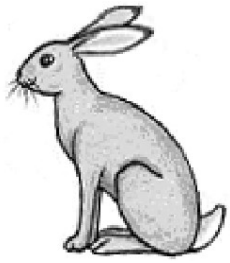
Great Britain Wildlife Disease Surveillance Partnership quarterly report

Disease surveillance and emerging threats



Volume 35: Quarter 4 of 2021 (October to December)

Highlights

- **Highly pathogenic avian influenza virus (HPAIV) continues for the fourth month (November to February) in wild birds (and poultry) ……. page 4**
- ***Reimerella anatipestifer* polyserositis and hepatitis, with enteritis, diagnosed in a mute swan …… page 21**

Contents

Editor: Cat Man, APHA Starcross
Phone: + 44 (0) 208 0265656
Email: catherine.man@apha.gov.uk

Introduction and overview

The Great Britain Wildlife Disease Surveillance Partnership comprising the Animal and Plant Health Agency (APHA), Scotland's Rural College (SRUC) Veterinary Services, Institute of Zoology (IoZ), the Centre for Environment, Fisheries and Aquaculture (CEFAS), the Wildfowl and Wetlands Trust (WWT), Natural England (NE), Forestry England (FE) and the Garden Wildlife Health (GWH) project produces the Great Britain Wildlife Disease Surveillance Partnership quarterly and emerging threat reports.

A full explanation of how data is analysed is provided in the annexe available on GOV.UK.

Issues and trends

The primary issue of this quarter in wildlife, is the epidemic of highly pathogenic avian influenza virus (HPAIV) which started in November 2021. At the time of writing (February 2022) the outbreak was still continuing in wild birds. The HPAIV outbreak this year has been primarily caused by the HPAIV H5N1 variant of the virus. This has caused mortality in wild birds, poultry and captive birds over a wide distribution of locations in England, Scotland and Wales. For the first time, HPAIV in Great Britain may be responsible for mortality of wild birds of conservation concern, as there is an estimate that more than 4,000 wintering barnacle geese (*Branta leucopsis*) have died on the English and Scottish sides of the Solway Firth (see page 23).

Elsewhere, working with colleagues at SRUC, the Royal (Dick) School of Veterinary Studies and the UK Centre for Ecology and Hydrology, allowed a collaborative investigation of nearly 180 auk (mainly guillemots (*Uria aalge*)) deaths. This carcase sample was, no doubt, part of a much larger mass mortality of guillemots and razorbills (*Alca torda*) in the North Sea. The birds were washed up on coasts from Aberdeen south to Norfolk between August and November 2021. A preliminary report on the findings has been published in the Veterinary Record.

Notifiable diseases

Great Britain Avian Influenza Wild Bird Surveillance (AIWBS): Quarter 4 of 2021 (October to December)

Total wild bird surveillance

While HPAI H5N8 was detected in wild birds in Sweden, Finland and Estonia, HPAI H5N1 was the dominant circulating strain during the fourth quarter of 2021 with detections in the Czech Republic in heron (*Ardea alba, Ardea cinerea*) and mute swan (*Cygnus olor*) but most notably in Germany and The Netherlands. As well as Great Britain, HPAI H5N1 detections were also made in Northern Ireland, Italy and Norway. From a Great Britain perspective, the current Avian Influenza (AI) season has become the largest that Great Britain has experienced, from both a wild bird and poultry disease perspective.

During the fourth quarter of 2021 a total of 915 birds were tested under the Avian Influenza Surveillance scheme in Great Britain. HPAIV H5 was detected in 435 wild birds, across 124 locations involving 26 species in 56 counties. Species infected were:

- barnacle goose (n=35)
- Bewick's swan (n=1)
- black-headed gull (n=5)
- black swan (n=2)
- Canada goose (n=60)
- common buzzard (n=18)
- curlew (n=2)
- great-crested grebe (n=2)
- grey heron (n=1)
- greylag goose (n=26)
- gull (n=3)
- herring gull (n=1)
- kestrel (n=3)
- lapwing (n=1)
- mallard duck (n=2)
- mute swan (n=180)
- peregrine falcon (n=3)
- pheasant (n=12)
- pink-footed goose (n=11)
- sea eagle (n=1)
- sparrow hawk (n=3)
- unidentified swan (n=18
- unspecified duck (n=3)
- unspecified goose (n=13)
- whooper swan (n=28)
- widgeon (n=1)

Table 1: Number of wild birds tested and results in Great Britain - 4th Quarter. *Number of birds tested: figures for October to December 2020 are shown in brackets.

Surveillance activity	Number of birds tested*	Positive HPH5 AI virus result and species of bird	Comments
Found dead or injured	915 (724)	435	Scanning surveillance All-year-round

Table 1 shows the number of wild birds tested under the Avian Influenza surveillance scheme. The number of birds tested under the Avian Influenza in the fourth quarter of 2021 (October to December) was 915 as compared with 724 for the same period in 2020. Scanning surveillance continues year-round and all birds tested were found dead or injured.

Figure 1 shows the distribution of wild birds collected, with findings of negative and positive detections. Specific areas experiencing mass mortality events include Stratford-upon Avon in the early weeks of the incursion, where a number of mute swans were reported; and then in November on the Solway Firth and surrounding areas, where many barnacle geese, and other species succumbed.

