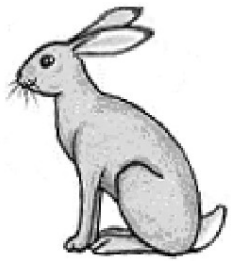
GB Wildlife Disease Surveillance Partnership quarterly report

Disease surveillance and emerging threats



Volume 31: Q4 – October-December 2020

Highlights

- **HPAIV in wild birds in Great Britain (pp. 4-10; 30-32)**
- **Neoplasia in a roe deer in Scotland (pp. 19)**
- **REACH - ban on lead shot in EU wetlands, completed November 2020 (p. 27)**

Contents

Introduction and overview

The GB 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), the Forestry Commission England (FCE) and the Garden Wildlife Health (GWH) project produces the GB Wildlife Disease Surveillance Partnership Quarterly Reports: https://www.gov.uk/government/publications/wildlife-gb-disease-surveillance-and-emerging-threats-reports

A full explanation of how data is analysed is provided in the annexe available on GOV.UK https://www.gov.uk/government/publications/information-on-data-analysis

Issues and trends

From a wildlife disease point of view, the year 2020 started quietly. Now, in review, two wildlife related emerging-disease zoonoses (WiREDZ) were notable and occurred in the second half of the year, namely Usutu virus (USUV) in passerines in London and then later, across Great Britain, the avian influenza virus (AIV) epidemic. The AIV outbreak is caused primarily by the highly pathogenic H5N8 (HPAIV H5N8) virus, and deaths have continued in wild birds into February 2021, affecting approximately 20 wild bird species across GB, with swans and geese the species in which the virus has been detected most frequently.

Of course, the third WiREDZ event in 2020 was Coronavirus Disease-19 (COVID-19) caused by SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2) infection. There is interest globally in which animal species may be susceptible to covid virus infection, other than humans. Disease and transmission in several domesticated and wild species (see Horizon Scanning, page 14) have been reported globally and, looking to the future, it will be important to investigate infection in these and other species in order to assess whether animal species can act as potential reservoirs of SARS-Cov-2.

Notifiable diseases

Avian Influenza (AI) Virus

Great Britain AI Wild Bird Surveillance (AIWBS)

Total wild bird surveillance

Since the first known detections in Russia in August 2020, hundreds of HPAI H5N8 infections have been detected in many species of wild birds across Europe. In addition, there have been multiple reports of detections in commercial poultry, across many sectors, and frequently following on from the detection of the same viral strain in wild birds. The OIE Reference Laboratory at Weybridge has confirmed this strain is different to the HPAI H5N8 virus circulating in Eastern Europe in the early part of 2020, and genetically different to the virus circulating in 2016/2017.

In response to the these early warning signals, the UK wild bird surveillance scheme decreased the threshold for surveillance which in turn increased sensitivity of detection via an upsurge in activity. During the fourth quarter of 2020 a total of 724 birds were tested under the Avian Influenza Surveillance scheme, and 280 tested positive for Influenza A; the vast majority identified as HPAI H5N8; but there have also been sporadic detections of H5N5 and H5N1 in wild birds; all the same clade as the H5N8 and sharing the same haemagglutinin (HA) backbone.

Surveillance activity	Number of birds tested*	Positive AI virus result and species of bird	Comments
Found dead/injured	724 *(168)*	280 Black Swan (*Cygnus atratus*) [n=11] Brent Goose (*Branta bernicla*) Buzzard (*Buteo*) Canada Goose (*Branta Canadensis*) [n=24] Common Buzzard (*Buteo buteo*) Great White Egret (*Ardea alba*) Grey Heron (*Ardea cinerea*) Greylag goose (*Anser anser*) [n=11] Herring Gull (*Larus argentatus*) Kestrel (*Falco*) Lesser Black Backed Gull (*Larus fuscus*) Black headed Gull (*Choriocephalus ridibundus*) Mixed Avian Mute Swan (*Cygnus olor*) [n=165] Peregrine Falcon (*Falco peregrinus*) Pink footed goose (*Anser brachyrhychus*) Shelduck (*Tadorna*) Sparrow Hawk (*Accipiter nisus*) Unspecified Unspecified Goose Unspecified Swan Whooper Swan (*Cygnus Cygnus*) [n=27] Wigeon (*Anas Penelope*) Little grebe (*Tachybaptus plumage*)	Scanning surveillance All-year-round

*Number of birds tested: figures for October-December 2019 are shown in brackets. Most commonly featured species-numbers shown in square brackets

Table 1 shows the number of wild birds tested under the Avian Influenza surveillance scheme. The number of birds tested for Avian Influenza in the fourth quarter (October – December) of 2020 was 724 as compared with 168 for the same period in 2019. Scanning surveillance continues year-round and all birds tested were found dead

