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Avian influenza overview December 2020 – February 2021

European Food Safety Authority,
European Centre for Disease Prevention and Control and
European Union Reference Laboratory for Avian Influenza

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Abstract

Between 8 December 2020 and 23 February 2021, 1,022 highly pathogenic avian influenza (HPAI) virus detections were reported in 25 EU/EEA countries and the UK in poultry (n=592), wild (n=421) and captive birds (n=9). The majority of the detections were reported by France that accounted for 442 outbreaks in poultry, mostly located in the Landes region and affecting the foie gras production industry, and six wild bird detections; Germany, who reported 207 detections in wild birds and 50 poultry outbreaks; Denmark, with 63 detections in wild birds and one poultry outbreak; and Poland, with 37 poultry outbreaks and 24 wild bird detections. Due to the continued presence of HPAI A(H5) viruses in wild birds and the environment, there is still a risk of avian influenza incursions with the potential further spread between establishments, primarily in areas with high poultry densities. As the currently circulating HPAI A(H5N8) virus can cause high mortality also in affected duck farms, mortality events can be seen as a good indicator of virus presence. However, also subclinical virus spread in this type of poultry production system have been reported. To improve early detection of infection in poultry within the surveillance zone, the clinical inspection of duck establishments should be complemented by encouraging farmers to collect dead birds to be pooled and tested weekly (bucket sampling). Six different genotypes were identified to date in Europe and Russia, suggesting a high propensity of these viruses to undergo multiple reassortment events. To date, no evidence of fixation of known mutations previously described as associated to zoonotic potential has been observed in HPAI viruses currently circulating in Europe based on the available sequences. Seven cases due to A(H5N8) HPAI virus have been reported from Russia, all were poultry workers with mild or no symptoms. Five human cases due to A(H5N6) HPAI and 10 cases due to A(H9N2) LPAI viruses have been reported from China. The risk for the general population as well as travel-related imported human cases is assessed as very low and the risk for people occupationally exposed people as low. Any human infections with avian influenza viruses are notifiable within 24 hours through the Early Warning and Response System (EWRS) and the International Health Regulations (IHR) notification system.

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Keywords: avian influenza, HPAI/LPAI, monitoring, poultry, captive birds, wild birds, humans

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1. Introduction

This scientific report provides an overview of highly pathogenic avian influenza (HPAI) virus detections in poultry, captive and wild birds and noteworthy outbreaks of low pathogenic avian influenza (LPAI) virus in poultry and captive birds, as well as human cases due to avian influenza virus, reported in and outside Europe between 8 December 2020 and 23 February 2021, 8 a.m. (CET). The background, terms of reference and their interpretation are described in Appendix A and the data and methodologies are reported in Appendix B.

2. Conclusions

Avian influenza outbreaks in European countries and in other countries of interest between 8 December 2020 and 23 February 2021, 8 a.m. (CET)

2.1. Main observations

- Seven human cases due to A(H5N8) HPAI virus have been reported from Russian authorities, all cases were poultry workers involved in an A(H5N8) outbreak on a poultry farm and were reported having no or mild symptoms. More data are needed to better understand the situation and performed investigations.
- Five human infections due to A(H5N6) HPAI and 10 cases due to A(H9N2) LPAI virus have been reported from China, during the period of the report and retrospectively from 2019 and 2020.
- In Europe, between 8 December 2020 and 23 February 2021 8 a.m. (based on the Animal Disease Notification System (ADNS), information provided by affected countries and OIE data):
 - 1,022 HPAI A(H5) detections were reported in poultry, captive and wild birds: 589 outbreaks in poultry, predominantly in France (n=446), Germany (n=51) and Poland (n=37); 415 detections in wild birds, predominantly in Germany (n=207), Denmark (n=63), and Ireland (n=20); and 9 outbreaks in other captive birds;
 - seven LPAI outbreaks were reported in poultry: by France, four A(H5Nx) and one A(H5N3); Italy, one A(H7N7); and Belgium one A(H5Nx).
- In general, the dynamics of the current A(H5N8) HPAI epidemic in Europe is similar to the epidemic in 2016–2017, with some differences. Compared to the 2016–2017 epidemic, the current epidemic had an earlier peak of detections in wild birds, earlier spread of the virus to the UK and Ireland, and less extensive spread in south-east Europe. As for poultry, the first outbreaks in Europe were detected earlier than observed during the 2016–2017 epidemic, a large number of outbreaks have been reported in domestic ducks in Southern France in both epidemics.
- Whereas wading birds were not or hardly involved in previous HPAI outbreaks in Europe, during this reporting period there was a localized die-off of over 3,000 red knots (*Calidris canutus*) in Germany, associated with A(H5N3) HPAI virus, a reassortant of A(H5N8) HPAI virus and a LPAI virus.
- The HA gene sequences of the currently circulating HPAI viruses in wild and domestic birds form a single genetic group within clade 2.3.4.4b, and cluster with HPAI A(H5Nx) viruses that have been detected in Iraq, Russia and Kazakhstan since May 2020. Six different genotypes have been identified to date in Europe and Russia, suggesting a high propensity of this virus to undergo multiple reassortment events with LPAI viruses circulating in wild birds in Eurasia. To date, no evidence of fixation of known mutations previously described as associated to zoonotic potential has been observed in the available sequences.
- The complete genome of one A(H5N8) virus from a human case identified in December 2020 in Russia is closely related to the A(H5N8) viruses detected in chickens in the same period and

geographic region, and groups together with A(H5N8) viruses currently circulating in Europe. No known markers for mammalian adaptation were identified in this strain.

- In comparison to the previous reporting period (EFSA et al., 2020b), an increasing number of outbreaks of HPAI A(H5N1), HPAI A(H5N5), HPAI A(H5N6) and particular HPAI A(H5N8) in poultry and wild birds (383 vs. 131) as well as a higher number of affected countries (17 vs. 11) were observed outside Europe. In contrast to the previous reporting period, HPAI cases in poultry and wild birds also were reported from the African continent (Algeria, Mauritania, Nigeria, Senegal).

2.2. Conclusions

- Following the first report of human cases, the risk of infection related to avian influenza A(H5N8) virus for the general population in the EU/EEA is assessed as *very low* and for occupationally exposed people *low*.
- The risk of transmission to humans by eventually contaminated poultry products is considered *negligible* as also outlined in a previous EFSA assessment (EFSA AHAW Panel, 2017).
- Characterised viruses have not so far shown fixation of mutations known as markers of adaptation for human and other mammals and are assessed as having low risk for human transmission. However, the high genetic variability of the viruses identified and the multiple reassortment processes with local LPAI viruses, underlines the possibility of the emergence of viruses that might have increased potential to infect humans.
- The high number of A(H5N8) HPAI outbreaks in domestic ducks in France may be a result of the high risk for incursion and transmission of HPAI in this production system. The affected region is characterised by having a high density of duck establishments, outdoor farming and frequent movement of live ducks for fattening.
- Based on comparison of the dynamics of the current epidemic in wild and domestic birds with that in previous years, continued A(H5N8) HPAI virus presence in wild birds and in the environment is expected in the next few months.
- The long duration of the avian influenza risk period could represent a challenge for the sustainability of the reinforced biosecurity measures implemented along the poultry chain (e.g., compulsory indoor confinement of free-range poultry) in high-risk areas or production sectors. The persistent presence of HPAI A(H5) viruses in wild birds and the environment and the possible reduction of biosecurity compliance might increase the risk of avian influenza incursions with the potential further spread between establishments, primarily in areas with high poultry densities.

3. Options for response

- Continued surveillance of avian influenza virus in wild birds and poultry in Europe, combined with timely generation and sharing of complete viral genome sequences, are crucial. These efforts have led to the detection of new virus introductions and the emergence of novel reassortant viruses. Continued monitoring together with in-depth analyses on virus evolution and genetic mutations, resulting in changes in viral properties that are relevant for animal and public health, are of utmost importance.
- To guarantee the continued application of appropriate risk-modulating and reinforced biosecurity measures and to improve early detection of infections in poultry, enhanced awareness among farmers to continue to apply stringent biosecurity measures and to monitor and report increases in daily mortality and drops in production parameters (EFSA et al., 2017b), such as egg production and food and water intake, are recommended.
- It appears that the currently circulating HPAI A(H5N8) virus can cause high mortality in affected duck farms (Vergne et al., 2020 and J. Gonzales, pers. comm). Nevertheless, observations of a subclinical virus spread in this type of poultry production system have been also reported. In such a situation to improve early detection within the surveillance zone, the clinical inspection

of duck establishments should be complemented by encouraging farmers to collect dead birds to be pooled and tested weekly (bucket sampling) (EFSA AHAW Panel et al., 2020).

- People should avoid touching sick or dead birds or bird droppings unprotected. Wearing personal protection equipment (face mask, goggles/face shield/protective glasses, gloves and gown/overall) when directly exposed to birds, their products or droppings, which may potentially be infected or contaminated with avian influenza viruses, will minimise any residual risk. Occupational safety and health measures should be set according to national legislation where workers could be exposed, and health surveillance should be offered according to national requirements (see section 4.6.1 for more detail). National public health and occupational health and safety (OSH) guidelines might detail the required level of protection and equipment. Appropriate measures should also be set for culling operations, which should cover the disposal of dead animals and waste.
- The evolution and increasing occurrence of reassortment events need to be closely monitored for the potential risk that avian influenza viruses transmit from birds to human, and subsequently between humans, and/or to other wild or domestic mammals. Therefore, the possible acquisition of genetic signatures of adaptation to mammalian species and increased pathogenicity needs to be monitored continuously.
- People potentially exposed to infected birds, e.g. during culling operations, should be adequately protected and actively monitored or at least self-monitor for respiratory symptoms or conjunctivitis for 10 days following exposure and immediately inform local health and occupational health or other preventive services to initiate testing and follow-up. Antiviral pre- or post-exposure prophylaxis should be considered for exposed people according to national recommendations.
- Wild birds belonging to the group of waders, like red knots and dunlins, found ill or dead should be considered for HPAI testing, even though they are not in the previously published list of wild bird species for passive surveillance of HPAI as well as any other new wild bird species involved in abnormal mortality events (EFSA et al., 2017a). Cross-sectorial cooperation and communication between animal and public health and OSH authorities is recommended (One Health approach) to initiate rapid response, follow-up and control measures.

4. Results

4.1. Overview of HPAI outbreaks in Europe during the previous and current seasons

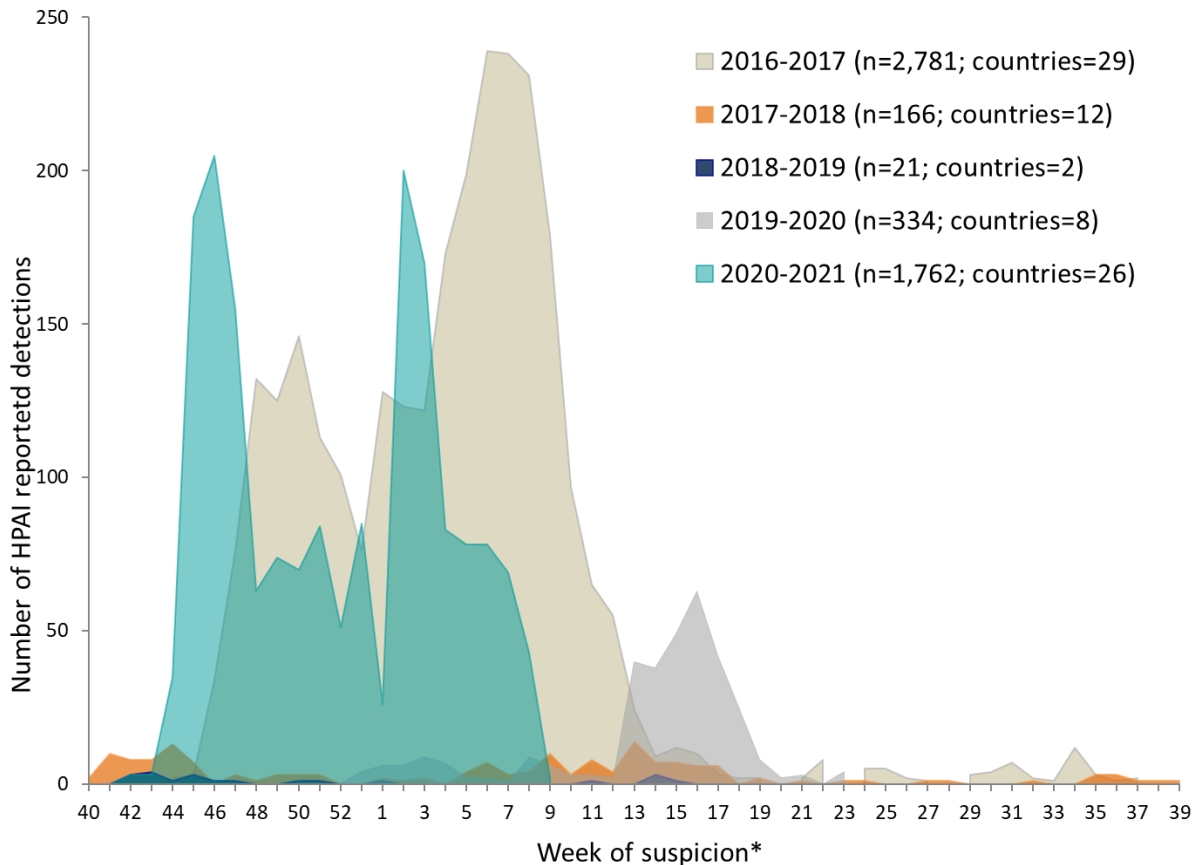
Figures 1 and 2 show the HPAI outbreaks detected in birds (poultry, wild and captive birds) in Europe and reported via ADNS for seasons 2016–2017, 2017–2018, 2018–2019, 2019–2020 and 2020–2021 by week of suspicion and geographical distribution, respectively. A season is the period that starts in week 40 (the beginning of October) and ends in week 39 (the end of September) of the following year. For the current season, 2020–2021, data reported are truncated at the beginning of week 9 (on 23 February 2021), as the season is still ongoing. A comparison among the geographical distribution of HPAI detections in the current 2020–2021 epidemic season to date and those recorded in 2016–2017 which was the largest recorded in the EU/EEA in terms of number of poultry outbreaks, geographical spread and number of dead wild birds, is shown in Figure 3.

The analysis of the characteristics of current 2020–2021 avian influenza seasons, from October 2020 to 23 February 2021, are reported in Figure 4 and 5 by week of suspicion and virus subtype.

Comparison of the HPAI detections in wild birds and poultry between 2016–2017 and 2020–2021 (Figure 3) shows differences in the start, spread and course of the overall epidemic in Europe (the end cannot yet be compared because the 2020/2021 epidemic is still ongoing). At the start of the epidemic in October 2016, the westernmost extent was the border between Poland and Germany (about 14 degrees E), while in October 2020 it was already reported in Ireland (about 9 degrees W), with many reports in Germany, Denmark and the Netherlands (up to about 4 degrees E).

