Rapid Risk Assessment on the finding of H5N6 HPAI in wild birds in Dorset

January 2018
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Summary

In December 2017, the Netherlands reported a new strain of H5N6 HPAI in a duck fattening farm in Flevoland; several cases in wild birds (mute swans, *Cygnus olor*) in the same region and cases in captive birds at a single site (mallard ducks, mute swans, greylag geese and guinea fowl) were reported in the following days. In late December / early January two further cases in wild birds were reported, one in southern Germany and one in west Switzerland. In January 2018, three mute swans were found dead and tested positive for H5N6 HPAI in Dorset, on the South coast of England and initial analysis confirms this virus has the same characteristics as the Netherlands strain. The current numbers, as of 12th January, are 15 mute swans, 1 Canada goose and 1 pochard, all found dead and all testing positive. There have been no reports in domestic poultry, either commercial or small holding premises.

This rapid risk assessment is to gather the evidence and assess the likely source of infection and the risk of spread of the virus to poultry or to wild birds in the UK, in comparison to the background risk level from migratory wild birds.

The assessment suggests that there is no substantial increase in risk of incursion to the UK as a result of this finding, in comparison to the national risk of incursion level (currently at MEDIUM). At a local level, there would be a slight increase in the risk of spread for poultry on poultry farms in the immediate area, where poultry mix with wild birds, but there is some uncertainty around the role of bridging species and the modes and risk of fomite spread into the local environment.

Introduction

During the winter and spring of 2016-2017 the most significant epizootic across Europe of highly pathogenic avian influenza (HPAI) occurred, eventually affecting 26 of the 28 member states as well as non-EU countries, from Europe to Asia and Africa. The virus concerned, H5N8 HPAI was detected in multiple species of wild birds, in particular wild waterfowl, causing large die-offs. Most poultry species showed some clinical signs, with Galliforme species being the most affected, where high mortality rates were reported. For a full over-view of the situation in the EU, see the EFSA opinions (EFSA 2017a & b).

In Asia, several strains of H5 virus are circulating in wild birds and poultry and these were being monitored closely, with an expectation that the wild bird migration routes may bring such viruses to Europe within a matter of months, during the migration season. This pattern has been repeated over several years and the strains of most concern were viruses from the clade 2.3.4.4 which were reported as spreading rapidly around Asia. In February 2017 there was a single incursion in Europe of H5N6 HPAI in a backyard farm of just 60 poultry; no further cases were reported and the virus was not related to the zoonotic strains in Asia (EFSA Panel, 2017). The arrival of H5N6 HPAI in NW Europe in December 2017 was therefore anticipated. The risk level for wild bird incursion was raised
to MEDIUM from LOW in October 2017 on the basis of H5N8 HPAI in Europe and the wild bird findings in Germany that month (Defra, 2017a). The finding of H5N6 HPAI in the Netherlands in December did not change that risk level, but it focussed our diagnostic capability for detecting this virus in any wild birds found dead or poultry report cases (Defra, 2017b).

On January 8th 2018, five mute swans were found dead at a site in Dorset on the South coast of England. Three of the five tested positive for H5N6 tests and showed genetic markers for high pathogenicity.

### Methodology

The OIE qualitative risk assessment methodology is used to assess the likelihood of entry and spread into poultry through the movement of wild birds or through indirect contact with the affected area.

The risk levels are according to EFSA guidance with expanded definitions derived from Kahn et al. 1999):

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<th>Definition from EFSA</th>
<th>Expanded description</th>
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</thead>
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<tr>
<td>Negligible</td>
<td>Event is so rare, does not merit consideration</td>
<td>The chance of the event occurring is so small it does not merit consideration in practical terms; it is not expected to happen for many years, if at all;</td>
</tr>
<tr>
<td>Very Low</td>
<td>Event is very rare, but cannot be excluded</td>
<td>The event is not expected to occur (very rare) in the next few years but it is possible</td>
</tr>
<tr>
<td>Low</td>
<td>Event is rare, but could occur</td>
<td>The event may occur occasionally (rare) but could occur in the next few years</td>
</tr>
<tr>
<td>Medium</td>
<td>Event occurs regularly</td>
<td>The event is possible within the next year</td>
</tr>
<tr>
<td>High</td>
<td>Event occurs very often</td>
<td>The event is expected to occur within the next year</td>
</tr>
</tbody>
</table>

### Definitions

**Waterfowl:** Including birds of the Anatidae family such as swans, dabbling and diving ducks and wild geese

**Water birds:** Other birds living in or around water, excluding the Anatidae, including gulls, waders, shore birds, herons, coots,
Hazard Identification

H5N6 HPAI viruses of the clades 2.3.4.4c and d were detected first in China in 2014 and then continued to spread in poultry in China, Laos, Cambodia, South Korea, Vietnam and Japan and some viruses in clade 2.3.4.4c have zoonotic potential and caused a small number of human cases (EFSA Panel, 2017).