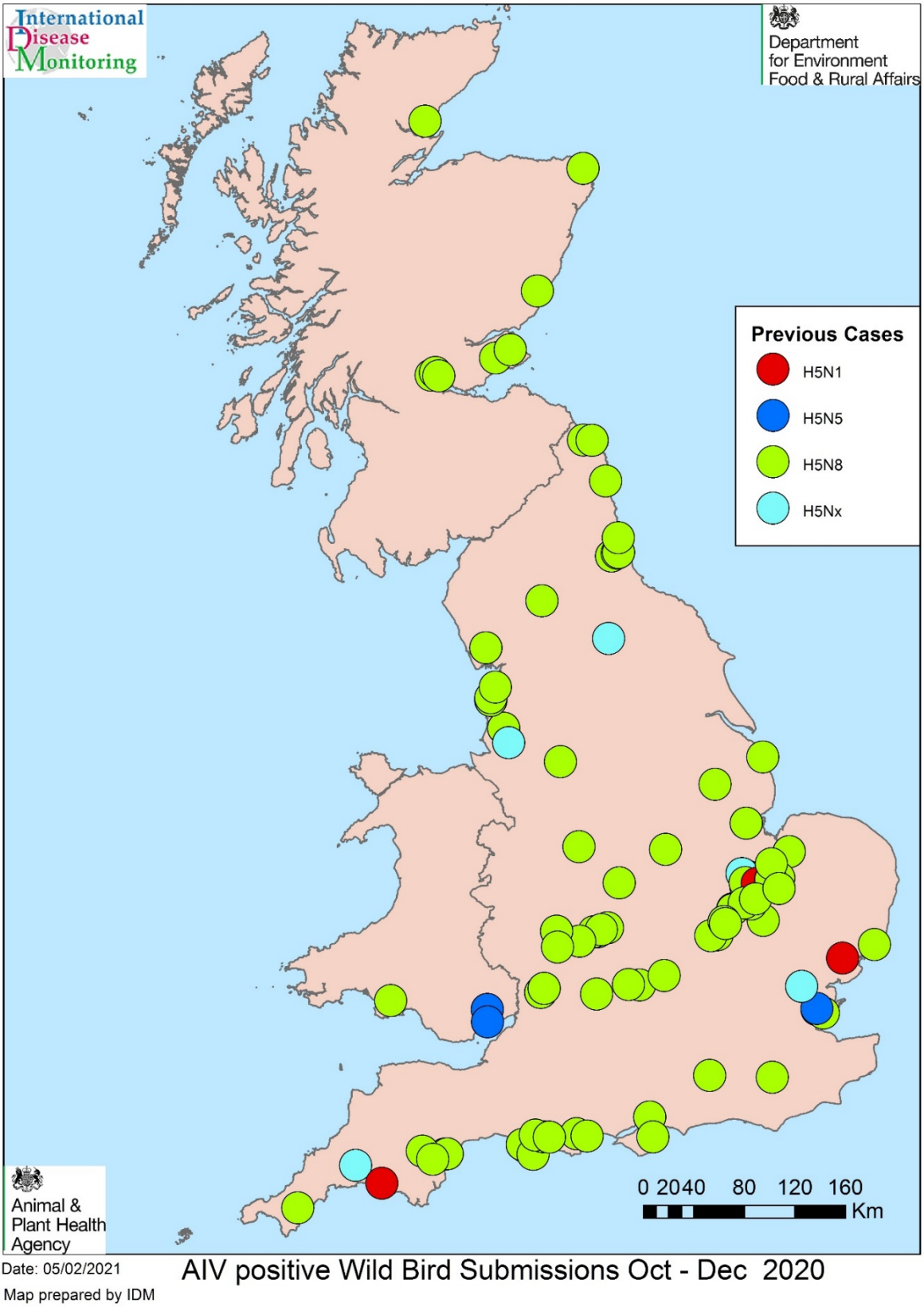


Figure 1 shows the locations where AIV positive wild bird were found and subsequently submitted for testing from October till December 2020 in Great Britain. It also shows the strain of AIV detected

Members of the public are asked to remain vigilant and report findings of dead wild waterfowl (swans, geese or ducks) or other dead wild birds, such as gulls or birds of prey 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 October to 31st December 2020 (Q4-2020), a total of 425 Warden Patrols were performed at sites across GB. This compares with a total of 421 Warden Patrols performed during the same period in 2019 (Q4-2019) in GB. During Q4-2020, most Warden Patrols were performed by Natural England and the Wildfowl and Wetlands Trust. In total during Q4-2020, 100 wild birds were reported found dead under the Warden Patrol Scheme of which 89 were tested, with 25 detections of HPAI H5N8. This compares with a total of 63 wild birds found dead of which 60 were tested during Q4-2019, with no detections of AIV.

In Q4-2020, Mute swans (14) and Canada geese (14) were the most common target species found, and birds were most commonly found in the South West region (55) with the lowest numbers in the Midlands (0), Scotland (1) and Wales (2). In Q4-2019, Whooper swans (18) were the most common target species found and birds were most commonly found in the South West region (19) with the lowest numbers in the Midlands (0), Wales (1) and North East (2).

Current EU situation

The current EU and UK outbreak situations can be found here:

https://www.gov.uk/government/publications/avian-influenza-bird-flu-in-europe

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

https://www.gov.uk/government/collections/animal-diseases-international-monitoring

Current UK Situation

An Avian Influenza Prevention Zone (AIPZ) came into force on the 11 November 2020 with additional housing measures from 14 December 2020 (and still in force at the time of writing), meaning that all bird keepers in England (whether they have pet birds,

commercial flocks or just a few birds in a backyard flock) are required by law to take a range of biosecurity precautions, including housing their birds (except in very specific circumstances). The risk of HPAI incursion in wild birds in GB remains VERY HIGH. The overall risk of exposure of poultry in GB remains MEDIUM (with stringent biosecurity) TO HIGH (where biosecurity is not adequate).

In Q4 of 2020 there were been 16 cases of HPAI H5N8 in premises in GB (one in Scotland, 15 in England); one case of HPAI H5N1 in a premises in England; and one case of LPAI H5N2 in England. Previous to the winter of 2020, the last detection of HPAI in a wild bird in the UK was a common buzzard (*Buteo buteo*) found in the east of England, in April 2018. The last HPAI outbreak in the UK in poultry prior to the winter of 2020 was in 2017 (HPAI H5N8).

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 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.
- In Scotland, contact your local APHA Field Services Office: https://www.gov.uk/government/organisations/animal-and-plant-health-agency/about/access-and-opening

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

- Avian influenza guidance: https://www.gov.uk/guidance/avian-influenza-bird-flu.
- 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) is available at: http://apha.defra.gov.uk/vet-gateway/tte/nad.htm

References

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915180/poa-avian-influenza-H5N8-russia-Sep20.pdf

https://www.gov.uk/guidance/avian-influenza-bird-flu

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/608529/ai-birdflu-factsheet-170413.pdf

https://www.gov.uk/government/publications/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

Rowena Hansen, Avian Virology, APHA Weybridge

Joanna Tye, DES, APHA Weybridge

Wildfowl and Wetlands Trust's (WWT) role in GB Avian Influenza Wild Bird Surveillance (AIWBS)

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

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 2020, 89 dead wild birds were found across nine WWT sites located in Gloucestershire, West Sussex, Tyne and Wear, Greater London, Lancashire, Carmarthenshire, Norfolk, Somerset and Dumfries and Galloway. Of the birds found, 87 were sampled for avian influenza virus, with two carcases being too heavily predated or in advanced decomposition to swab.

Eighteen priority target species were sampled during this quarter. These included species of geese, ducks, gulls, raptors and rails. In addition, samples were also obtained from four non-priority species: a hen harrier (*Circus cyaneus*), a mandarin duck (*Aix galericulata*), a common wood pigeon (*Columba palumbus*) and a feral pigeon (*Columba livia domestica*).

Highly pathogenic avian influenza (HPAI H5N8) was confirmed by PCR in 28 wild dead birds, collected at four surveillance sites (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 AI in UK's wildbird and poultry population, due to the constant monitoring of cases across Europe and tracking of migratory movements within waterbird populations. Positive AI carcases were disposed using an approved high capacity incinerator for Category 1 Animal By Products (ABPs).