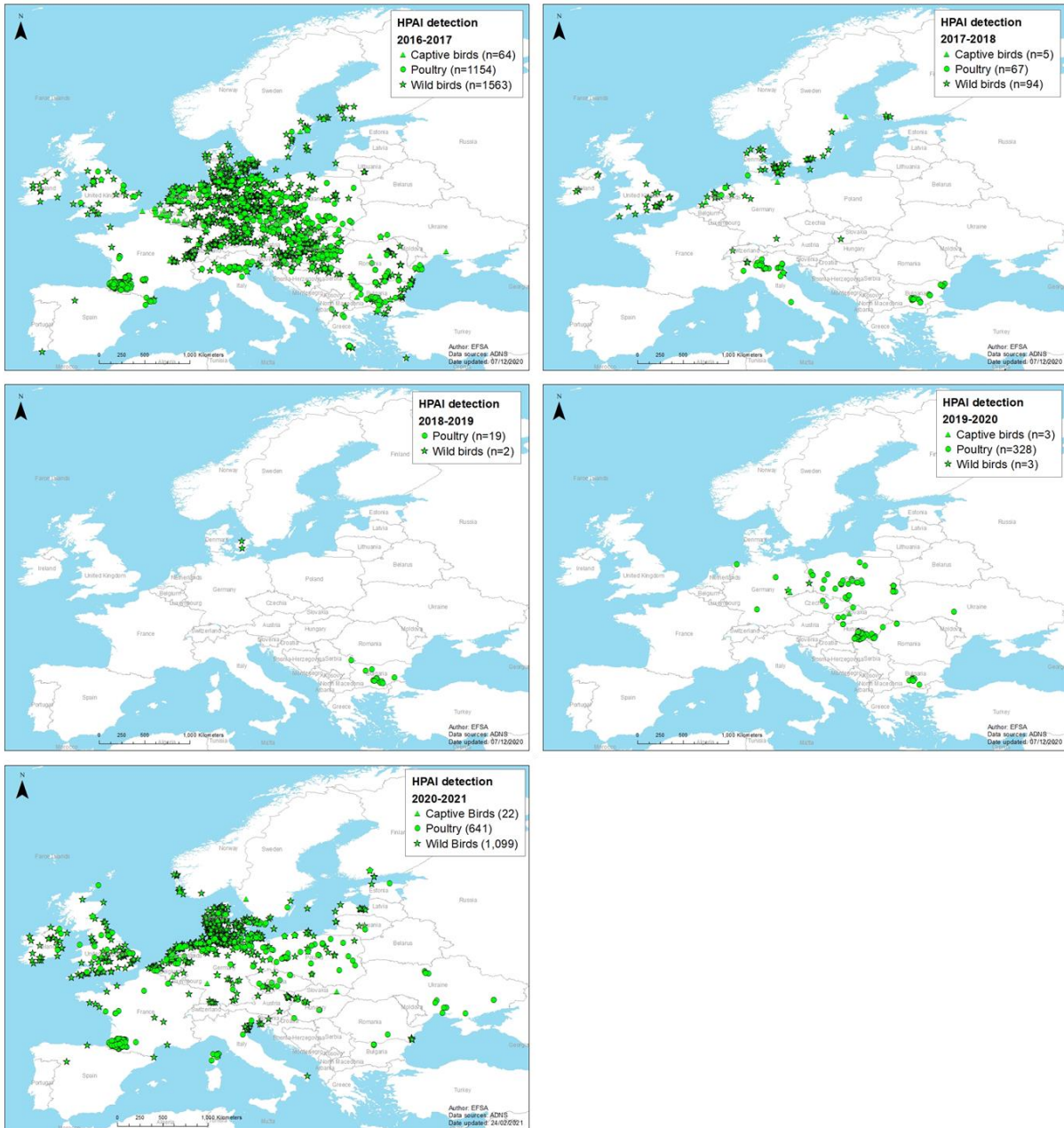
This was mirrored by the westward spread of the virus in the next two months: in 2016, the virus only became widespread in the U.K. and Ireland in December, while in 2020 this already was the case one month earlier, in November. Another difference in virus spread was the higher number of reports in south-east Europe (e.g. Romania, Bulgaria, Greece) in 2016/2017 than in 2020/2021.

As for the course of the epidemic, the peak of reports in wild birds in 2016-2017 was three months later (February, n=590) than in 2020/2021, when the peak was already in November (n=582). In comparison, the peak of reported outbreaks in poultry holdings appeared more similar between the two winters: February 2017 (n = 323) versus January 2021 (n=415). Of course, the data for February 2021 are not yet complete, but given what happened in 2016-2017, the 2020-2021 epidemic is not yet over.



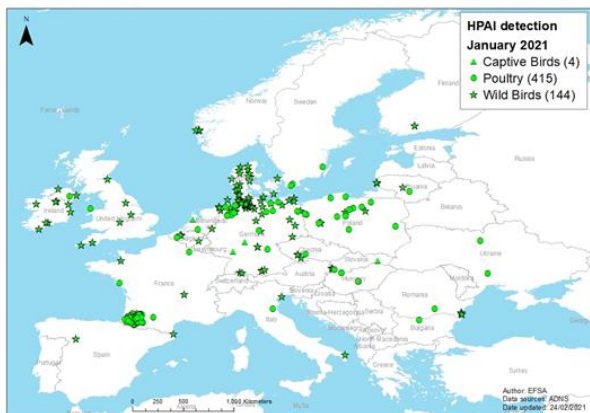
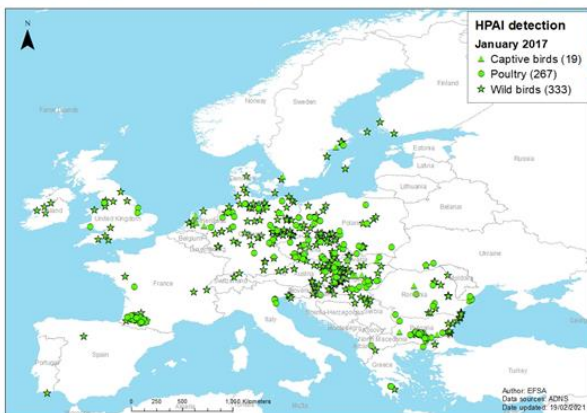
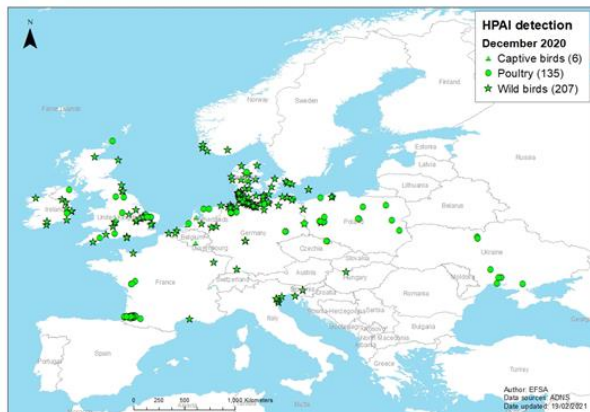
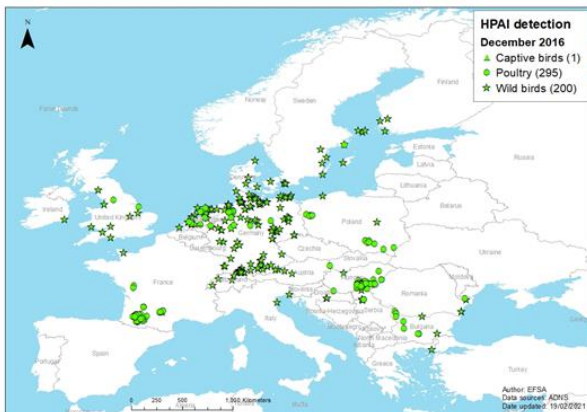
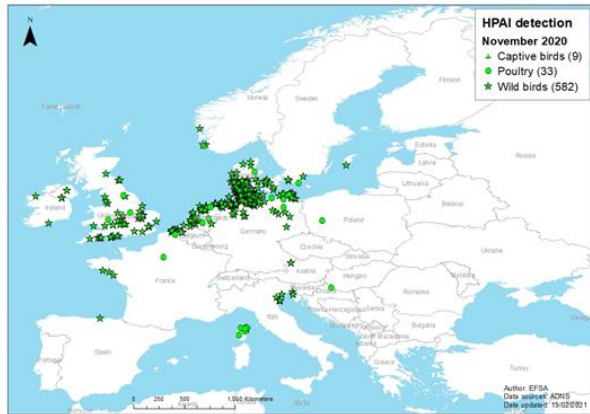
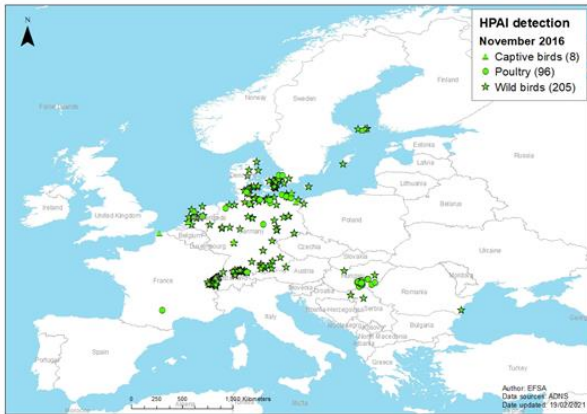
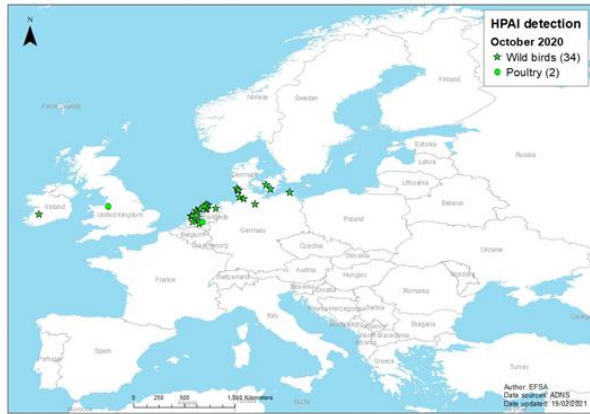
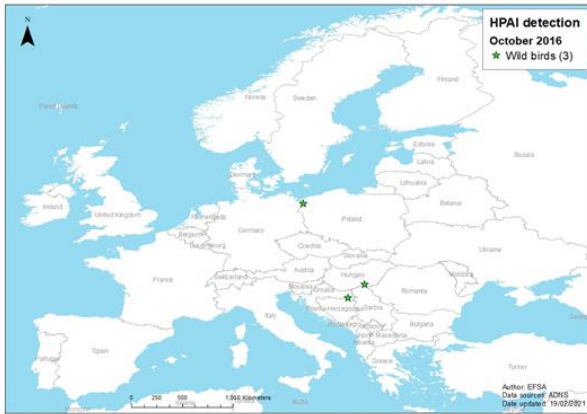
* When the date of suspicion is not available then the date of confirmation is used to assign the week of suspicion.
Data source: ADNS and OIE (23.02.2021), EFSA.

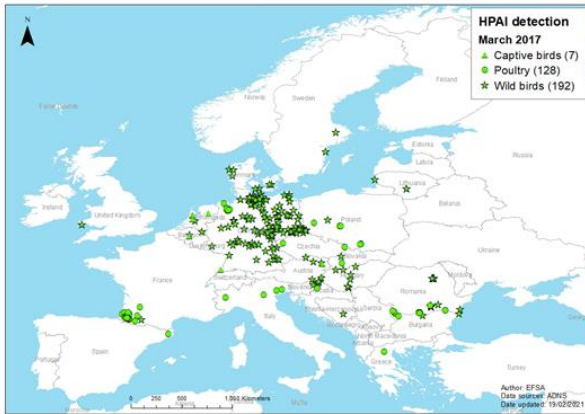
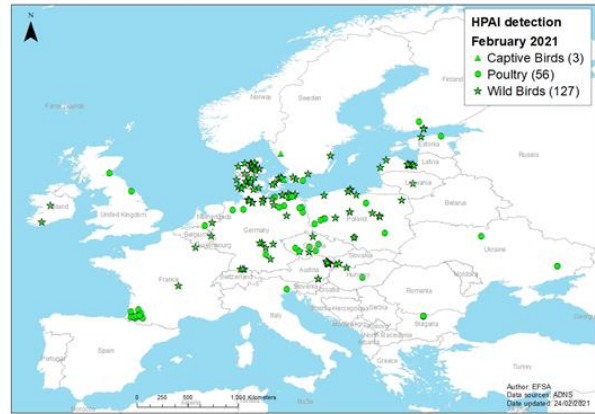
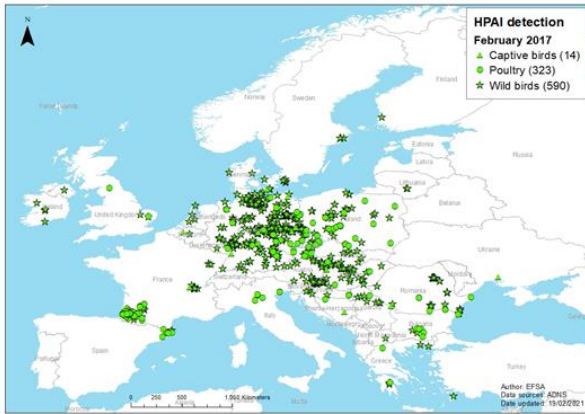
Figure 1: Distribution of total number of HPAI virus detections reported in Europe in the seasons 2016–2017 (green), 2017–2018 (orange), 2018–2019 (blue), 2019–2020 (grey), and 2020–2021 (turquoise) by week of suspicion, 28 September 2016 – 23 February 2021 (n=5,064)



* This designation is without prejudice to positions on status and is in line with United Nations Security Council Resolution 1244 and the International Court of Justice Opinion on the Kosovo Declaration of Independence.

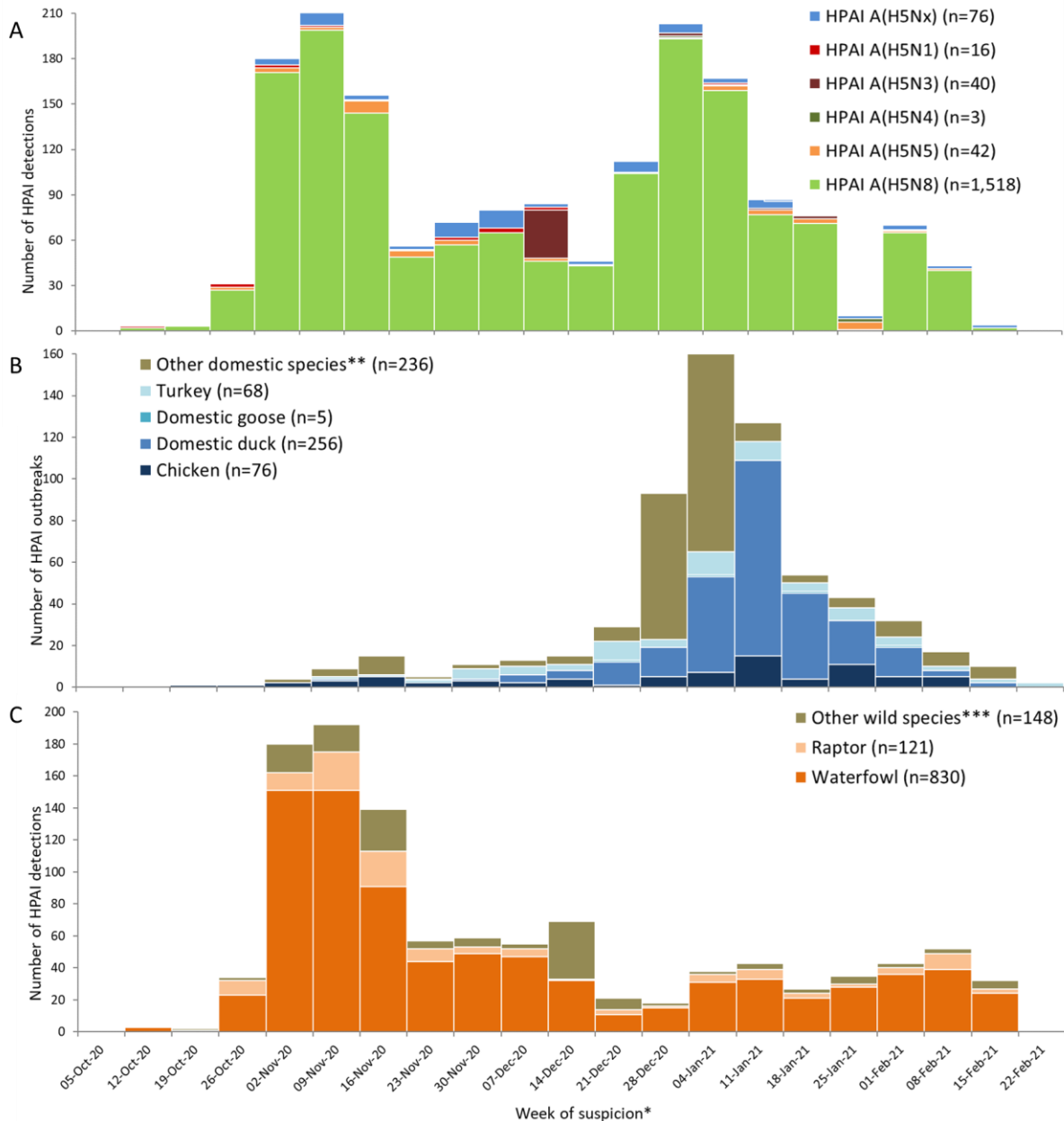
Figure 2: Geographical distribution, based on available geocoordinates, of HPAI detections in Europe in seasons 2016-2017 (n=2,781), 2017–2018 (n=166), 2018–2019 (n=21), 2019–2020 (n=334) and 2020-2021 (n=1,762) in poultry (circles), wild birds (stars) and captive birds (triangles) (1 October 2016 – 23 February 2021)





* This designation is without prejudice to positions on status and is in line with United Nations Security Council Resolution 1244 and the International Court of Justice Opinion on the Kosovo Declaration of Independence.

Figure 3: Geographical distribution, based on available geocoordinates, of HPAI detections in Europe by month of suspicion in season 2016-2017 on the left column (from October 2016 to May 2017) and in season 2020-2021 on the right column (from October 2020 to 23 February 2021)



* When the date of suspicion is not available then the date of confirmation is used to assign the week of suspicion.

** 'Other domestic species' category contains mixed, unknown bird species, or categories different from those displayed (i.e. guinea fowl, peacock, pheasant and quail).

*** 'Other wild species' category contains mixed, unknown bird species, or categories different from those displayed. The complete list of species by each wild bird category is reported in table B.1 in Appendix B.

