Veterinary Investigation Centre, Truro, Cornwall TR4 8PB.

Barn Owl (<i>Tyto alba</i>)	Intestinal coccidiosis	Cornwall	2/10	PME & microscopy
Blackbird (<i>Turdus merula</i>)	<i>Syngamus</i> sp.	Cornwall	1/2	PME & microscopy
Blackbird (<i>Turdus merula</i>)	<i>Porrocaecum</i> sp.	Cornwall	1/2	PME & microscopy
Song Thrush (<i>Turdus philomelos</i>)	<i>Porrocaecum</i> sp.	Cornwall	1/1	PME & microscopy
Sparrowhawk (<i>Accipiter nisus</i>)	<i>Porrocaecum</i> sp.	Cornwall	1/7	PME & microscopy
Sparrowhawk (<i>Accipiter nisus</i>)	<i>Synhimantus</i> sp.	Cornwall	1/7	PME & microscopy
Common Buzzard (<i>Buteo buteo</i>)	<i>Porrocaecum</i> sp.	Cornwall	1/2	PME & microscopy
Kestrel (<i>Falco tinnunculus</i>)	<i>Synhimantus</i> sp.	Cornwall	1/3	PME & microscopy
Kestrel (<i>Falco tinnunculus</i>)	<i>Cyathostoma lari</i>	Cornwall	1/3	PME & microscopy

* Garden bird mortality incidents usually involving several deaths.

Data from the Garden Bird Health *initiative* (GBH), 2006

Institute of Zoology, Zoological Society of London, London, NW1 4RY
Phone/fax: 0207 449 6685

The Garden Bird Health *initiative* (GBH) is a three-year project that began in spring 2005 to investigate causes of garden bird mortality across Great Britain. The project involves creation of a national surveillance system for garden bird health through opportunistic and systematic reporting schemes. Collaborators include regional disease investigation centres (Institute of Zoology; Liverpool University; Scottish Agricultural College; Wildlife Veterinary Investigation Centre), national ornithological organisations (British Trust for Ornithology; RSPB) and the Universities Federation for Animal Welfare. Information on the GBH*i* is available at www.ufaw.org.uk, Tel: 0207 449 6685.

Between Jan – December 2006 post mortem examinations were performed on approximately 650 birds of 38 species from the families Accipitridae, Aegithalidae, Columbidae, Corvidae, Emberizidae, Fringillidae, Hirundinidae, Muscicapidae, Paridae, Passeridae, Picidae, Prunellidae, Regulidae, Strigidae, Sturnidae, Sylvidae and Turdidae. Greenfinches, chaffinches, siskins, house sparrow, and goldfinches were the most frequently examined species in rank order.

Table 25 Data from the Garden Bird Health *initiative* (GBH) (continued)

Wildlife Species Affected	Disease / Infection	Method of Diagnosis	County Location + Comment
Brambling (<i>Fringilla montifringilla</i>), Bullfinch (<i>Pyrrhula pyrrhula</i>), Chaffinch (<i>Fringilla coelebs</i>), Dunnock (<i>Prunella modularis</i>), Goldfinch (<i>Carduelis carduelis</i>), Greenfinch (<i>Carduelis chloris</i>), House sparrow (<i>Passer domesticus</i>), Redpoll (<i>Carduelis flammea</i>), Siskin (<i>Carduelis spinus</i>) and Tree sparrow (<i>Passer montanus</i>)	Salmonellosis Agent: <i>Salmonella</i> Typhimurium DT 40 & DT56	Diagnosis: Gross pathology and microbiological examination	Multiple mortality incidents. Majority of incidents confirmed in January–March and October–December. Geographical distribution: Multiple counties in England, Wales and Scotland.
Brambling (<i>Fringilla montifringilla</i>), Bullfinch (<i>Pyrrhula pyrrhula</i>), Chaffinch (<i>Fringilla coelebs</i>), Collared dove (<i>Columba decaocto</i>), Dunnock (<i>Prunella modularis</i>), Goldfinch (<i>Carduelis carduelis</i>), Greenfinch (<i>Carduelis chloris</i>), House sparrow (<i>Passer domesticus</i>), Wood pigeon (<i>Columba palumbus</i>), Yellowhammer (<i>Emberiza citrinella</i>)	Trichomoniasis Agent: Trichomonad parasite	Diagnosis: Gross pathology, microbiological examination with Bushbys medium and PCR.	Multiple incidents throughout calendar year. Epidemic mortality occurred in late summer/ early autumn peaking in August/ September 2006. Geographical distribution: Multiple counties in England, Wales and Scotland.
Chaffinch (<i>Fringilla coelebs</i>), Goldfinch (<i>Carduelis carduelis</i>) and Hawfinch (<i>Coccothraustes coccothraustes</i>)	Yersiniosis Agent: <i>Yersinia pseudotuberculosis</i>	Diagnosis: Gross pathology and microbiological examination	Four incidents with single cases or multiple affected birds in spring 2006. Geographical distribution: Multiple counties Southern England
Chaffinch (<i>Fringilla coelebs</i>), Goldfinch (<i>Carduelis Carduelis</i>), Greenfinch (<i>Carduelis chloris</i>) and Siskin (<i>Carduelis spinus</i>)	Colibacillosis Agent: <i>E.coli</i> Serotype 086	Diagnosis: Microbiological examination. Characteristic <i>E.coli</i> 086 API20E profile, some isolates pending serology.	Multiple incidents with single or multiple affected birds in 2006. Geographical distribution: Multiple counties

Table 25 Data from the Garden Bird Health *initiative* (GBHi) (Continued)

Wildlife Species Affected	Disease / Infection	Method of Diagnosis	County Location + Comment
Blackbird (<i>Turdus merula</i>) and Starling (<i>Sturnus vulgaris</i>)	Syngamiasis Agent: <i>Syngamus trachea</i>	Diagnosis: Gross parasitological examination	Few incidents with single affected birds in 2006. Geographical distribution: Multiple counties
Chaffinch (<i>Fringilla coelebs</i>)	Cnemidocoptiasis Agent: <i>Cnemidocoptes</i> sp.	Diagnosis: Microscopic examination of lesions	Multiple incidents with single or multiple affected birds in 2006. Geographical distribution: Multiple England counties
Wood pigeon (<i>Columba palumbus</i>) and Dunnock (<i>Prunella modularis</i>)	Avian pox	Diagnosis: Gross pathology	Two incidents with single affected birds in February and August 2006. Geographical distribution: Fife and Warwickshire
Blackbird (<i>Turdus merula</i>) and Greater spotted woodpecker (<i>Dendrocopos major</i>)	Aspergillosis Agent: <i>Aspergillus fumigatus</i>	Diagnosis: Gross pathology and microbiological examination	Two incidents with single cases in 2006. Both birds with concurrent parasitic disease. Geographical distribution: Staffordshire and Argyll and Bute

GBHi publications

Lawson, B., Cunningham, A., Chantrey, J., Hughes, L., Kirkwood, J.K., Pennycott, T.W. & Simpson, V. (2006) Epidemic finch mortality. *Veterinary Record* **159(11)**, 367

Other wild bird-related papers

Foster, G., Evans, J., Knight, H.I., Smith, A.W., Gunn, G.J., Allison, L.J., Synge, B.A., Pennycott, T.W. (2006) Analysis of faeces samples collected from a wild-bird garden feeding station in Scotland for the presence of verocytotoxin-producing *Escherichia coli* O157. *Applied and Environmental Microbiology* **72(3)**, 2265-2267

Lawson, B., Macdonald, S., Howard, T., Macgregor, S.K., Cunningham, A.A. (2006) Exposure of garden birds to aflatoxins in Britain. *Science of the Total Environment* **15; 361(1-3)**, 124-131

Pennycott, T.W., Park, A., Mather, H.A. (2006) Isolation of different serovars of *Salmonella enterica* from wild birds in Great Britain between 1995 and 2003. *Veterinary Record* **158(24)**, 817-820

Simpson, V. and Molenaar, F. (2006) Increase in trichomoniasis in finches. *Veterinary Record* **159(18)**, 606