Site	Species	Quantity	Total
Carmarthenshire	Little Grebe	1	1
Gloucestershire	Canada goose	9	19
	Greylag goose	4	
	Mute swan	6	
Lancashire	Common buzzard	1	6
	Greylag goose	1	
	Mallard	1	
	Pink-footed goose	2	
	Whooper swan	1	
Norfolk	Whooper swan	2	2

Table 2 Confirmed avian influenza cases (H5N8) in wild birds, detected during October to December 2020, at different surveillance sites

This season's on-going surveillance has contributed to the relatively early identification of geographic distribution of AI within the UK and assessing local risks, just before national peak case numbers in November and December. The surprising high mortality within waterfowl and the individual effect within flocks may be an indication of the influence of environmental factors within each region, for example, and although hard to study, exposure to lead and its immunosuppressing effects on water bird populations. Hopefully the banning of the use of lead shot in wetlands across the EU (see below - *Lead poisoning from ammunition*), will ultimately remove high levels of lead exposure (Newth and others 2016) and lead to healthier and more robust hosts capable of resisting AIV infection.

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

Reference

Newth JL, Rees EC, Cromie RL, McDonald RA, Bearhop S, Pain DJ, and others. Widespread exposure to lead affects the body condition of free-living whooper swans *Cygnus cygnus* wintering in Britain. *Environmental Pollution* (Barking, Essex: 1987). 2016 https://doi.org/10.1016/j.envpol.2015.11.007

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

Zoonotic Diseases

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

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.

There were two detections of *Salmonella* in wildlife in Q4 of 2020; *S.* Enteritidis phage type 11 in a European hedgehog (*Erinaceus europaeus*) and *S.* Typhimurium phage type DT2 from a great white egret (*Ardea alba*).

S. Enteritidis phage type 11 was isolated from samples obtained from a European hedgehog submitted from a wildlife hospital. The hedgehog was reported to be showing neurological signs, weakness and collapsed prior to death. No additional clinical history is available. The *S.* Enteritidis phage type 11 was resistant to Tetracycline. *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 & Routh (1999) suggest that *S*. Enteriditis PT11 appears to be endemic in hedgehogs.

Salmonella Typhimurium phage type DT2 was isolated from the liver of a great white egret submitted to investigate the cause of death. This species is a new and recent colonist of the UK, with a small (10s of birds) but increasing breeding population. At post-mortem examination, lesions including hepatitis and localised peritonitis were observed in the bird. Figure 2 gives an indication of the size and colour of this species, it is of similar size to that of the grey heron (*Ardea cinerea*). Figure 2 shows the sharp cross section of the breast bone referring to poor body condition. Figure 4 shows hepatitis in this bird. The isolate was fully sensitive to all antimicrobials tested. S. Typhimurium DT2 is typically thought to be a host adapted strain that infects pigeons (Mueller-Doblies and others, 2018), although it is occasionally isolated from a range of species. The exact source of infection was unknown, however it was postulated that infection could have come from ingestion of carrion.

Figure 3: great white ergret (*Ardea alba*) within a microbiological safety cabinet

Figure 2: “razor keel” in a great white egret (*Ardea alba*)

Figure 4: perihepatitis in the great white egret (*Ardea alba*)

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. http://dx.doi.org/10.1136/vr.128.11.245

Mueller-Doblies D, Speed KCR, Kidd S and Davies RH. Salmonella Typhimurium in livestock in Great Britain – trends observed over a 32-year period. *Epidemiology & Infection* 2018:**146**(4):409-422. http://dx.doi.org/10.1017/S095026881800002X

Robinson I and Routh A. Veterinary care of the hedgehog. *In Practice* 1999:**21**:128-137. http://dx.doi.org/10.1136/inpract.21.3.128

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 routine game bird isolates were excluded. All are from England and Wales.

Catherine Man and Ed Fullick, APHA Diseases of Wildlife Scheme

Report from Wildlife Zoonoses and Vector Borne Disease Research Group

Summary - Zoonotic, farmed, pet animal and international trade risk

Passive surveillance for lyssaviruses in UK bats

Forty one bats were tested for lyssavirus under passive surveillance during this quarter. Forty bats were negative for lyssavirus whilst one Serotine bat (*Eptesicus serotinus*) from Somerset tested positive for EBLV1.

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

Rabies diagnosis

One dog and 2 cats 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 surveillance in wild birds

Brain and kidney tissue samples from 133 wild birds were tested for WNV with negative results.

Usutu virus surveillance in wild birds

Routine Usutuvirus surveillance testing at APHA runs from 1st April until 31st October each year.

Brain and kidney samples from 3 Blackbirds were tested for Usutu virus with negative results.

Additionally, twenty four birds of mixed species submitted by Zoological Society of London (ZSL) were negative for Usutu virus.

West Nile virus surveillance in Equids

One horse showing neurological signs that were inconsistent with WNV infection and one horse recently imported into UK were tested for WNV by IgM cELISA with negative results.

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

- COVID-19 in wildlife species (free-living, mainly captive). References available from internet searches. Including: COVID-19 in a pet ferret (Slavonia), experimental challenge of rabbits and raccoon dog. Infection in a group of gorilla (USA).

- HPAIV in wild birds, UK. For references see the Contents Page of this Wildlife Quarterly Report (WQR).

- African swine fever (ASF) eradicated in boar (Sus scrofa) in Belgium. https://ec.europa.eu/newsroom/sante/newsletter-specific-archive-issue.cfm?archtype=specific&newsletter_service_id=327&newsletter_issue_id=27362&page=1&fullDate=Fri%2020%20Nov%202020&lang=default

- Risk of incursion of new recombinant myxomatosis virus into the UK. Abade dos Santos FA, Carvalho CL, Pinto A, Rai R, Monteiro M, Carvalho P, Mandonca P, Peleteiro MC, Parra F, Duarte MD. Detection of recombinant hare myxoma virus in wild rabbis (Oryctoagus cuniculus algirus). Viruses 2020:12(10):1127 https://doi.org/10.3390/v12101127

- Risk of tularemia incursion into the UK? No current reference.

- Feline rabies in Italy due to West Caucasian bat lyssavirus (WCBL). PHE Emerging Infections Summary, July-Sept 2020. Conventional rabies vaccines not considered to offer protection against this virus.

- Novel arterivirus associated with encephalitis in hedgehogs. See this report page 20. Dastjerdi A, Inglese N, Partridge T, Karuna S, Everest DJ, Frossard J-P, Dagleish MP, Stidworthy MF. A novel arterivirus associated with an outbreak of fatal encephalitis in European hedgehogs (Erinaceus europaeus) from England. Emerging Infectious Disease 2020:27(2):578-581 doi.org/10.3201/eid2702.201962

- PCBs associated with reduced testes weight in porpoises. Williams RS, Curnick DJ, Brownlow A, Barber JL, Barnett J, Davison NJ, Deaville R, Doeschate M, Perkins M, Jepson PD, Jobling S. Polychlorinated biphenyls are associated with reduced testes weight in harbour porpoises (Phocoena phocoena). Environment International 2021: article ID 106303 https://doi.org/10.1016/j.envint.2020.106303

Garden Wildlife Health summary

The Garden Wildlife Health project (GWH) has continued to conduct scanning disease surveillance of garden birds, hedgehogs, reptiles, and amphibians.