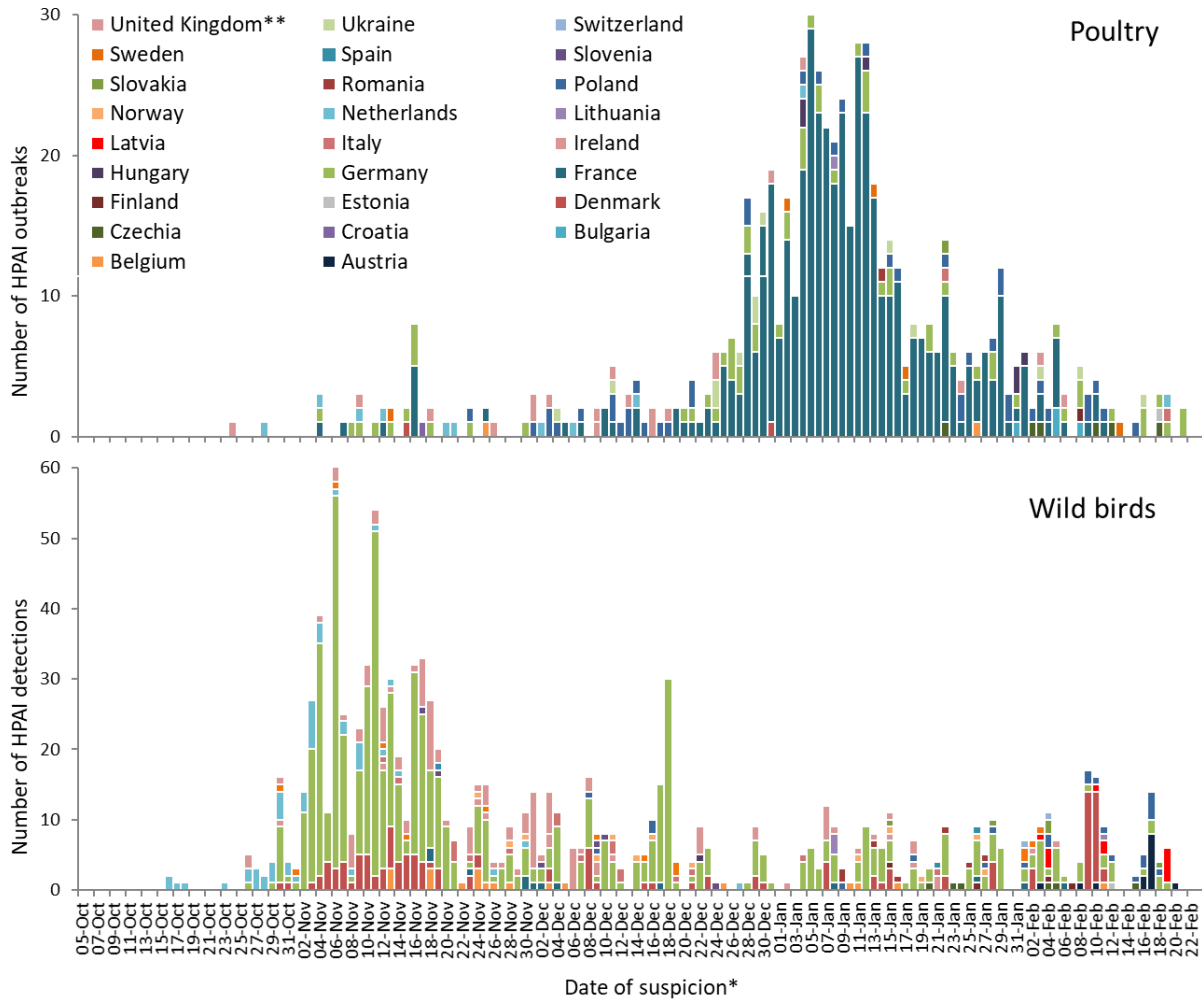
Data source: ADNS and OIE (23.02.21), EFSA.

Figure 4: Distribution of total number of HPAI virus detections reported in Europe by week of suspicion (dates indicate the first day of the week) and (A) virus subtype (n=1,695), (B) affected poultry categories (n=641), (C) affected wild bird categories (n=1,099), 5 October 2020 – 23 February 2021

4.2. HPAI and LPAI detections in Europe, 8 December 2020 – 23 February 2021 (TOR 1 and TOR 2)

4.2.1. HPAI detections in poultry, other captive birds and wild birds

From 8 December 2020 to 23 February 2021, 8 am, 1,022 HPAI A(H5) virus detections were notified in poultry (n=592), captive (n=9) and wild birds (n=421) in Europe, and were reported via the ADNS or OIE, as presented in Table 1. The timeline, location and affected bird category of the avian influenza detections are presented in Figures 5 and 6. The characterisation of HPAI-affected poultry establishments¹ is reported in Section 4.2.1.1; the description of the HPAI detections in wild birds is reported in section 4.2.1.2.



* When the date of suspicion is not available then the date of confirmation is used to assign the week of suspicion.

** United Kingdom data was extracted from ADNS until 31 December 2020. From 1 January 2021 onwards, the data source was ADNS for Northern Ireland and OIE WAHIS for Great Britain.

Data source: EFSA, ADNS and OIE (23.02.21).

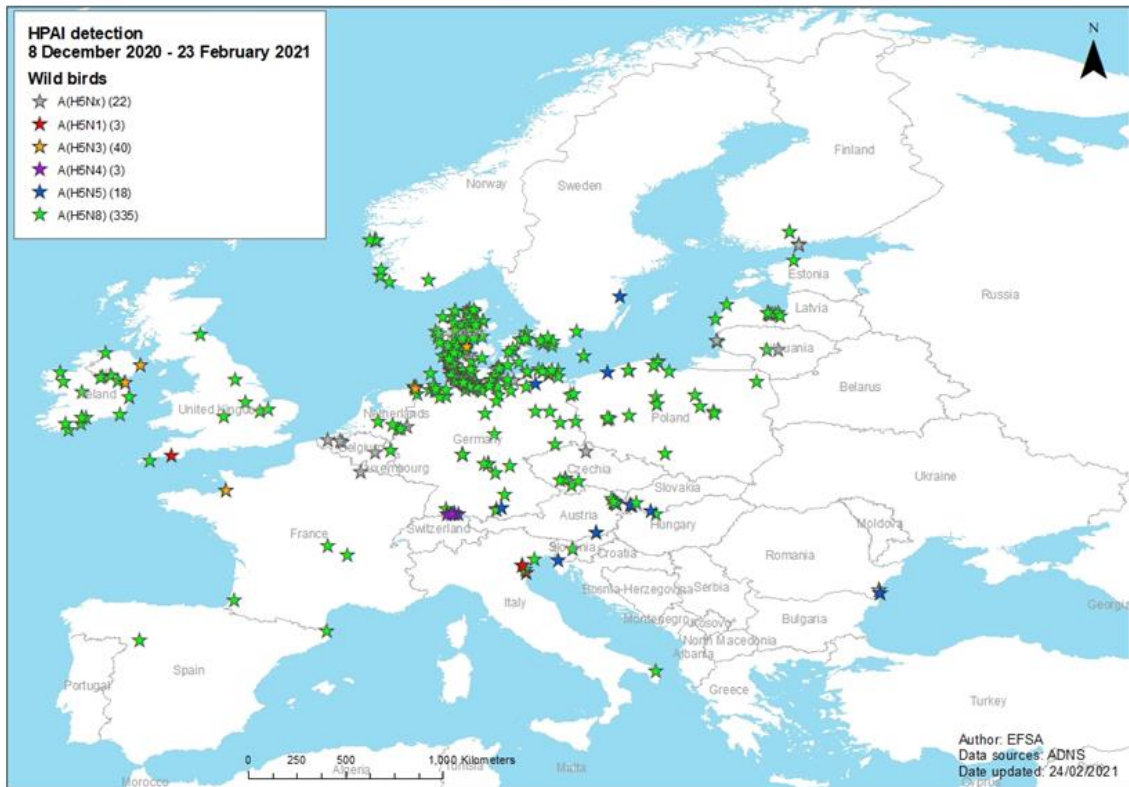
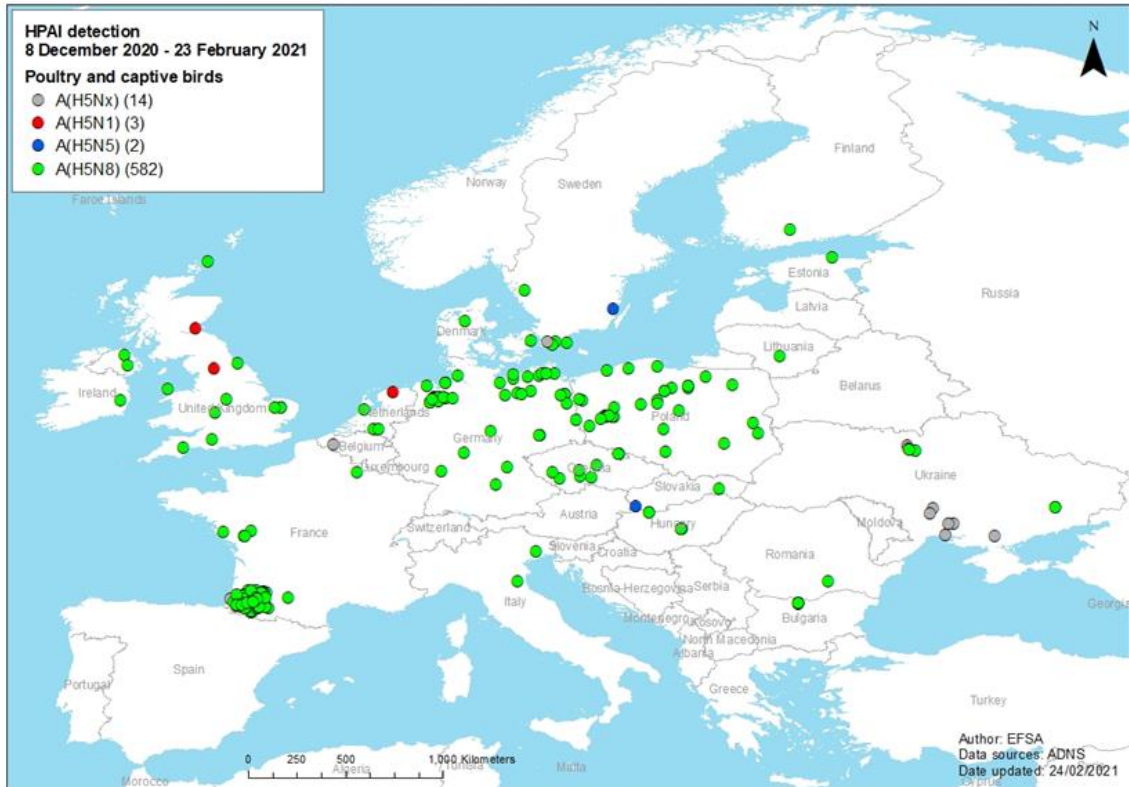
Figure 5: Distribution of the highly pathogenic avian influenza detections in Europe, by day of suspicion and country in wild birds (n=1,099) and poultry (n=640), from 5 October 2020 to 23 February 2021 (n=1,739)

¹ According to Regulation (EU) 2016/429 'establishment' means any premises, structure, or, in the case of open-air farming, any environment or place, where animals or germinal products are kept, on a temporary or permanent basis, except for: (a) households where pet animals are kept; (b) veterinary practices or clinics. Regulation (EU) 2016/429 of the European Parliament and of the Council of 9 March 2016 on transmissible animal diseases and amending and repealing certain acts in the area of animal health ('Animal Health Law'). OJ L 84, 31.3.2016, p. 1–208.

Table 1: Number of highly pathogenic avian influenza outbreaks in Europe, by country, virus subtype and affected sub-population, 8 December 2020 – 23 February 2021. Cumulative numbers for the whole 2020-2021 season are reported in brackets (5 October 2020 – 23 February 2021)

Country	Captive birds		Poultry				Wild birds						Total
	A(H5Nx)	A(H5N8)	A(H5Nx)	A(H5N1)	A(H5N5)	A(H5N8)	A(H5Nx)	A(H5N1)	A(H5N3)	A(H5N4)	A(H5N5)	A(H5N8)	
Austria							1 (1)				2 (2)	11 (11)	14 (14)
Belgium	(1)		1 (1)		(1)		4 (8)					1 (12)	6 (23)
Bulgaria						4 (4)							4 (4)
Croatia						(1)							(1)
Czechia						6 (6)	1 (1)					5 (5)	12 (12)
Denmark		1 (2)				1 (2)	1 (6)		1 (1)		(2)	61 (120)	65 (133)
Estonia						1 (1)						1 (1)	2 (2)
Finland						1 (1)	1 (1)					3 (3)	5 (5)
France			4 (5)			442 (452)	1 (5)		1 (1)			3 (7)	451 (470)
Germany		3 (3)			(1)	51 (62)	7 (23)	(1)	36 (36)	1 (1)	6 (18)	157 (547)	261 (692)
Hungary						6 (6)						1 (1)	7 (7)
Ireland						1 (1)			1 (1)			19 (26)	21 (28)
Italy						2 (2)		2 (5)			(1)	6 (12)	10 (20)
Latvia												12 (12)	12 (12)
Lithuania						1 (1)	2 (2)					2 (2)	5 (5)
Netherlands		1 (10)		1 (1)		2 (10)	(4)	(5)			(1)	1 (40)	5 (71)
Norway	(1)											10 (13)	10 (14)
Poland						37 (43)					1 (1)	23 (23)	61 (67)
Romania						1 (1)	4 (4)				3 (3)		8 (8)
Slovakia		1 (1)			1 (1)						4 (4)	1 (1)	7 (7)
Slovenia											1 (1)	2 (5)	3 (6)
Spain												2 (3)	2 (3)
Sweden	1 (1)	1 (1)			1 (1)	3 (4)					1 (2)	7 (12)	14 (21)
Switzerland										2 (2)			2 (2)
Ukraine			8 (9)			4 (4)							12 (13)
United Kingdom*		1 (2)		2 (2)		11 (18)	(3)	1 (3)	1 (1)		(3)	7 (90)	23 (122)
Total	1 (3)	8 (19)	13 (15)	3 (3)	2 (4)	574 (619)	22 (58)	3 (14)	40 (40)	3 (3)	18 (38)	335 (946)	1022 (1762)

*United Kingdom data was extracted from ADNS until 31 December 2020. From 1 January 2021 onwards, the data source was ADNS for Northern Ireland and OIE WAHIS for Great Britain. Data source: EFSA, ADNS and OIE (23.02.21).



* This designation is without prejudice to positions on status, and is in line with United Nations Security Council Resolution 1244 and the International Court of Justice Opinion on the Kosovo Declaration of Independence.

Figure 6: Geographical distribution, based on available geocoordinates, of avian influenza detections reported by virus subtype in Europe in poultry and captive birds (n=601) in the upper figure, and in wild birds (n=421) at the bottom, 8 December 2020 – 23 February 2021

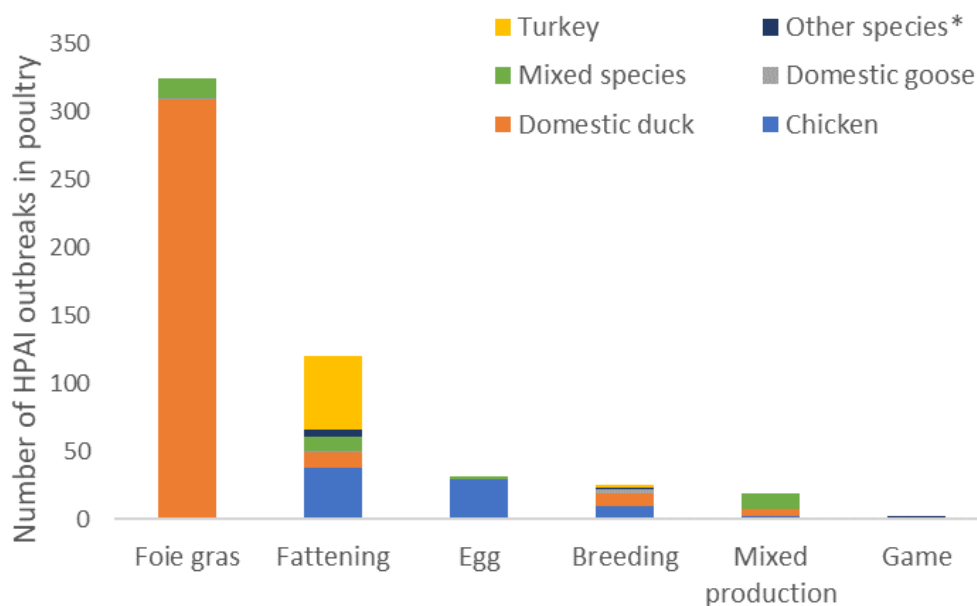
4.2.1.1. HPAI in domestic birds

Characterisation of the HPAI-affected poultry establishments

In this section only the outbreaks reported between 26 November 2020 and 11 February 2021 are thoroughly presented. Outbreaks occurred prior to 26 November 2021 are covered in the previous EFSA report (EFSA et al., 2020a), and the outbreaks occurred later than 11 February were too close to the publishing of this report for collecting the data, and in many cases, the epidemiological investigations of those outbreaks were still ongoing.