Table 26 Tiggywinkles Wildlife Hospital Data 2006 – South East England

Data supplied by Tiggywinkles, Aston Road, Haddenham, Bucks, HP17 8AF

Species	Disease / Infection	Numbers affected	Method of Diagnosis	County Location
Badger	Arthritis	3	Clinical History & X-ray	Bucks, Oxon
Badger <i>N</i>	Spondylosis deformans	4	Clinical History & X-ray	Bucks, Oxon
Badger	Shot - shotgun	1	X-ray	Bucks
Fox	Shot – shotgun	2	X-ray	Bucks
Fox	Sarcoptic Mange	12	Parasitology	Bucks, Oxon, Berks, London
Hedgehog	<i>Capillaria aerophila</i>	1876	Parasitology	Bucks, Oxon, Herts, Berks, Essex
Hedgehog	Ringworm – <i>Trichophyton erinacei</i>	17	Clinical History, microbiology	Bucks, Oxon
Hedgehog	<i>Caparinia tripilis</i>	76	Parasitology	Bucks, Oxon
Hedgehog	<i>Sarcoptes scabiei</i>	2	Parasitology	Bucks
Hedgehog	<i>Octodectes spp.</i>	47	Parasitology	Bucks, Oxon
Muntjac Deer	Arthritis	4	Clinical History & X-ray	Bucks
Rabbit	*Myxomatosis	132	Clinical History	Bucks, Oxon, Herts
Rabbit	Coccidiosis	2	Clinical History & Microscopy	Bucks
Black Headed Gull (<i>Larus ridiindus</i>)	Shot - shotgun	1	X-ray	Oxon
Black Headed Gull	Avian Botulism	5	Clinical History	Oxon
Buzzard	Shot – shotgun	3	X-ray	Bucks
Buzzard	Trichomoniasis	2	Clinical History	Bucks

* - OIE Reportable diseases

Table 26 Tiggwinkles Wildlife Hospital Data 2006 – South East England continued

Species	Disease / Infection	Numbers affected	Method of Diagnosis	County Location
Greylag Goose	Shot – shotgun	2	X-ray	Bucks
Greenfinch	Trichomoniasis	5	Clinical History	Bucks, Oxon
Herring gull	Avian Botulism	1	Clinical History	
House Martin, <i>N</i>	Trichomoniasis	1	Clinical History	Bucks
Magpie	Trichomoniasis	1	Clinical History	Bucks
Mallard Duck	Avian Botulism	68	Clinical History	Bucks
Moorhen	Avian Botulism	1	Clinical History	Bucks
Red Kite	Shot – shotgun	1	X-ray	Bucks
Red Kite	Trichomoniasis	1	Clinical History	Bucks
Rook	Trichomoniasis	1	Clinical History	Bucks
Sparrowhawk	Trichomoniasis	1	Clinical History	Bucks
Stock Dove	Trichomoniasis	3	Clinical History	Bucks
Mute swan	Shot – shotgun	3	X-ray	Bucks
Mute swan	Bumble Foot	1	Clinical History	Bucks
Mute swan	Avian Botulism	5	Clinical History	Bucks
Tawny Owl	Trichomoniasis	9	Clinical History	Bucks, Oxon
Wood Pigeon	Shot - shotgun	2	X-ray	Bucks
Wood Pigeon	Trichomoniasis	269	Clinical History	Bucks, Oxon, Berks, Herts

Table 27 Wildlife Disease Surveillance, Northern Ireland 2006

Data (including both OIE reportable(*) and OIE wildlife disease lists) supplied by Veterinary Services Division, Belfast

Species affected	Disease/infection	Numbers affected	Method of diagnosis	County/ Location
Otter	Starvation – gastric ulceration, hepatitis, chronic interstitial pneumonia	1	Necropsy	Down
Grey seal	Starvation	1	Necropsy	Down
Grey seal	Salmonella bovis/morbificans	1	Necropsy Bacteriology	Antrim
Grey seal	Parasitic pneumonia	1	Necropsy	Derry
Grey seal	Parasitic pneumonia	1	Necropsy	Derry
Common seal	Starvation	2	Necropsy	Down
Common seal	Encephalitis	1	Necropsy	Down
Porpoise	Parasitic pneumonia	1	Necropsy	Derry
Porpoise	Parasitic and bacterial pneumonia	1	Necropsy	Down
Porpoise	Encephalitis	1	Necropsy	Down
Striped dolphin	Live stranded	1	Necropsy	Down
Sei whale	Live stranded (young whale)	1	Necropsy	Antrim
Mute swan	Starvation/visceral gout	4	Necropsy	N Ireland
Mute swan	Starvation	Multiple	Necropsy	N Ireland
Mute swan	Trauma	Multiple	Necropsy	N Ireland
Mute swan	Peritonitis/septicaemia	1	Necropsy	Antrim
Whooper swan	Predation	1	Necropsy	Antrim
Whooper swan	Lead poisoning	2	Necropsy/ Biochemistry	Antrim
Guillemots	Starvation and parasitism	Large numbers particularly in September	Necropsy	Down/ Antrim
Guillemots	Avian tuberculosis* (unconfirmed)	1	Necropsy	Derry
Black guillemot	Oiled	1	Necropsy	Down
Razorbill	Nematodes proventriculus	1	Necropsy	Derry
Eider duck	Hepatic amyloidosis fungal air sacculitis	1	Necropsy	Down
Eider duck	Hepatitis	1	Necropsy	Down
Teal	Avian tuberculosis*	1	Necropsy	Down
Mallard duck	Intestinal trematodes	1	Necropsy	Down
Common gull	Haemorrhagic enteritis, trematodes	1	Necropsy	Down
Great black-backed gull	Haemorrhagic enteritis, trematodes	1	Necropsy	Down
Great black-backed gull	Fungal airsacculitis	1	Necropsy	Down
Gannet	Fishing hook and weight in proventriculus/peritonitis	1	Necropsy	Antrim
Cormorant	Nematodes proventriculus	1	Necropsy	Tyrone
Heron	Trauma (mainly fledglings blown from nest in gales)	16	Necropsy	Tyrone
Coot	Pneumonia/septicaemia	1	Necropsy	Antrim
Starlings	Trauma	750	Necropsy	Down

Table 27 Wildlife Disease Surveillance, Northern Ireland 2006 (Continued)

Species affected	Disease/infection	Numbers affected	Method of diagnosis	County/ Location
Starlings	Trauma	45	Necropsy	Down
Rook	Syngamus	Multiple	Necropsy	N Ireland
Jackdaw	Syngamus	1	Necropsy	Armagh
Greenfinch	Trichomoniasis	2	Necropsy	Antrim
Chaffinch	Trichomoniasis (unconfirmed)	2	Necropsy	Antrim
Collared doves	Trichomoniasis	2	Necropsy	Armagh/ Down
Rowan	Capillaria	1	Necropsy	Antrim
Jackdaw	Capillaria	1	Necropsy	Antrim

Road Traffic Accident (RTA) survey of badgers in Northern Ireland for bovine tuberculosis

In 2006, 98 badger carcasses were collected and examined as part of an ongoing RTA survey. At the time of preparation of this report, culture for the presence of *Mycobacterium bovis* has been completed on samples from 65 carcasses, of which 8 (12.3%) were confirmed positive.

Northern Ireland surveys of wild bird populations for the presence of avian influenza virus

As a consequence of the spread of highly pathogenic avian influenza (HPAI) H5N1 virus in the Far East and Eastern Europe, in 2005 the EC required Member States to increase the level of surveillance for the possible presence of AI virus.

Wild bird surveillance was carried out in Northern Ireland as part of the overall UK wild bird surveillance programme. In 2006, the autumn surveillance (September-December 2006) has been targeted towards wild bird species found in Northern Ireland from the internationally agreed list of species that are thought to present a higher risk in relation to Avian Influenza. The focus has been on waterfowl in particular, including gulls, waders, ducks, geese and swans.

This surveillance programme was based on three strands:

- Sampling of live-caught wild birds
- Sampling of freshly shot birds
- Examination of carcasses from unusually high mortality events affecting wild birds

Survey of live-caught birds

Tracheal/oropharyngeal and cloacal swabs for avian influenza examination were collected from live birds. Following capture, these birds were ringed, samples collected for avian influenza virus screening and the birds released.