Taxon	No. of disease incident reports (No. of sites)	Total No. of animals observed (sick/dead)	No. of postmortem examinations conducted
Amphibians	24 (21)	26 (7/19)	0
Birds	1427 (700)	1806 (1428/378)	11
Hedgehogs	150 (143)	159 (24/135)	1
Reptiles	0	0	4
Total	1601 (864)	1991 (1459/532)	16

Table 3 shows the numbers of Garden Wildlife Health disease incident reports submitted and postmortem examinations conducted during Q4 2020

Taxon	No. of disease incident reports in Q4 (no. sick/dead)	
	2019	2020
Amphibians	11 (3/8)	24 (7/19)
Birds	851 (885/252)	1427 (1428/378)
Hedgehogs	126 (15/118)	150 (24/135)
Reptiles	3 (1/2)	0
Total	991 (904/380)	1601 (1459/532)

Table 4 compares the numbers of Garden Wildlife Health disease incident reports for Q4 2019 and 2020.

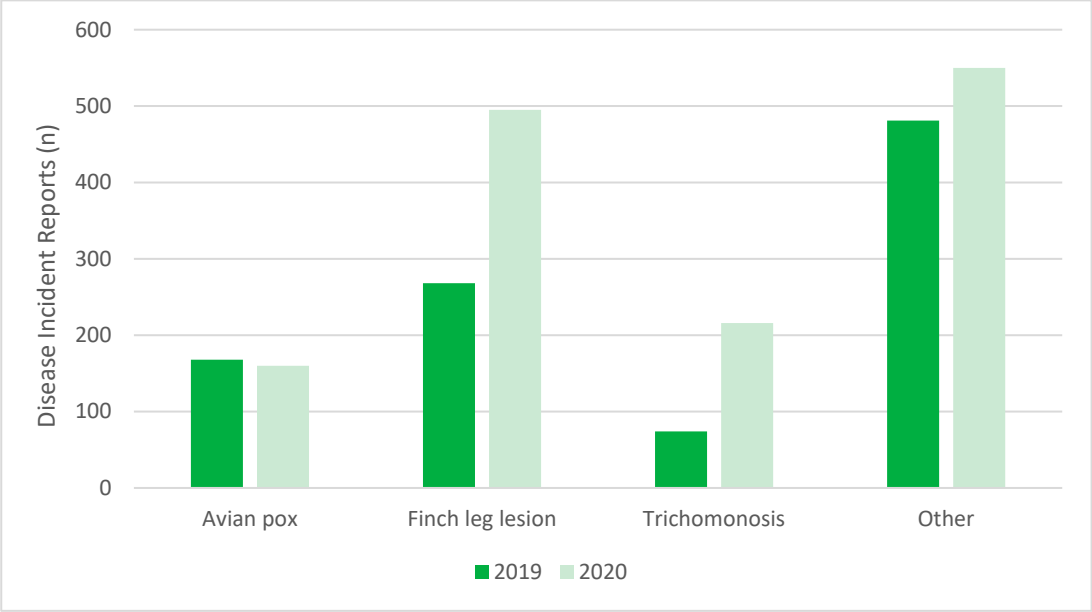


Figure 5 compares the numbers of Garden Wildlife Health avian disease incident reports allocated suspect diagnoses for Q4 2019 and 2020, with the category of 'other' mostly comprising reports of nestling mortality, trauma (e.g. window collision), predation or cases of birds exhibiting non-specific signs of ill health (e.g. fluffed-up plumage, lethargy). Further information on avian pox, finch leg lesions and trichomonosis is available by following the respective links

Taxon	No. of disease incident reports (no. sick/dead)	
	2019	2020
Amphibians	260 (1378/1990)	355 (330/805)
Birds	3643 (3584/1235)	6237 (5638/2888)
Hedgehogs	419 (78/382)	640 (130/623)
Reptiles	27 (8/30)	51 (5/48)
Total	4349 (5048/3637)	7283 (6103/4364)

Table 5 compares the numbers of Garden Wildlife Health disease incident reports for 2019 and 2020

No unusual trends have been apparent within the GWH Disease Incident Report (DIR) data, with general reporting patterns comparable to 2019. The overall increase in number of DIRs from 2019 to 2020 is likely to be a result of COVID-19 restrictions, which have led to the public spending more time at home and in their gardens, and the British Trust for Ornithology (BTO) making their Garden BirdWatch Scheme free of charge in spring 2020.

Institute of Zoology (IoZ)

Mammal reports

Wild mammal reports from the IoZ

Sperm whale mass stranding, East Yorkshire

On 24th December 2020, a mass stranding event (MSE) of sperm whales (*Physeter macrocephalus*) occurred near Withernsea on the East Riding of Yorkshire coast. Seven sperm whales are thought to have live stranded and died during the event, making it the largest sperm whale MSE recorded in England in the 100+year period since UK strandings began to be routinely recorded by the Natural History Museum in 1913.

Two bodies disappeared on successive tides following the Christmas Eve mass stranding. A ZSL team from the UK Cetacean Strandings Investigation Programme (CSIP) were able to attend onsite from 28th December. However, the post-mortem interval precluded any detailed pathological examination due to autolysis. Significant logistical constraints around access also limited the capacity for any meaningful assessment of causality and efforts focussed on data and sample collection on the five whales remaining onsite.

All examined animals were juvenile/subadult males between 11m and 13m in length, as has been the case with nearly every other UK stranded sperm whale; sexual segregation

exists in this species across their range. The gastrointestinal tract was accessed and examined in two of the stranded whales: large quantities of squid beaks were present in stomachs, but no evidence of recent feeding and no visible plastics/marine debris were noted. A wide range of samples were collected onsite to help inform collaborative research on genetics, contaminants, age and diet.

