GB Wildlife Disease Surveillance Partnership Quarterly Report

Quarterly Report: Vol 23 : Q1 January – March 2018

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VIDA diagnoses are recorded on the APHA FarmFile database and SAC Consultancy: Veterinary Services (SAC C VS) LIMS database and comply with agreed diagnostic criteria against which regular validations and audits are undertaken.

The investigational expertise and comprehensive diagnostic laboratory facilities of both APHA and SAC C VS are widely acknowledged, and unusual disease problems tend to be referred to either. However recognised conditions where there is either no diagnostic test, or for which a clinical diagnosis offers sufficient specificity to negate the need for laboratory investigation, are unlikely to be represented. The report may therefore be biased in favour of unusual incidents or those diseases that require laboratory investigation for confirmation.

APHA VICs have UKAS Accreditation and comply with ISO 17025 standard. SAC C VS have UKAS accreditation at their central diagnostic laboratory and at the Aberdeen, Edinburgh, Perth, Ayr, Dumfries, Inverness, St Boswells and Thurso Disease Surveillance Centres which comply with ISO 17025 standard.
INTRODUCTION

The GB Wildlife Disease Surveillance Partnership comprising the Animal and Plant Health Agency (APHA), Scottish Agricultural College Consulting (SAC Consulting), Institute of Zoology (IoZ), the Centre for Environment, Fisheries and Aquaculture (CEFAS), the Wildfowl and Wetlands Trust (WWT), Natural England (NE), the Forestry Commission England (FCE) and the Garden Wildlife Health (GWH) project produces the GB Wildlife Disease Surveillance Partnership Quarterly Reports:


OVERVIEW

Issues and trends
The period covered by this report saw severe winter weather conditions, with prolonged snow cover and sub-zero temperatures, over most of Britain, particularly during March. This has caused wildlife mass mortality events (mme’s) in wild mammals, birds and amphibians, as described later in this Report.

For the second quarter in succession, wild bird submissions to the APHA GB Avian Influenza Wild Birds Surveillance (AIWBS) project and the APHA Diseases of Wildlife Scheme (DoWS) have been frequent often involving mass mortality events and reflecting the heightened awareness of the presence of Highly Pathogenic AI virus (HPAIV) in British wild birds.

Paul Duff, APHA Diseases of Wildlife Scheme (DoWS)

NOTIFIABLE DISEASE

Avian Influenza Virus

Great Britain AI Wild Bird Surveillance (AIWBS): January – March 2018

Total wild bird surveillance
In December 2017 the Netherlands reported H5N6 in a commercial poultry holding. Since then, there have been further reports of H5N6 in wild birds across northwest Europe including Denmark, Finland, Germany, Ireland, Slovakia, Sweden and the UK; although the reports indicate that virus spread has not reached the levels seen with the H5N8 epizootic in 2016/2017. The first report in the UK of H5N6 was in week 2; a mass–mortality event (n=31) affecting mute swans (Cygnus olor), pochard (Aythya feina) and a Canada goose (Branta canadensis) in Dorset. Between January and March 2018 a further 18 cases of H5N6 were confirmed in wild birds, four of those were mass mortality incidents. In total, 520 birds were tested for the Avian Influenza surveillance scheme; 98 were found positive to H5N6; with a range of species represented including swans, Canada geese, pochard, tufted duck (Aythya fuligula), gulls, mallards (Anas platyrhynchos), mute swans, wild pheasants (Phasianus colchicus), buzzards (Buteo buteo) and a northern goshawk (Accipiter gentilis). Mass mortality incidents featured more in January and early February, when swans and other waterfowl were more frequently found. Fewer birds were confirmed positive in the latter weeks, but birds of prey were a more prominent feature of the species confirmed H5N6 positive. The surveillance threshold criteria remained at one for target species (wild geese, wild ducks including mallards, swans, gulls and birds of prey) during Q1.

<table>
<thead>
<tr>
<th>Surveillance activity</th>
<th>Number of birds tested*</th>
<th>Positive AI virus result and species of bird</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Found dead/injured</td>
<td>520 (516)</td>
<td>There were 90 H5N6 positive cases found in a range of species of wild birds; the majority were waterfowl.</td>
<td>Scanning surveillance All-year-round</td>
</tr>
</tbody>
</table>

*Number of birds tested: figures for January-March 2017 are shown in brackets.
Members of the public are asked to remain vigilant and report findings of target species in addition to mass mortality incidents to the Defra Helpline: 03459 33 55 77. The criteria for a mass mortality incident are five or more wild birds of any species at any location (irrespective of county) in England, Scotland and Wales.

Warden Patrol Scheme

The main emphasis of the warden patrol scheme is on AIWBS in found dead wild birds, including mass mortality incidents, and patrols of designated reserves by skilled wild bird ecologists and wardens. These Warden Patrols continue all-year-round, but are also seasonally targeted in the winter and spring periods (October to March) each year.

During the period 1st January to 31st March 2018 (Q1-2018), a total of 443 Warden Patrols were performed at sites across GB. This compares with a total of 453 Warden Patrols performed during the same period in 2017 (Q1-2017) in GB. During Q1-2018, the Warden Patrols were mainly performed by Natural England and the Wildfowl and Wetlands Trust. Warden Patrols were also carried out by six other voluntary organisations. In total during Q1-2018, 131 wild birds were reported found dead under the Warden Patrol Scheme of which 83 were tested, with no AI detections. This compares with a total of 127 wild birds found dead of which 76 were tested during Q1-2017, with H5N8 detected in 5 birds.

In Q1-2018, Whooper Swans (Cygnus cygnus) (32) were the most common target species found, and birds were most commonly found in the East region with the lowest numbers in the Midlands, Scotland, and Wales. Whooper Swans were the most common target species found in Q1-2017 as well (22) and birds were most commonly found in the North East region with the lowest numbers in Scotland, Wales and the Midlands.