From 26 November 2020 to 11 February 2021, a total of 566 HPAI outbreaks in poultry were notified in 18 countries in ADNS: 439 in France, 45 in Germany, 39 in Poland, 12 in the United Kingdom², 12 in Ukraine, six in Hungary, four in the Netherlands, four in Czechia, four in Bulgaria, three in Sweden, two in Northern Ireland³, and one in Italy, Belgium, Ireland, Denmark, Finland, Lithuania, Romania, and Slovakia (Figure 7A). During this time, a total of 8,059,478 birds were affected (Figure 7B). Two of the outbreaks (one in the Netherlands and one in the United Kingdom) were reported to be A(H5N1) subtype, and two were A(H5N5) (one in Sweden and one in Slovakia) subtype. All the other outbreaks were reported to be A(H5N8) subtype (Table 1).

The description of the bird species and the production category of these HPAI-affected establishments are shown in Figure 7. A total of 121 establishments were housing >10,000 birds each with chicken, turkey or ducks as species/species group reared. A total of 243 holdings belong to the housing category of 1,001-10,000 birds; these establishments were mainly housing chickens, ducks, turkey, geese or other species. The remaining 202 establishments were keeping less than 1000 birds and were keeping domestic ducks, chickens or mixed species.



* Other species: pheasant, quail, guinea fowl

Figure 7: Poultry species, and production category of holdings affected by HPAI between 26 November 2020 and 11 February 2021 (n=521).

² Great Britain data not available from 1 January 2021. Only outbreaks occurring in Northern Ireland are reported.

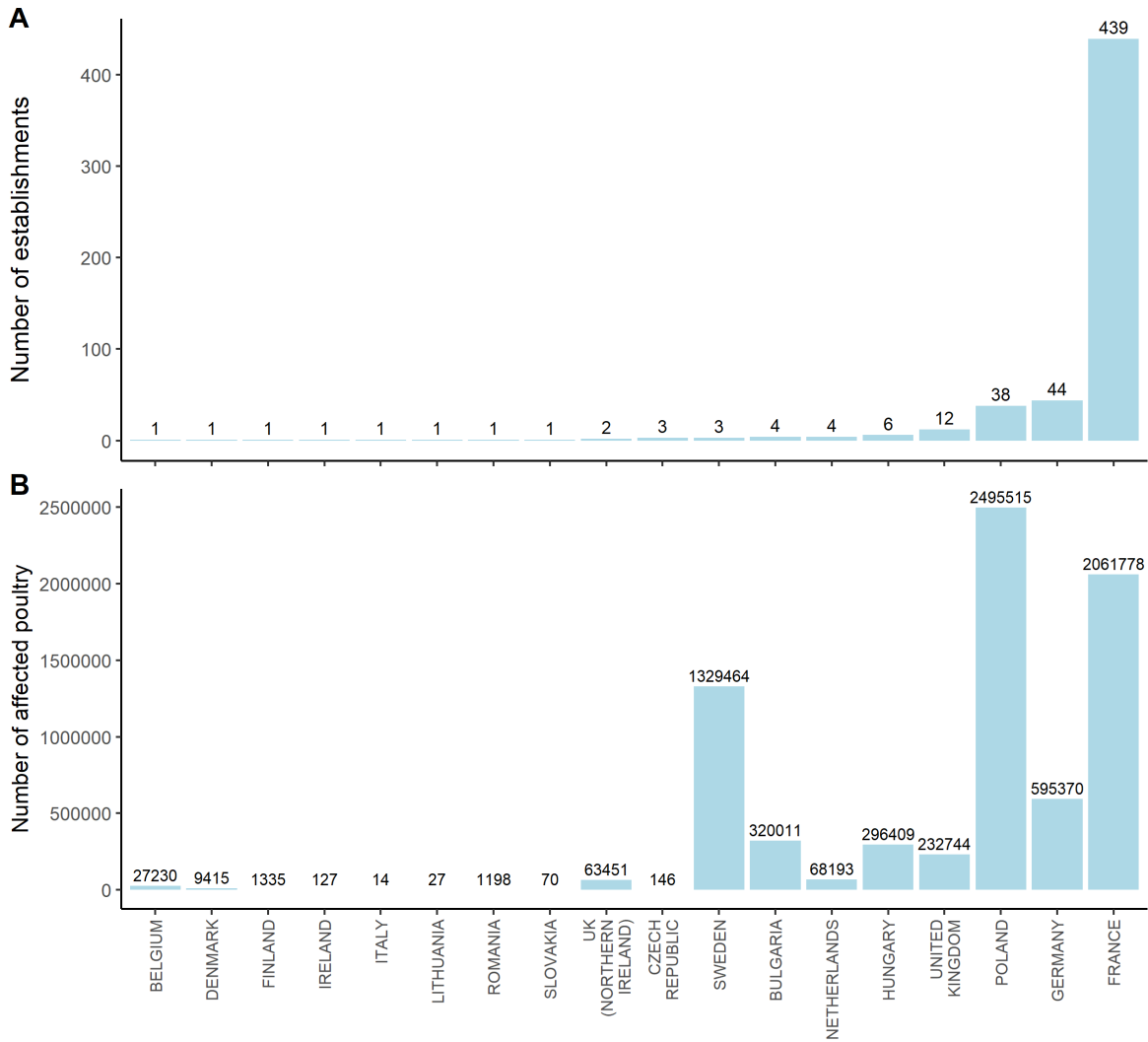


Figure 8: Number of establishments (A) and domestic birds (poultry) (B) affected by HPAI in the EU between 26 November 2020 and 11 February 2021.

HPAI A(H5N5)-affected poultry establishments in Belgium

On 29 January 2021, one HPAI A(H5N5) primary outbreak was confirmed in a turkey fattening farm with 27,230 birds in West Flanders in Belgium. Typical symptoms of HPAI were not observed in the affected establishment; only low mortality and low morbidity were present. Histomoniasis was eventually also confirmed in the flock. Epidemiological investigations concluded that the most likely source of infection was wild birds. All restriction and containment/control/eradication measures were promptly implemented by the Belgian authorities in accordance with European legislation. Restriction measures include, since 1 November 2020, mandatory confinement of all poultry and captive birds (except ratites and in some instances, racing pigeons) in Belgium. The characteristics of the affected establishment and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments in Bulgaria

Between 3 and 8 February 2021, four poultry establishments were affected by HPAI A(H5N8) in Pleven Region in Bulgaria. The first outbreak was detected in an establishment housing 99,500 laying hens; suspicion was raised due to increased mortality, clinical signs and drop in egg production in the flock. Active surveillance activities implemented in the area after the first outbreak allowed to detect three additional outbreaks: two in duck fattening farms (total of 164,000 ducks) and one in a parent flock for broilers (55,764 animals). The characteristics of the affected establishment and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments in Czechia

Between 22 January and 11 February 2021, four HPAI A(H5N8) outbreaks were confirmed in backyard, free-range mixed poultry holdings in Southern Bohemia, Central Bohemian and Pardubice Regions in Czechia. Contact with wild birds was the most likely source of infection because, in all instances, poultry of the affected holdings had access to a water body (pond or river) where wild birds were also present located near the farm. The characteristics of the affected establishment and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments in Denmark

On 1 January 2021, one HPAI A(H5N8) outbreak was confirmed in Viborg, Denmark, at a mixed poultry commercial holding with 9,415 birds. The establishment was specialised in breeding game for restocking (with 5,976 pheasants and 3,211 mallards) but ornamental birds, geese and hens were also kept (24 ornamental ducks, 45 ornamental geese, 16 ornamental pheasants and 143 hens). The suspicion was raised due to increased mortality. In Denmark it is mandatory to keep domestic birds indoors or fenced under roof, net or wire, with exemption for ducks and geese, since 6 November 2020. The most likely source of infection is contact with wild birds. The characteristics of the affected establishment and species reared are presented in Table A.1 in Annex A.

HPAI A (H5N8)-affected poultry establishments in Finland

On 8 February 2021, a suspicion was raised at a game farm with 1,335 common pheasants (*Phasianus colchicus*) in Kanta-Häme Region, Finland. Increased mortality and clinical signs compatible with HPAI were observed in the flock. In two sampling events altogether six wild pheasants (*Phasianus colchicus*) had been previously detected HPAI A(H5N8) positive in the vicinity of the affected establishment; this is considered to be the source of infection (wild birds) as the game birds were kept in outdoor cages. Culling of all birds on the farm has been completed. There are forty hobby farms located in the surveillance zone. The characteristics of the affected establishments and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments in France

Between 5 December 2020 and 11 February 2021, 439 HPAI A(H5N8) outbreaks were confirmed at poultry establishments in nine regions of France. Out of these, 334 outbreaks (76%) occurred in Landes, in the Southwest of the country, and out of these, 92% (309/334) occurred in domestic ducks. This region holds a high concentration of duck and geese farms specialised in foie gras production where, depending on specific organisations of the poultry production chain, animals are often kept outdoors and moved between farms specialised in different production phases. Phylogenetic analysis suggested that in this region very few initial introductions (rather than multiple) from the wild to the domestic host occurred, with subsequent geographical spread between establishments. An HPAI A(H5N8) positive dead gull (undetermined species) was detected on 15 December 2020 on the outdoor premises of a domestic mule duck holding also identified as an A(H5N8) outbreak in the same region. Since 5 November 2020 for all high-risk regions, and since 17 November 2020 for all other regions, confinement (or at least protection from contact with wild birds) had been mandatory for all commercial or non-commercial poultry holdings. Derogations may be allowed for animal welfare or technical reasons: however, in this case for domestic ducks kept for fattening or foie gras production, the total cumulated number of birds in the holding must not exceed 3,200 in order to allow any outdoor access. Feed and water had to be systematically provided indoors. Implementation of control measures also included depopulation of 174 infected holdings and preventive culling of all poultry in 560 holdings in the restriction zone, accounting for a total of 2,445,748 domestic waterfowl (mostly domestic ducks) and 555,814 other poultry species and setting up a restriction area in which all movements are prohibited (the limits of this buffer zone go up to 20 km around the outbreaks). A proportion of holdings preventively culled, and in which no clinical signs of HPAI infection were observed, were found to be already infected. Preliminary data suggested that the implemented measures were effective in controlling the outbreaks, with a peak of outbreaks being observed in the first week of January 2021. The characteristics of the affected establishments and species reared are presented in Table A.2 in Annex A.

HPAI A(H5N8) affected poultry establishments in Germany

Between 22 December 2020 and 11 February 2021, 42 HPAI A(H5N8) primary outbreaks and one secondary outbreak were confirmed in poultry establishments in 11 regions in Germany, affecting a total of 595,329 birds. Forty of these establishments were commercial; out of these, 30 were fattening units (27 turkey units, two chicken and one duck units), five were egg laying units, and the remaining five were breeding flocks (two chicken, two geese and one turkey). The three remaining affected units were backyard, mixed-purpose holdings. Mortality and clinical signs were observed in 42 and 41 units, respectively (out of 43). Outdoor access was not allowed for at least 35 flocks; data were not available for the remaining 10. Epidemiological investigations indicated that contact with wild birds was the most likely source of infection in 18 outbreaks, human-related (via vehicles or persons) in the turkey breeding unit outbreak, and unknown in the remaining 24 instances. The characteristics of the affected establishments and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8) affected poultry establishments in Hungary

Between 6 January 2021 and 3 February 2021, six outbreaks of HPAI A(H5N8) were confirmed in Bács-Kiskun, Komárom-Esztergom Regions in Hungary. In Komárom-Esztergom two commercial turkey fattening units were affected; indirect viral introduction via wild birds was determined as the most likely source of infection in the first establishment. Secondary spread might have occurred to the second unit, but this was not confirmed. In Bács-Kiskun region, four commercial laying hen units were affected. All four units were located within a 1 km radius. The first outbreak was confirmed on 14 January 2020 and 20 days later, three other units were also found to be infected. All laying hen units showed a decrease in egg production, soft eggshells and a drop in feed and water intake; no mortality or clinical signs were observed. The definitive sources of infection in the laying hen holdings were not determined. Control measures were implemented in both regions, resulting in the destruction of 211,984 laying hens and 84,425 turkeys. The characteristics of the affected establishments and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments in Ireland

On 10 December, HPAI A(H5N8) was confirmed on a small turkey fattening premise in Wicklow (127 birds), Ireland, following detection of birds with respiratory signs and swollen heads. Positive A(H5N8) wild birds detected in the vicinity were the most likely source of infection. The characteristics of the affected establishments and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8) affected poultry establishments in Italy

On 23 January, HPAI A(H5N8) was confirmed in a backyard hobby flock holding with 11 chickens and three cranes (*Balearica regulorum*) for own use in Emilia-Romagna Region. The holding was located near a wetland area; for this reason, wild birds were considered to be the source of infection. All commercial poultry holdings in the protection and surveillance zones tested negative for HPAI in virology and serology. The characteristics of the affected establishments and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments in Lithuania

HPAI A(H5N8) was confirmed on 31 December 2020 on a small mixed backyard flock (with a total 28 birds) in Kaunas Region, Lithuania. Three chickens and one turkey found dead were sampled under the passive surveillance activities framework. No other clinical signs were present. The birds were most likely infected when visiting a water body near the farm which also attracted wild waterfowl. The characteristics of the affected establishments and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments in the Netherlands

Between 7 December 2020 and 5 January 2021, a total of four HPAI A(H5N8) primary outbreaks were confirmed in commercial poultry establishments in three regions in the Netherlands, affecting a total of 68,193 birds. All the establishments were commercial; three of them housed chickens and one was housed turkeys. One of the establishments was a chicken breeding unit, two were fattening units (one for chickens and one for turkeys) and the other was a chicken mixed unit. Clinical signs and mortality were observed in all establishments. The most likely source of infection is unknown for all four

outbreaks. Since 21 October 2020 there has been 'housing order' in the country, where all poultry have been under compulsory 'indoor housing' (see Annex A); hence, all introductions took place whilst poultry were kept indoors. The characteristics of the affected establishments and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments in Poland

Between 4 December 2020 and 10 February 2021, 33 HPAI A(H5N8) primary and six secondary outbreaks were confirmed in poultry establishments in 24 districts of Poland, affecting a total of 2,419,463 birds. Thirty-three out of 39 establishments were commercial holdings; 20 were fattening units (nine units were housing chickens, five were housing turkeys, two were housing geese, one was housing ducks and three were housing mixed species), 11 were egg production units (laying hens), four were breeding units (two holding chicken, two holding turkeys and one holding mixed species). One of the farms affected by a secondary outbreak was a goose breeding unit; the virus was introduced in the holding via poultry. Birds had outdoor access in eight out of 39 units. Mortality or clinical signs were observed in at least 35 establishments (data was not known for two holdings). Eighteen of the commercial units were located in close proximity to a water source or reservoir visited by wild birds; indirect infection via wild birds was considered the most likely cause of introduction in these cases. In thirteen other cases it was considered that the virus was possibly introduced via ventilation, bedding or staff.

HPAI A(H5N8)-affected poultry establishments in Romania

On 14 January 2021, one HPAI A(H5N8) primary outbreak was confirmed at a teaching, experimental poultry establishment in Ilfov Region in Romania. The 228 domestic geese and 970 domestic ducks held in the establishment had outdoor access; wild birds was the most likely source of viral introduction. The characteristics of the affected establishment and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N5)-affected poultry establishments in Slovakia

On 22 January 2021, one HPAI A(H5N5) primary outbreak was confirmed in a non-commercial holding in Dunajská Streda, Slovakia. Mortality was observed in 52 out of 70 chickens. The holding was located near the Danube River and the birds had outdoor access; for this reason, the most likely source of viral infection was wild birds. The characteristics of the affected establishment and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8) and HPAI A(H5N5)-affected poultry establishments in Sweden

Between 3 and 18 January 2021, two HPAI A(H5N8) outbreaks were confirmed at commercial poultry establishments in Sjöbo and Skurup Regions, and one HPAI A(H5N5) was detected in Mönsterås, Sweden. The poultry holdings were separated in different epidemiological units. The infected establishments were a chicken breeder holding (85,000 chickens), a turkey fattening holding (23,500 animals) and a laying hen holding (with 2 million animals). The latter farm was the largest affected and was comprised by three individual epidemiological units (of which two are in very close proximity) housing laying hens plus three epidemiological units holding pullet chickens. High mortality was observed in one of the laying hen units with A(H5H5) being confirmed the following day, with secondary spread to two additional laying hen units in the following days. Clinical signs in one of the pullet units were observed on 1 February 2021. Preventive culling was also applied in the other two pullet units. The source of infection regarding the pullet unit is still under investigation but it is suspected to be resultant from airborne spread from culling activities implemented in the laying hen unit 1,5 km away. The initial source of infection was still under investigation at the time of writing of this report. The characteristics of the affected establishments and species reared are presented in Table A.1 in Annex A.