Figure 6 shows one of the seven sperm whales (Physeter macrocephalus) that stranded on December 24th 2020 near Withernsea on the East Riding of Yorkshire coast

Figure 7 shows squid beaks that were found within the stomachs of two sperm whales (*Physeter macrocephalus*), whose gastrointestinal tracts were examined, and that were part of a mass stranding event on December 24th 2020 near Withernsea

IoZ

Wild mammal reports from Scotland

Carcinoma, through to be of salivary gland origin, was diagnosed in an aged roe deer (*Capreolus capreolus*) shot near Dumfries and Galloway. The premises had previously had a deer with necrotising lymphadenitis secondary to bacterial infection (from which *Bibersteinia trehalosi* and *Staphylococcus aureus* had been isolated) so this further carcase was submitted when a large swelling on the face was noted. At necropsy, body condition was fair, and the swelling on the left hand side of the face extended from just distal to the ear, behind the eye to just caudal to the angle of the jaw. The left pre-scapular lymph node was visibly enlarged. In the oral cavity there was a chain of enlarged lymph nodes down to about the level of the third cervical vertebra. The mass had distorted the larynx, which was displaced to the right. The mass was composed of necrotic areas, and larger areas of firm pale yellow to white tissue. In the lungs there were an enormous number of pale firm lesions which ranged from 2mm to 6cm in size. The mediastinal lymph nodes were enlarged and firm. Histopathology of both the facial mass and the lung confirmed neoplastic epithelial cells consistent with carcinoma, with the site leading to the assumption that the original was the salivary gland – it was also noted that there were some similarities to salivary gland polymorphous adenocarcinoma.

SRUC Veterinary Services noted that salivary gland neoplasia is uncommon in ruminants but salivary gland adenocarcinoma has been reported in a farmed deer in Switzerland.

Reference

Sieber V, Robert N, Schybli M, Sager H, Miserez R, Engels M, Ryser-Degiorgis MP. Causes of Mortality and Diseases in Farmed Deer in Switzerland. *Vet Med Int* 2010; article ID 684924 https://doi.org/10.4061/2010/684924

Caroline Robinson, SRUC Veterinary Services

Wild mammal reports from APHA DoWS

Electrocution from a transformer as a cause of death in red squirrels

Significance – Biodiversity; sporadic losses in a threatened species with view to prevention

A male and female red squirrel (*Sciurus vulgaris*) were submitted to APHA Penrith under the APHA Diseases of Wildlife Scheme (DoWS). Both were found dead directly below a pole-mounted electricity transformer and electrocution from the transformer was the suspected cause of death. Electrocution in this species has been diagnosed on two previous occasions in Cumbria and dead squirrels on transformers have been reported elsewhere (Figure 8). This is therefore a recognised cause of sporadic mortality in this species.

Figure 8: A dead red squirrel, with tail visible, on top of a pole-mounted electricity transformer (image courtesy of C. Shuttleworth)

At post-mortem examination the only abnormalities detected were unusually twisted (singed) facial whiskers (vibrissae) in both animals, while in the female, bands of hair across the ventrum also had singed hairs (Figure 9). Otherwise the animals were in good

body condition with no other obvious lesions. These findings are also typical of the other cases examined by DoWS.

Figure 9: Red squirrel showing singed facial whiskers and areas of singed hairs on the ventrum.

Figure 10: Engineers making the pole-mounted electricity transformer safe (image courtesy of F. Lumber).

The electricity company was very helpful and responded quickly. Engineers came to the site and insulated the transformer in question (Figure 10). Some of these photographs and part of this article were also produced in an APHA Veterinary Record Surveillance Report from DoWS.

Paul Duff, APHA Diseases of Wildlife Scheme

Novel Arterivirus Associated with Outbreak of Fatal Encephalitis in European Hedgehogs, England, 2019

Significance – potential diversity threat to species in decline. New virus.

An outbreak of encephalitis began in October 2019 in wild hedgehogs (*Erinaceus europaeus*) admitted to the Vale Wildlife Hospital and Rehabilitation Centre (Tewkesbury, England) and lasted for four months. Approximately 50% of hedgehogs admitted showed development of clinical signs, died, or were euthanased. Both juveniles and adults (approximately 15% of hedgehog admissions) were affected by this neurological disease.

Neurological signs developed within three days of the onset of inappetence and included tremors, twitching, hyperaesthesia, ataxia/paresis, falling to one side, and paddling legs when laterally recumbent. Later signs included seizures. All described clinical signs developed after admission to the hospital; thus, all cases were considered hospital acquired. No major macroscopic lesions were identified. Histologic lesions were consistent with a common aetiology. Multiple coronal and longitudinal brain sections showed non-specific moderate-to-severe multifocal gliosis of highest severity in forebrain and hindbrain. Virological investigation, through Next-Generation Sequencing, at the APHA–Weybridge on freshly frozen brain tissues from three hedgehogs detected a novel arterivirus, hedgehog arterivirus-1 (HhAV-1). Genetic analysis of the virus DNA sequence showed the highest similarity to arteriviruses detected in African giant-pouched rats (*Cricetomys gambianus*) sampled in Guinea, but only 43% identity. Arteriviruses are known to cause persistent/asymptomatic infections (e.g., equine arteritis virus) and to be highly species specific. Therefore, the virus was most likely introduced into the hospital by one, or several, asymptomatic hedgehogs. So far, no arterivirus has been detected in humans and the HhAV-1 is unlikely to pose a zoonotic potential. This disease outbreak highlights the requirement for strict biosecurity measures during rehabilitation involving intensive hospitalization of animals of this species. APHA offers a real time PCR for the detection of the hedgehog arteriviruses.

The pathology and virology Depts at APHA working in collaboration with the GWH (Garden Wildlife Health) at IoZ and the International Zoo Veterinary Group (IZVG) are intending to investigate the disease further. The GWH factsheet on hedgehog arterivirus is now online at : https://www.gardenwildlifehealth.org/portfolio/arteriviruses-in-hedgehogs/

The British Hedgehog Preservation Society has funded part of this investigation.

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Akbar Dastjerdi, APHA Weybridge

Enteric nematode infestation in a brown long-eared bat (*Plecotus auritus*)

Significance – potential biodiversity threat and endemic disease in this species.

A nematode and a faecal sample were submitted to Wildlife Network for Disease Surveillance (WNDS) in early September from a thin female brown long-eared (BLE) bat. The bat was seen grounded and was collected by Babs York, registered Bat Carer (BCT's Bat Care Network) in the East of England and on admission weighed 5.72g, had a forearm length of 39mm and it was assessed that the animal was probably born in 2020. A large nematode was seen protruding from the anus (Figure 11).

Figure 9: nematode protruding from the anus of a live BLE bat

Anthelmintic treatment was started immediately under the veterinary cascade. This was given by topical application of one drop of Xeno® 50-Mini (approximately 3.3*μg* ivermectin) after parting the fur on the back of the neck and applying directly to the skin.