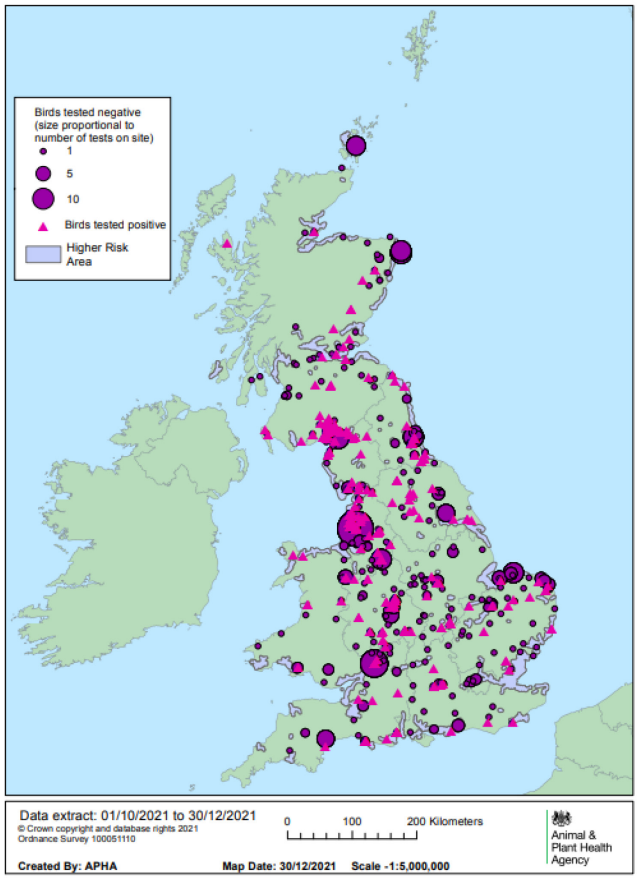


Figure 1: Wild bird submissions and cases positive for HPAI H5N1 in winter 2021

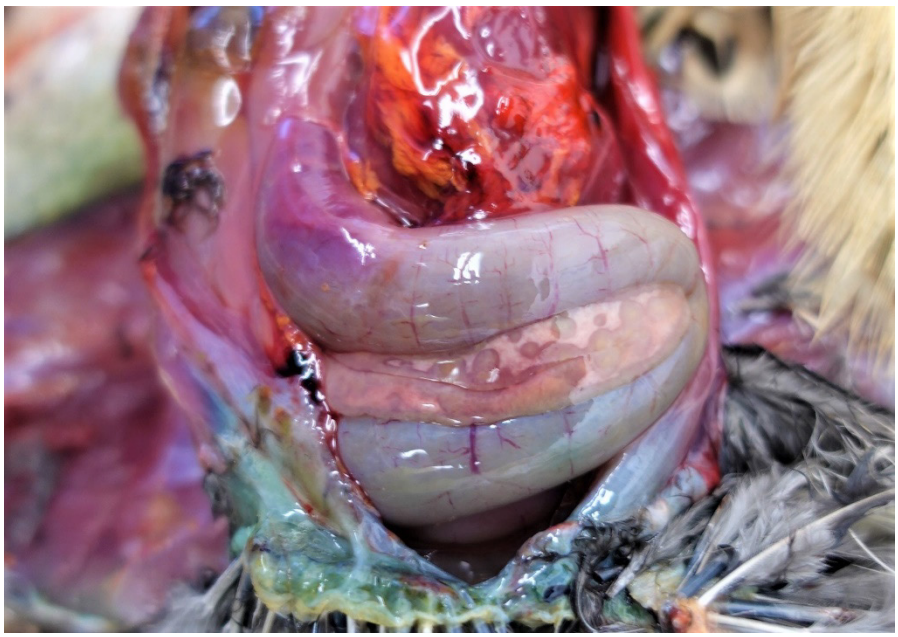


Figure 2: Gross pathology of pheasant organs showing pancreatic necrosis, a consistent prominent feature noted in H5N1 HPAI avian submissions this season

Current EU situation

Wild bird along with poultry detections of predominantly HPAI H5N1 are still considered high. Information about the current EU and UK outbreak situations can be found on GOV.UK.

APHA, in collaboration with Defra monitors the international situation and distribution of avian influenza detections.

Current UK situation

There have been a further 196 detections of HPAI in wild birds so far in 2022 (data correct as of 10 February 2022). Numbers of reports of wild birds to the Defra Helpline by members of the public remain high, although the percentage of positive wild birds in comparison to the baseline tested is showing signs of reducing.

The UK risk status is being evaluated on a weekly basis. At the present time, the official risk level of HPAI H5 in wild birds is therefore maintained at very high across Great Britain.

The housing order which came into force on 29 November 2021 remains in force. At all times, poultry keepers should maintain robust biosecurity measures, be vigilant for clinical signs of disease and 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 5.00pm 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
- in Scotland, contact your local APHA Field Services Office

Further information regarding avian influenza in poultry and wild birds is also available on GOV.UK:

- avian influenza
- biosecurity advice
- when and how to register your poultry flock and which species must be registered in Great Britain
- information about the chargeable testing scheme offered in Great Britain 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)

References

- Preliminary Outbreak Assessment: High Pathogenicity Avian Influenza (H5N8) in
- Defra's Avian Influenza guidance
- APHA's report on Avian Influenza in wild birds.
- Gibbens N, Brown IH, Irvine RM. Testing for exclusion of notifiable avian disease. *Veterinary Record* 2014;174:534-535. http://dx.doi.org/10.1136/vr.g3412

APHA staff contributors

- Rowena Hansen, Scott Reid, Craig Ross, Avian Virology, APHA Weybridge
- Lee Goolding, DES, APHA Weybridge
- Fabian Lean, Veterinary Pathology, APHA Weybridge

Wildfowl and Wetlands Trust's (WWT) role in Great Britain Avian Influenza Wild Bird Surveillance (AIWBS) October to December 2021

Throughout this quarter as migratory waterbird numbers increased, WWT continued to carry out passive surveillance of avian influenza across our reserves.

Between October and December 2021, 191 dead wild birds were found across nine WWT sites located in Gloucestershire, West Sussex, Tyne and Wear, Greater London,

Lancashire, Carmarthenshire, Norfolk and Dumfries and Galloway. Due to the high mortalities observed, a representative number of wild dead bird of the same species were sampled daily at certain sites. In total, 136 wild birds were swabbed for avian influenza virus during this quarter.

Twenty priority target species were sampled. These included species of geese, swans, waders, ducks, gulls, rails and raptors. In addition, a sample was also obtained from one non-priority species: a barn owl (*Tyto alba*).

Highly pathogenic avian influenza (HPAI H5N1) was confirmed by PCR in 62 wild dead birds, collected at four surveillance sites (see Table 2). All carcases were swabbed and collected following recommended health and safety guidelines with full personal protective equipment (PPE), including FFP3 masks. Biosecurity measures were put in place prior to the detection of HPAI in the UK, due to the constant monitoring of cases across Europe and tracking of migratory movements within water bird populations. Positive AI carcases were disposed using an approved high capacity incinerator for Category 1 ABP.

Table 2: Confirmed avian influenza cases (H5N1) in wild birds, detected during October to December, at different surveillance sites

Site	Total avian influenza positive	Species	Quantity
Lancashire	29	whooper swan greylag goose pink-footed goose lapwing grey heron mallard	19 4 3 1 1 1
Gloucestershire	15	mute swan greylag goose Bewick's swan	10 4 1
Norfolk	9	whooper swan greylag goose	8 1
Dumfries and Galloway	6	whooper swan barnacle goose common kestrel	3 2 1
Tyne and Wear	2	black-headed gull	2
Carmarthenshire	1	herring gull	1
Total	62		

As in 2020, the ongoing surveillance has contributed in identifying relatively early on the AI geographic distribution within the UK and assessing local risks, just before national peak case numbers in November and December.