Current EU situation

The current EU and UK outbreak situation can be found here: https://www.gov.uk/government/publications/avian-influenza-bird-flu-in-europe


Current UK Situation

As a result of the detection of H5N6 in early January an Avian Influenza Protection Zones (AIPZ) was put in place across England and Wales in order to decrease the potential risk of direct/indirect contact between poultry and infected wild birds. Please click on the link for further information of the current AIPZ status: https://www.gov.uk/government/news/avian-influenza-bird-flu-in-winter-2017-to-2018

It is important to note that at the time of writing, there has been no detection of HPAI H5N6 in poultry in the UK. However, at all times, poultry keepers are advised to maintain robust biosecurity measures, vigilance for clinical signs of disease and to promptly report suspected cases of notifiable avian disease in poultry to APHA:

- In England – call the Defra Rural Services Helpline on 03000 200 301. The Helpline is open Monday to Friday, 8.30am to 5pm and there is an out of hours facility on the same number for reporting suspicion of disease in animals.
- In Wales, the helpline number is 0300 303 8268

Further information regarding avian influenza in poultry and wild birds is also available:

- When and how to register your poultry flock, and which species must be registered in Great Britain: https://www.gov.uk/guidance/poultry-registration.
- Information about the chargeable testing scheme offered in GB by APHA that enables veterinarians to request ‘Testing for Exclusion of notifiable avian disease’ in chicken and turkey flocks, in
circumstances that would not require the implementation of statutory disease control measures (Gibbens and others, 2014): http://ahvla.defra.gov.uk/vet-gateway/nad/index.htm.

Avian influenza and Newcastle disease/PPMV-1 events, including H5 HPAI internationally, are also summarised in GB Wildlife Disease Surveillance Partnership quarterly reports.

References
https://www.gov.uk/guidance/avian-influenza-bird-flu
Wildlife disease surveillance reports, 2016 - GOV.UK
https://science.vla.gov.uk/flu-lab-net/docs/outbreak-hpai-h5n8-europe.pdf
Avian influenza (bird flu) - GOV.UK
Avian influenza in wild birds: winter 2016 to 2017 - GOV.UK
Avian influenza in wild birds: winter 2016 to 2017 - GOV.UK
Current status of avian influenza in Europe and the UK: http://veterinaryrecord.bmj.com/content/182/2/54
Rowena Hansen, Avian Virology, APHA Weybridge
Joanna Tye, CERA, APHA Weybridge

Wildfowl and Wetlands Trust's (WWT) role in GB Avian Influenza Wild Bird Surveillance (AIWBS): January–March 2018

SUMMARY: Threats - HPAIV, targeted active surveillance of wetland birds

WWT continued to monitor avian influenza in wild birds throughout this quarter as part of its involvement in the GB AIWBS. The Wild Bird Surveillance programme was carried out across WWT’s eight wetland reserves, with a minimum of weekly patrols conducted on eight reserves, and additional patrols being carried out on an ad hoc basis at Steart Marshes, Somerset.

Between January and March 2018, 90 dead waterbirds were found, of which 75 were sampled for avian influenza virus, representing sampling from all nine sites in Gloucestershire, Carmarthenshire, Somerset, West Sussex, Greater London, Norfolk, Lancashire, Tyne & Wear, and Dumfries & Galloway. The sampled birds comprised 17 waterbird species of surveillance priority, including swans, geese, ducks, gulls, rails, northern lapwing (Vanellus vanellus), plus one black-tailed godwit (Limosa limosa) and one Eurasian sparrowhawk (Accipiter nisus). Birds which were not sampled for avian influenza virus were either found in an advanced state of decomposition, had been heavily predated upon, or were inaccessible. All samples tested negative for highly pathogenic avian influenza (HPAI) viruses which represents a different pattern of mortality to that of the H5N8 outbreak in the winter of 2016/17. Samples from two waterbirds (whooper swan (Cygnus Cygnus) and wigeon (Mareca penelope)) found in January 2018 tested non-negative for non-H5 avian influenza virus. See APHA report for further details of HPAI surveillance results from across the UK.

WWT

APHA AIWBS and APHA DoWS - a brief summary of selected HPAIV incidents

Some information on three mortality incidents in wild birds submitted to APHA DoWS are given below as examples of findings in these cases. In the first, approximately 70 waterbirds, of several species, were reported to have been found dead at a large body of water in the West midlands. The dead birds were found over a period of several days after a period of cold weather and storms in January. Up to 55,000 birds (mainly gulls) can be present on or around the water in January. Deaths occurred from the 5th to the 11th after which there was no significant mortality. 17 birds were submitted to APHA and the H5 gene was confirmed by PCR in 5/6 tufted duck, 6/6 greater black-backed gull (Larus fuscus), 1 of 2 herring gulls (L argentatus), 1/1 great crested grebe (Podiceps cristatus); while tests on a heron (Ardea cinerea) and black headed gull (Chroicocephalus ridibundus) gave negative results; in all 13/17 birds were PCR positive. All birds were in good body condition, none however had food in their gastro-intestinal tracts. Haemorrhages were present in the gizzard of one tufted duck and blood was present in the oropharynx of a herring gull,
however these were the extent of pathological changes possibly associated with viraemia. Six showed post-mortem predation signs.

Eight mallard and one moorhen (*Gallinula chloropus*) were submitted having died with other birds in a village pond in the midlands in late January. Liver petechiation and haemorrhagic loops of intestine, in one bird only, were suggestive of viraemia. HPAIV H5 was detected by PCR in all nine birds. Most showed evidence of post-mortem predation. The third case involved a mass mortality event on a nature reserve in the Home Counties. This was investigated and 19 birds were collected and submitted including two mallard, five tufted duck, six grey lag goose (*Anser anser*) and herring and black-headed gulls. All were in good body condition but autolysed at the time of submission. With the exception of one herring gull, H5 influenza virus RNA was detected by PCR in all birds (although not from all tissue swabs from all birds). Two H5 influenza virus positive birds had petechial and ecchymotic haemorrhages on the epicardial surfaces of their hearts, suggestive of acute infection. Again, like the first case, little foodstuff was present in the gastro-intestinal tracts. In summary, from these cases, pathology that could be associated with an acute viraemia, was not consistently seen in all birds positive for the H5 gene, acute pathology was seen in a minority of birds, and the acute pathology that was reported was not consistent among the few birds in which it was present.