Figure 10: the nematode after removal, nematode identification requested

Squash preparations of a pre-treatment faecal sample were made in alcohol and examined at various microscopic powers. No nematode or other helminth eggs were identified. However there were a couple of structures that may have been desiccated nematodes. The nematode (Figure 12) was not further identified and will be sent to the Natural History Museum (NHM) for specific identification. However due to Covid restrictions there is a very large backlog of specimens awaiting examination, so the species may not be confirmed for some while.

Treatment was repeated twice more with intervals of two weeks and the bat gained weight. A further faecal sample was submitted after the second treatment and no nematodes or eggs were identified. She was released on 11/10/20 at a site across the road from where she was found, a large common where there are plenty of trees. She weighed 11.8g at release and immediately flew away (Figure 13; before release).

Figure 11: BLE bat prior to release, after captivity, treatments and negative parasitology

There is no clear evidence regarding the significance of nematode endoparasitism in British bats. Barlow and others (2013) confirmed a case of endoparasitism with *Molinostrongylus* species, which was implicated as the cause of death in a BLE. However Simpson (2013) reported that from 2001-2013 he had necropsied 74 BLE and 18 had large enteric nematodes. These were presumptively identified as *Seuratum* species, probably *Seuratum mucronatum*. Previous nematodes from BLE bats examined by Simpson were confirmed by NHM as *S. mucronatum*. However in these cases he saw no pathology or weight loss associated with the parasitism.

In this case the BLE was under weight but it was uncertain if it recovered due to anthelmintic treatment and artificial feeding or just as a result of supplementary feeding. This is obviously an area that needs further investigation. Nematode identification in all cases needs to be carried out, to help determine if some species may be more pathogenic than others.

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Alex Barlow, Wildlife Network for Disease Surveillance; Babs York, Cambridgeshire Bat Group; Iain Cope, Newmarket Vets4Pets

Avian Reports

Wild Bird reports from the IoZ

Usutu virus infection in garden birds

As described in detail in the Q3 report of 2020, in August 2020, five blackbirds (*Turdus merula*) and one house sparrow (*Passer domesticus*) from a single site in Greater London were examined post-mortem and were found to have been infected with Usutu virus (USUV), a mosquito-borne flavivirus that primarily affects birds belonging to the orders Passeriformes (perching birds) and Strigiformes (owls). These six birds are the first USUV-positive cases detected in Great Britain where, since 2013, kidney and brain samples from all wild birds submitted to Garden Wildlife Health (GWH) during the active mosquito season (March - November) have been screened for flaviviruses (Folly and others, 2020). For more information on this recent detection of USUV, see the GB Wildlife Disease Surveillance Partnership quarterly report volume 30: Q3 – July-September 2020. More information on USUV infection in wild birds can be found in the Garden Wildlife Health disease factsheet (www.gardenwildlifehealth.org/portfolio/usutu-virus/), and on the revised HAIRS risk assessment on Usutu virus (www.gov.uk/government/publications/hairs-risk-assessment-usutu-virus).

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Wildfowl and Wetlands Trust (WWT) report

Passive surveillance of waterbirds

Post-mortem examinations were performed on 31 wild birds originating from four WWT sites (Slimbridge, Gloucestershire; Arundel, West Sussex; Martin Mere, Lancashire and Llanelli, Carmarthenshire). A total of 12 target species were examined, which included four mallards (*Anas platyrhynchos*), three black-headed gulls (*Chroicocephalus ridibundus*), four greylag geese (*Anser anser*), two tufted duck (*Aythya fuligula*), five moorhens (*Gallinula chloropus*), two herring gulls (*Larus argentatus*), three great cormorants (*Phalacrocorax carbo*),one gadwall (*Mareca strepera*), one greater scaup (*Aythya marila),* one mute swan (*Cygnus olor*), one whooper swan (*Cygnus Cygnus*), and one pink-footed goose (*Anser brachyrhynchus*). Three other species were also examined: a feral pigeon

(*Columba livia domestica*), a rook (*Corvus frugilegus*) and a Eurasian curlew (*Numenius arquata*). The primary causes of death for the abovementioned species are summarised below (Table 6).

The main causes of avian mortality during this quarter were predation (32%) and trauma (26%). Within the trauma cases, there was one black-headed gull, one herring gull, one moorhen and one tufted duck, all with internal haemorrhage in the coelomic cavity, compatible with collision or vehicle involved incidents. One pink-footed goose also presented with internal haemorrhage; however, external examination revealed puncture wounds in the mid right pectoral muscle and mid abdomen with direct access to the coelomic cavity, compatible with shot injuries. Shot pellets were not found. Other potential collision cases involved one black-headed gull with a complete humeral bone fracture and a gadwall with soft tissue damage to the left wing resulting in increased laxity and bruising. Post-mortem examination of the Eurasian curlew revealed a combination of trauma and predatory lesions: skin defect in left pectoral muscle, puncture wound on the medial aspect and in the left inguinal fold, as well as a skin laceration on the right side at the base of the neck and mild internal haemorrhage (cranial to the heart). The majority of the predated birds collected presented only as musculo-skeletal remains with skin, minimal soft tissue, absence of internal organs and extensive maggot infestation. Two moorhens, one greylag and one feral pigeon had also suffered from decapitation causing severe neck haemorrhage from ruptured vessels secondary to lethal pull injury from an unidentified predator, possibly birds of prey (such as a suspicion of Goshawk in the greylag case).

Avian mycobacteriosis was the primary cause of mortality in 16% of the carcases found with a characteristic presentation of multi-focal granuloma-like lesions in hepatic, splenic and renal tissues and/or reproductive organs in all five birds (a mute swan, a whooper swan, and three mallards). One mallard also presented with a soft distended abdomen due to accumulation of free fluid in the coelomic cavity and coelomitis (“peritonitis”), related to mycobacterial infection.

Two wild bird mortalities (6%) involved less common causes this quarter: advanced aspergillosis in one greater scaup, which also presented with signs of predation (minimal soft tissue presence and absent skeletal structures on right side), and a greylag with internal changes compatible with advanced pneumonia and sepsis (pulmonary oedema, pancreatic changes, moderate hepatomegaly and unilateral renomegaly).

Six additional wild birds (10%) did not receive diagnostic examination due to advanced decomposition or lack of obvious gross abnormalities; however, three great cormorants and one mallard did have severe intestinal parasite infestation.