HPAI A(H5N8)-affected poultry establishments and in captive birds in the United Kingdom

Between 29 November and 31 December 2020, 12 HPAI primary outbreaks were confirmed at poultry establishments in the United Kingdom. Two additional outbreaks were confirmed in Northern Ireland

between 6 and 11 January 2021³. All outbreaks were identified as HPAI A(H5N8), except in one for which data was not available. Seven of the establishments were commercial; three were housing turkey (two fattening units and one unknown), three were laying hens units and two were duck units (data on production type was not available). Three backyard units were housing only chickens and 3 were housing ducks and geese. The third affected non-commercial establishment housed 42 raptors (*Falco rusticolus*, *Falco cherrug*), three chickens and two ducks; mortality was observed in fourteen falcos but not on poultry. A total of 296,195 birds were affected. No data was available at the time of writing of this report on the most likely source of introduction of the virus in the affected holdings.

Information extracted from the scientific literature

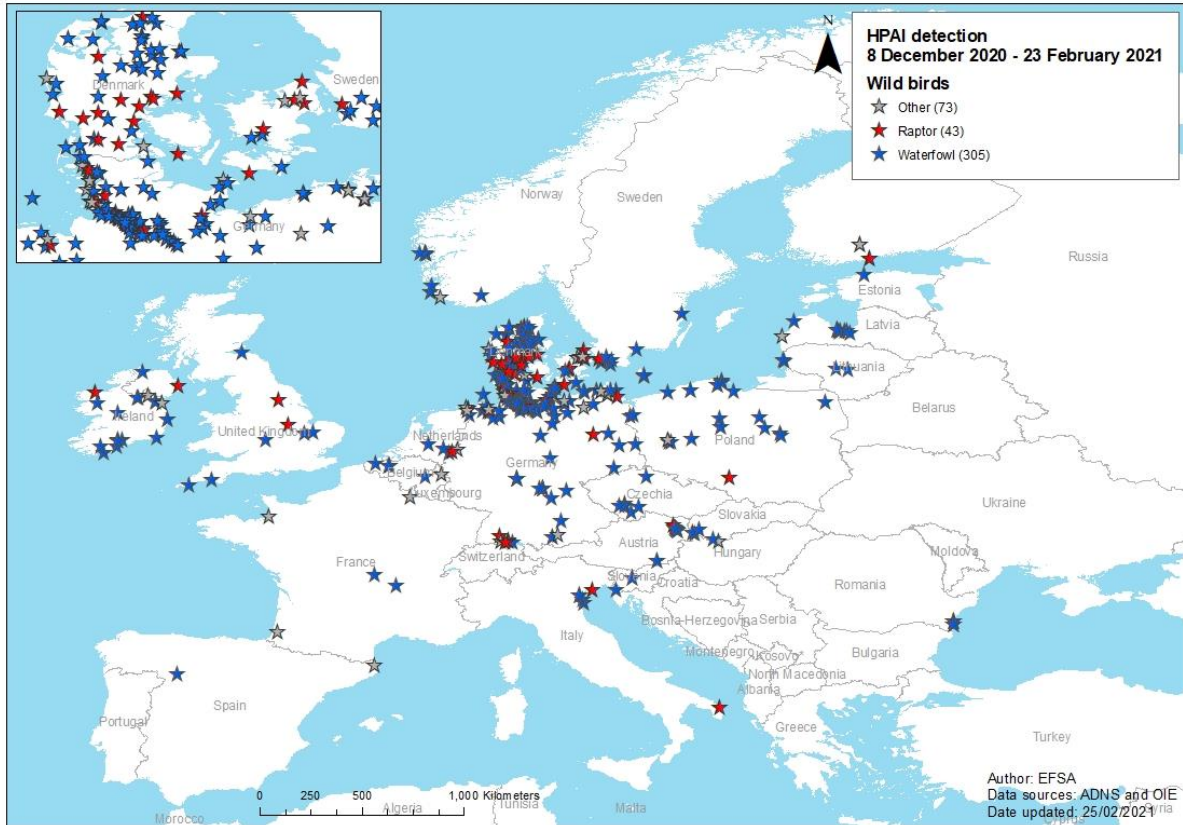
Smietanka et al. (2020) described the clinical signs of natural HPAI H5N8 virus infection, clade 2.3.4.4b, in Poland in 2019–2020 in various poultry species. In turkeys, sudden and high mortality was observed, and clinical signs included depression, reduction in vocalisation, decreased feed and water intake and nervous signs such as tremors, incoordination, paralysis of the wings and fast alternate movements of the legs. In chickens, there was increased mortality, and clinical signs included lethargy, ataxia, bloody nasal discharge, and diarrhoea. In domestic geese, mortality ranged between 2 and 13%, and clinical signs included depression, a drop in food consumption, tremors, movements of the neck and head, sinusitis and nasal discharge. In guinea fowl, no clear clinical signs were seen except for an increased mortality. Fattening domestic ducklings showed mortality from 20 to 65%, and neurological signs that included tremors, incoordination, lying on the back and making pedalling movements of the legs, opisthotonus, and circling movements of the body. In breeding ducks, only single deaths were observed, with total mortality in two positive flocks at the time of official intervention of 0.27 and 0.4%. Clinical signs were drop in food and water consumption and 90% decrease in egg production.

4.2.1.2. HPAI in wild birds

Between 8 December 2020 and 16 February 2021, 421 HPAI detections in wild birds were reported to the ADNS and OIE by EU/EEA and the UK (Figure 9). In 415 HPAI detections, only one wild bird species was found infected, whereas two species were involved in the other six detections. Overall, at least 47 wild bird species were reported as infected: at least 19 waterfowl species (305 detections), at least 21 other wild bird species (73 detections) and at least 7 raptors species (43 detection). The complete list of HPAI detection by wild bird species is reported in Table C.1, Annex C. The wild bird species most often reported, i.e. those involved in more than 10 detections, were barnacle goose (*Branta leucopsis*) (n=75), mute swan (*Cygnus olor*) (n=68), greylag goose (*Anser anser*) (n=52), whooper swan (n=42), red knot (n=31), *Cygnus sp* (n=25) and common buzzard (*Buteo buteo*) (n=20). The daily distribution of HPAI detections in the most affected wild bird species is shown in Figure 10. The actual mortality of wild birds associated with HPAI is much higher than the number in which HPAI has been detected in the laboratory. For example, the number of dead or moribund wild birds identified since 25 October 2020 was more than 16,000 along the Wadden Sea coast of Germany, and more than 5,000 in the Netherlands. In Germany, the predominant species involved were barnacle geese (45%), red knots (18%) and Eurasian wigeons (10%); in the Netherlands, 41% were barnacle geese (SH, online; AImpact2021 working group; T Kuiken, pers. comm).

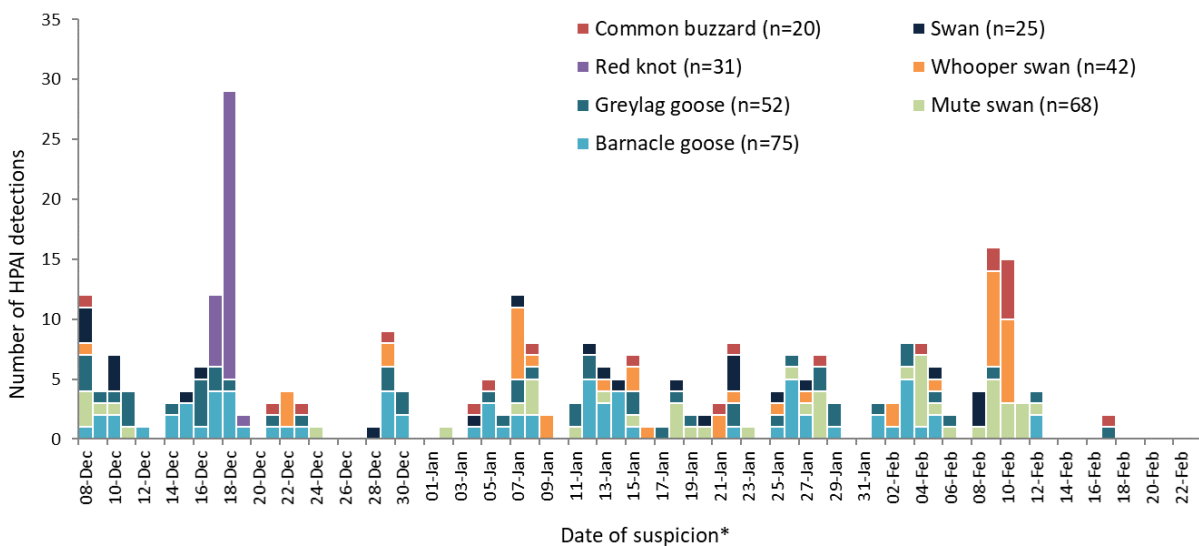
After the high number of HPAI detections in barnacle geese and greylag geese in the previous reporting period, low numbers of these two species continued to be detected positive in December, January and February. Other wild bird species also continued to be detected positive for HPAI in the current reporting period, both in sick/dead birds and in asymptomatic birds. An unusual observation in Germany in December was a sudden, localized die-off involving over 3,000 red knots (*Canutus calidris*), in a selection of which HPAI A(H5N3) was detected (FLI, 2021). Neither this species nor other species of wading birds have been so heavily involved in such HPAI epidemics before.

³ From 1 January 2021, outbreaks occurring in Great Britain were not reported through ADNS system.



* This designation is without prejudice to positions on status, and is in line with United Nations Security Council Resolution 1244 and the International Court of Justice Opinion on the Kosovo Declaration of Independence.

Figure 9: Geographical distribution, based on available geocoordinates, of avian influenza detections in wild birds in Europe, by species category, 8 December 2020 – 23 February 2021 (n=421)



* When the date of suspicion is not available then the date of confirmation is used to assign the week of suspicion. Data source: EFSA, ADNS and OIE (23.02.21).

Figure 10: Number of reported detections of highly pathogenic avian influenza virus A(H5) in wild birds of the most affected wild bird species (i.e. those involved in more than 10 detections) in the

EU/EEA and the UK, by date of suspicion, from 8 December to 23 February 2021. Note that in one single reported detection of HPAI in wild birds more than one bird and wild bird species might be involved

Information extracted from the scientific literature

No literature was found on phenotypic characterisation of HPAI viruses circulating in the EU in wild birds in the last two years.

4.2.2. LPAI in domestic birds

Characterisation of the LPAI-affected poultry establishments

Between 8 December 2020 and 23 February 2021, seven LPAI outbreaks were notified in the poultry sector and in captive birds in Europe. Information available from the ADNS (European Commission, online-a), from the OIE (OIE, online) and provided by Member States, characterising the LPAI outbreaks, is presented in Table 3.

Table 2: Characteristics of the LPAI-affected poultry and captive bird establishments in Europe, 8 December 2020 – 23 February 2021 (n=7)

Country	Virus subtype	Poultry species	Surveillance stream	Presence of signs in the outbreaks	Date of suspicion	Number of susceptible birds
Belgium	A(H5Nx)	Chicken			14/12/2020	78,900
France	A(H5N3)	Mulard duck	Outbreak related	no	07/01/2021	1,173
	A(H5Nx)	Mulard duck	Outbreak related	no	09/01/2021	1,000
	A(H5Nx)	Mulard duck	Outbreak related	no	13/01/2021	1,144
	A(H5Nx)	Mulard duck	Outbreak related	no	18/01/2021	10,200
	A(H5Nx)	Mulard duck	Outbreak related	no	25/01/2021	3,140
Italy	A(H7N7)	Domestic goose	Active	no	29/01/2021	83
Total						95,640

Data source: ADNS, OIE, Member States.

4.2.3. Genetic characterisation of avian influenza viruses

Description of the nomenclature of the HPAI A(H5) viruses used in the document

The HA gene of clade 2.3.4.4 A(H5) viruses has rapidly evolved since the most recent official update of the nomenclature of the A/goose/Guangdong/1/1996-lineage H5Nx virus (Smith et al., 2015). This clade emerged in China in 2008 and since then it has acquired various neuraminidase subtypes, including N1, N2, N5, N6 and N8, by reassortments with other enzootic avian influenza viruses from different regions, and evolved into several subgroups. While a revised nomenclature of clade 2.3.4.4 viruses is pending, in the previous reports we used the genetic clustering described in 2018 by Lee and co-authors, who recognised four groups (a to d) within clade 2.3.4.4 (Lee et al., 2018). Recently, an update to the unified nomenclature for clade 2.3.4.4 A(H5) viruses has been proposed by WHO (WHO, 2020a) and eight genetic groups (a to h) have been recognised. In order to align the nomenclature system between international organisations this classification has been adopted for this report. Based on this proposed clustering, A(H5) viruses of clades 2.3.4.4a and d–h have mainly been circulating in poultry in Asia, while clades 2.3.4.4b and 2.3.4.4c have spread globally through wild bird migrations during 2014–2015 (2.3.4.4c) and 2016–2017 (2.3.4.4b)

Genetic characterisation of HPAI viruses of the A(H5) subtype circulating in Europe

The topology of the HA phylogenetic tree shows that all the European HPAI A(H5) viruses collected between 31 July 2020 and 12 February 2021 from 11 Member States, the United Kingdom and Russia (available in GISAID on 24 February 2021) belong to clade 2.3.4.4b and group together and with HPAI A(H5) viruses which have been identified in Iraq and Kazakhstan since May 2020. Analyses of the remaining gene segments revealed the co-circulation in Europe and Central Asia of seven distinct genotypes two A(H5N8), one A(H5N1), three A(H5N5) and one A(H5N3) which originated from multiple

reassortment events with LPAI viruses circulating in wild birds in Eurasia and Africa. Five of these genotypes one A(H5N8), one A(H5N1), one A(H5N3) and two A(H5N5) were detected in Europe.

No evidence of mutations associated with mammalian adaptation has been observed in the analysed viruses, except for a single mutation (S678N) in the PB1 protein identified in one H5N8 collected from a wild bird (common buzzard) in Italy, which has been reported to be related to an enhanced polymerase activity in mammalian cells and to an increased virulence in mice (Gabriel et al., 2007). The exact meaning of this mutation however remains to be clarified.

The complete genome of the recently reported A(H5N8) virus identified from a human case in December 2020 in Russia (Astrakhan region) clusters together with the A(H5N8) circulating in Europe since the second half of 2020 and belongs to a genotype common and widespread in Europe. Specifically, it is closely related (identity ranging from 99.9 to 100%) to the A(H5N8) viruses collected in December 2020 from chickens in the same region of Russia and does not possess any known mutations previously described as associated to zoonotic potential.

Genetic characterisation of LPAI viruses of the A(H5) subtype circulating in Europe

The full genome sequences of two LPAI A(H5N2) viruses collected from one of the reported outbreaks in France and one outbreak in poultry in The Netherlands (suspicion date: 4 December 2020) have been characterized. Genetic analyses show that all genome segments of the virus from France are related to LPAI virus sequences collected in Europe, Asia or Egypt, while the A(H5N2) from The Netherlands is closely related to A/chicken/NL-Bruchem/14003323/2014(H5N2) for all segments except PB2 and PB1.

Genetic characterisation of LPAI viruses of the A(H7) subtype circulating in Europe

On 29 January 2021, an LPAI A(H7N7) virus was detected in one pool of cloacal swabs of five domestic geese (*Anser anser* var. domesticus) on a backyard farm in the municipality of Ravenna. The complete genome characterization showed that this virus clusters with LPAI viruses identified in wild and domestic birds in Italy in 2019–2020 for the HA, NA, NP and M gene segments. For the remaining gene segments, the Italian H7N7 virus clusters with LPAI viruses recently collected from wild birds in Eurasia.

4.2.4. Human cases due to A(H5N1), A(H5N2), A(H5N5) or A(H5N8) viruses detected in Europe

Since 26 November 2020 and as of 11 February 2021, seven countries reported a total of 1,289 people exposed to infected birds (e.g. during culling activities). Poland accounted for 73% of this figure, with a total of 944 exposed people. Data on the number of exposed people involved in HPAI outbreaks was not available for 11 countries.

On 20 February 2021, media cited Russian authorities to have identified seven occupationally exposed workers infected by A(H5N8) virus at a poultry farm in south Russia (RBC TV, online). According to media reports the workers were exposed during an outbreak of A(H5N8) in a bird flock in December 2020. The cases were reported as asymptomatic or with mild symptoms. No human-to-human transmission has been observed according to Russian authorities (TASS, online). Further details of these human cases are needed to better understand the situation.

No human infection with avian influenza viruses, as detected in wild birds and poultry in Europe, has been identified in the EU/EEA or globally during the period covered by this report or been previously reported (EFSA et al., 2020a). No virus genetic markers indicating increased binding affinity to human-like receptor and increased risk of human transmission have been identified. A previous risk assessment on A(H5N8) is available from WHO stating that the likelihood of human infection with A(H5N8) virus is low (WHO, online-a).