According to a Promed report on 13 December 2017, “The OIE/FAO/EU International Reference Laboratory at APHA-Weybridge, UK, working with the Animal and Plant Quarantine Agency of the Republic of Korea, characterized a novel emerging highly pathogenic avian influenza A (H5N6) virus isolated from both wild birds and domestic poultry in the Republic of Korea. Phylogenetic analyses of a representative of these viruses showed that it was different from previously circulating Korean H5N6 viruses in the 2016-2017 winter season and which had caused a very limited number of human cases. All genes of the novel HPAI virus except the neuraminidase were of the "European H5N8 HPAI lineage" that emerged last winter (16/17) and continues to be detected in some European countries. The neuraminidase N6 is most similar to the H5N6 reassortant virus isolated from chickens in Greece in early 2017, which had acquired a neuraminidase gene from the Eurasian low pathogenic avian influenza A virus lineage circulating in wild birds. These analyses demonstrate continued circulation of this H5 lineage in multiple geographic regions and likely wild-bird mediated spread.” See also Lee et al, 2017.

The current season (winter 2017/2018) has seen several outbreaks in poultry and cases in wild birds of H5N8 HPAI in Italy, Bulgaria and Germany (see Figure 1), but none in the northerly part of the EU; further outbreaks of H5N8 HPAI cannot be ruled out since the virus continues to circulate elsewhere including the Middle East and South Africa.

In December 2017, the Netherlands reported a single outbreak of avian influenza in fattening ducks in Flevoland region (OIE, 2017). Four week old ducks showed increased clinical signs and increased mortality. The birds tested positive at the National Reference Laboratory and the virus was confirmed as H5N6 HPAI; disease control measures were put in place, including a housing requirement for all commercial poultry. According to the Dutch laboratory, the sequence shows this was a reassortant between a low pathogenic HxN6 strain and the circulating Eurasian H5N8 HPAI strain (Wageningen, 2017). Further cases in wild mute swans were reported during December and January (OIE, 2017). At the end of December, Switzerland reported a case of H5N6 HPAI in a wild mute swan and on the 8th January, Germany reported a case of H5N6 HPAI in a wild duck (species not known; OIE, 2017). The H5N6 HPAI currently in Europe therefore appears to be an emerging strain.

On the 8th January, three dead mute swans reported from a wild waterfowl site in the county of Dorset were submitted for testing to the EU/OIE/FAO reference laboratory in Weybridge. On the 9th January, the samples were confirmed positive for H5N6 HPAI. The virus is closely related to the viruses isolated in the Netherlands and presumed to be similar to those isolated in wild birds in Germany and Switzerland. Phylogenetic analyses of selected representatives of these novel H5N6 viruses showed the haemagglutinin gene
is very similar to that of the previously circulating H5 clade 2.3.4.4 H5N8 viruses in the 16-17 winter season. In addition, the neuraminidase N6 is most similar to the H5N6 reassortant virus isolated from chickens in Greece in early 2017, which had acquired a neuraminidase gene from the Eurasian low pathogenicity avian influenza A virus (LPAIV) lineage circulating in wild birds.

At the site, since the 1st of January until the 11th January, the dead wild bird count is 25 mute swans, 3 Canada geese and 1 pochard. Samples will continue to be taken from suitable carcases for testing.

Figure 1: Reports of H5N6 HPAI and H5N8 HPAI since October 2017 (data from the EU Animal Disease Notification System).

During the winter and spring of 2016-2017 there were multiple outbreaks of H5N8 HPAI in poultry and captive birds and cases in wild birds across Europe. When compared to this year and the H5N6 HPAI outbreaks on the Continent (see Figure 2 below) it is clear that the level of infection pressure is far lower this year than at the same time last year. This meant the risk level for the UK was considerably higher earlier in the season in 2016/2017. There are of course caveats to these data – the new strain of H5N6 HPAI may not be causing such high levels of mortality in wild waterfowl as was seen with H5N8 HPAI in 2016/2017; the waterfowl may exhibit some resistance to infection if they had previously been exposed to H5N8 HPAI virus; the findings in mute swans above other species could be increased susceptibility, exposure or simply they are easier to find when they die.
 Nevertheless, there can also be similarities drawn with the 2014/2015 winter when the first
cases of H5N8 HPAI were detected in the EU, and which caused only a very limited number of outbreaks (only 9 commercial premises) and cases in Germany, Italy, Netherlands and the UK (Adlhoch et al. 2014).