Primary cause of death/PM findings	Total	Species (and notes)
Predation	10	4 x moorhens, 1 x black headed gull, 3 x greylags, 1 x feral pigeon, 1 x rook
Trauma	8	2 x black headed gulls, 1 x herring gull, 1 x moorhen, 1 x gadwall, 1 x pink-footed goose, 1 x tuft ducks, 1 x Eurasian curlew
Avian mycobacteriosis	5	3 x mallards, 1 x mute swan, 1 x whooper swan
Other	2	1 x greater scaup (aspergillosis), 1 x greylag goose (pneumonia)
No diagnosis (due to decomposition or lack of or inconclusive gross abnormalities)	6	3 x great cormorant (internal parasite infestation), 1 x herring gull, 1x mallard (internal parasite infestation), 1 x tufted duck

Table 6 Confirmed & suspected causes of wild bird mortality (including morbidity meriting euthanasia on welfare grounds) at WWT reserves between October and December 2020

Sarcocystis surveillance project

Between October and December 2020, the *Sarcocystis* surveillance project received 27 reports of infection in wildfowl submitted by members of the hunting community. Approximately 60% of reported cases were in mallards *Anas platyrhynchos* (16), with additional cases in Eurasian wigeon *Mareca penelope* (8) and Eurasian teal *Anas crecca* (3). Approximately 70% of cases were reported in males, possibly reflecting bias in the hunting bag rather than infection predilection. These results bring the total number of reports submitted from the start of the September 2020 shooting season to 47 – similar to the previous shooting season. For further information on *Sarcocystis* surveillance in UK waterfowl and for previous reports, please refer to the Sarcocystis Survey website: www.sarcocystissurvey.org.uk

Lead poisoning from ammunition

A five-year process under the framework of the EU's chemicals regulation Registration Evaluation Authorisation and Restrition of Chemicals (REACH) to ban use of lead shot in EU wetlands came to a successful conclusion in November 2020. The aim of the restriction is to prevent a million waterbird deaths in EU wetlands each year and the sub-clinical poisoning of millions more. It was passed firstly by the European Parliament's ENVI Committee, then by the whole European Parliament and Council and will be formally adopted as EU legislation in January 2021 with a two-year implementation period. GB REACH will likely consider this now although this is likely to take time. The dossier on the

wider EU restriction on lead ammunition in terrestrial areas will be published in early 2021. This will remain of relevance to the UK due to sales of game meat from the UK to the EU.

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

Wild Bird reports from Scotland

Corvid respiratory syndrome was diagnosed in a submission of two carrion crows (*Corvus corone*), following a report of five dead crows from a member of the public in Wigtownshire. At necropsy, both were thin, and a severe fibrinous airsacculitis was seen in both, with fibrinous pericarditis in one. Small areas of lung consolidation were noted in one also. *Pasteurella multocida* was isolated from the air sac in one case, and a *Bacillus* species from the pericardium in the other. Corvid respiratory syndrome associated with *P. multocida* is a recognised cause of sporadic outbreaks of multiple deaths in corvids, although the causative organism is not always readily cultured.

An unusual congenital renal abnomality may have contributed to the development of pyelonephritis and death in an adult female mute swan (*Cygnus olor*) which was found dead on the bank of a loch in Angus. At necropsy, body condition was moderate to poor, and multiple flat, yellow foci were present on the plantar aspect of both feet. Significant findings included strong adhesions between the ventral coelomic wall and the kidneys, which were located in an aberrant position. There was no renal tissue at all in the usual location in the renal fossa. The left kidney contained multiple, caseous foci throughout the length of the organ whilst the right was unremarkable in appearance, apart from the location. Histopathology identified a severe chronic nephropathy with multifocal granulomatous nephritis with bacterial infection, urolithiasis, fibrosis and renal atrophy. The lesions were likely to be of several weeks' duration, and SRUC VS noted that they could have developed secondary to urinary stasis, if damage to the distal ureter related to egg laying had occurred, or alternatively the aberrant location of the kidneys could have predisposed to blockage of urinary outflow. Unusually, visceral gout (the usual outcome of kidney failure in birds) was not noted in this case. The skin lesions on the foot web appeared to be due to yeast infection - possibly candidiasis.

This case was of note due to the unusual nature of the congenital abnormality found.

Avian tuberculosis with associated hepatitis was diagnosed in a male golden eagle (*Aquila chrysaetos*) found dead at the bottom of a tree in Angus. At necropsy, body condition was poor. The liver was massively enlarged and contained multiple firm white foci from 1 to more than 40 mm in diameter that were visible through the capsule and extended throughout the parenchyma. The thoracic airsacs contained pale foci and the anterior margin of the right lung appeared similarly affected. Numerous acid-alcohol fast bacteria were seen in smears from the liver, indicating a mycobacterial infection consistent with avian tuberculosis.

This case was of note due to the species involved, and by the concern caused to members of the public when large raptors are found dead – the case was submitted for examination by the police, to determine the cause of death.

Terminal *Morganella morganii* bacteraemia and disseminated intravascular coagulation were seen in a male white tailed sea eagle (*Haliaeetus albicilla*) chick found dead in the nest on Mull at around 5-6 weeks of age. The climbers observing the nest felt there was little or no prey present considering it was a brood of two, and both chicks had been previously observed to try to bolt down chunks of red meat which were clearly too big. These were eventually regurgitated. At necropsy, body condition was very poor. There was black fluid around the heart, and the right lung was mottled dark red and grey. The proventriculus and gizzard were massively distended by fibrous vegetative material and the intestines contained black fluid. Culture of the liver yielded *Erysipelothrix rhusiopathiae* in mixed growth with *Morganella morganii*. *M. morganii* was also isolated from the lung in mixed growth.

M. morganii is a normal inhabitant of the gastrointestinal tract in birds of prey (Bangert and others, 1988) but it has occasionally been recognised as a cause of disease. *E. rhusiopathiae* is not a commensal organism and has been identified as a cause of disease and death in birds of prey. Histopathology found evidence of a terminal bacteraemia and secondary disseminated intravascular coagulation due to a small Gram negative bacteria which was consistent with the *M. morganii* rather than the *E. rhusiopathiae*. It was suspected that the *E. rhusiopathiae* could nevertheless have been playing a role, as these small bacteria may have been masked by the presence of numerous larger post-mortem bacteria on the slides. However, starvation was considered the primary cause of death, with the bacteria only able to flourish and kill the chick because it was in a weakened state.

This case was of note due to the species involved, for which heightened monitoring and surveillance is carried out following the reintroduction to Scotland.

A second case this quarter also involved *Morganella morganii*. Parasitic airsacculitis and pneumonia were diagnosed in a juvenile male buzzard (*Buteo buteo*) found dead on Mull. At necropsy, body condition was very poor and there was a thick brown plaque in the right thoracic airsac. The right lung was darkly discoloured, and the left lung was pale. Bacterial culture of the airsac lesion yielded *M. morganii* in pure growth. On histopathology, numerous worm eggs were seen in a fibrinous inflammatory exudate in the airsac and at the margins of the lung tissue next to the pleura and airsacs in associatiation with necrosis and inflammation. It was not possible to identify the nematode eggs definitively – *Syngamus* or *Capillaria* spp were a possibilities.