For further details of HPAI surveillance from across Great Britain, please refer to the APHA report for this quarter.

Rosa Lopez, Veterinary Officer (Conservation), Wildfowl & Wetlands Trust (WWT)

Zoonotic diseases

APHA Diseases of Wildlife Scheme (DoWS): Salmonellosis in wildlife

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.

APHA Salmonellosis diagnoses in wildlife for quarter 4 are summarised in Table 3.

Table 3: shows the number of Salmonellosis diagnoses in wildlife in quarter 4 of 2021, the phage type, which species were infected, the number of isolations and the clinical diseases associated with the isolate

Salmonella isolated	Species infected	Number of isolations	Clinical disease
S. Enteritidis PT11	Hedgehog	3	Yes (diarrhoea)
S. Enteritidis PT11	Hedgehog	1	Yes (gastrointestinal disease excluding diarrhoea)
S. Typhimurium DT1	Swan	1	Found dead
S. Typhimurium U308	Swan	1	Found dead

S. Enteritidis PT11 is the commonest *Salmonella* spp. isolated from hedgehogs, it is common and widespread in hedgehogs in England (Keymer and others, 1991). Robinson and Routh (1999) suggest that *S*. Enteriditis PT11 appears to be endemic in hedgehogs.

S. Enteritidis PT20 has also been previously detected by APHA although it appears to be a less common isolate than PT11.

Two mute swans (*Cyngus olor*) were euthanased after having been found ill at a marina. This is not an uncommon scenario during the present avian influenza (AI) outbreak when, for welfare reasons, wild birds with possible AI have been euthanased. In this case the swans tested negative for AI. Both had signs of enteritis with faecal staining around their vents, minimal food material in their intestinal tracts and green liquid rectal content in one and black content in the other.

A group B salmonella, *Salmonella* Typhimurium phage type DT1, was isolated from the faeces of one suggesting that this may have been the cause of the enteritis. The source of the *Salmonella* is not known but this *Salmonella* has been associated with wild birds previously.

A further mute swan submission was received as part of the avian influenza wild bird survey. It had been reported as unwell prior to being euthanased at a local veterinary practice. On postmortem examination, it was noted to be in poor condition and had diarrhoea. There was intestinal endoparasitism with morphology consistent with thorny-headed worm. *S*. Typhimurium U308, a strain associated with pigs, was cultured from intestinal contents.

However, it was only isolated on enrichment culture rather than direct culture, making the clinical significance harder to determine.

Quality statement regarding these data

The Great Britain data and the output of ad-hoc data retrieval from APHA FarmFile database. These figures are provisional. Research project and routine game bird isolates were excluded. All are from England and Wales.

References

- Keymer I, Gibson E, Reynolds, D. Zoonoses and other findings in hedgehogs (*Erinaceus europaeus*): a survey of mortality and review of the literature. *The Veterinary Record* 1991:128(11): 245-249.
- Robinson I and Routh A. Veterinary care of the hedgehog. *In Practice* 1999:21:128-137. https://doi.org/10.1136/inpract.21.3.128

APHA staff contributors

- Catherine Man and Paul Holmes, APHA Diseases of Wildlife Scheme

Report from Wildlife Zoonoses and Vector Borne Disease Research group

Passive surveillance for lyssaviruses in UK bats

Thirty six bats were tested for lyssavirus under passive surveillance during this quarter. All were negative.

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

One unidentifiable bat submitted from The Shetland Islands that had flown into a UV trap was tested as illegal landing by both FAT and qRT-PCR with negative results.

Rabies diagnosis

Five dogs and one cat that died in quarantine were tested for rabies with negative results.

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.

West Nile virus (WNV) surveillance and Usutu virus surveillance in wild birds

Brain and kidney tissue samples from 78 wild birds collected during this period and submitted via APHA, SRUC and IoZ were tested by PCR for WNV with negative results.

Tissues from 38 wild birds were also tested by PCR for Usutu virus with negative results.

West Nile virus surveillance in Equids

Serum from one horse in Suffolk which had shown neurological signs was tested by cELISA for WNV with negative results as part of differential diagnosis.

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

Ongoing new and re-emerging diseases, unusual diagnoses and horizon scanning

Wildlife Diseases, horizon scanning: news items associated with wildlife populations and wildlife disease. Very brief summaries are given, including possible wildlife disease threats to human, livestock and biodiversity health

No wildlife-related threats, points for information or horizon scanning issues were reported this quarter.

Garden wildlife health summary

The Garden Wildlife Health project (GWH) has continued to conduct scanning disease surveillance of garden birds, hedgehogs, reptiles, and amphibians. The disease incident reports (DIRs) received, and PMEs conducted by the GWH team during quarter 4 of 2021 are summarised in Table 4 and 5, and Figure 3.

Table 4: shows the numbers of Garden Wildlife Health disease incident reports and postmortem examinations for quarter 4 of 2021

Taxon	Number of disease incident reports (number of sites)	Total number of animals observed (sick/dead)	Number of postmortem examinations (number of sites)
Amphibians	26 (16)	38 (5/33)	3 (2)
Birds	817 (433)	984 (778/206)	10 (10)
Hedgehogs	110 (106)	125 (16/109)	9 (8)
Reptiles	3 (3)	4 (1/3)	5 (4)
Total	956 (558)	1151 (800/351)	27 (24)

Table 5: compares the numbers of Garden Wildlife Health disease incident reports for quarter 4 of 2020 and 2021

Taxon	2020	2021
Amphibians	24 (7/19)	26 (5/33)
Birds	1427 (1428/378)	817 (778/206)
Hedgehogs	150 (24/135)	110 (16/109)
Reptiles	0	3 (1/3)
Total	1601 (1,459/532)	956 (800/351)

No unusual trends in GWH DIRs were observed this quarter, and whilst the number of avian DIRs was reduced in quarter 4 of 2021 in contrast to quarter 4 of 2020, it is comparable to the DIRs received over the same period in 2019 (766 DIRs involving 804 sick and 236 dead garden birds).

The high number of avian DIRs received in 2020 is considered likely, in large part, to be a result of increased observer effort during the COVID-19 pandemic, with people spending more time at home and in their gardens observing birds.