**ZOOLOGICAL DISEASES**

**APHA Diseases of Wildlife Scheme (DoWS); Salmonellosis in wildlife;**

January – March 2018

**THREAT: Zoonotic, farmed and pet animal risk**

There is no routine monitoring of *Salmonella* in wild birds or wild mammals. Therefore all isolates are usually from clinical cases, although *Salmonella* may often not be the primary cause of disease. Occasionally it is isolated from small-scale surveys.

*Salmonella* Typhimurium DT12a was isolated from a juvenile male hedgehog (*Erinaceus europaeus*) in a wildlife hospital. This isolate was resistant *in vitro* to tetracycline but widely sensitive to other antibiotics. This is an unusual isolate for hedgehogs with *S.* Enteritidis PT11 the most common *Salmonella* species isolated. Defra’s latest, “Salmonella in livestock production in Great Britain” publication, which is for 2016, gives three cases of *S.* Typhimurium DT12 in cattle in 2016 but none in the four previous years. DT12 includes a number of diverse genotypes with a MDR variant being linked with *S.* Typhimurium DT104. *S.*Kedougou was isolated by a private laboratory from swab from a feral ferret (*Mustela putorius furo*) in the West Country. No further details were given. Defra’s 2016 *Salmonella* publication reports that during 2016 the most commonly reported serovars from animal feedstuffs and compound feed were *S.* Kedougou and *S.* Senftenberg with 29 isolations each.

No Salmonella species were isolated from wild birds this quarter. Also there were no reports of bird variant *S.* Typhimurium DT40, DT56 or DT56v from domestic species.

Quality statement regarding these data: - UK data and the output of ad-hoc data retrieval from APHA FarmFile database. These figures are provisional. Research project and game bird isolates were excluded. All are from England and Wales.

No salmonella infections were identified by DoWS this quarter.

**Alex Barlow, APHA Diseases of Wildlife Scheme**

**IoZ; Salmonellosis in wildlife;**

**Passerine salmonellosis**

**Summary including possible threats – Point for Information (PFI);**

**Threat to Passeriform health and welfare; Potential threat to human and domestic animal health**

Passerine salmonellosis, caused by *Salmonella* Typhimurium, typically affects gregarious, seed-eating Passeriformes, often during the winter months. Whilst greenfinches (*Chloris chloris*) and house sparrows (*Passer domesticus*) are most commonly affected, other species are also susceptible.

In February 2018, a siskin (*Spinus spinus*) found dead at a site in Scotland was examined post mortem. Macroscopic abnormalities included multi-focal, yellow lesions in the oesophagus, liver, gizzard, and caecal tonsils. Microbiological examination of these tissues revealed a confluent, pure isolate of *Salmonella* sp., and histopathological examination confirmed the diagnosis of salmonellosis in this case. Further, whole genome sequencing identified the isolate as *S.* Typhimurium, with closest identity to phage
type U277, which is consistent with previous isolations of *Salmonella* sp. from this, and other, passerine species.

We continue to alert members of the public to the potential risk of zoonotic *Salmonella* infection from direct or indirect contact with wild birds, and we routinely advise on basic hygiene precautions, such as hand washing after feeding wild birds.

**References**


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**Report from Wildlife Zoonoses and Vector Borne Disease Research Group; 1st Quarter January – March 2018**

**SUMMARY - THREAT: Zoonotic, farmed, pet animal and international trade risk**

**Passive surveillance for lyssaviruses in UK bats**

Nineteen bats were tested for lyssavirus under passive surveillance. All were negative.

Five zoo bats were tested in this quarter for lyssaviruses. All were negative.

**Rabies surveillance in terrestrial wildlife**

Vigilance continues for this notifiable disease in UK wildlife but no samples from terrestrial wildlife were submitted for testing this quarter.

One dog (death in quarantine) was tested for rabies with negative results.

**WNV surveillance in wild birds SV3045**

Brain and kidney tissue samples from a single blackbird showing possible neurological signs were tested by TaqMan PCR for both WNV and Usutu virus during this period with negative results.

Wild bird surveillance for WNV and Usutu virus will resume at the start of the vector season on 1st April 2018

**West Nile virus surveillance in Equids**

One serum sample from a horse showing neurological signs was tested for WNV by cELISA during this period with negative result.

Paul Phipps, Wildlife Zoonoses and Vector Borne Disease Research Group, APHA Weybridge

**From horizon scanning - zoonotic potential of Borna disease virus 1 (BoDV-1), wildlife reservoir.**

A proposed wild animal reservoir is the bicoloured white-toothed shrew (*Crocidura leucodon*). This shrew does not occur in the UK but two closely related species (*Crocidura* spp.) occur on the Scilly and Channel Islands. The routes of transmission of BoDV-1 from the shrew (or other animal reservoir) are unknown. The endemic area for BoDV-1 is in central Europe, and does not include the UK. This Borna virus is distinct from VSBV-1 [variegated squirrel 1 bornavirus]. Current interest from Germany, 2018, where there were four human cases of encephalitis, three of these associated with BoDV-1 relating to solid organ recipients; 2/4 cases fatal.


APHA Diseases of Wildlife Scheme
ONGOING NEW AND RE-EMERGING DISEASES, UNUSUAL DIAGNOSES AND HORIZON SCANNING

MAMMAL REPORTS

Wild mammal reports from Scotland

Antibody to Louping Ill Virus was detected in 35 of 49 mountain hares (*Lepus timidus*) shot on a moor in the highlands.