![Figure 1: Reports of H5N8 HPAI in captive birds, wild birds and poultry from October 2016 to 9th January 2018. Reports of H5N6 HPAI are superimposed to demonstrate the difference in the infection pressure.](image)

**Risk Assessment**

**Risk question**

What is the risk of further spread occurring from the site in Dorset as a result of the finding of H5N6 HPAI in mute swans?

The risk assessment will consider the likely source of infection at the site under the entry assessment and then the spread to poultry as the exposure assessment.

This document will not consider the public health aspects of the virus. Consequence assessment will only cover the impact of an outbreak in poultry premises.
Entry Assessment

1. Migratory wild birds arriving at the Fleet area in Dorset are the source of infection at the site - **high likelihood; low uncertainty**

2. The source of infection was spread from an existing poultry farm with undetected infection – **very low likelihood; low uncertainty**

3. The source of infection was spread from resident wild birds - **low likelihood; medium uncertainty**

4. The source of infection was spread through indirect contact (fomites, products of animal origin etc) - **very low likelihood; low uncertainty**

Evidence:

Migratory birds at the site:

Previous ornithological surveys at the site on the Fleet River have reported high numbers of both resident and migratory wild waterfowl. Last year, in January 2017, there were the resident population of mute swans (~200) and around 250 other dabbling ducks (shoveler, wigeon, teal, and mallard), diving ducks (pochard and tufted ducks) and Canada geese as well as other waterfowl, such as cormorants and coots. The mute swans and Canada geese only move short distances around the site (<200m) as they are fed in situ. Evening flightlines were observed over just one evening for tens of corvids and numerous (~2,000) gulls. The gulls do not roost at the site itself.

Further afield, along the Fleet itself, there were high counts of Brent geese (>1,600), wigeon (>1,200) as well as teal, pintail, lapwing, dunlin and Mediterranean and blackheaded gulls.

The BTO (2017) reports that although most mute swans are sedentary, in some areas they are practically or wholly migratory. Those in the UK usually just make relatively small movements. However other birds present at the site itself and the general area, such as the wigeon and the teal, are migratory, and may have flown in from northern Europe or Ireland.

Surrounding poultry farms:

There have been no recent reports of disease in any poultry farms in the UK. The virus has not been fully characterised in all the poultry breeds but given the clinical signs observed in ducks in the Netherlands’ outbreak, it is likely that infection will lead to clinical signs and therefore would be reported through our disease reporting system.
Annual and winter resident wild birds:

There is a year round system for reporting dead and sick or injured wild birds to Defra and warden patrols take place at areas of high migratory wild waterfowl congregations. These birds tend to be the first wild birds to test positive in any migration season. Although the presence of undetected infection in apparently healthy wild waterfowl resident in the area cannot be ruled out, the balance of probability for the source of infection lies with the migratory wild waterfowl in the area given its relatively unique contact structure and epidemiology.

Indirect contact:

The site is closed to visitors at this time of year, therefore there is only very limited indirect contact and introduction of contaminated products of animal origin or fomites is unlikely given the low number of outbreaks in Europe and in the absence of specific information to the contrary. The birds are fed so it is possible the feed was contaminated from being in contact with a wild bird or by attracting wild birds to the outside feeding site.

Exposure Assessment

1. Wild waterfowl becoming infected at the site and carrying infection to poultry on poultry farms in the immediate area – low likelihood; medium uncertainty (dependent upon on farm biosecurity)

2. Other wild water birds or wild birds becoming infected or contaminated at the site and carrying infection to poultry on poultry farms in the immediate area – medium likelihood; medium uncertainty (dependent upon on farm biosecurity)

3. Spread through indirect contact (fomites, products of animal origin etc) - low likelihood; low uncertainty

Evidence

At the site itself, there have been 15 mute swans, one Canada goose and one pochard found dead and tested positive (as of the 12th January). This would mean that the immediate environment is potentially contaminated and with low temperatures at this time of year the virus may persist for many days, even weeks.