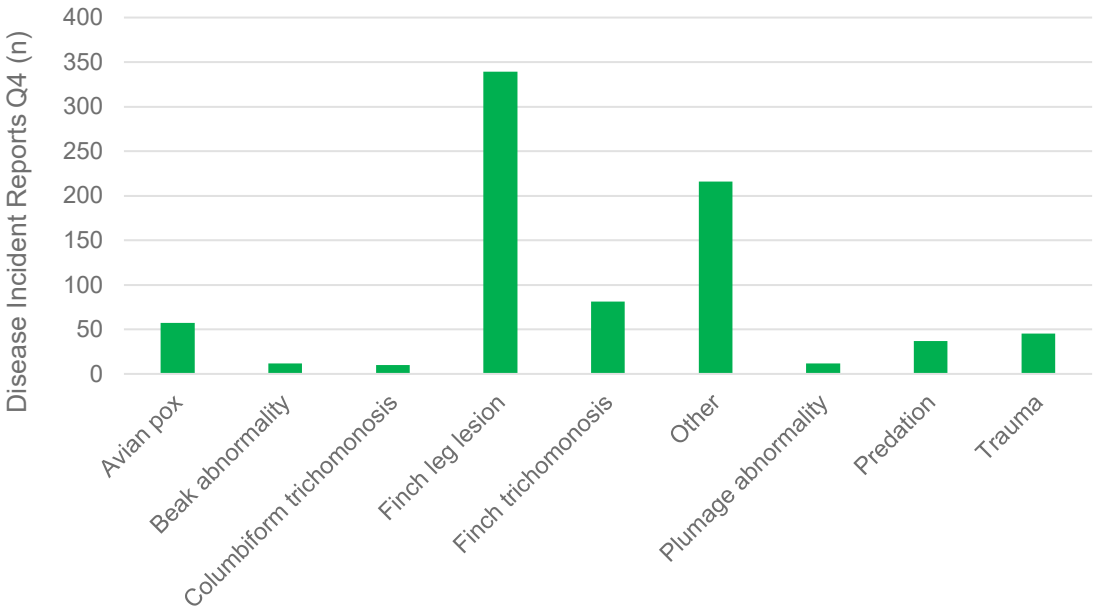


Figure 3: shows the numbers of Garden Wildlife Health avian disease incident reports allocated suspect diagnoses for quarter 4 of 2021, with the category of 'other' mostly comprising reports of birds exhibiting non-specific signs of ill health (for example, fluffed-up plumage, lethargy). Further information on avian pox, beak abnormality, finch leg lesions, trichomonosis, and plumage abnormality is available by following the respective links

Table 6: compares the numbers of Garden Wildlife Health disease incident reports for the calendar years 2020 and 2021

Taxon	2020	2021
Amphibians	355 (330/805)	362 (196/886)
Birds	6237 (5638/2888)	5027 (4422/1985)
Hedgehogs	640 (130/623)	515 (81/496)
Reptiles	51 (5/48)	29 (3/32)
Total	7283 (6103/4364)	5933 (4702/3399)

Institute of Zoology (IoZ)

Mammal reports

Wild mammal reports from IoZ

Pygmy sperm whale (*Kogia breviceps*) stranding

In December 2021, a 1.83m juvenile male pygmy sperm whale (*Kogia breviceps*) was found dead stranded at Hive Beach, Burton Bradstock on the Dorset coast (Figure 4a). The body of this unusual stranding was recovered by the Cetacean Strandings Investigation Programme (CSIP) staff from ZSL.

During necropsy, evidence of dehydration and possible live stranding was observed, as well as shallow rakemarks on the skin on its flanks, with the wide spacing potentially indicative of interspecific aggression by a pilot whale (genus *Globicephala*) (Figure 4b). No gross evidence of plastic ingestion or disease was observed. However, final ancillary test results are pending.

This was only the 15th stranding of this species recorded in the UK since the inception of the CSIP Programme in 1990. Pygmy sperm whales are a deep diving marine mammal species which are poorly understood, and little is known about their conservation status, distribution or abundance.

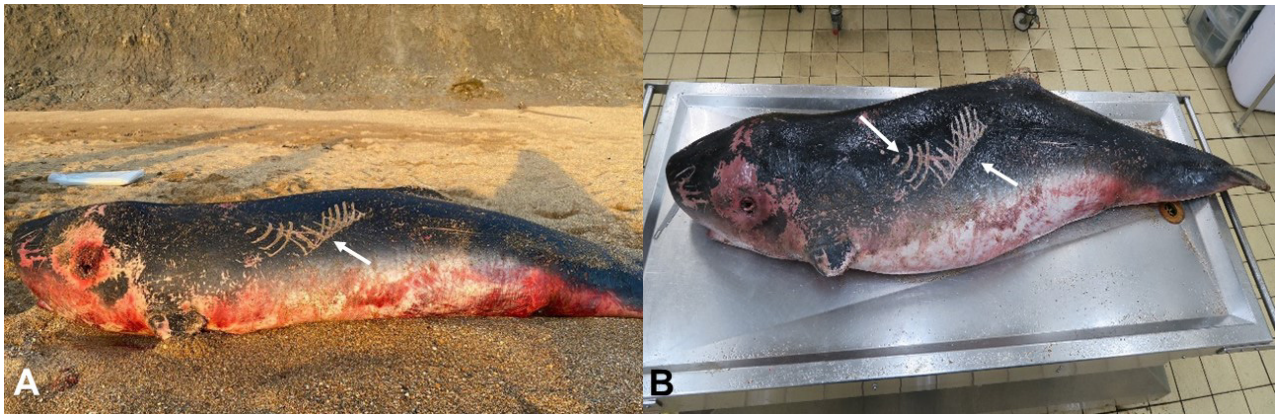


Figure 4: shows a 1.83m juvenile male pygmy sperm whale (*Kogia breviceps*) found dead stranded at Hive Beach, Burton Bradstock on the Dorset coast on 16 December 2021 (A), examined postmortem showing shallow rakemarks on the skin on its flanks (arrows), with the wide spacing potentially indicative of interspecific aggression by a pilot whale (genus *Globicephala*) (B)

Institute of Zoology

Avian reports

Wild bird reports from the IoZ

Finch leg lesions update

Proliferative leg skin lesions were the most common observation of ill health in garden birds reported to GWH in 2021, accounting for 28% of all avian DIRs. Proliferative leg skin lesions, caused by an infection with *Cnemidocoptes* sp. mites, *Fringilla coelebs* papillomavirus, or a combination thereof, are typically reported in chaffinches (*Fringilla coelebs*), and to a lesser extent in other finch species (for example, bullfinch *Pyrrhula pyrrhula*), especially over the winter months in Great Britain (Lawson and others, 2018).

On rare occasions, cnemidocoptosis is also observed in other passerines, as reported previously (quarter 1 of 2020) in two dunnocks (*Prunella modularis*) (Seilern-Moy and others, 2020).