An extended spectrum beta lactamase (ESBL) positive *Escherichia coli* was isolated from a faecal sample from a grey seal (*Halichoerus grypus*) which had showed mucoid diarrhoea and vomiting. The organism was recovered in heavy, pure growth from the sample, and a routine sensitivity profile showed extensive antimicrobial resistance. ESBL production was tested for, and returned a positive result. A high and potential significant coccidial oocyst count was also noted. ESBLs are currently uncommon in many UK livestock, and this is therefore a relatively unusual finding, although this type of resistance does appear to be increasing in prevalence. ESBLs can confer resistance to a large number of beta-lactam compounds and therefore have significance for animal and public health. In human medicine, organisms which possess an ESBL are generally considered resistant to all penicillins (with the exception of temocillin) and all cephalosporins (with the exception of cefoxitin) irrespective of the results obtained in routine susceptibility tests. [Neither temocillin or cefoxitin is authorised for veterinary use]. In the medical field, treatment failures and death have occurred when cephalosporins were used against ESBL producers that appeared susceptible in vitro.

A typhlocolopathy of unknown origin was seen in two Eurasian beavers (*Castor fiber*). The first was trapped in Beauly where two others had recently been found dead. The juvenile female beaver showed no clinical signs in the shelter, but was found dead suddenly one morning. At necropsy, profuse watery large intestinal content was seen, and the mucosa of the proximal colon was reddened and thickened. Stomach content was fluid and black, with black spots peppered over the gastric mucosa. Small intestinal content was red-black. Eggs of the large intestinal fluke *Stichorchis subtriquetrus* were seen in the large intestinal content. Histopathology revealed widespread acute damage to the stomach and large intestine, but with no definitive evidence of significant infectious disease. The changes in the stomach and large intestine appeared vascular, or due to hypoxia. Shock or stress were considered to have played a significant role. Infectious disease could not be excluded, but the changes did not suggest viral, parasitic, fungal or bacterial disease. A second beaver from the same location was affected, and samples submitted following acute diarrhoea, collapse and death. Histopathology revealed dramatic oedema in the large intestine and multifocal chronic inflammation in the lungs. There was no evidence of necrosis or inflammation in the portion of large intestine submitted, and a vascular cause was considered most likely. The oedema and congestion in the large intestine was similar to the other beaver, but there was none of the mucosal degeneration in this case, and the changes in the submitted tissues were not sufficient to explain the death.

Caroline Robinson, SAC Consulting Veterinary Services
APHA DoWS
Wild mammal reports from APHA DoWS

Wildlife mass mortality events (mmes) associated with late winter 2017/18 snow-cover and freezing temperatures – see also related articles in the wild bird and amphibian sections.

Summary including threats – point for information

Threat to red deer biodiversity, welfare and possible cause for public concern

Photos top left, clockwise – immature red deer found dead *in situ* after snow drifts melted (photos 1 and 2) on the Cumbrian Fells. At post-mortem examination, red deer, showing good rumen fill and lack of fat. *Photo credits, T Harrington, National Trust and APHA Diseases of Wildlife Scheme.*

Several mass mortality events (mmes) have occurred in a range of wild species across the country associated with extended winter weather including sub-zero temperatures and snow-cover over many days in March 2018. Six red deer (*Cervus elaphus*) were found dead on the Cumbrian fells (photos above) after the snow drifts melted. Red deer mortality in the Fells has been previously associated with hard winters with prolonged snow-cover. No evidence of infectious disease was found however light infestations of lungworm and fluke were detected and these may have contributed to the poor body condition seen in all the animals. All the deer had good rumen-fill (see photo) and death was thought primarily to be associated with very low ambient temperatures and snow cover over a period of days in animals which were already in poor condition.

National wildlife disease surveillance schemes in Switzerland and Sweden also reported wildlife mass mortality events considered to be due to late winter sub-zero temperatures and snow cover, primarily in deer and other ruminant species.
Avian Reports

Wild Bird report from the IoZ
In Q1 2018, we received 359 disease incident reports (DIRs) involving 627 birds (375 sick/252 dead) from 34 species and 237 sites from England, Scotland, Wales and Northern Ireland. PMEs were performed on 57 birds from 45 sites from England, Scotland and Wales.

Finch Trichomonosis – update and recent publication
Summary including possible threats – Point for Information (PFI);
Threat to bird health, welfare, biodiversity and cause of considerable public concern
In Q1 2018, a suspected diagnosis of trichomonosis was assigned to 118 DIRs, involving 142 sick/151 dead birds from 78 sites from England, Scotland, Wales and Northern Ireland.
Further, trichomonosis was diagnosed in 35 birds (comprising seven species, predominantly chaffinches (Fringilla coelebs) and greenfinches (Chloris chloris)) examined post-mortem from 28 sites from England, Wales and Scotland. This included a single hawfinch (Coccothraustes coccothraustes), the first time we have diagnosed trichomonosis in this species.

A recent review paper, published in Philosophical Transactions of the Royal Society B, examined the health risks associated with supplementary food provision for British birds in peri-domestic habitats. The research, conducted by the Zoological Society of London, British Trust for Ornithology and Fera Science Ltd., focuses on both endemic (passerine salmonellosis) and emerging (finch trichomonosis and Paridae pox) diseases (as well as aflatoxin exposure), and suggests evidence-based mitigation strategies to minimise the risks of disease transmission associated with supplementary feeding to wild bird health, welfare, and biodiversity.

References

Suttonella ornithocola infection in a coal tit (Periparus ater)
Summary including possible threats – Point for Information (PFI);
Threat to bird health and welfare
In March 2018, a coal tit (Periparus ater) from a single mortality event at a site in Cumbria was submitted for PME. Evidence of mild pulmonary congestion was evident and histological examination is pending. Microbiological examination of the lungs revealed a moderate mixed predominance of beta-haemolytic Gram-negative bacteria tentatively identified as Suttonella sp.