By the end of 2006, a total of 346 birds (692 samples) have been tested for avian influenza virus. H1N1 (low pathogenic) was isolated from a Teal duck sampled on 20th September. Low pathogenic H5 (LPH5) was detected on two Teal ducks sampled on 1st and 2nd November. Low pathogenic avian influenza H6N8 was isolated from a Teal duck sampled on the 31st October

Paramyxovirus-1 (PMV-1) (Lineage 6) of low pathogenicity was isolated from a Teal duck sampled on the 19th September. This isolate has 97% identity with a bird isolate from the UK this year and 98.5% nucleotide sequence identity with an isolate from Denmark from 1998.

Paramyxovirus-6 (PMV-6) was isolated from a Teal duck sampled the same day (19th September). Another Paramyxovirus-1 (Lineage 1, avirulent) was isolated from a Teal duck sampled on the 11th October.

Data (including both OIE reportable and OIE wildlife disease lists) supplied by Veterinary Services Division, Belfast (Continued)

Survey of shot birds

Sampling of freshly shot birds was carried out as part of legal wildfowling activities around Lough Neagh, Lough Erne and Lough Foyle. Tracheal/oropharyngeal and cloacal swabs for avian influenza examination were collected from freshly shot birds.

A total of 43 birds (86 samples) were tested until the end of December 2006 for high pathogenicity avian influenza virus subtypes H5 or H7, low pathogenicity AI virus subtypes H5 or H7, and other low pathogenicity AI virus subtypes. All samples were negative for AI virus.

Examination of carcasses from unusual mortality events

156 die-off incidents (approximately 313 birds tested) were examined for avian influenza in the year 2006. All samples were negative for AI virus.

Wildlife Incident Investigation Scheme

At the time of compiling this report, the following positive poisoning cases in wildlife had been identified:

Table 28 Wildlife Disease Surveillance, Northern Ireland 2005 – Positive poisoning cases

Species	No	Location	Poison
Rooks and chaffinches	9	Co Tyrone	Alphachloralose
Buzzard	1	Co Tyrone	Carbofuran
Buzzard	1	Co Armagh	Carbofuran

Table 29 Wildlife Disease Surveillance, Northern Ireland 2005

Wildlife species affected	Disease/infection	Numbers affected/dead/in group (if known)	Method of diagnosis	County location
Teal Duck	H1N1	1	RT-PCR + Virus Isolation	Co Down WBS
Teal Duck	LPH5	2	RT-PCR	Co Down WBS
Teal Duck	PMV-1 (low pathogenic)	1	RT-PCR + Virus Isolation	Co Down WBS
Teal Duck	PMV-6	1	RT-PCR + Virus Isolation	Co Down WBS
Teal Duck	PMV-1 (avirulent)	1	RT-PCR + Virus Isolation	Co Down WBS
Teal Duck	H6N8	1	RT-PCR + Virus Isolation	Co Down WBS

Table 30 Data from the RSPCA Wildlife Centre, Kings Lynn, Norfolk 2006

Species Affected	Disease / Infection	Numbers affected, not necessarily dead	Method of Diagnosis
Hedgehog	<i>Salmonella</i> Enteritidis	c. 30	Clinically & selective culture
Hedgehog	Parasitic bronchopneumonia	c. 250	Parasitology on faecal smears
Hedgehog	Ringworm – <i>Trichophyton</i> Erinacei	45	Fungal culture
Hedgehog <i>N</i>	Brachylaemus fluke	3	Parasitology on faecal smears
Hedgehog <i>N</i>	Mammary adenocarcinoma	1	Histology
Common Seal (<i>Phoca vitulina</i>)	Parasitic bronchopneumonia	26	Baermann larval counts
Common Seal	Herpes virus infection	3	Histopathology & IPX staining
Common Seal <i>N</i>	Patent <i>Ductus arteriosus</i> & Hiatus hernia	1	Necropsy
Grey Seal	Parasitic bronchopneumonia	28	Baermann larval counts
Red Fox	Leptospirosis	2	Histology, serology, IHC analysis
Rabbit *	Myxomatosis	c. 60	Clinical signs
Mute Swan	Lead poisoning	43	Blood lead analysis
Mute Swan	Aspergillosis	3	Necropsy & culture
Mute Swan	Botulism	11	Clinical history
Wood Pigeon	Trichomoniasis	38	Microscopic confirmation
Wood Pigeon	Lead poisoning	1	Blood lead analysis
Wood Pigeon	Avian pox	3	Clinical findings
Collared Dove	Trichomoniasis	26	Microscopic confirmation
Collared Dove	Tick-associated haemorrhage	29	Clinical findings
Herring Gull	Lead poisoning	1	Blood lead analysis
Herring Gull	Botulism	8	Clinical history
Black-headed Gull	Botulism	5	Clinical history
Common Gull	Botulism	3	Clinical history
Lesser Black Backed Gull (<i>Larus fuscus</i>)	Botulism	10	Clinical history
Manx Shearwater (<i>Puffinus puffinus</i>)	Aspergillosis	1	Necropsy & culture
Shelduck	<i>Amidostomum</i> sp.	25	Necropsy
Tawny Owl (<i>Strix aluco</i>)	Trichomoniasis	12	Microscopic confirmation
Marsh Harrier <i>N</i> (<i>Circus aeruginosus</i>)	Trichomoniasis	1	Microscopic confirmation
Marsh Harrier <i>N</i>	Teratoma	1	Histopathology
Rook (<i>Corvus frugilegus</i>)	<i>Aspergillus fumigatus</i>	1	Fungal culture

* Additionally, about 20 wild rabbits were tested for the presence of *E. cuniculi* by serology and CNS histopathology. All were negative.

*OIE Reportable Disease

Table 31 Data from the RSPCA Wildlife Centre, West Hatch, Somerset 2006

Species Affected	Disease / Infection	Numbers affected, not necessarily dead	Method of Diagnosis
Hedgehog	Dermatophytosis	8	Clinical signs and culture
Hedgehog	Verminous pneumonia <i>Crenosoma</i> and/or <i>Capillaria</i> sp.	43	Clinical signs and faecal smear/flotation
Hedgehog	Coccidiosis	8	Clinical signs and faecal smear/flotation
Rabbit*	Myxomatosis*	15	Clinical signs and faecal smear/flotation
Rabbit	Coccidiosis	3	Clinical signs and faecal smear/flotation
Fox	Sarcoptic Mange	6	Clinical signs and skin scrape
Grey Seal	<i>Providencia alcalifaciens</i>	1	Nasal swab and culture
Pipistrelle Bat	Facial abscess- <i>Proteus mirabilis</i>	1	Culture
Otter	<i>Coccidia</i> sp.	1	Faecal flotation, no associated signs
Otter	<i>Strongyloides</i> sp. larvated eggs	2	Faecal smear, no associated signs
Otter	<i>Emmonsia</i> sp. in lungs	1	Necropsy at Wildlife VIC
Otter	<i>Pseudamphistomum truncatum</i>	1	Necropsy at Wildlife VIC
BIRDS			
Mute Swan	Lead Toxicosis	21	Clinical signs and blood levels of lead
Mute Swan	Mycotic airsacculitis	1	Clinical signs and necropsy
Raven <i>N</i>	Fibroma/Myxofibroma	1	Histopathology
Buzzard	Trichomoniasis (unconfirmed)	2	Necropsy
Buzzard	Mycotic airsacculitis	1	Necropsy
Kestrel	Bacterial airsacculitis	1	Necropsy. PM performed at Wildlife VIC
Kestrel	Trichomoniasis (unconfirmed)	1	Necropsy
Peregrine Falcon	Trichomoniasis (unconfirmed)	1	Necropsy
Herring Gull	Botulism (suspected)	6	Clinical signs
Guillemot	Mycotic airsacculitis	Several	Clinical signs, haematology Necropsy
Tawny Owl	Trichomoniasis (unconfirmed)	1	Necropsy
Wood Pigeon	Trichomoniasis	10	Microscopy
Wood Pigeon <i>N</i>	Coccidiosis	2	Clinical signs and faecal smear/flotation
Wood Pigeon	Candidiasis	1	Microscopy
Feral Pigeon	Coccidiosis	9	Clinical signs and faecal smear/flotation
Feral Pigeon	Trichomoniasis	1	Microscopy
Collared Dove	Trichomoniasis	1	Microscopy
Blackbird	Coccidiosis	8	Clinical signs and faecal smear/flotation
Greenfinch	Salmonellosis	1	Necropsy and culture
Greenfinch	Trichomoniasis (unconfirmed)	1	Necropsy