In quarter 4 of 2021, we conducted a PME on an unusual case of an adult male chaffinch presenting with severe proliferative leg skin lesions. *Cnemidocoptes* sp. mites were visible upon microscopic examination of the affected skin. Multifocal, beige-yellow, elongate (ca 5 to 8mm by 1mm) lesions were scattered throughout the pectoral muscles (see Figure 5). Additionally, traumatic injuries consistent with window collision as the proximate cause of death were present.

Upon microbiological examination, the bacterium *Staphylococcus aureus* was isolated from samples of affected pectoral muscle, liver, and small intestinal tract contents. Histopathological examination confirmed the presence of bacteraemia, pectoral myositis, myocarditis, and valvular endocarditis with abundant intralesional Gram-positive cocci, consistent with *S. aureus* (see Figure 6).

Whilst finches affected by leg skin lesions usually remain bright and active and appear relatively unaffected by this condition, in severe cases they may experience secondary bacterial infections or the leg abnormalities may interfere with locomotion, ultimately predisposing the animal to trauma or predation (Lawson and others, 2018).

Figure 5: shows the exposed pectoral muscles of a chaffinch (*Fringilla coelebs*) with multifocal, beige-yellow, elongated (approximately 5 to 8mm by 1mm) lesions.

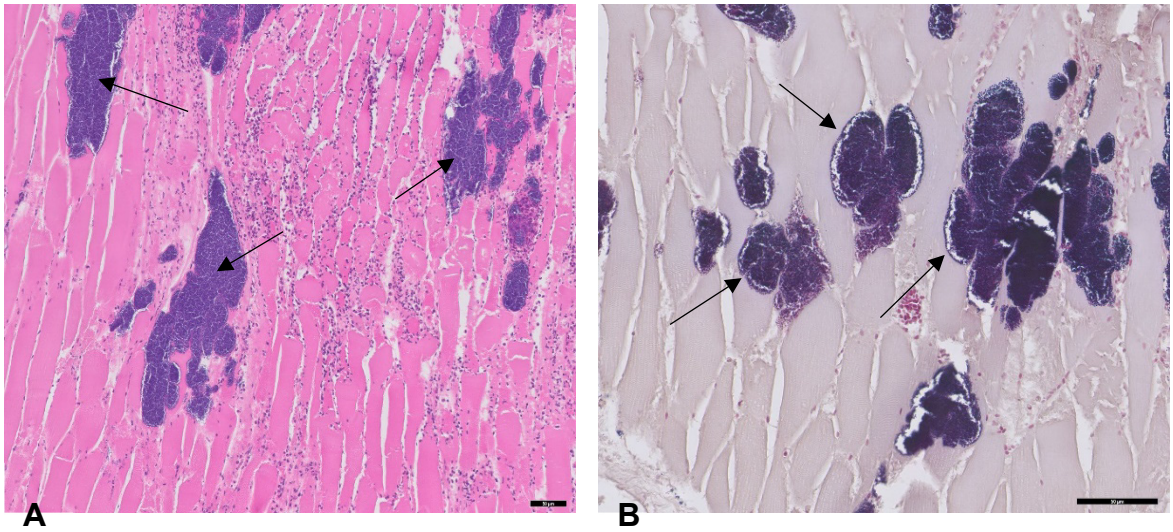


Figure 6: shows photomicrographs of pectoral myositis in a chaffinch (*Fringilla coelebs*) in H and E (A) and Gram stain (B). The arrows indicate abundant colonies of Gram-positive cocci consistent with *Staphylococcus aureus*. Bar 50µm

References

- Seilern-Moy K, Heaver JP, Fernandez JR, Macgregor SK, John SK, Cunningham AA, Lawson B. Atypical knemidokoptosis in two Dunnocks (Prunella modularis) in southern England. The Journal of Wildlife Diseases. 2021;57(2):467-70 https://doi.org/10.7589/JWD-D-20-00152
- Lawson B, Robinson RA, Fernandez JR, John SK, Benitez L, Tolf C, Risely K, Toms MP, Cunningham AA, Williams RA. Spatio-temporal dynamics and aetiology of proliferative leg skin lesions in wild British finches. Scientific Reports 2018;8(1):1-2 https://doi.org/10.1038/s41598-018-32255-y

Garden bird trichomonosis update

Since its emergence in 2005 (Lawson and others, 2012), finch trichomonosis has caused a significant and ongoing population decline of greenfinches in the UK (Lawson and others, 2018).

In the recently published fifth review of Birds of Conservation Concern in the UK, the greenfinch moved directly from the Green to the Red List due to the 62% reduction in its UK breeding population since 1993 (Stanbury and others, 2021):

To our knowledge, this is the first time a British wild bird species has been red-listed as a result of an infectious disease and demonstrates how conditions may emerge and pose a conservation threat to previously common wildlife species.

Additionally, the UK chaffinch population has declined by 30% from 2007 to 2018, according to the most recent British Trust for Ornithology, Joint Nature Conservation Committee and the Royal Society for the Protection of Birds Breeding Bird Survey (BBS) (Harris et al, 2020). GWH vets and BTO scientists are investigating whether finch trichomonosis is also a driver of the chaffinch population decline.

In 2021, a suspected diagnosis of garden bird trichomonosis was assigned to 13% of avian DIRs (640/5027), involving 845 sick and 333 dead birds from 417 sites across the UK, predominantly affecting greenfinches (*Chloris chloris*) (191/640) and chaffinches (196/640 avian DIRs), but also including other passerines (190/640) and columbiformes (62/640).

Through postmortem examination, trichomonosis was diagnosed in 14 passerines from separate sites in England, Scotland and Wales which comprised greenfinch (n=5), chaffinch (n=3), goldfinch (*Carduelis carduelis*) (n=2), siskin (*Spinus spinus*) (n=2) and lesser redpoll (*Acanthis cabaret*) (n=2). Trichomonosis remains the most frequently identified infectious disease as a cause of death in garden birds.

As reported in quarter 2 of 2021, GWH vets confirmed trichomonosis in two lesser redpolls, and previously also in other red-listed species such as the yellowhammer (*Emberiza citrinella) and* hawfinch (*Coccothraustes coccothraustes*), further highlighting how this disease may be an additive threat to species already of conservation concern.