Suttonella ornithocola infection has been most commonly observed in blue tit (Cyanistes caeruleus), as a cause of pneumonia-like disease; however, other birds within the tit families (Paridae and Aegithalidae) are also susceptible to infection. Coal tits are one of the less frequently affected tit species: the bacterium has previously only been isolated from two individuals of this species, from Scotland (Lawson et al. 2010) and Finland (EWDA Bulletin, 2017). The early-spring timing of this event is typical of the seasonality observed in previous years.

References
Pigeon paramyxovirus-1 (PPMV-1)
Summary including possible threats – Point for Information (PFI);
Threat to wild Columbiform health and welfare; Potential threat to poultry health
A multiple mortality incident involving three collared doves from the same site in Tyne and Wear, England was reported in January 2018. Upon PME of the single available carcass, several macroscopic abnormalities were noted, including: thin body condition, gastrointestinal serosal blood vessel congestion, a large volume of yellow-green fluid throughout the gastrointestinal tract, and marked splenic pallor. Samples of lung and trachea, intestines and brain were submitted to the AHPA laboratory for avian paramyxovirus-1 PCR testing. All tissue samples tested positive for PPMV-1 RNA.
PPMV-1 is well known as a cause of multiple mortality of captive and wild Columbiformes in GB. Given the potential implications for poultry health, and the increased popularity of both garden bird feeding and the keeping of backyard chickens, it is important to raise awareness of this potential risk and maintain surveillance for this infection.

References
Garden Wildlife Health ‘Pigeon Paramyxovirus-1’ factsheet: https://www.gardenwildlifehealth.org/portfolio/pigeon-paramyxovirus-1/
IoZ

Wildfowl and Wetlands Trust (WWT) report: January–March 2018

Passive surveillance of waterbirds
Post mortem examinations were performed on 46 wild birds which were found dead between January and March 2018. These comprised 13 species across seven WWT sites (Slimbridge, Gloucestershire; Arundel, West Sussex; London Wetland Centre, Greater London; Martin Mere, Lancashire; Welney, Norfolk; Caerlaverock, Dumfries & Galloway; and Steart Marshes, Somerset). The following species were examined: whooper swan Cygnus cygnus (18), mute swan Cygnus olor (2), greylag goose Anser anser (1), pink-footed goose Anser brachyrhynchus (1), Canada goose Branta canadensis (2), mallard Anas platyrhynchos (5), wigeon Mareca penelope (2), black-headed gull Chroicocephalus ridibundus (6), moorhen Gallinula chloropus (5), coot Fulica atra (1), little grebe Tachybaptus ruficollis (1), rock pigeon Columba livia (1) and jackdaw Corvus monedula (1). The primary causes of death are summarised below (Table 1).
The most significant finding of the quarter was necrotizing enteritis (usually in both the small and large intestine) in whooper swans from the centre in Norfolk (9 cases, representing half the whooper swan deaths from this surveillance period). As has been previously reported, the condition is likely to be multifactorial but can be associated with consumption of carbohydrate rich foods such as potatoes and sugar beet. Two of the swans had concurrent parasitic infestations – one with gapeworms, and one with tapeworms. This condition is also of note as a differential diagnosis for AI in the field.
Three additional whooper swans cases from the region had lesions consistent with an impact with a power line. Other causes of trauma included predation, injury, intra/interspecific aggression and a case of chronic, severe, localised coelomitis, secondary to intestinal perforation, with one gunshot found within necrotic tissue of the coelomic cavity in a pink-footed goose (legal quarry species).
Table 1. The primary causes of wild bird mortality (or morbidity requiring euthanasia) found at WWT reserves between January and March 2018; †n denotes juvenile birds, and number of juvenile birds.

<table>
<thead>
<tr>
<th>Primary cause of death</th>
<th>Total</th>
<th>Species (and notes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necrotizing enteritis</td>
<td>9</td>
<td>9 x Whooper swan†2</td>
</tr>
<tr>
<td>Trauma</td>
<td>9</td>
<td>4 x Whooper swan†1, 1 x Pink-footed goose, 1 x Wigeon, 2 x Moorhen, 1 x Mallard</td>
</tr>
<tr>
<td>Aspergillosis</td>
<td>2</td>
<td>2 x Whooper swan†2</td>
</tr>
<tr>
<td>Haemorrhagic enteritis</td>
<td>2</td>
<td>1 x Jackdaw; 1 x Whooper swan</td>
</tr>
<tr>
<td>Tape worm infestation</td>
<td>2</td>
<td>2 x Black-headed gull</td>
</tr>
<tr>
<td>Visceral gout</td>
<td>2</td>
<td>1 x Mute Swan; 1 x Mallard</td>
</tr>
<tr>
<td>Mycobacteriosis</td>
<td>1</td>
<td>1 Wigeon</td>
</tr>
<tr>
<td>Gizzard impaction</td>
<td>1</td>
<td>1 x Whooper swan</td>
</tr>
<tr>
<td>Heavy metal poisoning (lead)</td>
<td>1</td>
<td>1 x Mute Swan†1</td>
</tr>
<tr>
<td>Intestinal Obstruction</td>
<td>1</td>
<td>1 x Whooper swan</td>
</tr>
<tr>
<td>Gastrointestinal nematodiasis</td>
<td>1</td>
<td>1 x Black-headed gull</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>1</td>
<td>1 x Greylag goose</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>1 x Black-headed gull – splenomegaly; 1 x Coot – splenomegaly and hepatomegaly; 1 x Black-headed gull†1 – multiple nodules in subcutaneous space and muscle; 1 Rock pigeon – Liver failure; 1 x Moorhen – Splenomegaly; 1 x Mallard – Necrotizing oesophagitis and ingluvitis</td>
</tr>
<tr>
<td>Undetermined cause of death</td>
<td>6</td>
<td>1 x Canada goose, 1 x Moorhen, 1 x Little grebe, 1 x Black-headed gull, 2 x Mallard†</td>
</tr>
<tr>
<td>No diagnosis (due to heavy predation or decomposition)</td>
<td>2</td>
<td>1 x Canada goose, 1 x Moorhen</td>
</tr>
</tbody>
</table>
Targeted surveillance for Sarcocystis in wildfowl