* OIE Reportable Disease

Table 32 Data from the RSPCA Wildlife Centre, Nantwich 2006

Wildlife Species Affected	Disease / Infection	Numbers affected / dead / in group (if known)	Method of Diagnosis
Rabbit	Myxomatosis*	21	Vet examination
Red Fox	Severe mange	1	Vet exam
Sparrowhawk	Trichomoniasis	1	Vet exam (oral lesions)
Collared dove	Trichomoniasis	9	Vet exam (oral lesions)
Buzzard	Trichomoniasis	1	Vet exam (oral lesions)
Buzzard	Avian tuberculosis* and aspergillosis	1	Vet exam
Feral pigeon	Trichomoniasis	5	Vet exam (oral lesions)
Goldfinch	Trichomoniasis	1	Vet exam (oral lesions)
Gannet	Aspergillosis	1	Endoscopy
Great spotted woodpecker <i>N</i>	Trichomoniasis	1	Vet exam (oral lesions)
Greenfinch	Trichomoniasis	3	Vet exam (oral lesions)
Hedgehog	Ringworm (severe)	7	Vet exam
Magpie	Trichomoniasis	1	Vet exam (oral lesions)
Mute swan	Aspergillosis	3	Vet exam (endoscopy)
Mute swan	Avian Tuberculosis*	2	Vet exam
Tawny owl	Trichomoniasis	8	Vet exam (oral lesions)
Woodpigeon	Trichomoniasis	37	Vet exam (oral lesions)

*OIE Reportable Disease

Wildlife Incident Investigation Scheme (WIIS), 2005

The Wildlife Incident Investigation Scheme investigates deaths of wildlife (also companion animals such as pets and working dogs, some livestock and beneficial insects such as honeybees and bumblebees) where there is evidence that pesticide poisoning may be involved. The Scheme is used to monitor pesticide use after approval, so that product approvals can be revised if necessary. It also provides a measure of the success of the pesticide registration process, and helps in the verification and improvement of the risk assessments made in this process. Evidence from the Scheme can also be used to enforce legislation on the use of pesticides and the protection of humans, food, the environment and animals.

There were 103 incidents attributed to pesticides during 2005: two incidents involved pesticides used in line with the conditions of their approval (approved use); 22 incidents involved pesticides that were used carelessly and not in line with the conditions of their approval (misuse); 51 incidents involved the deliberate and illegal use of pesticides (abuse); 25 incidents involved pesticides where how they had been used was uncertain (unspecified use) and three incidents involved pesticides formulated as veterinary products (veterinary use). If a veterinary product is suspected to be involved in an incident it should be reported to the Veterinary Medicines Directorate on: 01932 338427.

The pesticide incidents reported in Table 30 account for over half of the poisoning incidents reported by the Scheme during 2005 (for details on these and other poisoning incidents see Ref 1. or the website). Different pesticides and uses are associated with these wild bird and mammal incidents. For example, incidents with wild mammals were almost exclusively attributed to anticoagulant rodenticides and most of these incidents involved foxes. Incidents with wild birds were mostly attributed to the abuse of pesticides, particularly carbamates, and most of these incidents involved raptors.

The Scheme relies on individuals to report suspected incidents and so if you encounter dead animals and believe pesticides may be involved, please report this on 0800 321600.

Table 33 Pesticide Poisoning of Animals in 2005 investigation of suspected incidents in the UK

Category of incident investigated	Number of incidents investigated	Number in which pesticide poisoning was identified	Number in which diagnostic examinations identified another cause of death (e.g. disease, trauma, starvation, or non-pesticide poisoning)
Wildlife-mammals	53	12	15
Wildlife- birds	160	43	55
TOTAL*	210	55	70

* Wildlife from more than one category may be involved in a single incident.

Data and text supplied by CSL, and is a selected summary of data available in the Panel's report (Ref. 1).

Web <http://www.pesticides.gov.uk/environment.asp?id=58>

Please note that 2006 data is currently being compiled and was not available when this Report was produced, but quarterly updates are available on the above website.

Table 34 Louping-ill and squirrel pox wildlife sero-surveillance undertaken by the Moredun Research Institute, 2006

Species affected	Disease / infection	Locality	Method of diagnosis	Numbers affected (% sero-positive)
Red deer (<i>Cervus elaphus</i>) and Roe deer (<i>Capreolus capreolus</i>)	Louping ill	Scotland	Haemagglutination inhibition serology	47 sera tested, 23 sero-positive (49%)
Red deer, Roe deer	Louping ill	England	Haemagglutination inhibition serology	6 sera tested, 0 sero-positive (0%)
Mountain hare (<i>Lepus timidus</i>)	Louping ill	Scotland	Haemagglutination inhibition serology	171 sera tested, 18 sero-positive (10.5%)
Red grouse (<i>Lagopus lagopus scoticus</i>)	Louping ill	Scotland	Haemagglutination inhibition serology	529 sera tested, 76 sero-positive (14.5%)
Red grouse (<i>Lagopus lagopus scoticus</i>)	Louping ill	England	Haemagglutination inhibition serology	796 sera tested, 44 sero-positive (5.5%)
Black grouse (<i>Tetrao tetrix</i>)	Louping ill	Scotland	Haemagglutination inhibition serology	1 sera tested, 1 sero-positive (100%)
Red legged partridge (<i>Alectoris rufa</i>)	Louping ill	Scotland	Haemagglutination inhibition serology	2 sera tested, 0 sero-positive (0%)
Mountain hare (<i>Lepus timidus</i>)	Louping ill	Scotland	LIV TaqMan RT-PCR	6 sera tested, 0 sero-positive (0%)
Red grouse (<i>Lagopus lagopus scoticus</i>)	Louping ill	Scotland	LIV TaqMan RT-PCR	7 sera tested, 0 sero-positive (0%)

Table 35 Squirrel pox serology, Moredun

Species affected	Disease / infection	Locality	Method of diagnosis	Numbers affected (% sero-positive)
Grey squirrels (<i>Sciurus carolinensis</i>)	Red Squirrel Pox Virus	Various locations in England and Scotland	ELISA to measure antibody against red squirrel poxvirus	591 sera tested, 304 sero-positive (51%)
Red squirrels (<i>Sciurus vulgaris</i>)	Red Squirrel Pox Virus	Various locations in England and Scotland	ELISA to measure antibody against red squirrel poxvirus	58 sera tested, 13 sero-positive (22%)

Stranded Cetaceans and marine turtles.

Data supplied by Institute of Zoology, London

The UK Cetacean Strandings Investigation Project (UKCSIP), initiated in 1990, is a long-term national research programme using systematic and standardised methodologies to investigate the causes of morbidity and mortality in UK-stranded cetaceans and marine turtles. It is principally funded by Defra. A national marine mammal database and tissue archives are maintained as part of the research programme to support a broad range of parallel scientific research activity. The project involves close collaboration between the Zoological Society of London (Institute of Zoology), Scottish Agricultural College (Inverness), The Natural History Museum (London), Veterinary Laboratories Agency, Liverpool University, Centre for Environment, Fisheries and Aquaculture Science and Marine Environmental Monitoring. The project contributes to the UK Government's commitment to a number of international conservation agreements.