References

- Stanbury A, Eaton M, Aebischer N, Balmer D, Brown A, Douse A, Lindley P, McCulloch N, Noble D, Win I. The status of our bird. British Birds. 2021;114:723-47 https://doi.org/10.5061/dryad.cc2fqz672
- Harris SJ, Massimino D, Balmer DE, Eaton MA, Noble DG, Pearce-Higgins JW, Woodcock P, Gillings S. The Breeding Bird Survey 2020. BTO Research Report. 2021;736
- Lawson B, Robinson RA, Toms MP, Risely K, MacDonald S, Cunningham AA. Health hazards to wild birds and risk factors associated with anthropogenic food provisioning. Philosophical Transactions of the Royal Society B: Biological Sciences. 2018;373(1745):20170091. https://doi.org/10.1098/rstb.2017.0091
- Lawson B, Robinson RA, Colvile KM, Peck KM, Chantrey J, Pennycott TW, Simpson VR, Toms MP, Cunningham AA. The emergence and spread of finch trichomonosis in the British Isles. Philosophical Transactions of the Royal Society B: Biological Sciences. 2012;367(1604):2852-63 https://doi.org/10.1098/rstb.2012.0130
- Institute of Zoology

Wildfowl and Wetlands Trust (WWT) report: October to December 2021

Passive surveillance of waterbirds

Post mortem examinations were performed on 78 wild birds originating from five WWT sites (Slimbridge, Gloucestershire; Arundel, West Sussex, Martin Mere, Lancashire, London, Greater London and Castle Espie, County Down).

A total of 17 target species were examined, which included:

- 31 mallards (*Anas platyrhynchos*)
- 10 greylag geese (*Anser anser*)
- two pink-footed geese (*Anser brachyrhynchus*)
- two Canada geese (*Branta Canadensis*)
- seven mute swans (*Cygnus olor*)
- two whooper swans (*Cygnus cygnus*)
- one Bewick's swan (*Cygnus columbianus bewickii*)
- six coots (*Fulica atra*)
- two moorhens (*Gallinula chloropus)*
- two shelducks (*Tadorna tadorna*)
- two teals (*Anas crecca*)
- two tufted ducks *(Aythya fuligula)*
- one common pochard (*Aythya farina*)
- one shoveler (*Anas clypeata*)
- two black-headed gulls (*Chroicocephalus ridibundus*)
- two lesser black-backed gulls (*Larus fuscus*)

- one herring gull *(Larus argentatus)*

Two other species were also examined: a feral pigeon *(Columba livia domestica),* and a jackdaw (*Corvus monedula*). The primary causes of death for the above mentioned species are summarised below (see Table 7).

The main cause of avian mortality during this quarter was trauma (33%) and avian mycobacteriosis in second place. Within the trauma cases, there were three mallards, two lesser black-backed gulls, one herring gull, one jackdaw and one shoveler duck with internal haemorrhage in the coelomic cavity, congested lungs and signs of impact, except for one lesser gull, which had a puncture wound compatible with a shot injury.

Other potential collision cases involved three mallards with complete neck and limb bone fracture and a black-headed gull with soft tissue damage to the left wing resulting in increased laxity and bruising.

Two whooper swans presented subcutaneous bruising, one from an unfortunate landing in a river against a log and the other was covered in mud, superficial injuries around the beak and head, suggestive of a landing collision. However, this swan also tested PCR-positive for low pathogenic avian influenza.

A juvenile shelduck also presented with generalised subcutaneous bruising from an unknown traumatic event. One coot was tangled in nylon thread resulting in fatal constrictive lesions. Ten birds (nine mallards and one mute swan) presented severe, extensive, dorsal bruising and skin lesions consistent with same species aggression.

Avian mycobacteriosis was the primary cause of mortality in 13% of the carcases found (three mallards, three greylags, two coots and two tufted ducks). Post-mortem examination revealed a characteristic presentation of multi-focal granuloma-like lesions in hepatic, splenic and renal tissues in all 10 birds, as well as purulent-mucoid free fluid in the coelomic cavity.

The majority of the predated birds collected (11%), presented only musculo-skeletal structure with skin, minimal soft tissue, absence of internal organs and extensive maggot infestation, except for one bewick swan that had been decapitated by a fox, which had a mildly congested spleen, and pancreatic lesions.

Seven birds (six mallards and one teal) were part of a botulism outbreak that affected 81 wild ducks at one of our reserves. As expected, no abnormalities were detected on internal examination.

Two juvenile Canada geese, two juvenile greylags, a mallard, a coot and a feral pigeon had extremely low body condition scores, were emaciated, and had intense intestinal parasite infestation.

Severe necrotic enteritis was detected in three mute swan and two pink-footed goose, which all presented congested intestinal loops and necrotic lesions within the intestinal lining.

In less prevalence this quarter - two mute swans and two greylags had pancreatic necrotic lesions, with a mixture of congested lungs, enlarged and mottled spleen and dispersed petechaie in several organs indicative of a possible infectious disease.

On examination one pochard presented, an extremely distended abdomen, with large gas-filled intestinal loops, suspicion of a bacterial infection was concluded in this case.

One mallard was euthanased due to poor body condition, non-ambulatory, and a large non-self-resolving haematoma causing large swelling of increasing growth in the right foot (possible secondary hemorrhage coagulopathy). Another mallard drowned due to getting trapped under water, but incidentally also had extensive cysts in the pectoral muscles compatible with sarcocystis, and lastly, one mallard had egg yolk coelomitis.

Six additional wild birds (7%) did not receive diagnoses due to advanced decomposition or lack of obvious gross abnormalities.

Table 7: Confirmed and suspected causes of wild bird mortality (including morbidity meriting euthanasia on welfare grounds) at WWT reserves between October and December 2021.†n denotes juvenile birds and number of juvenile birds; *n denotes euthanased birds and number of euthanased birds

Primary cause of death or PM findings	Total	Species (and notes)
Trauma	26	15 mallards*2†1, 1 mute swans, 2 whooper swans, 2 lesser black-backed gulls, 1 black-headed gull, 1 coot, 1 herring gull, 1 jackdaw, 1 shelduck, 1 shoveler
Avian mycobacteriosis	10	3 mallards, 3 greylags, 2 coots, 2 tufted ducks
Predation	9	3 mallards†1 , 1 Bewick's swan†1, 1 moorhens, 1 black headed gull, 2 greylags†2, 1 coot,
Botulism	7	6 mallard, 1 teal
Parasite infestation	7	2 Canada geese†2, 2 greylags†2, 1 mallard, 1 coot, 1 feral pigeon

Primary cause of death or PM findings	Total	Species (and notes)
Necrotic enteritis	5	3 mute swans *1†1 , 2 pink-footed goose
Other	8	3 mallards*1 (yolk coelomitis, drowned, possible coagulopathy), 2 greylag geese (possibly viral), 2 mute swans (possibly viral), 1 pochard (sepsis)
No diagnosis (due to decomposition or lack of or inconclusive gross abnormalities)	6	1 coot, 1 greylag goose, 1 moorhen, 1 teal duck, 1 shelduck, 1 mute swan†1

Rosa Lopez, Veterinary Officer (Conservation), Wildfowl & Wetlands Trust (WWT)

Wild bird reports from Scotland

Incidental exposure to permethrin, brodifacoum and bromadiolone was detected in a grey heron which was found dead in a field. Cause of death was ascertained to be due to emaciation secondary to a recent femoral fracture.