The area around the waterfowl site in Dorset is relatively low in poultry farms but a survey of the area 10km wide along the Fleet has identified 38 premises registered on the GB poultry register, of which 21 are “commercial” in that more than 50 poultry birds are registered there, and fewer than 5 have more than 5,000 poultry.

In 2007/2008 and in 2016/2017 this site was reported with avian influenza, during periods of heightened risk across Europe. In the first instance, H5N1 HPAI was reported in 11 wild
waterfowl (10 mute swans and a Canada goose) while in 2016/2017 H5N8 HPAI was detected in twenty mute swans over a period of a few weeks. During neither incident was any spread to neighbouring poultry farms observed, consistent with a low risk.

Wild waterfowl

An ornithological survey of the area in January 2017 looked at the movement of the resident ducks, geese and swans and the flight lines of other water birds, particularly gulls, in the area and observed very limited movement (<200m each day) for many of the waterfowl while the gulls tended to overfly the site itself *en route* to their overnight roosts. The limited daily movement of the waterfowl is likely to be linked to the local daily feeding at the site which meant minimising the need for foraging for food further afield. Local dabbling ducks such as mallards mixing with backyard poultry were a serious concern during the 2016/2017 H5N8 HPAI epizootic, therefore the risk cannot be ruled out and the uncertainty around the level of infection outside the site and along the Fleet means this is a low risk.

Wild water birds and other birds (bridging species)

There is uncertainty around the role of other species acting as bridging species between wild waterfowl and poultry and the level of environmental contamination along the Fleet or in other species of wild bird. During the H5N8 HPAI epizootic many species other than waterfowl were testing positive, including water birds such as gulls and waders, birds of prey, corvids and passerines. Corvids were observed last year accessing the site under consideration and gulls may occasionally land therefore this pathway is considered a medium risk with medium confidence. Further evidence around the role of bridging species would improve the confidence. The medium risk level is related to the expectation of reasonable biosecurity on farm.

Indirect contact

The site is currently closed to visitors. All dead birds are being disposed of officially as animal by-products. Any official visitors to the site must wear personal protective equipment if they are handling dead birds and therefore take precautions to disinfect after the visit. This will substantially limit the likelihood of spread off the site. However the Fleet itself is a public area and may have been visited by infected wild waterfowl therefore this is a low risk with low uncertainty.

Consequence Assessment

Further wild bird findings both locally and nationally are possible and should not be considered an exceptional event. Where there is good biosecurity present on poultry farms, i.e. reducing the level of direct and indirect contact between poultry and wild birds, there should be no increase in risk as a result of this finding. However if more findings in wild birds in other areas are made, then this risk will be reassessed. A finding in a wild bird
has no trade impact; there are no requirements for control zones or any implications for trade in live poultry, poultry products including meat and table eggs or other captive birds.

Any outbreak of avian influenza is a serious issue and the Government has good control plans in place should an outbreak occur in poultry, which will limit the spread and allow the UK to regain our disease free status as soon as possible. The trade impact would be regionalised as much as possible, in accordance with the EU regulations and third country agreements but there can still be a substantial impact from reporting a single outbreak, regardless of the size of the poultry premises.

**Conclusion**

Overall, the finding of wild birds infected with H5N6 HPAI virus at the site in Dorset does not substantially increase the risk of incursion to poultry on poultry farms in GB. There may be some unquantifiable increase in risk to poultry premises nearby, because of the contact with bridging species or other wild water birds; this is only a marginal increase and will be time limited by the level of infection circulating in the wild bird population. This will depend on the biosecurity practices at the premises.

There is no increase in risk of incursions of avian influenza to wild bird populations in the rest of the UK, above MEDIUM which is the current level. Wild waterfowl are unlikely to move far from the area at this time of year, according to the observed behaviour of the birds in previous seasons; this site is a high risk site during any season for avian influenza in Europe; previous incursions here did not lead to any spread to poultry farms. More wild waterfowl may test positive in the coming weeks not only from this site but elsewhere in the UK or continental Europe and this will continue to inform our risk level.

**Uncertainty**

An uncertainty rating is assigned to the analysis based on the following matrix. It uses a combination of the type, amount and quality of the evidence against the level of agreement between different sources.

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</tbody>
</table>
Limited Evidence | Robust Evidence
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Evidence

## References


OIE (2017) WAHID – Weekly Disease information
http://www.oie.int/wahis_2/public/wahid.php/Diseaseinformation/WI