Table 36 Causes of death of cetaceans and marine turtles examined at post mortem in the UK in 2005 (2006 data not yet compiled)

<u>Species</u>	<u>Cause of death category</u>	<u>No.</u>
Harbour porpoise	Bycatch*	26
	Starvation (including four neonates)	23
	Pneumonia (parasitic/bacterial/mycotic)	21
	Physical trauma (bottlenose dolphin attack)	15
	Live Stranding	11
	Physical trauma (unidentified cause)	10
	Generalised bacterial infection	9
	Gastropathy and/or Enteropathy	2
	Others	1
	Not established	8
Short-beaked common dolphin	Bycatch	14
	Live Stranding	3
	(Meningo) encephalitis	3
	Starvation	2
	Gastropathy and/or Enteropathy	1
	Generalised bacterial infection	1
	Others	1
Striped dolphin	Bycatch	1
	Live Stranding	1
	(Meningo) encephalitis	1
	Starvation	1
	Others	1
White-beaked dolphin	Live Stranding	4
	Starvation	1
White-sided dolphin	Live stranding	3
	Starvation	1
	Generalised bacterial infection	1
Bottlenose dolphin	Pneumonia (Parasitic)	1
	Not Established	1

Table 36 Stranded Cetaceans and marine turtles. - continued

<u>Species</u>	<u>Cause of death category</u>	<u>No.</u>
Risso's dolphin	Live stranding	1
	Starvation	1
Long-finned pilot whale	Live Stranding	1
	Others	1
Minke whale	Entanglement	1
Leatherback turtle	Not Established	2
Loggerhead turtle	Not Established	1

* Of the 26 harbour porpoise bycatches reported here, two were carcasses retrieved directly from fishing vessels.

Further data from marine mammal incidents investigated as part of the UKCSIP Project, from examinations at VLA Truro are given on the marine mammal Incidents table.

For a summary of the findings of this Project, please see the - Cetacean Strandings Investigation and Co-ordination in the UK 2000-2004. Final report to the *Department for Food and Rural Affairs*. At:-

<http://www.defra.gov.uk/wildlife-countryside/resprog/findings/index.htm>

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OIE REPORTABLE and WILDLIFE LIST DISEASES**Table 37 DISEASE INCIDENT TABLES - MAMMAL INCIDENTS**

Inci dent No.	SPECIES AFFECTED	DISEASE	LOCALITY	REPORTED MORTALITY	COMMENT
NOTE These mammal disease incidents do not appear in other tables in the Report					
06/1	Fox	<i>Pasteurella multocida</i> pneumonia	E. England	1	Necropsy, bacteriology
06/2	Fox	Bacterial pneumonia, foreign body inhalation	E England	1	Necropsy and histopathology
06/3	Badger	Leptospiral infection Clinical significance and cause of death not established	S. England	One affected	Positive <i>Leptospira</i> sp. PCR on kidney.
06/4	Roe deer	Liver fluke	N England	1	Necropsy
06/5	Roe deer	Helminthiasis. 5000 <i>Trichostrongyle</i> sp.	S England	1	Necropsy

OIE REPORTABLE and WILDLIFE LIST DISEASES - TABLE 37 MAMMAL INCIDENTS
(Continued)

Incident No	SPECIES AFFECTED	DISEASE	LOCALITY	REPORTED MORTALITY	COMMENT
06/06	Brown hare	Parasitism: coccidiosis and helminths	E England	1	Necropsy, parasitology
06/07	Brown hare	<i>Pasteurella multocida</i> pneumonia.	E England	1	Necropsy and bacteriology
06/08	Brown hare	Leporine dysautonomia	E England	1. Four reported dead out of population of 26	Necropsy histopathology
06/09	Brown hare	Yersiniasis <i>Y. pseudotuberculosis</i>	E England	1	Necropsy and bacteriology of intestine
06/10	Rabbit (<i>Oryctolagus cuniculus</i>)	Myxomatosis. Considered to be frequent, endemic and widespread in the UK. OIE Reportable disease	Widespread throughout the UK	Please see tables	Clinical history, necropsy
06/11	Rabbit	Hepatic coccidiosis	N England	1 - Many reported dead	Necropsy, microbiology
06/12	Red squirrel	Squirrel pox disease. Examined by the Institute of Zoology London	N.E. England	2	Necropsy, Electron microscopy
06/13	Red squirrel	Predator attack	N England	4/44 examined	Necropsy
06/14	Red squirrel	Trauma (mainly road traffic accident)	N England	9/44	Necropsy
06/15	Red squirrel	Squirrel pox disease	N England	11/44	Necropsy, Electron microscopy
06/16	Red squirrel	Enteritis <i>Listeria ivonovii</i> infection	N England	1/44	Necropsy, bacteriology
06/17	Red squirrel	Enteritis coccidiosis/helminthiasis	N England	1/44	Necropsy, Histopathology
06/18	Red squirrel	Enteritis - no diagnosis. <i>Adenovirus</i> isolated in some	N England	5/44	Necropsy, Electron microscopy
06/19	Red squirrel	Septicaemia	N England	3/44	Necropsy Histopathology
06/20	Red squirrel	Pneumonia including mycotic, <i>Yersinia enterocolitica</i> , <i>Pasteurella</i> sp. and no pathogen isolated (2)	N England	6/44	Necropsy, Histopathology bacteriology
06/21	Red squirrel	No diagnosis	N England	4/44	Necropsy, microbiology
06/22	Hedgehog, Juveniles	Cryptosporidiosis. Concurrent helminthiasis. <i>Clostridium sordellii</i> cultured	S England	5	Necropsy and microbiology. Significance of clostridia not known
06/23	Hedgehog	Cryptosporidiosis.	S England	2 affected	Microbiology on faeces
06/24	Hedgehog	Cryptosporidiosis.	Midlands	2	Necropsy and histopathology

TABLE 38 Marine Mammal Incidents. Data detail from Table 36.

Data supplied by VLA Truro

Incident No	SPECIES AFFECTED	DISEASE/Cause of mortality	LOCALITY	REPORTED MORTALITY	COMMENT
06/25	Harbour porpoise (<i>Phocoena phocoena</i>)	Trauma- killed by bottlenose dolphin attack	Cornwall	5	Necropsy
06/26	Harbour Porpoise	Possible bycatch	Cornwall	1	Necropsy
06/27	Harbour Porpoise	Parasitic bronchitis/pneumonia	Cornwall	2	Necropsy
06/28	Harbour Porpoise	Maternal separation/starvation	Cornwall & Devon	2	Necropsy
06/29	Striped Dolphin (<i>Stenella coeruleoabla</i>)	Poor condition/ oesophageal mucosal lesions	Cornwall	1	Necropsy
06/30	Common dolphin (<i>Delphinus delphis</i>)	Bycatch	Cornwall & Devon	11	Necropsy
06/31	Common dolphin	Possible bycatch Brucella sp. isolated from uterus	Cornwall & Devon	3	Necropsy
06/32	Common dolphin	Parasitic bronchitis/pneumonia	Cornwall	1	Necropsy
06/33	Common dolphin	Cause of death not established. Brucella sp. isolated from spleen and testes of one animal	Cornwall	2	Necropsy
06/34	Bottlenose Dolphin (<i>Tursiops truncates</i>)	Parasitic bronchitis/pneumonia Possible bycatch Brucella sp. isolated from milk/mammary tissue	Cornwall	1	Necropsy
06/35	White-beaked dolphin (<i>Lagenorhynchus albirostris</i>)	Possible bycatch +/- pneumonia	Devon	1	Necropsy
06/36	Grey seal (<i>Halichoerus grypus</i>)	Malnutrition	Cornwall	3	Necropsy
06/37	Grey seal	Cause of death not established	Cornwall	3	Necropsy
06/38	Grey seal	<i>Mycoplasma phococeraabrae</i> Isolated from bite wounds	Cornwall	2	Potentially zoonotic mycoplasma
06/30	Grey seal N?	<i>Mycoplasma</i> sp. (possible new species) Isolated from bite wounds	Cornwall	1	Bacteriology only

Alternative diagnoses in wild birds submitted for AIV examinations 2006: Incidents

During 2006, as part of the surveillance for Avian Influenza Virus (AIV) in wild birds, Defra agencies collected large numbers of dead birds from mortality incidents reported by the public. These birds were submitted to VLA Regional Laboratories. Between February and September 2006, 6910 birds from 4240 incidents (submissions) were received, and a percentage of these were examined diagnostically. The diagnostic results were posted weekly on the Defra web site from February to September. These diagnostic results supported confidence in the AIV surveillance results and alleviated concerns about the causes of wild bird mortality incidents.