Active early stage blowfly larvae were present on the carcase but had not penetrated the body cavity. Screening for toxins found a significant residue of brodifacoum and a low background residue of bromadiolone, both rodenticides, and a low background residue of permethrin (which is approved as a veterinary product, has a variety of uses for humans such as anti-mosquito clothing treatments, and is also used as a biocide). Whilst the presence of these residues is indicative of exposure, poisoning was not thought to be responsible for the bird's death. However, these findings are an indicator of the value of screening apex predators for exposure to chemicals to monitor the accumulation or ecological impact of toxin build up in wildlife food chains.

Reimerella anatipestifer polyserositis and hepatitis, with enteritis, was diagnosed in a male mute swan cygnet (*Cygnus olor*) found floating at the edge of a loch in Lanarkshire. A second swan was noted to be lethargic. At necropsy, body condition was poor. The gizzard mucosa was thickened and necrotic with a diphtheritic membrane. The intestines became progressively more distended proximally to distally, with content progressing from dry to a solid necrotic core with a thick, dry diphtheritic membrane in the large intestine. The airsacs were thickened, with yellow-white dry deposits of exudate.The heart was

encased in thick, wet exudate in the pericardial sac. The lungs were collapsed, green and covered in exudate, and the liver was enlarged, soft and necrotic. *R. anatipestifer* was isolated from affected tissues, and histopathology confirmed bacterial polyserositis typical of that associated with this organism, which also causes liver necrosis. This case was of interest as a reference to intestinal pathology caused by *R. anatipestifer* could not be found; this finding appears to be unusual. However, SRUC Veterinary Services commented that it could be caused by the same pathological processes.

References

- Terio KA, Mcaloose D, St. Leger J. (2018) Pathology of Wildlife and Zoo Animals. Chapter 29: Anseriformes, Ciconiiformes, Charadriiformes, and Gruiformes, p 708. Published by Academic Press.
- Caroline Robinson, SRUC Veterinary Services

Wild bird reports from APHA DoWS

Highly pathogenic avian influenza in a curlew (*Numenius arquata*)

One of the early cases of Highly pathogenic Avian Influenza (HPAI) in wild birds this winter was found in a curlew that showed neurological signs prior to death. The curlew was found in the forecourt of a car sales garage near the M6 motorway in Lancashire.

It presented with malaise and trembling and was making snapping motions with its bill at the air, almost as though it was feeding emphatically, non-directionally and at high speed. It was taken by a member of the public, alive, to a local vet practice where it received nursing care but died overnight.

On receipt of the carcass at Penrith Veterinary Investigation Centre, oropharyngeal and cloacal swabs were collected as per guidance for the AI surveillance in wild birds. No abnormalities were seen on postmortem examination. Testing of the swabs confirmed highly pathogenic H5N1 influenza virus (HPAI).

Given the unusual neurological signs which the curlew presented with, fixed tissues were sent for histopathological examination and Avian Influenza (AI) immunohistochemistry (IHC) was carried out to investigate if AI or some other disease process was responsible for the clinical signs. Special stains revealed multifocal acute splenic necrosis and non-specific gliosis in the brain.

IHC staining found Influenza A antigen in multisystemic distribution, with abundant staining of the brain (see Figure 7), lungs and around the areas of splenic necrosis. This distribution is consistent with HPAI infection and suggests that the neurological disease in the curlew was likely a manifestation of acute functional impairment as a result of disease.

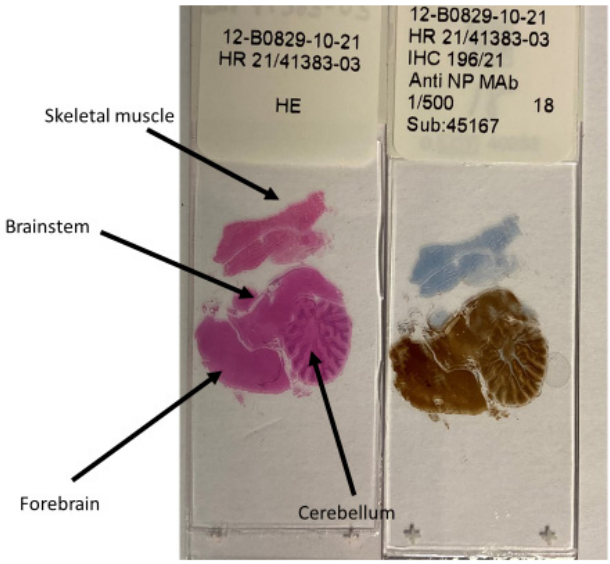


Figure 7: IHC positive staining for AI. The sections of brain showed abundant staining, in comparison to the section of skeletal muscle above it on the slide

This case highlights that not all AI infected birds are found dead and great care should be given to biosecurity and potential pathogen exposure while nursing wild birds, especially during the periods of migration and increased AI risk.

Mass mortalities of conservation concern of barnacle geese (*Branta leucopsis*) and pink-footed goose (*Anas brachyrhynchus*) due to Avian Influenza Virus (AIV) on the Solway Firth (England and Scotland)

HPAIV H5N1 infection was detected from late November 2021 onward in barnacle geese from several salt marshes around the Solway Firth. Unfortunately, due to the huge influx of AIV wild birds at APHA Veterinary Investigation Centres, the decision was taken that diagnostic post mortem examinations should not be undertaken. Confirmation of AIV infection was by PCR testing on oral and vent swabs and as a consequence there are no pathological lesions to report.

At the time of writing, there have been 35 confirmed isolates of HPAIV in this species. Of the 25 species affected by AIV during the winter 2021 to 2022 epidemic, in what has been the severest outbreak of HPAIV yet in Great Britain, barnacle geese detections are third in ranking behind mute swan (*Cygnus olor*) with 180, and Canada goose (*Branta canadensis*) with 60 official detections, nationwide.

These figures of course bear little reflection into the mortality in the wild, as only representative birds were sampled for virology. The Solway is the wintering habitat for the Svalbard breeding flock of barnacle geese. At one time this flock comprised only 500 birds, however almost 40,000 Svalbard barnacles now regularly winter on the Solway.