Updates on the surveillance for sarcocystis (identified as being caused by *Sarcocystis rileyi*) have been provided in previous quarterly reports. A further 13 cases were reported via the on-line reporting system between January and March. The number of reported cases has increased year on year. This trend may reflect an increased awareness of the disease and the mechanism of reporting among the shooting community, although the results of the questionnaire survey distributed among wildfowlers suggests a striking increase in cases (see Figure 1), the implications of which are hard to determine at present. There is current concern from those aware of the situation further up the flyway that this is likely to represent a real threat to the affected wildfowl populations not necessarily through mortality but other impacts on fitness.

In March, a Feedback Report was produced summarising the results obtained between 2015 and 2017. See the UK Wildfowl Sarcocystis Survey website (sarcocystissurvey.org.uk) for further information and access to the full 2015-2018 Feedback Report. Findings are being submitted for publication.

WTW

Wild bird reports from Scotland:

Lead poisoning was diagnosed in a white-tailed sea eagle (*Haliaeetus albicilla*) found shortly before death in Argyll. At necropsy, the five-year-old male eagle was found to be in good body condition. Deer larder waste and carcasses were provided for eagles on a neighbouring peninsula. The crop contained green-coloured mucus and there was a large amount of remarkably green, fibrous plant matter in the gizzard, mixed with the remains of a projectile with a 7.7 mm diameter. Liver lead was 57.4 mg/kg FT. Tissue lead levels > 2.07 mg/kg FT in the liver or kidney is consistent with a diagnosis of lead poisoning in birds.

Lead poisoning was diagnosed in a mute swan (*Cygnus olor*) found dead in the western isles in poor body condition. An x-ray indicated radio-opaque material the size of shot pellets in an area suggestive of ingestion. At necropsy, lead levels of 11.8 mg/kg FT were found in the kidney.

Lead poisoning was diagnosed in examined birds from a group of ten adult and two immature whooper swans (*Cygnus cygnus*) found dead in poor body condition around a loch in the Scottish borders. Of these, three were fully examined due to degradation of the carcases of the others. Pericardial adhesions and fluid intestinal contents were noted. Lead levels in the three livers were 19.1, 31.4 and 23.2 mg/kg FT.

Lead poisoning was diagnosed in a further two adult whooper swans (*Cygnus cygnus*) found dead around the same loch in the Scottish borders around a month after the first spate of deaths. Significant findings included several small metal balls of approx. 1mm diameter in the gizzard of one swan, and one similar ball found in the other. Liver lead levels were 13.1 mg/kg FT in one swab, and kidney lead levels were 31.8 mg/kg FT in the other.

Louping ill was diagnosed in an immature red grouse cock (*Lagopus lagopus*) which was found with opisthotonus on a moor where the grouse population was falling. Gross necropsy was unrewarding. Systemic *Escherichia coli* infection was diagnosed, however this would be an unusual diagnosis at this age without a predisposing condition. Histopathology revealed an acute nonsuppurative encephalitis with vasculitis and light incomplete perivascular lymphocytic cuffing. A significant enteric coccidial infection was also noted. Louping ill virus RNA was detected in brain tissue.

A ruptured right atrium was seen in an adult female white tailed sea eagle (*Haliaeetus albicilla*) found dead on a beach near Oban. At necropsy, body condition was good and marked pulmonary oedema was noted. The right atrium was ruptured, with haemorrhage around the heart. The left atrioventricular valves were thickened, as were the aortic valves. There were ecchymotic haemorrhages on the epicardium and haemorrhagic streaks within the myocardium.
Aspergillosis was diagnosed in a whooper swan (*Cygnus cygnus*) found dead in a harbour. At necropsy, the bird was emaciated, and fungal plaques from pinpoint size to 1cm in diameter were seen scattered over the air sacs and thoracic walls. *Aspergillus fumigatus* was isolated.

Salmonellosis was diagnosed in a goldfinch submitted following the death of at least five goldfinches and one siskin in a garden with bird feeders. At necropsy, the male bird was lean, the oesophagus was thickened and the spleen was enlarged, with white abscesses throughout. *Salmonella Typhimurium* was isolated from tissue samples.

Trichomonosis was diagnosed in twelve wood pigeons (*Columba palumbus*) found dead in one area of countryside. At necropsy, body condition was fair to poor, and seven of the birds had visible friable yellow lesions in the mouth and pharynx. Trichomonosis (canker) was diagnosed presumptively.

Presumptive candidiasis was diagnosed in an adult red grouse cock (*Lagopus lagopus*) which was found unable to fly. At necropsy, the crop was very dilated and full of heather, while the mucosa was thickened and showed a diphtheritic membrane in places. A Gram smear prepared from crop tissue showed large numbers of gram positive, oval, budding cells consistent with candidiasis, and no other causes of morbidity were found.