The large numbers of wild birds examined (mainly water birds, particularly mute swans and mallard) provided a unique opportunity to investigate the causes of death in these populations. A provisional summary of the main causes of mortality is given below and selected specific incidents are summarised in the next table. It should be noted that for the majority of birds, a diagnosis was not reached. This was due to several factors including unsuitable carcasses being submitted, post-mortem decomposition, post-mortem predation and no lesions being identified. Samples from the birds examined were submitted to VLA Weybridge for AIV testing and results are reported in Table 1.

Table 39

Alternative diagnoses in wild birds submitted for AIV examinations Feb – Sept. 2006		
Condition/ Disease	Number of Incidents	Comment
Traumatic injury	208	Water birds mainly affected. Injuries included road traffic accidents, collisions with power cables and buildings etc.
Starvation/emaciation	51	Water birds. Based on gross necropsy
Death caused by shooting	45	Mallard, feral doves, Canada geese, woodpigeon, rooks and pheasants
Suspected predator attack	23	Usually single birds affected in each incident.
Neoplasia	6	Canada goose, mallard, feral pigeon, feral duck. Single birds per incident
Lead poisoning	10	Kidney biochemistry. Mainly waterbirds
Visceral gout	5	Wide variety of species. Single birds
Garden bird oesophagitis (trichomoniasis)	77	65/77 incidents occurred after July 2006
Salmonellosis	41	Mainly passerines. Cases recorded in Table 15
Egg peritonitis/"egg bound"	27	Mute swan, mallard, feral duck, Canada goose, shelduck, rook
Paramyxovirus1 OIE reportable disease	22	Pigeon species. England, Wales and Scotland. See incident table
Peritonitis	18	Diagnosis based on necropsy findings
Septicaemia	14	Diagnosis based on necropsy findings
Parasitism	15	Significant clinical cases: not necessarily fatal
Mycotic pneumonia/airsacculitis	14	Diagnosed in a range of species
Pigeon/Dove trichomoniasis	13	Pigeons and collared doves
Duck viral enteritis OIE reportable disease	12	Mute swan, feral duck, shelduck, mallard. Spring months
Avian botulism (suspected)	12	Water birds, more frequent in summer
Avian tuberculosis	7	Usually single birds per incident

Table 40 WILD BIRD INCIDENTS, mainly from VLA, examined for AIV and WNV where appropriate

Inci dent No	SPECIES AFFECTED	DISEASE	LOCALITY	REPORTED MORTALITY	COMMENT
OIE REPORTABLE DISEASES, BIRD INCIDENTS					
06/31	Mallard (<i>Anas platyrhynchos</i>) Teal (<i>Anas crecca</i>) Pochard (<i>Aythya farina</i>) Coot (<i>Fulica atra</i>) Bewicks swan (<i>Olor bewickii</i>) Pintail (<i>Anas acuta</i>) Shelduck (<i>Tadorna tadorna</i>) Greylag goose (<i>Anser anser</i>) Gadwall (<i>Anas strepera</i>) Moorhen (<i>Gallinula chloropus</i>) Black-headed gull (<i>Larus ridibundus</i>) Wood pigeon (<i>Columba palumbus</i>)	Avian tuberculosis (<i>Mycobacterium avian</i>) infection OIE Reportable Disease	Wildfowl reserve in Southern England	5 1 1 4 1 1 1 2 1 3 2 1	Necropsy and staining
06/32	Feral pigeon (<i>Columba livia</i>)	Paramyxovirus 1 OIE Reportable Disease	England	16 incidents	Necropsy and virology. <u>Birds in this incident table were monitored for AIV infection</u>
06/33	Collared dove	Paramyxovirus 1	England	2 incidents	Necropsy and virology
06/34	Collared dove N	Paramyxovirus 7 (PMV 7)	England	Isolate from pooled tissues from 6 birds	Birds died from canker. PMV7 not thought to be pathogenic in doves
06/35	Woodpigeon	Paramyxovirus 1	English Midlands	1 incident, 20 birds	Clinical significance not known.

TABLE 40 **WILD BIRD INCIDENTS** (Cont'd)

inci dent No	SPECIES AFFECTED	DISEASE	LOCALITY	REPORTED MORTALITY	COMMENT
06/ 36	Mute swan	Gastro-intestinal impaction	S England	1	Necropsy. Frequent diagnosis in mute swans and Canada goose
06/ 37	Mute swan	Liver amyloidosis	England	1	Necropsy. Relatively frequent diagnosis in mute swans
06/ 38	Mute swan	Generalised pulmonary oedema. Suspect drowning	England	1	Necropsy. Not infrequent in swans and ducks
06/ 39	Mute swan	Duck viral enteritis. OIE Reportable disease	England	4	Necropsy
06/ 40	Mute swan	Verminous heart worm <i>Sarconema eurycerca</i> suspected	Not given	1	Necropsy. Parasite not identified
06/ 41	Mute swan Cygnets <i>N</i>	Yolk sac infection	England	2	Necropsy
06/ 42	Mute swan	<i>Pasteurella multocida</i> infection OIE Reportable Disease	England	1	Necropsy Bacteriology
06/ 43	Canada goose (<i>Branta canadensis</i>)	Suspected avian botulism	E England	Approx 20	Clinical history Necropsy
06/ 44	Mallard, Canada goose	Suspected avian botulism	E England	7	Salmonellae also isolated
06/ 45	Mallard	Suspected avian botulism	S England	10	Clinical history Necropsy
06/ 46	Teal	Suspected avian botulism	S England	6	Clinical history Necropsy
06/ 47					
48	Shelduck	Duck viral enteritis	England	1	Necropsy
49	Feral duck	Duck viral enteritis	England	2	Necropsy
06/ 50	Mallard ducklings	Drowning in a swimming pool	England	11	History, Necropsy
06/ 51	Black headed gull (<i>Larus ridibundus</i>)	Sugar beet impaction	N England	Approx 25	Necropsy, Sugar beet used in area as sheep feed
06/ 52	Common gulls	Suspected avian botulism	E England	9	Salmonellae also isolated
06/ 53	Kittiwake (<i>Rissa tridactyla</i>) juveniles only	Starvation and intestinal parasitism	S England At cliff colony	100	Necropsy, microbiology

Table 40 **WILD BIRD INCIDENTS** – continued

inci dent No	SPECIES AFFECTED	DISEASE	LOCALITY	REPORTED MORTALITY	COMMENT
06/54	Common guillemot (<i>Uria aalge</i>) Razorbill (<i>Alca torda</i>)	Starvation	W. England at 5 Regional Laboratories	145 auks from 25 submissions	Necropsy. Occurred mid April, western shores of Britain
06/55	Common guillemot, Razorbill	Starvation and gastric parasitism	W. England	19	Necropsy
06/56	Puffin (<i>Fratercula arctica</i>)	Unknown	N England	40	Necropsy and microbiology histopathology. Starvation and trauma excluded
57	Razorbill	Unknown	N England	9	As above
06/58	Sparrowhawk (<i>Accipiter nisus</i>)	trichomoniasis	N England	1	Necropsy. Infection possibly from feeding on garden birds with trichomoniasis
06/59	Barn owl (<i>Tyto alba</i>)	Ascaridia infestation	Southern England	1 x adult 2 x juveniles	Necropsy
60					
06/61	Wood pigeon (<i>Columba palumbus</i>)	Trichomoniasis	Southern England	> 20	Necropsy
06/62	Collared dove (<i>Streptopelia decaocto</i>)	Trichomoniasis	Southern England	14	Necropsy
63					
64					
06/65	Rook (<i>Corvus frugilegus</i>)	<i>Syngamus</i> infestation	N England	2 dead many dead rooks in rook colony	Necropsy and parasitology
06/66	Rook	Trauma	England	18 found dead in a graveyard	Necropsy, cause unknown
06/67	Redwing (<i>Turdus iliacus</i>) and other thrushes	Trauma due to storm on night migration	Wales	26 found dead	Clinical history and necropsy
06/68	Chaffinch	Colisepticaemia	S England	1	Necropsy and bacteriology
06/69	Chaffinch	Oesophagitis, trichomoniasis. Frequent diagnosis	England	20 deaths in 4 weeks	Necropsy microbiology
06/70	Starlings, (<i>Sturnus vulgaris</i>) Juveniles N	Drowning in swimming pools	E England 2 incidents close together but probably unrelated	2 incidents, 23 deaths and 41 deaths respectively	Clinical history. Necropsy