Approximately 1500 barnacle carcases have been counted during the outbreak, the majority on dedicated surveys undertaken by nature conservation organisations. Most carcases were skeletal, when found, as scavenging animals, particularly foxes, eat the carcases very quickly. AIV positive birds have been reported from all the major Solway marshes.

Ecologists now reckon, in February 2022, that at least 4,000 birds are ‘missing’, presumably dead, to AIV, but the figure could be as high as 8,000 barnacle geese. If confirmed, this estimated 10 to 20% mortality is a significant hit on this particular population, and if losses continue- a potential biodiversity risk for the Svalbard population (but not for the species, as there are other significant barnacle goose breeding populations).

As of February 2022, there are signs that the outbreak in the Solway is continuing, declining in barnacle geese but still active in the more numerous pink-footed goose (*Anser brachyrhynchus*).

It is not clear why barnacle geese experienced a high mortality. This species feeds, flies and roosts in compact flocks, and the relatively close proximity of susceptible birds to infective individuals may play a role. There may also be a species susceptibility but this would be difficult to demonstrate.

Figure 8: Flock of barnacle geese over the Solway, December 2021, flying in a dense flock (courtesy Frank Mawby)

Figure 9: Barnacle geese feed, roost and fly in dense flocks often comprising hundreds of birds. This provides many opportunities for direct (bird to bird, usually by aerosol) or indirect (via contaminated water, mud, fomites or at pasture) viral transmission (courtesy Frank Mawby)

Figure 10: Scope view - this barnacle goose was seen to drop from a flock, and circle in the air before landing alone on the Solway mudflats

Figure 11: The pooled liquid blood in the abdomen area in this barnacle goose, although heavily scavenged, indicates that it has only been dead for a matter of hours. Scavenging mammals and birds remove carcase tissues and carcases quickly

Figure 12: Solway Area of Outstanding Natural Beauty (AONB) - signage on wild waterbirds and HPAIV. Signs such as these were posted at several nature reserves and prominent sites along the coast. Note the clear guidance to phone the Defra helpline number

Paul Duff (APHA DoWS), Bart Donato (Natural England), Frank Mawby (retired Natural England)

Aspergillosis in Mallards (*Anas platyrhynchos*)

Two mallards were found dead on a small 25 by 20m pond where there was a 'large' population of mallards and moorhens. Both were in very poor bodily condition and had multiple pale white foci, up to 2mm diameter throughout all lung tissue. A few larger plaques of cream coloured material were present in the thoracic air sacs. *Aspergillus fumigatus* was isolated from affected lung. The factors that predisposed these ducks to aspergillosis are not known.

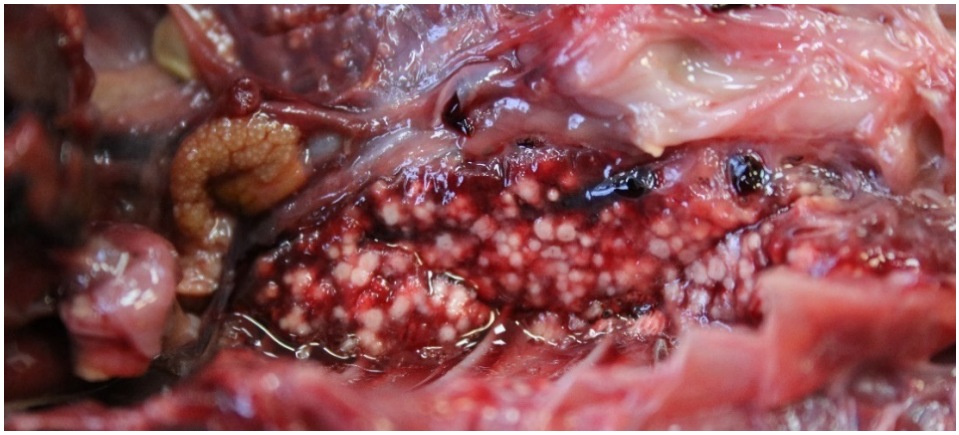


Figure 13: Multiple pale foci due to aspergillosis in the lungs of a Mallard

Avian Tuberculosis in a tufted duck (*Aythya fuligula*)

A female tufted duck was found dead in a wetland area. It had a massively enlarged liver which occupied a large amount of the coelomic cavity. The liver was firm and pale red with cream speckling. There were several small circular single or multifocal masses on the serosal surface of the intestine.

Firm localised lesions were also present on the ribs. The rib lesions were suspicious of healed fractures, but histological examination of liver and intestinal lesions showed severe multifocal granulomatous hepatitis with acid fast bacteria present.

These findings were consistent with a diagnosis of avian mycobacteriosis.This is caused by infection with *Mycobacterium avium* ssp. *avium.* Transmission between birds is by oral ingestion leading to intestinal lesions (and dissemination to other organs) and shedding of the organisms in the faeces. Clinical signs typically develop slowly over a period of weeks or months with slow loss of condition, lethargy and can lead to diarrhoea and dull ruffled appearance.

The mycobacteria are relatively resistant and can survive in the environment for many years, particularly in damp acidic conditions, but the organism is killed by direct sunlight. We see sporadic cases in wild birds but there is likely to be environmental contamination in the areas they visit.

Figure 14: Enlarged liver due to avian tuberculosis in a tufted duck

Pigeon deaths suspected to be caused by a predator

A batch of nine pigeon carcases (*Columba livia domestica*) was received under the Avian Influenza in Wild Birds Surveillance Scheme. They were reported to have been collected from the bell tower of a ruined church in the Midlands. Four were suitable for sampling for avian influenza, with negative results obtained and follow-up postmortem examinations were undertaken.

The four birds all had significant traumatic pathology, two having fractured skulls, one had a fractured humerus and the fourth had a body cavity wound, each with associated haemorrhage. The findings supported a diagnosis of trauma caused by a predator such as a peregrine falcon, the bird carcases being ‘stored’ by the bird as its ‘food cache’.

Paul Holmes, APHA Diseases of Wildlife Scheme

The material in this report has been compiled by the Animal and Plant Health Agency (APHA) Surveillance Intelligence Unit in collaboration with the APHA Surveillance and Laboratory Services Department.

The report is available on GOV.UK at:

https://www.gov.uk/government/collections/animal-disease-surveillance-reports.

Any enquiries regarding this report should be sent to APHA's Surveillance Intelligence Unit by emailing SIU@apha.gov.uk.

More information about scanning surveillance reports is available on APHA's Vet Gateway at http://apha.defra.gov.uk/vet-gateway/surveillance/index.htm.

APHA is an executive agency of the Department for Environment, Food & Rural Affairs, and also works on behalf of the Scottish Government and Welsh Government.