4.3. Prevention and control measures applied in Europe, 26 November 2020 – 11 February 2021 (TOR 3)

From 26 November 2020 to 11 February 2021, a total of 566 HPAI outbreaks at poultry establishments were notified in Europe in ADNS. For a description of the control and prevention measures applied in the affected Member States, see Annex B.

4.4. The avian influenza situation in other countries not reporting via ADNS, 8 December 2020 – 23 February 2021 (TOR 4)

An overview of the HPAI detections notified from other countries not reporting via ADNS but via the OIE or national authorities from 8 December 2020 to 23 February 2021 is presented in Table 3 and Figure 11. For the purposes of this report, only findings of avian influenza viruses occurring in countries that are considered to be of epidemiological interest for the EU/EEA or of public health relevance are described.

Table 3: Number of HPAI detections in other countries not reporting via ADNS, by virus subtype and country, 8 December 2020 – 23 February 2021 (n=383)

Region	Country	Domestic birds					Wild birds				Total
		A(H5N1)	A(H5N5)	A(H5N6)	A(H5N8)	HPAI	A(H5Nx)	A(H5N1)	A(H5N8)	HPAI	
Africa	Algeria				1						1
	Mauritania							1			1
	Nigeria	4									4
	Senegal	1						1			2
Asia	Cambodia	1									1
	China								5		5
	Hong Kong								2		2
	India	6			11	6		1	5	16	45
	Iran				37				2		39
	Iraq				1						1
	Israel				3						3
	Japan				46				22		68
	Nepal				2						2
	Korea				93				97		190
	Taiwan		6				1				7
Viet Nam	1		6							7	
Europa	Russia				2		1		2		5
Total		13	6	6	196	6	2	3	135	16	383

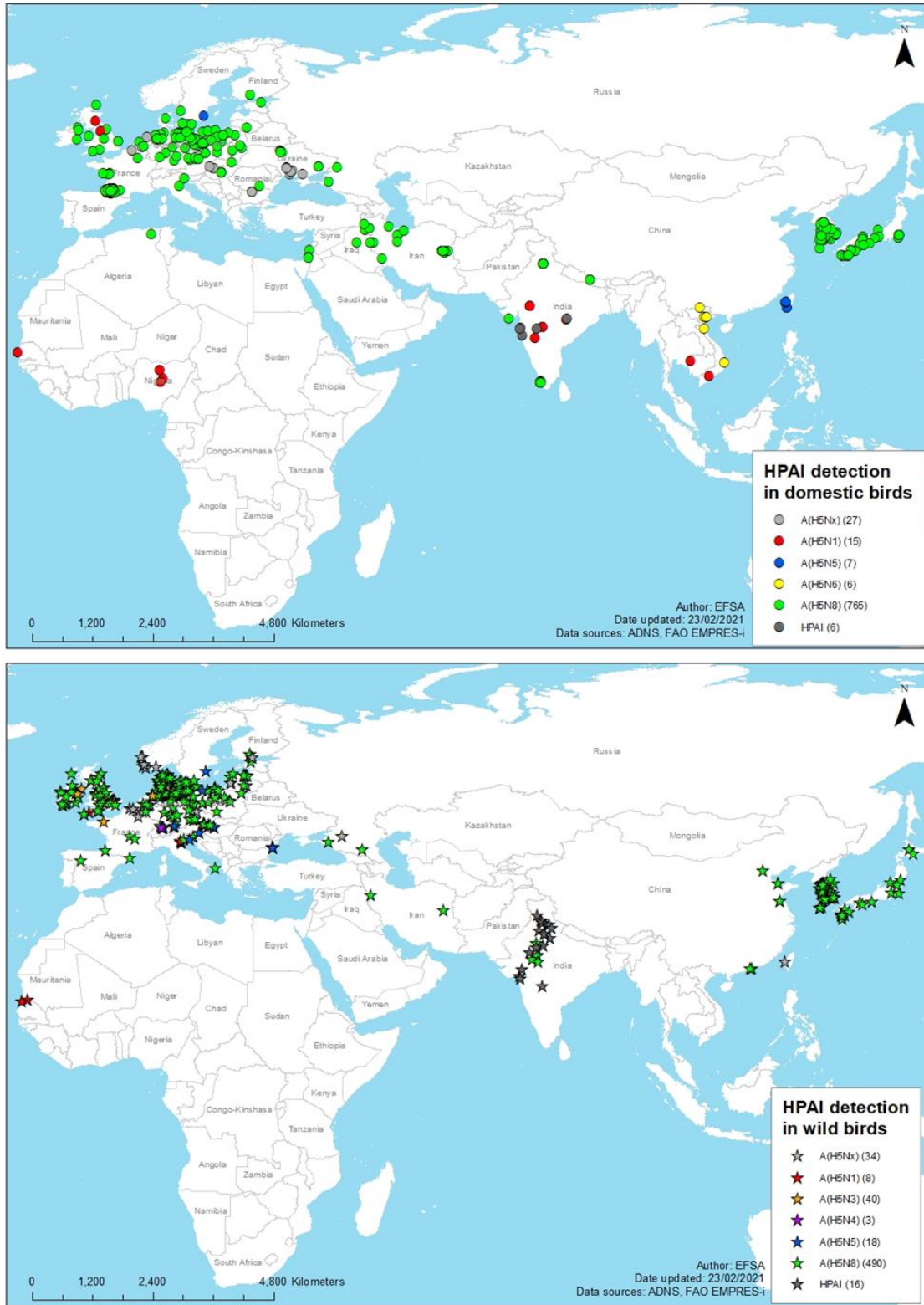


Figure 11: Geographical distribution, based on available geocoordinates, of HPAI detections reported in domestic birds (n=826) and wild birds (n=609) in Europe, Asia and Africa, by virus type, 8 December 2020 – 23 February 2021

4.4.1. HPAI A(H5N1)

4.4.1.1. Domestic and wild birds in previously affected regions

Detections

In contrast to the last report, poultry and wild bird cases of HPAI A(H5N1) were notified from West Africa in the relevant time period. In addition to an outbreak on a very large chicken farm, Senegal reported a massive outbreak of HPAI A(H5N1) in great white pelicans (*Pelecanus onocrotalus*) in the Djoudj National Bird Park in northern Senegal on the border with Mauritania. The Mauritanian veterinary authorities reported a week later that HPAI A(H5N1) had also been detected in dead pelicans in the adjacent Diawling National Park. Furthermore, in Nigeria, HPAI A(H5N1) was detected on a backyard and three medium-sized poultry farms first time since the outbreaks of HPAI A(H5N8) in February 2019 (Figure 12).

From 8 December 2020 to 16 February 2021 three Asian countries notified the detection of HPAI A(H5N1) in domestic and wild birds. The outbreaks in India and Vietnam continued and new cases were detected on small- and medium-sized poultry farms. Furthermore, India detected several cases of HPAI A(H5N1) during a mass mortality in bar headed geese (*Anser indicus*) in Punjab province. In addition, Cambodia reported the first outbreak of HPAI A(H5N1) in a small chicken farm since 2017 (Figure 12).

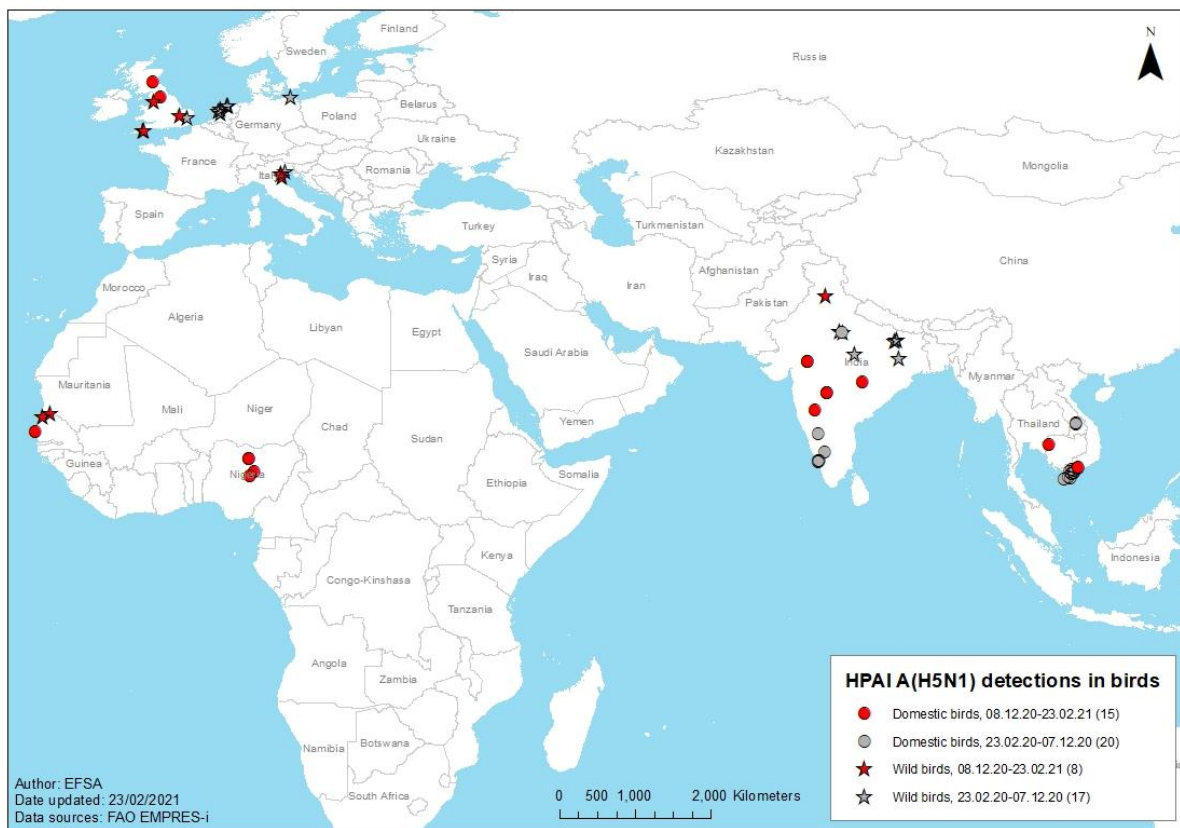
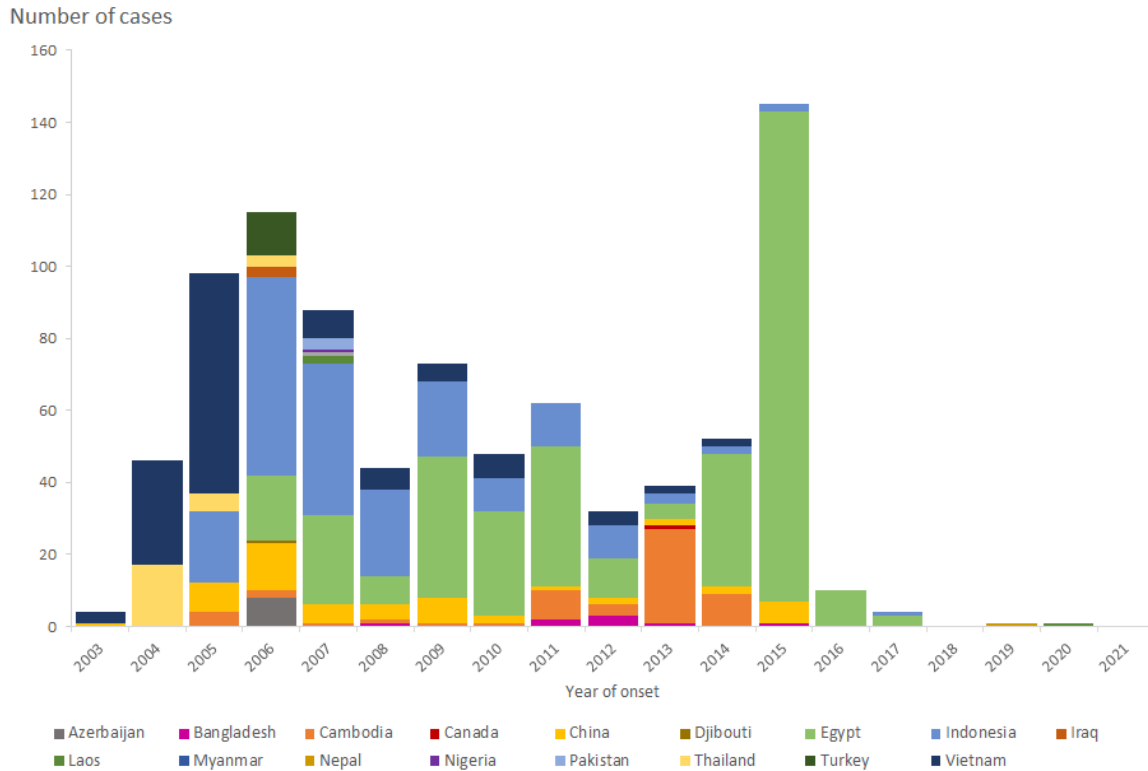


Figure 12: Geographical distribution, based on available geocoordinates, of HPAI A(H5N1) detections reported in domestic birds (circles) and wild birds (stars) (n=60); red symbols indicate outbreaks that occurred between 8 December 2020 and 23 February 2021, grey symbols indicate outbreaks that occurred between 23 February and 7 December 2020 (FAO, online-a)

4.4.1.2. Human infections due to A(H5N1)

No human case due to avian influenza A(H5N1) has been reported since the last report (EFSA et al., 2020a). Since 2003, and as of 12 February 2021, 862 laboratory-confirmed cases of human infection

with avian influenza A(H5N1) virus, including 455 deaths, have been reported from 17 countries outside the EU/EEA (CHP, 2020; WHO, 2020f, online-b) (Figure 13).



Data source: WHO (CHP, 2020; WHO, online-b).

Figure 13: Distribution of confirmed human cases of A(H5N1) by year and country of reporting, 2003 – 12 February 2021 (n=862)

4.4.2. HPAI A(H5N2) and A(H5N5)

4.4.2.1. Domestic and wild birds

Detections

The Taiwanese lineage HPAI A(H5N2) has been in circulation in Taiwan since 2012 and caused severe outbreaks at chicken, duck, goose and turkey establishments. As in the last report, no case of HPAI A(H5N2) was reported to the OIE in the relevant reporting period. The Taiwanese lineages of HPAI A(H5N2) (clade 2.3.4.4) differ from the Eurasian HPAI A(H5N2) lineage (Li et al., 2020); the latter belonging to clade 2.3.4.4b, which has been detected, with different genotypes, in Egypt and Russia as well as in Asian countries between 2016 and 2019 (EFSA et al., 2019) and in Bulgaria in 2020. But the outbreaks of HPAI A(H5N5) continued in medium-sized poultry establishments in western Taiwan. Furthermore, Taiwan detected a case of HPAI A(H5Nx) in a northern pintail (*Anas acuta*) in the same province in December 2020 (Figure 14).

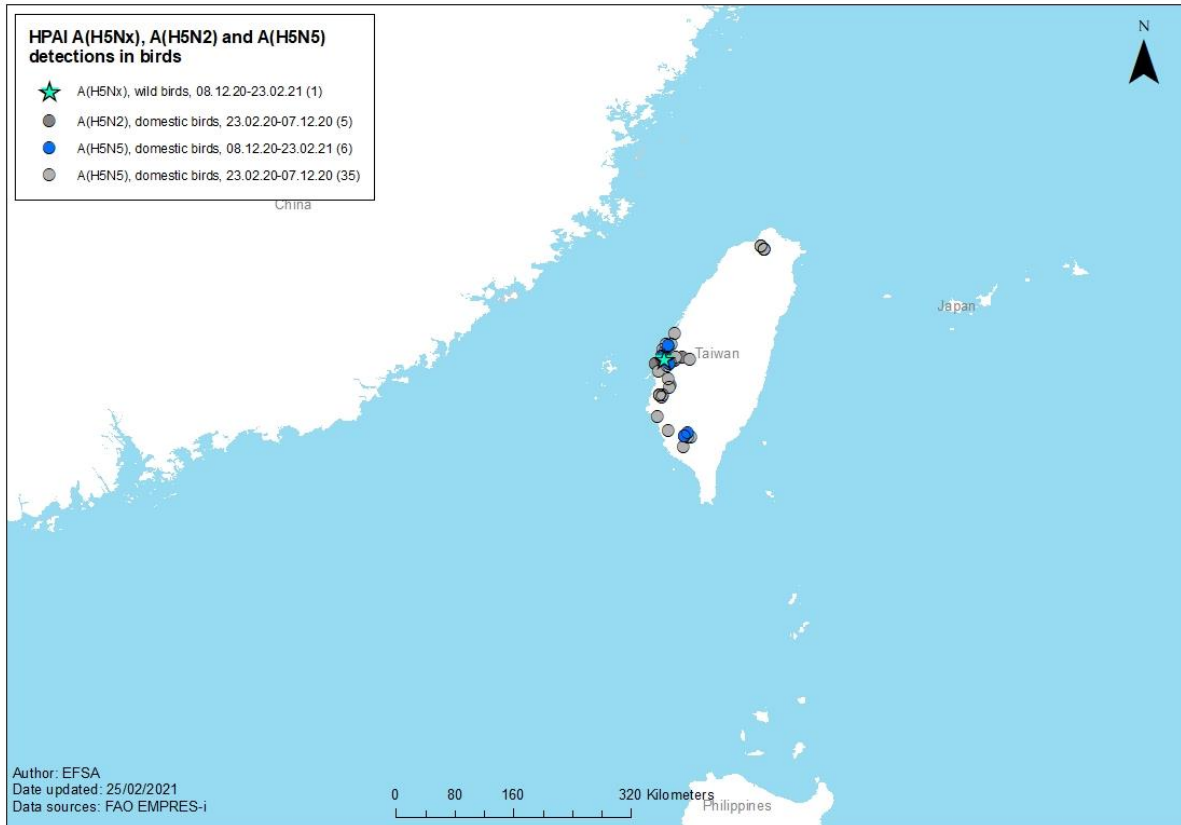


Figure 14: Geographical distribution, based on available geocoordinates, of HPAI A(H5N2) and A(H5N5) detections reported in domestic birds in Taiwan (n=47); dark grey symbols indicate HPAI A(H5N2) detections between 23 February and 7 December 2020, light grey symbols indicate HPAI A(H5N5) detections between 23 February and 7 December 2020, blue symbols indicate HPAI A(H5N5) detections between 8 December 2020 and 23 February 2021, (FAO, online-a)

4.4.3. HPAI A(H5N6)

4.4.3.1. Domestic and wild birds

Detections

From 8 December 2020 to 16 February 2021, Vietnam reported 6 further outbreaks of the zoonotic reassortment of HPAI A(H5N6) clade 2.3.4.4c in medium-sized poultry farms in previously affected provinces. No wild bird cases of HPAI A(H5N6) were reported in the relevant time period (Figure 15).