Amphibian incidents – no incidents reported in 2006

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
SVS	State Veterinary Service
RDS	Rural Development Service
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, indicates that incident was WNV monitored
AIV	Avian Influenza Virus, indicates that incident was AIV monitored
WQR	VLA Wildlife Quarterly Report
<u>Laboratory tests</u>	
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

REFERENCES AND PUBLICATIONS

Further reading on wildlife disease surveillance and causes of mortality in the UK

Reference 1. Wildlife poisoning

Pesticide poisoning of animals 2005: investigations of suspected incidents in the UK. *Report of the Environmental Panel of the Advisory Committee on Pesticides*, Defra, London(2006), Barnett, EA, Fletcher, MR, Hunter, K. and Sharp, EA

Ref 2. Recent OIE Wildlife Disease Reports for 2004 and 2005, website -

<http://www.defra.gov.uk/corporate/vla/science/science-end-ann-wild-disrep.htm>

Ref 3. VLA Wildlife Disease Quarterly Reports – 3 monthly surveillance updates

<http://www.defra.gov.uk/corporate/vla/science/science-end-survrep-qtly.htm>

Ref 4. Defra wildlife and wildlife disease websites -

<http://www.defra.gov.uk/animalh/diseases/vetsurveillance/species/deer/index.htm>

<http://www.defra.gov.uk/animalh/diseases/vetsurveillance/species/wildlife/hws.htm>

<http://www.defra.gov.uk/animalh/diseases/vetsurveillance/species/wildlife/index.htm>

Ref. 5

UK Wildlife disease surveillance

Wildlife Disease Surveillance by the VLA
Microbiology Today (2003) Vol 30, Nov03, 157-158, Duff, P.

Ref.6

Wildlife casualties with listed diseases

BSAVA Manual of Wildlife Casualties (2003)
Editors Mullineaux, E. and others. British Small Animal Veterinary Association, Gloucester
ISBN 0 905214 63 3

Other References

7.

Young farmer dies as 'rabbit flu' * claims its first victim
The Times (2006) Monday August 21
Sanderson, D

* Fatality due to *Pasteurella multocida* septicaemia, thought to have originated from a dead wild rabbit.

West Nile Virus

8.

Potential arbovirus emergence and implications for the United Kingdom.
On line *Emerging Infectious Diseases* (2006) **12**, 4. <http://www.virologyj.com/content/3/171>
Gould, E.A., Higgs, S., Buckley, A, Gritsun, T.S.

9.

Detection of seroconversion to West Nile virus, Usutu virus, Sindbis virus in UK sentinel chickens.
On line: *Virology Journal* (2006) 3,71. <http://www.cdc.gov/ncidod/EID/vol12no04/05-1010.htm>
Buckley, A, Dawson, A, Gould E.A.

Avian influenza

10.

Summary of avian influenza activity in Europe, Asia, Africa and Australia.
Abstracts of 6th International Symposium on Avian Influenza, Cambridge April 2006. (2006)
Alexander, D.J. .

11.

First incursion of H5N1 highly pathogenic avian influenza of the 'Asian' lineage into Europe. Abstracts of 6th International Symposium on Avian Influenza, Cambridge April 2006. (2006)
Brown, I.H., Londt, B.Z., Shell, W., Manvell, R.J., Banks, J., Gardner, R., Outtrim, L., Essen, S.C., Sabrovic, M., Slomka, M. & Alexander, D.J.

12.

An overview of the epidemiology of avian influenza.
Abstracts of the 4th IVVDC Congress, Oslo June 2006. (2006)
Alexander, D.J.

13.

Recent epidemiology and ecology of influenza A viruses in avian species in Europe and the Middle East.
Proceedings of the OIE/FAO International Conference on Avian Influenza. Schudel A., Lombard M. (eds) *Developments in Biology*, Vol 124, Basel Karger pp 45-50. (2006).
Brown, I.H., Banks, J., Manvell, R.J., Essen, S.C., Shell, W., Slomka, M., Londt, B. & Alexander, D.J.

European Bat Lyssavirus and Rabies

14.

Isolation of EBLV-2 in a Daubenton's bat (*Myotis daubentonii*) found in Oxfordshire.
Vet Rec. (2006) **159**(16): 534-5.
Fooks AR, Marston D, Parsons G, Earl D, Dicker A, Brookes SM.

- 15.**
European bat lyssaviruses: distribution, prevalence and implications for conservation.
Biological Conservation (2006) 131, 193-210
Harris SL, Brookes SM, Jones G, Hutson AM, Racey PA, Aegerter J, Smith GC, McElhinney LM, Fooks AR.
- 16.**
Passive surveillance (1987 to 2004) of United Kingdom bats for European bat lyssaviruses.
Vet Rec. 2006 Sep 30;159(14):439-46.
Harris SL, Brookes SM, Jones G, Hutson AM, Fooks AR.
- 17.**
European bat lyssavirus type 2 RNA in *Myotis daubentonii*.
Emerg Infect Dis. (2006) 12, (7):1142-4.
Johnson N, Wakeley PR, Brookes SM, Fooks AR.
- 18.**
Risk assessments to inform policy decisions regarding importation of pets from North America.
Vet Rec. (2006) 20;158, (20):694-5.
Kosmider RD, Kelly L, Laurenson K, Coleman P, Fooks AR, Woolhouse M, Wooldridge M.
- 19.**
Molecular epidemiology of rabies viruses in Europe.
Dev Biol (2006) (Basel).125:17-28.
McElhinney LM, Marston D, Johnson N, Black C, Matouch O, Lalosevic D, Stankov S, Must K, Smreczak M, Zmudzinski IF, Botvinkin A, Aylan O, Vanek E, Cliquet F, Muller T, Fooks AR.
- 20.**
EBLV-2 prevalence in the United Kingdom as determined by surveillance testing.
Dev Biol (Basel). (2006) 125: 265-71.
Smith GC, Brookes SM, Harris SL, Aegerter JN, Jones G, Fooks AR
- 21.**
(2006) Wildlife rabies control policy in Great Britain. Review.
Dev Biol (Basel) (2006) 125:113-8.
Smith GC, Fooks AR.

References from Moredun

- 22.**
Wildlife and the risk to humans and domestic animals: a case for disease surveillance.
Veterinary Journal (2006) **171**, 204-205.
D. Buxton.
- 23.**
Intracranial granuloma caused by asporogenic *Aspergillus fumigatus* in a harbour porpoise (*Phocoena phocoena*).
Veterinary Record. (2006) **159**, p458-460.
Dagleish, MP., Patterson, IAP, Foster, G, Reid, R, Linton C & D. Buxton.
- 24.**
The detection of Louping ill virus in clinical specimens from mammals and birds using TaqMan RT-PCR.
Journal of Virological Methods. (2006) **137**(1):21-8
Marriott, L, Willoughby, K, Chianini, F, Dagleish, MP, Scholes, S, Robinson, AC, Gould EA & Nettleton PF.
25
Polioencephalomalacia in a juvenile hooded seal (*Cystophora cristata*)
Vet Rec. (2006) 138, 516-518
Dagleish, M. P , Patterson, I, Foster G, Reid RJ, Brain, LTA, Buxton D
(Seal found dead on Scottish beach)

References from Wildlife Veterinary Investigation Centre

- 26.**
Epidemic finch mortality.
Veterinary Record (2006) **159**, 367
Lawson B., Cunningham A., Chantrey J., Hughes L., Kirkwood J.K., Pennycott T. W. & Simpson V.

27.
Patterns and significance of bite wounds in Eurasian otters (*Lutra lutra*) in southern and south-west England.

Veterinary Record (2006) **158**, 113-119

Simpson V. R.

28.

Post mortem identification of swans.

Veterinary Record (2006) **158**, 604.

Simpson V.

29.

Increase in trichomoniasis in finches.