*Caroline Robinson, SAC Consulting Veterinary Services*
APHA DoWS Report Wild birds
Mass mortality events (mmes) due to severe winter weather
Summary including possible threats – Point for information (pfi)
Possible threat to biodiversity


Forty-four Oystercatchers (*Haematopus ostralegus*) from 74 found dead were submitted from four upland locations (2 reservoirs) over a 9 day period in March from the North-east of England. The birds had empty stomachs and were in poor body condition, with low body weights. They were probably en-route from wintering grounds on the coast to upland breeding grounds and could not penetrate the frozen substrate there for invertebrate prey with their long beaks. In March over a 3-week-period, the Diseases of Wildlife Scheme (DoWS) received four submissions of 74 birds (of 6 species, golden plover (*Pluvialis apricaria*) – see photo above, lapwing (*Vanellus vanellus*), fieldfare (*Turdus pilaris*), redwing (*Turdus iliacus*), blackbird (*Turdus merula*) and a single common buzzard (*Buteo buteo*)
from one beach and the adjacent sand dunes in South Wales. All were in an emaciated state with little food in gastro-intestinal tracts and, as time went on, the birds submitted were more autolysed. Again it was concluded that the severe weather, including strong winds, snow and frozen ground prevented the birds feeding with starvation being the likely cause of death, although we cannot exclude the possibility that some may have drowned in the Bristol Channel. Why they all died on this particular beach was not clear; wild bird deaths from other beaches in South Wales were not reported.

Sian Mitchell, Colin Weaver, APHA DoWS

Wild bird surveillance based on submissions where HPAIV has been excluded
Summary including possible threats – point for information. Assessing mortality events where AIV was excluded

Approximate numbers of birds submitted during February and March 2018 from England and Wales are given below

<table>
<thead>
<tr>
<th>Bird species / family</th>
<th>Submissions during Feb 2018 Birds submitted (no of submissions)</th>
<th>Submissions during Mar 2018 Birds submitted (no of submissions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mute swans</td>
<td>32 (23)</td>
<td>20 (15)</td>
</tr>
<tr>
<td>Geese</td>
<td>4 (4)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Ducks</td>
<td>1 (1)</td>
<td>4 (3)</td>
</tr>
<tr>
<td>Gulls</td>
<td>12 (3)</td>
<td>15 (5)</td>
</tr>
</tbody>
</table>

Approximate submission figures of some wild waterbirds for AIV monitoring and post mortem examination during February and March 2018 are given in the table above. The numbers of wild birds submitted during this time for AIV surveillance under safety containment restrictions did not always allow a full diagnostic post-mortem examination to take place however Veterinary Investigation Officers performed these where possible and generated useful surveillance information. In the brief descriptions given below AIV was negated.

The most frequent diagnosis in these birds was deaths due to traumatic injury. Usually the nature of the trauma was not known, however in some cases road traffic collisions and predation were strongly suspected, while a small number of birds had been obviously shot. Traumatic injury usually involved single birds or pairs however the deaths of 10 black headed gulls (*Chroicocephalus ridibundus*) found dead together in East Anglia was attributed to blunt trauma of an unknown nature. Diagnosis of starvation and emaciation was frequently seen in raptors and waterbirds. Less frequent diagnoses, usually involving single birds, included – visceral gout in mute swans, avian tuberculosis (and trauma) in a mute swan, peritonitis and pericarditis in both mute swan and whooper swan (*Cygnus cygnus*) and lead poisoning in a mute swan and mallard (*Anas platyrhynchos*) trauma and acanthocephalan helminthiasis in a tufted duck. In summary, the findings are similar to those in previous winters, when HPAIV has been present in the UK and where numbers of birds submitted to APHA have been high or very high (occasionally in the thousands of carcases) in that, ‘common diseases are commonly diagnosed’. This statement is not as meaningless as it may sound, as it provides a list of common diagnoses in particular for waterbirds. This list, including the conditions above, has remained relatively consistent since the time of the first AIV wild bird surveillance in 2006 and it gives some confidence in our diagnostic records and abilities nationally.

One possible new syndrome in swans and Canada geese that we have recognised for over 20 years but for which a definitive cause has yet to be found is proventricular dilation (where lead poisoning has been
excluded). We suspect that some of these cases are due to an avian bornavirus infection, however, to date, we have been unable to confirm this with laboratory testing.

**HORIZON SCANNING – WILDLIFE DISEASE**

**Dermatophilosis in wild birds**

**Summary including possible threats – point for information. A possibly emerging disease in avians**

Dermatophilosis is a contagious zoonotic skin disease caused by a bacterial pathogen (*Dermatophilus congolensis*), it is well described in mammals. The reference below provides only the second description of the disease in birds. 27/60 (45%) sanderlings were infected on a coastal island in the USA. Both sanderlings and the pathogen are present in the UK. The potential significance of this report is that it is only the second report of this pathogen affecting birds, and several birds in the group were affected, not just one individual. One potential significance is as a possible emerging disease (in avians). However dermatophilosis has been recently been suspected (for the first time) by DoWS, affecting wild red squirrels (*Sciurus vulgaris*) in Wales. These outbreaks of dermatophilosis are unlikely to pose an increased threat to human, livestock and/or biodiversity health.


**Horizon scanning – ‘Kamikaze’ a new form of raptor poisoning**

An apparently new form of poisoning of raptors, particularly peregrine falcons (*Falco peregrinus*), anecdotally referred to as 'Kamikaze poisoning' was reported recently from Sweden (1 case in a peregrine falcon) and Switzerland (several cases, species not specified). It involves the application of a carbofuran or organochlorine toxin to the feathers of pigeons, which are then released. When the pigeons are killed and eaten by raptors, the raptors died through ingestion of toxic feathers. The practice is considered (reference needed) to have come from Eastern Europe.

**UK Priority and Conservation Concern Species**

**MAMMAL REPORTS**

**Summary including possible threats – point for information, possible biodiversity threat.**

Fourteen dead bats from a very large roost of several hundred Natterer’s bats (*Myotis nattereri*) in Southern England were examined. In many, autolysis of the carcasses was an issue however on the fresher animals intestinal parasitism was identified. Culture on fungal skin lesions produced mixed fungal growths including *Rhizopus spp.* however the causative fungus for the white nose syndrome was not detected.