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Caroline Robinson, SRUC Veterinary Services

Wild Bird reports from APHA DoWS

Significance – Notifiable disease in wildlife (potentially zoonotic)

PPMV-1 detected in pigeons

Two gull species (not submitted and species not identified) and seven feral pigeons (*Columba livia*) were found dead in a suburban location in Norfolk. Three pigeon carcases were submitted and AIV infection was subsequently excluded. However, the virological examinations resulted in the detection of pigeon paramyxovirus (PPMV-1) in all tissues examined (brain, lung and trachea and intestine). Further examinations were not undertaken however, it can be concluded that PPMV-1 infection was the probable cause of death and cause of the pigeon mass mortality. It was not clear what caused the death of the gulls. This incident demonstates that, where possible, all wildlife mass mortalities should be investigated to detect diseases other than HPAI.

AIV update

Highly pathogenic avian influenza virus in wild birds, November 2020

Since the first week of November 2020, highly pathogenic avian influenza virus (HPAIV) has been confirmed in at least 20 wild bird species, including mute swan (*Cygnus olor*), whooper swan (*Cygnus cygnus*), (feral) black swan (*Cygnus atratus*), greylag goose (*Anser anser*), pink-footed goose (*Anser brachyrhynchus*), Canada goose (*Branta canadensis*), brent goose (*Branta bernicla*), shelduck (*Tadorna tadorna*), wigeon (*Mareca penelope*), lesser black backed gull (*Larus fuscus*), little grebe (*Tachybaptus ruficollis*), herring gull (*Larus argentatus*), grey heron (*Ardea cinera*), great white egret (*Ardea alba*), buzzard (*Buteo buteo*), sparrowhawk (*Accipiter nisus*), kestrel (*Falco tinnunculus*), peregrine falcon (*Falco peregrinus*), red kite (*Milvus milvus*) and red knot (*Calidris canutus*)). HPAIV detections have predominated in mute swans, greylag geese and Canada geese however, the detection of the virus in small numbers of four species of birds of prey is notable, although only small numbers of each of the four species were affected. Cases have been widely distributed and, at the time of writing, positive birds had been found throughout England (25 counties) and in Scotland (5 counties) and Wales (2 counties) with over 200 birds testing positive whilst further wild birds are in the process of being tested from other locations. For the latest situation see:

https://www.gov.uk/government/publications/avian-influenza-in-wild-birds

In HPAIV confirmed birds, examined at APHA (Veterinary Investigation Centres), a range of pathology has been seen, ranging from birds with very subtle, almost negligible, changes through to birds with signs typical of acute viraemia with widespread haemorrhages in several internal organs (Figures 14-16), enlarged spleens, hepatitis and in one bird to date, pancreatitis (Figure 15). It is important in cases of mortality in wild birds to consider the possibility of avian influenza, particularly given the current situation in the UK. If dead wild waterfowl (swans, geese or ducks) or other dead wild birds, such as gulls or birds of prey are found, they should be reported to the Defra helpline (03459 33 55 77 please select option 7).

Figure 12: Haemorrhage on the surface of the heart of a mute swan (Cygnus olor) subsequently confirmed with HPAIV, November 2020 (photo credit A. Mackintosh, APHA)

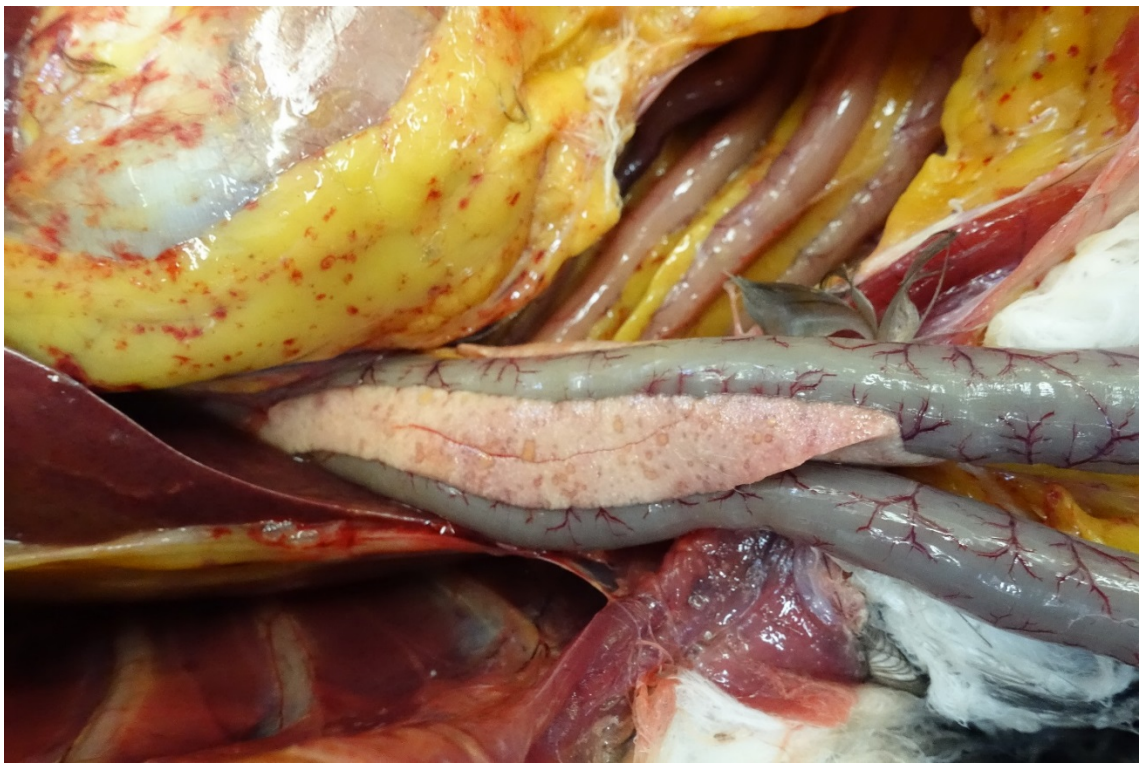

Figure 13: Feral black swan (*Cygnus atratus*), Devon, with confirmed HPAIV. Showing point haemorrhages in tissues and pancreatic lesions (probable necrosis). Credit, APHA Disesases of Wildlife Scheme and APHA Starcross

Figure 14: Feral black swan (*Cygnus atratus*), Devon, with confirmed HPAIV (same bird as Figure 15). Hepatitis. Credit, APHA Disesases of Wildlife Scheme and APHA Starcross

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.