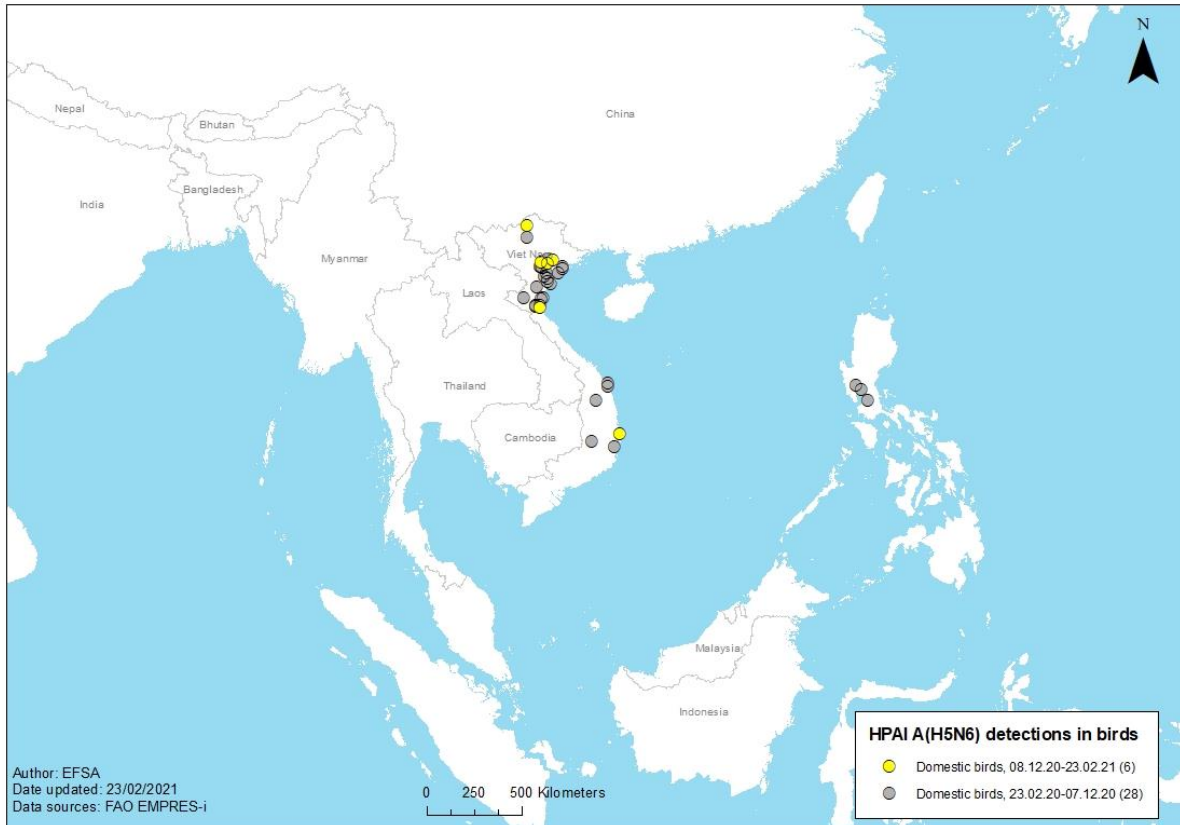
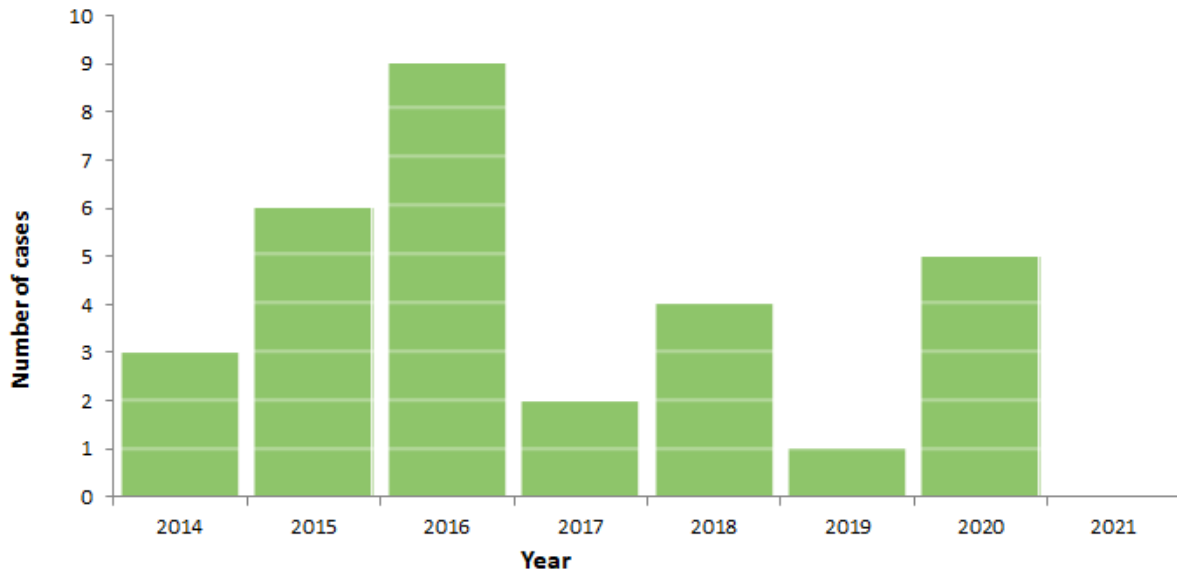


Figure 15: Geographical distribution, based on available geocoordinates, of HPAI A(H5N6) detections reported in domestic birds (n=34); yellow symbols indicate outbreaks that occurred between 8 December 2020 and 23 February 2021, grey symbols indicate outbreaks that occurred between 23 February and 7 December 2020 (FAO, online-a)

4.4.3.2. Human infections due to A(H5N6)

Five new human cases due to avian influenza A(H5N6) has been notified since the last EFSA report (EFSA et al., 2020a; WHO, 2020b, c). Since 2014, and as of 12 February 2021, 30 laboratory-confirmed cases of human infection with avian influenza A(H5N6) viruses of clade 2.3.4.4 circulating in South-East Asia have been reported globally with 16 of them with fatal outcome (CHP, 2021) (Figure 16). One case from 2015 was described by Li et al. (2016). Twelve deaths due to A(H5N6) had been reported between 2014 and 2017 (Jiang et al., 2017). All of the cases were infected and detected in mainland China (WHO, 2019a).



*If the date of onset is not available the date of reporting has been used

** the epicurve includes one case reported in the literature with year of onset in 2015

If date of onset is not available, the date of reporting has been used; the epicurve includes one case reported in the literature with year of onset in 2015.

Source: ECDC line list (see Appendix B.2).

Figure 16: Number of human cases due to A(H5N6), clade 2.3.4.4, infection by year of onset, China 2014– 12 February 2021 (n=30)

4.4.4. HPAI A(H5N8)

4.4.4.1. Domestic and wild birds

Detections

Further outbreaks of HPAI A(H5N8), clade 2.3.4.4b, from poultry and wild birds were reported between 8 December 2020 and 23 February 2021 from China, Iran, Israel, Japan and the Republic of Korea. China detected HPAI A(H5N8) in several wild bird species as mandarin ducks (*Aix galericulata*), black swan (*Cygnus atratus*) and mute swans (*Cygnus olor*) in western China provinces. In addition, Hongkong reported two cases of HPAI A(H5N8) in wild birds, including a peregrine falcon (*Falco peregrinus*), first time since the outbreaks of HPAI A(H5N6) in May 2018. In contrast to the last report, Iran notified not only cases in wild birds (Eurasian coot [*Fulica atra*] and storks [*Ciconiidae*]), but also a large outbreak (n=37) in backyard, medium and large-sized poultry farms. Outbreaks with large numbers of affected farms have also been reported from India (n=17), Japan (n=46) and the Republic of Korea (n=93) in the relevant reporting period. Major outbreaks of A(H5N8) in wild birds have also been observed in all previously mentioned countries. Several wild bird species were identified as e.g., house crow (*Corvus splendens*) and bar headed goose (*Anser indicus*) in India; e.g., white tailed eagle (*Haliaeetus albicilla*), mallard (*Anas platyrhynchos*), hooded crane (*Grus monacha*), peregrine falcon (*Falco peregrinus*), northern pintail (*Anas acuta*), mandarin duck (*Aix galericulata*), whooper swan (*Cygnus cygnus*) and mute swan (*Cygnus olor*) in Japan; e.g., great egret (*Ardea alba*), grey heron (*Ardea cinerea*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), gadwall (*Mareca strepera*), tufted duck (*Aythya fuligula*), bean goose (*Anser fabalis*), mute swan (*Cygnus olor*), whooper swan (*Cygnus cygnus*) and Eurasian spoonbill (*Platalea leucorodia*) in the Republic of Korea. Furthermore, from 8 December 2020 to 16 February 2021 the national authorities of Algeria, Iraq, Israel and Nepal reported several outbreaks of HPAI A(H5N8) in domestic poultry (Figure 17).

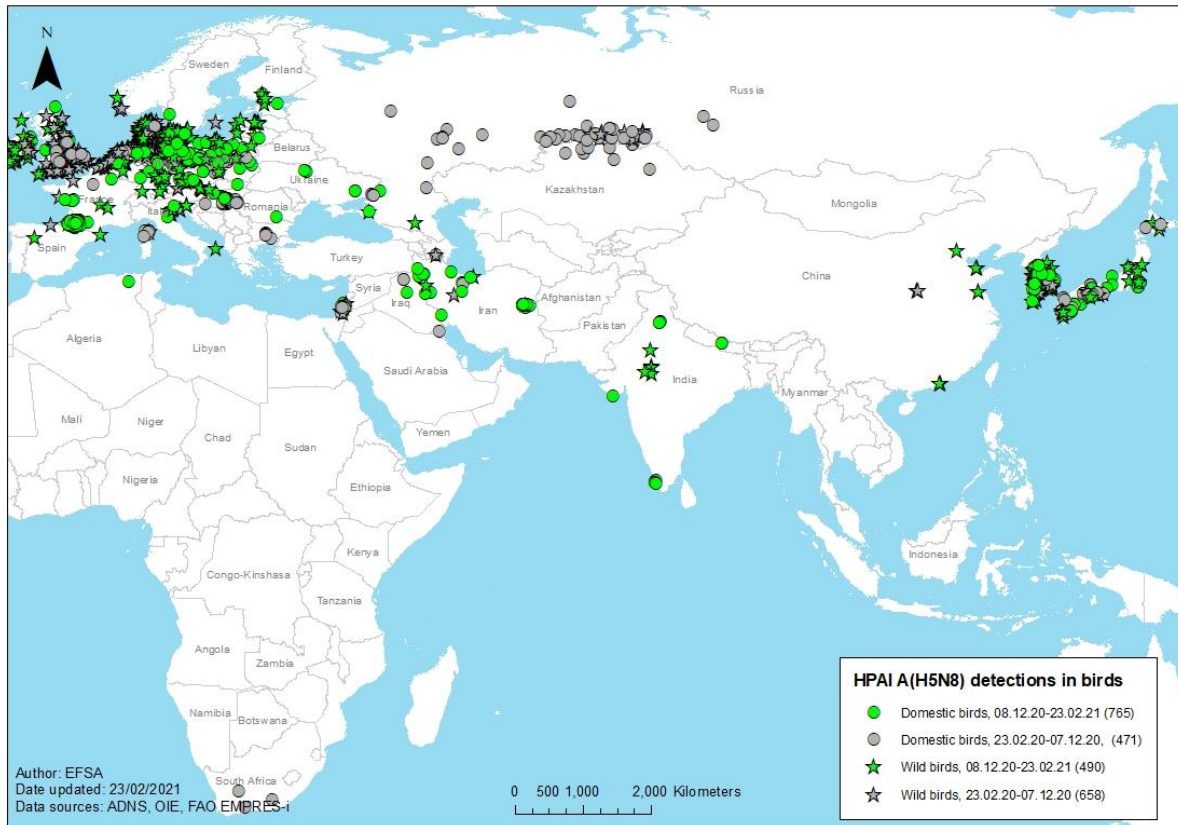


Figure 17: Geographical distribution, based on available geocoordinates, of confirmed HPAI A(H5N8) outbreaks in domestic birds (circles) and wild birds (stars) ($n=2,384$); green symbols indicate outbreaks that occurred between 8 December 2020 and 23 February 2021, grey symbols indicate outbreaks that occurred between 23 February and 7 December 2020 (FAO, online-a)

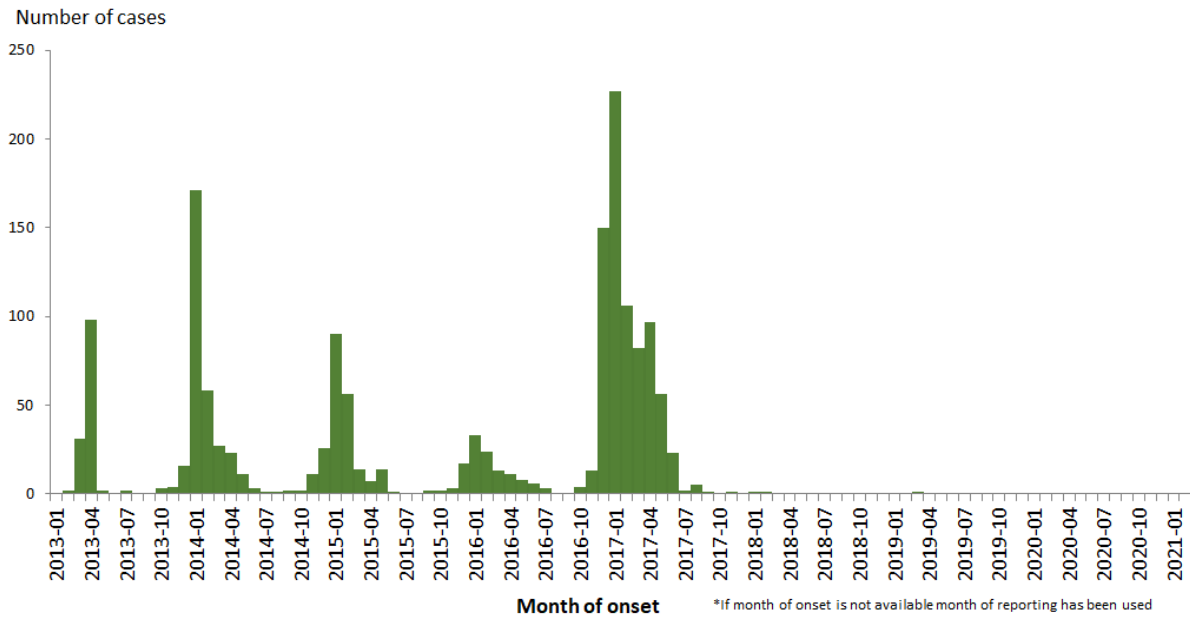
4.4.5. HPAI-LPAI A(H7N9)

4.4.5.1. Domestic and wild birds

No LPAI or HPAI A(H7N9) cases were notified in poultry or wild birds within the relevant time period for this report. The last case was reported from Shandong province, China, in October 2020. Fourteen chicken samples tested positive for A(H7N9) virus in Shandong Province, but no official information on pathogenicity is available. The nationwide A(H7N9) vaccination campaigns for poultry, with the exception of poultry in AI-free zones and export farms, started extensively in September 2017 (FAO, online-b).