Veterinary Record (2006) **159**, 606

Simpson V. and Molenaar F.

30.

Hepatozoon species infection in wild red squirrels (*Sciurus vulgaris*) on the Isle of Wight.

Veterinary Record (2006) **159**, 200-205

Simpson V.R., Birtles R., Bown K., Panciera R. J., Butler H. and Davison N.

31.

Bile fluke in otters and mink.

Veterinary Record (2006) **158**, 69.

Tomlinson A. and Simpson V.

VLA Wildlife Group

32.

Cutaneous teratoma in a wild roe deer (*Capreolus capreolus*) in the UK

Vet Rec. (2006), **159**, 211-212.

Barlow, A M and Couper, D.

Marine Mammal Scientific publications (on infectious disease) (2006)

33.

The Relationship between polychlorinated biphenyls in blubber and levels of nematode infestations in harbour porpoises, *Phocoena phocoena*.

Parasitology doi:10.1017/S003118200500942X

Bull, J.C., Jepson, P.D., Ssuna, R.K., Deaville, R. & Fenton, A. (2006)

34.

The risk of infection from polychlorinated biphenyl exposure in harbour porpoise (*Phocoena phocoena*) – A case-control approach.

Environmental Health Perspectives (2006) **114**, 704-711

Hall, A.J., Hugunin, K., Deaville, R., Law, R.J., Allchin, C.R., Jepson, P.D.

35.

Phocine Distemper Virus – Data and models, nature and nurture.

Biological Conservation (2006) **131**: 221 –229

Hall, A.J., Jepson, P.D., Goodman, S.J. and Härkönen, T.

36.

The 1988 and 2002 phocine distemper virus epidemics in European harbour seals.

Diseases of Aquatic Organisms (2006) **68**: 115-130.

Härkönen, T., Dietz, R., Reijnders, P., Teilmann, J., Thompson, P., Harding, K., Hall, A., Brasseur, S., Siebert, U., Goodman, S., Jepson, P.D. and Dau Rasmussen, T.

37.

Cetacean Strandings Investigation and Co-ordination in the UK 2000-2004.

Final report to the *Department for Food and Rural Affairs*. (2006) pp 1-79.

<http://www.defra.gov.uk/wildlife-countryside/resprog/findings/index.htm>

Jepson, P.D. (editor)

38.

Characterisation of a *Brucella* sp. strain as a marine mammal types despite isolation from a patient with spinal osteomyelitis in New Zealand.

Journal of Clinical Microbiology (2006) **44**, (12), 4363-70

Mc Donald, WL, Jamaludin R, Mackereth, G, Hansen M, Humphrey S, Short P, Taylor T, Swingler J, Dawson CE, Whatmore AM, Stubberfield E, Perrett LL, Simmons, G.

(Zoonotic marine brucellosis incident possibly due to eating contaminated seafood)

39.

Isolation of *Brucella* from a bottlenose dolphin (*Tursiops truncatus*)

Vet Rec (2006) **158**, 831-2.

Dawson CE, Perrett LL, Young EJ, Davison NJ Monies RJ

Tuberculosis

40.

Persistence of disease in territorial animals; insights from a model of Tb control in badgers

New Zealand Journal of Ecology (2006) **30**: 35-41

Smith GC;

41.

Effects of culling on badger *Meles meles* spatial organization: implications for the control of bovine tuberculosis.

Journal of Applied Ecology (2006) **43**: 1-10

Woodroffe R, Donnelly CA, Cox DR, Bourne FJ, Cheeseman CL, Delahay RJ, Gettinby G, McInerney JP, Morrison WI.

42.

Positive and negative effects of widespread badger culling on tuberculosis in cattle.

Nature (2006) **439**: 843-846

Donnelly CA, Woodroffe R, Cox DR, Bourne FJ, Cheeseman CL, Clifton-Hadley RS, Wei G, Gettinby G, Gilks P, Jenkins H, Johnston WT, Le Fevre AM, McInerney JP, Morrison WI.

43.

Badgers and bovine tuberculosis. The ecological complexities of managing a wildlife disease reservoir.

Cattle Practice (2006) **14**: 7-11

Delahay RJ

44.

Demographic correlates of bite wounding in Eurasian badgers, *Meles meles* L, in stable and perturbed populations.

Animal Behaviour (2006) **71**: 1047-1055

Delahay RJ, Walker NJ, Forrester GJ, Harmsen B, Riordan P, Macdonald DW, Newman C, Cheeseman CL.

45.

Screening badgers (*Meles meles*) for *Mycobacterium bovis* infection by using multiple applications of an ELISA.

Cattle Practice (2006) **13**: 327-332

Forrester GJ, Delahay RJ, Clifton-Hadley RS

46.

Culling and cattle controls influence tuberculosis risk for badgers:

Proceedings of the National Academy of Sciences of the United States of America (2006) **103** (40): p 14713-14717

Woodroffe R, Donnelly CA, Jenkins HE, Johnston WT, Cox DR; Bourne FJ, Cheeseman CL, Delahay RJ, Clifton-Hadley RS, Gettinby G, Gilks P, Hewinson G, McInerney JP, Morrison W

47.

Biological hurdles to the control of TB in cattle: A test of two hypotheses concerning wildlife to explain the failure of control.

Journal: Biological Conservation (2006) **131** (2): p 268-286.

MacDonald DW, Riordan P, Mathews F.

48.

Is *Mycobacterium bovis* in the environment important for the persistence of bovine tuberculosis?

Biology Letters (2006) **2**: 460-462

Courtenay O, Reilly LA, Sweeney FP, Hibberd V, Bryan S, Ul-Hassan A, Newman C, MacDonald DW, Delahay RJ, Wilson GJ, Wellington EMH.

49.

Farm husbandry and the risks of disease transmission between wild and domestic mammals: A brief review focusing on bovine tuberculosis in badgers and cattle

Animal Science (2006) **82**: 767-773

Ward A, Tolhurst B, Delahay RJ

Other references

50.

The presence of antibodies to *Toxoplasma gondii* in European badgers

Journal of Wildlife Diseases (2006) **42**: 179-181

Anwar A, Knaggs J, Service KM, McLaren GW, Riordan P, Newman C, Delahay RJ, Cheeseman C, Macdonald DW,

51.

Unusual mortality incidents in tit species (Family *Paridae*) associated with the novel bacterium *Suttonella ornithicola*.

Veterinary Record (2006) **158**, 203-205.

Kirkwood JK, Macgregor SK, Malnick, H, Foster G.

52.

Skeletal deformities and mortality in grey herons (*Ardea cinerea*) at Besthorpe heronry, Nottinghamshire.

Veterinary Record (2006) **159** (16) 514-521.

Feltrer Y; Draper ER, C.; Perkins, M.; Cunningham, A. A..

54.

Wildlife: specialism or shared responsibility?.

Veterinary Times (2006) 36 (23) p14-15.

Cooper JE, Cooper ME.

55.

Wild boar in veterinary practice.

Veterinary Times (2006) 36 (16) p16.

Cousquer, G.

56.

Cholelithiasis and chronic cholangiohepatitis in a mute swan (*Cygnus olor*).

Veterinary Record (2006) **158**, 166-167.

Cousquer G, Patterson-Kane JC.

57.

Ethical and legal implications of treating casualty wild animals.

In Practice (2006) 28, 2-6.

Cooper JE, Cooper ME.

58.

Wild rabbits (*Oryctolagus cuniculus*) as potential carriers of verocytotoxin-producing *Escherichia coli*.

Veterinary Record (2006) **159**: 175-178

Scaife HR, Cowan D, Finney J, Kinghorn-Perry SF, Crook B.

59.

Modelling wildlife rabies: Transmission, economics and conservation.

Biological Conservation (2006) **131**: 163-179

Sterner RT, Smith GC.

60.

Angiostrongylus vasorum in canids.

Veterinary Record (2006) **159**: 60

Tomlinson AJ, Taylor M, Roberts E.

61.

Zoo and wildlife medical education. A European perspective.

Journal of Veterinary Medical Education (2006) **33**: 401-407

Frolich K, Grabitzky SE, Walzer C, Delahay RJ, Dorrestein GM, Hatt JM.

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