**MAMMAL REPORTS**

**Disease Risk Analysis and Health Surveillance (DRAHS)**

**Summary including possible threats – Point for Information (PFI); Conservation translocation and conservation concern**

The Disease Risk Analysis and Health Surveillance (DRAHS) partnership (Zoological Society of London/Natural England) is currently carrying out comprehensive disease risk analysis for forthcoming conservation translocations of the pine marten (*Martes martes*) from Scotland to England and reintroductions of the water vole (*Arvicola amphibius*) into England.

**Adenovirus in Hazel dormice (*Muscardinus avellanarius*) reintroduced in England**

**Summary including possible threats – Point for Information (PFI); Conservation reintroduction, animal welfare and conservation concern**

A review of hazel dormice (*Muscardinus avellanarius*) submitted for post-mortem examination to the IoZ was performed for individuals with signs of haemorrhagic enteritis as part of a Disease Risk Analysis for adenovirus. Intestine samples from 15 of these were submitted to the APHA in March 2018 and four (one
free-living from Polstead in Suffolk, and three in quarantine at London Zoo prior to release) were confirmed
to be positive for adenovirus by PCR.
Adenovirus infection associated with enteric disease and mortality is recognised in red squirrels (Sainsbury
et al., 2001) and has been implicated in disease outbreaks in captive and translocated red squirrels
(Everest et al., 2014). However, adenovirus antigen has also been detected in red squirrels without enteric
abnormalities suggesting subclinical infections may be widespread within wild British populations of red
squirrels (Everest et al., 2014).
In the absence of confirmation of active enteric adenovirus infection by transmission electron microscopy
in the dormouse cases identified to date, it is unknown whether adenovirus infection causes clinically
significant disease in dormice. However, it should be assumed that adenoviruses can be pathogenic in
dormice in certain circumstances (e.g. when exposed to stress). Follow up research will aim to determine
if the strains detected in captive bred dormice are novel (alien) adenoviruses, or similar to the ones found
in wild dormice and other wild rodents in England.

References
novel adenovirus associated with splenitis, diarrhoea and mortality in translocated red squirrels, _Sciurus

IoZ

BIRD REPORTS – none received.

AQUATIC ANIMAL DISEASES

MARINE FISH REPORTS

Ankylosing spondylitis in haddock (_Melanogrammus aeglefinus_)
Vertebral malformations in haddock from the North Sea have been noted for many
years and were again reported during August 2017 in commercial catches from
the North Sea east of Aberdeen. Prevalence was estimated to be 35%. No
other species showed this condition. Samples were transported frozen to the
Cefas Weymouth Laboratory for examination. The vertebral column was
found to be severely compressed with deformed vertebra and extensive
intervertebral fibrosis resulting in fusion and compression of the spine. Samples taken for histological
examination revealed the presence of bacteria in spinal cartilage and fibrotic and granulomatous tissues.
Attempts to identify the bacterium are continuing.

Steve Feist, CEFAS
AMPHIBIAN REPORTS

In Q1 2018, a total of 92 disease incident reports (DIRs), involving 674 individual amphibians (72 sick/ 602 dead), were reported from 65 sites from England, Scotland and Wales. The majority of reports were of anurans only: 85 DIRs involving common frogs (*Rana temporaria*) from 60 sites (55 of which had multiple mortalities), four DIRs involving common toads (*Bufo bufo*) from separate sites. Three reports involved urodeles: one DIR involving a great crested newt (*Triturus cristatus*), one DIR involving five smooth newts (*Lissotriton vulgaris*) from the same site, and one DIR involving 10 newts of unknown species and 2 common frogs from the same site.

Post-mortem examinations (PMEs) were conducted on 20 common frogs from 10 sites from England.

Winterkill
Summary including possible threats – Point for Information (PFI);
Public concern

During late February/early March 2018, Great Britain (GB) experienced unusually low temperatures with hard frosts and snow which coincided with the emergence of amphibians from their over-wintering sites, and the onset of the breeding season. The extended period of sub-zero temperatures and associated ice cover on ponds led to increased numbers of mass mortality incidents (involving up to 100 dead common frogs from a single site) across the country. Based on the incident history, a suspected diagnosis of ‘winterkill’ was assigned to 22 DIRs, involving common frogs and newts (smooth newts and newts of unknown species).

Whilst amphibian mass mortality events are often documented at this time of the year and are not known to cause long-term population-level declines, large numbers of dead amphibians at a single pond can raise public concern. To address this, we created a new factsheet on ‘amphibian winterkill’, which includes information on the proposed mechanisms for winterkill and mitigation strategies to reduce the likelihood of its occurrence, such as maintaining a hole in pond ice and sweeping snow from the surface to allow sunlight to penetrate the water below.

References
Garden Wildlife Health ‘amphibian winterkill’ factsheet:
https://www.gardenwildlifehealth.org/portfolio/winterkill-in-amphibians_gwh/

Chytrid fungi and ranavirus surveillance

*Batrachochytrium salamandrivorans* (Bsal); potential threat to newt health and biodiversity if Bsal becomes established in the wild in GB;

*Batrachochytrium dendrobatidis* (Bd); threat to amphibian health, welfare and potential threat to biodiversity;

Ranavirus threat to amphibian health, welfare and biodiversity

In Q1 2018, PMEs were conducted on 20 common frogs. Skin swabs were taken from each animal for real-time duplex PCR screening for Bd/Bsal and liver samples were collected to screen for ranavirus infection using a real-time PCR. All samples tested negative for Bd/Bsal and ranavirus DNA.

Bd and ranavirus infections are known to be widespread in GB, representing a threat to amphibian welfare, and may adversely impact amphibian biodiversity. Bsal is considered a significant potential threat to native species biodiversity, particularly the great crested newt, which is known to be susceptible to fatal Bsal infection. Although, to date, Bsal has not been detected in the wild in GB, this pathogen has been confirmed in captive amphibians in the country. We continue to engage in heightened surveillance for Bsal, prioritising investigation of newt mortality incidents, and remain vigilant for possible incursion of Bsal into free-living urodeles populations in GB.

IoZ