4.4.5.2. Human infections due to A(H7N9)

No human cases due to avian influenza A(H7N9) have ever been reported from Europe and no human case has been reported globally since 2019 (WHO, 2020d, c). Since February 2013, a total of 1,568 human cases have been reported from outside of Europe (Figure 18), including at least 615 deaths (39%) (WHO, 2019a, b). Of all human cases, 32 have been infected with HPAI virus A(H7N9), 13 of them fatal, according to the Chinese National Influenza Center (Chinese National Influenza Center et al., 2018).



Source: ECDC line list (see Appendix B.2).

Figure 18: Number of human cases due to A(H7N9), infection by month and year of onset, 2013 – 12 February 2021 (n=1,568)

4.4.6. LPAI A(H9N2)

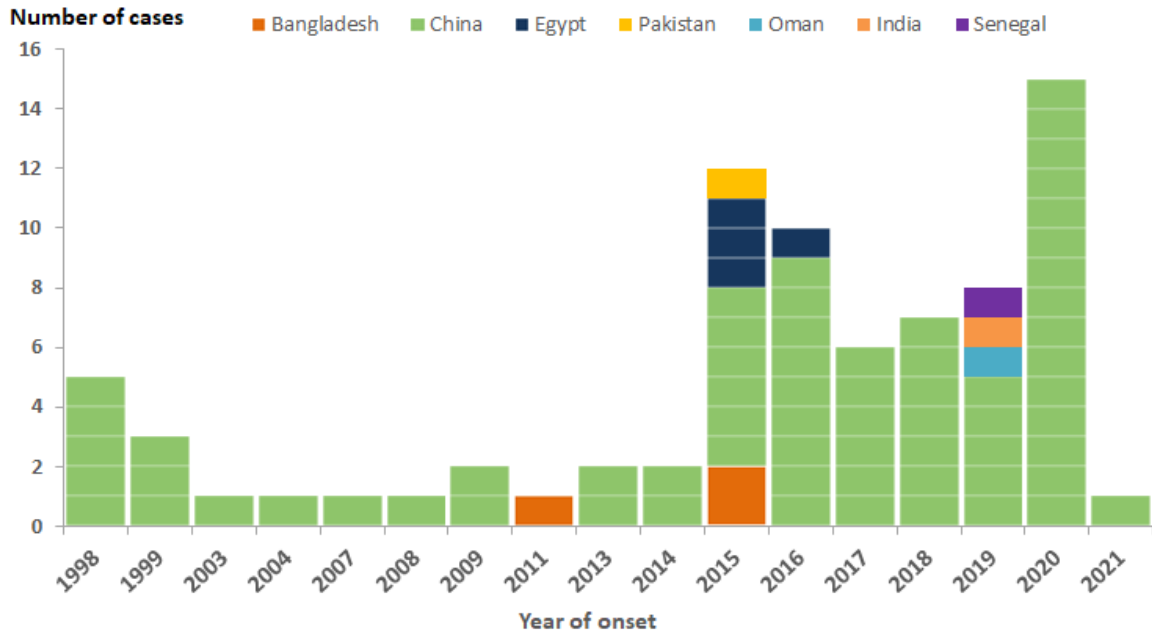
4.4.6.1. Domestic and wild birds

Detection

As mentioned in previous EFSA reports, A(H9N2) is the most commonly detected non-notifiable subtype of influenza virus in poultry in Asia, the Middle East and Africa (Zecchin et al., 2017; Bonfante et al., 2018; Chrzastek et al., 2018; Xu et al., 2018; Zhu et al., 2018; Awuni et al., 2019; Kariithi et al., 2019). These Regions remained LPAI (H9N2) endemic at least until 23 February 2021.

4.4.6.2. Human infections due to A(H9N2)

Since the last EFSA report, ten human cases of infection have been reported from China, nine human cases were reported retrospectively between 2019 and 2020, and one in January 2021 (CHP, 2021). Since 1998, and as of 12 February 2021, 78 laboratory-confirmed cases of human infection with avian influenza A(H9N2) virus, including one death, have been reported globally. Cases were reported from China (67), Egypt (4), Bangladesh (3), India (1), Oman (1), Pakistan (1) and Senegal (1) (ECDC line list; see Appendix B.2) (Figure 19). Exposure to live or slaughtered poultry or contaminated environment has been reported. The age group most affected by A(H9N2) infections in humans is children under 10 years of age (Figure 20).



Data source: ECDC line list

Figure 19: Distribution of confirmed human cases of A(H9N2) by reporting country, 1998 – 12 February 2021 (n=78)

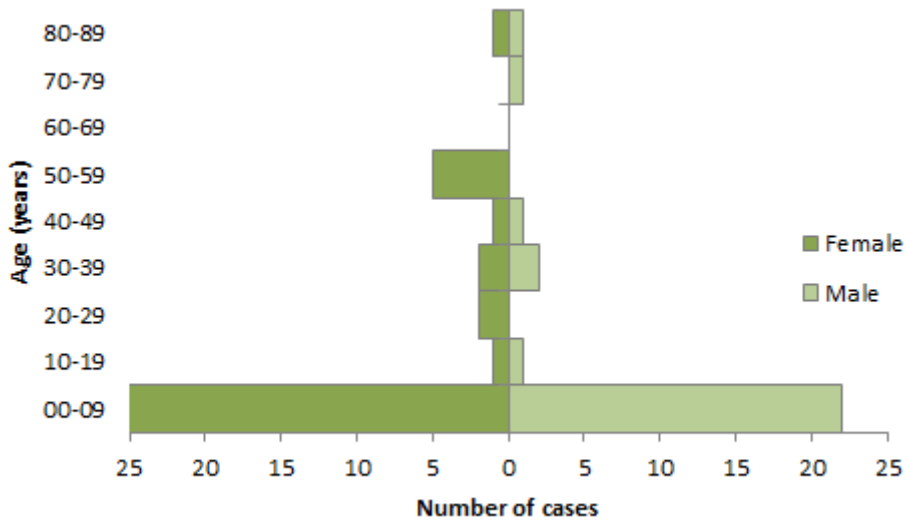


Figure 20: Distribution of confirmed human cases of A(H9N2) by age group, 1998 – 12 February 2021 (n=78)

4.5. Scientific analysis of avian influenza spread from non-EU/EEA countries and within the EU/EEA

The evolution of the current HPAI A(H5) epidemic continues to resemble the pattern of transmission shown during the 2016-2017 HPAI A(H5N8) epidemic wave, but with fewer detections in wild birds and poultry in south-east Europe (Figure 3). HPAI A(H5) viruses continue to circulate, apparently at a lower level, in wild birds. New outbreaks in poultry have been identified in some Member States (Tab. 1), even in countries/areas with an absence or a low level of virus detections in wild birds (e.g., Bulgaria, France). This situation could reflect either the possible circulation of HPAI A(H5) virus subtypes in wild

birds with no high mortalities, the low sensitivity of the HPAI early detection system in wild birds, or the possible spread of infection among poultry premises not mediated by wild birds.

The evolution of the HPAI A(H5) epidemic, the possible establishment of infection in native sedentary birds, and the capacity of the virus to persist in the environment suggest that the HPAI A(H5) viruses circulating in Europe will continue to pose a risk for the poultry sector in the next few months.

The long duration of the AI risk period represents a continuous challenge for the sustainability of the risk mitigation and reinforced biosecurity measures to be implemented in HPAI high-risk areas. Indeed, stringent biosecurity measures are costly, time-consuming, and problematic to sustain in the long term. A high level of awareness on AI risk should be maintained among poultry producers and early detection systems should be strengthened particularly in areas at high risk of AI.

4.6. Monitoring, diagnosis of human infections and public health, occupational health and safety measures for infection prevention and control in the EU/EEA

4.6.1. Occupational health and safety measures

Where there is a potential risk of exposure to these viruses from infected birds (whether in an agricultural or other setting), the workplace risk assessment should be revised taking into account all risks, including the increased physical load on workers from wearing personal protective equipment (PPE) and appropriate measures should be taken, prioritising technical and organisational measures over personal measures. The measures should be consulted with the health and safety committee where available or workers' representatives. These may include technical measures such as physical distancing, enhanced ventilation, dust-and aerosol-avoiding measures (for example when cleaning and handling litter) and the use of appropriate PPE, when other measures do not sufficiently protect workers. Work clothing and street clothing should be stored separately and a separation of potentially contaminated areas from clean areas ensured (black/white areas) and appropriate hygiene measures applied. In agricultural settings, care should be taken to avoid contaminations of domestic areas, for example through contaminated work clothing. Appropriate personal protective equipment should be provided by employers and properly stored and disposed of, and workers should be trained in its use. Specific measures should be set out for culling operations and for the handling of dead animals and waste.

At premises where workers may be exposed to the above-mentioned viruses, for example when directly exposed to birds, their products or droppings, which may potentially be infected or contaminated with avian influenza viruses, the workplace risk assessment should be revised by employers and appropriate occupational safety and health measures should be set⁴, taking into account all risks, including those from additional physical load when wearing personal protective equipment. Appropriate personal protective equipment should be provided by employers and workers should be trained in its use and disposal. PPE should be properly stored. At poultry farms, it should be ensured that living areas are not contaminated, for example through work clothing, e.g. to avoid additional risk to family workers and relatives.

4.6.2. Monitoring and options for public health measures

It is important to remain vigilant, to prevent any transmission and identify any possible early transmission events to humans. People at risk are mainly those in direct contact/handling diseased birds or poultry, or their carcasses (e.g. farmers, agricultural workers at poultry farms, veterinarians and labourers involved in culling and rendering).

⁴ An extensive body of occupational safety and health (OSH) legislation applies to the protection of workers. Employers' obligations are set out in the OSH framework Directive 89/391/EC and its daughter directives, in particular directive 2000/54/EC 000 on the protection of workers from risks related to exposure to biological agents at work. These Directives are minimum requirements and are implemented in national regulations. There may be specific guidance for poultry workers in the Member states and they may also include requirements for appropriate health surveillance for instance.

Workers should wear PPE (face mask, goggles/face shield/protective glasses, gloves and gown/overall) and avoid unprotected direct contact with sick or dead birds, carcasses, faeces as well as potentially contaminated environments. National public health and OSH guidelines might detail the required level of protection and equipment. Appropriate measures should also be set for culling operations, which should cover the disposal of dead animals and waste.

Occupationally and people otherwise exposed to birds with avian influenza virus infection should be identified and monitored for development of influenza-like symptoms. Local health authorities and occupational health services should consider active monitoring these groups, particularly during and after culling operations. Workers should have access to appropriate health surveillance according to national OSH requirements and the occupational health services or physicians should be consulted. Health monitoring of exposed workers should be offered in accordance with national OSH requirements at the affected holdings⁵. Additionally, people with direct exposure at affected holdings or to likely infected wild birds should be monitored for a minimum of 10 days to document possible related symptoms, including influenza-like illness (ILI) with fever and cough or conjunctivitis. As a minimum, all persons exposed to the likely infected birds should be instructed to report any symptoms to local health and occupational health or other preventive services.

Avian influenza viruses circulating in EU/EEA have not shown any resistance to antivirals such as neuraminidase inhibitors. Early or presumptive treatment with neuraminidase inhibitors should always be considered for suspect or confirmed cases, in line with relevant national and international recommendations. Antiviral prophylaxis could also be considered depending on the local risk assessment (i.e. intensity of exposure).

It is recommended that confirmed cases, including family workers at farms and relatives, are followed-up, tested and offered post-exposure prophylaxis as recommended by relevant national / international guidelines.

Healthcare workers managing symptomatic exposed (or possible) cases should follow standard, contact and respiratory precautions, depending on the local risk assessment. Workplace prevention measures should be set accordingly. A protocol to investigate non-seasonal influenza has been published by WHO (WHO, 2018).

4.6.3. Diagnosis

People in the EU presenting with severe respiratory or influenza-like infection and a history of exposure to poultry or wild birds will require careful investigation, management and infection control. Appropriate samples for influenza tests should be rapidly taken and processed from patients with relevant exposure history within 10 days preceding symptom onset. If positive specimens cannot be subtyped, those should be shared with the national reference laboratory (National Influenza Centres; NICs).

With routine diagnostic laboratory assays, human infection with A(H5Nx) viruses should be detected as positive for influenza A virus, and negative for influenza B, A(H1), A(H1)pdm09 and A(H3) viruses and therefore classified as un-subtypeable influenza A virus if no-specific A(H5) diagnostic test is performed. Such un-subtypeable influenza A virus isolates or clinical samples that cannot be subtyped should be sent to NICs, and further to a WHO Collaborating Centre for Reference.

4.6.4. Reporting

Human infections with avian influenza viruses are notifiable under EU legislation within 24 hours through the Early Warning and Response System (EWRS) according to EU Decision 1082/2013/EU⁶.

⁵ Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work (seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC) - OJ L 262, 17.10.2000, p. 21–45

⁶ Commission Implementing Decision of 8 August 2012 amending Decision 2002/253/EC laying down case definitions for reporting communicable diseases to the Community network under Decision No 2119/98/EC of the European Parliament and of the Council (notified under document C(2012) 5538) - OJ L 262, 27.9.2012

The reporting is also required through the International Health Regulations (IHR) notification system (WHO, 2017) (ref): 'Each State Party shall notify WHO, by the most efficient means of communication available, by way of the National IHR Focal Point, and within 24 hours of assessment of public health information, of all events which may constitute a public health emergency of international concern within its territory in accordance with the decision instrument, as well as any health measure implemented in response to those events'

Information should also be shared with local occupational safety and health (OSH) authorities.

4.6.5. Sharing of sequences

The timely characterisation of viruses and the sharing of sequence information remain crucial for the monitoring of virus evolution and for virus vaccine development. Sharing of sequence data through the GISAID EpiFlu (GSAID, online) or other sequence databases as well as virus isolates with WHO Collaborating Centres are important for public health assessment, improvement of diagnostics and the development of candidate vaccines. Sharing of influenza viruses through the Global Influenza Surveillance and Response System (GISRS) (WHO, online-b).

4.6.6. Candidate vaccine viruses

Candidate vaccine viruses (CVV) developed, under development or proposed are listed in a report from WHO (WHO, 2020e). The Vector institute in Russia reported about a vaccine under development against A(H5N8) (RGRU, online).

4.7. ECDC risk assessment for the general public in the EU/EEA

ECDC has published a Threat Assessment Brief on 24 February 2021 and parts are repeated in section 4.6 and below (ECDC, 2021).

Avian influenza A(H5N8) viruses have caused large outbreaks in birds and poultry since 2014, with estimates suggesting over 10 000 exposure events of people in the EU/EEA during the outbreaks in 2016-2018 [14]. Since 2019 alone, nine countries reported more than 2,000 exposures of people during culling and related activities, but no transmission to humans (data reported to EFSA between 1 January 2019-11 February 2021). Despite this high number of exposure events and ongoing large and widespread outbreaks, no documented transmission to humans has ever been reported in the EU/EEA or globally.

The following assessment is based on limited information available about the reported human cases and there is therefore considerable uncertainty regarding the conclusions reached. The assessment of risk is based on the following information:

- Transmission of avian influenza viruses from birds to humans is a rare event.
- Only seven human cases have now been reported despite widespread global circulation of A(H5N8) since 2014.
- The seven human cases were occupational workers in an A(H5N8) virus affected poultry farm who likely had close contact with infected birds.
- All the human cases have been reported as mild or asymptomatic.
- No human-to-human transmission has been reported.
- No markers for mammalian adaptation, pathogenicity for humans or altered susceptibility to existing antivirals have been observed in avian influenza viruses currently detected in EU/EEA in wild birds and poultry outbreaks. The A(H5N8) viruses remain poorly adapted to humans.

This risk to the general public of human transmission due to avian influenza A (H5N8) is assessed as *very low* and to occupationally exposed people *low*.

No human-to-human transmission has been described. The likelihood of infection is related to direct exposure to infected wild birds or poultry, therefore, very low for the general population and low for

people directly exposed to infected birds. The disease severity has been described as asymptomatic or mild, therefore the impact based on severity is very low.

Other A(H5Nx) viruses have shown high severity and mortality, so that the evolution of these viruses need to be closely monitored and human-to-human transmission identified and reported as early as possibly to implement public health control and worker protection measures. Workers should be protected following an updated workplace risk assessment and prevention measures set accordingly⁷.

Further information of the viruses is needed to assess the situation. Should information on mutations in the virus genome be available and such mutations with indication for human transmissibility or pathogenicity identified, a reassessment will be performed as soon as new data are available

However, zoonotic transmission of avian influenza viruses cannot be fully excluded in general when avian influenza viruses are present in birds. The use of personal protective measures for people exposed to birds infected with avian influenza viruses will minimise any residual risk. Overall, avian influenza virus transmission to humans is a rare event and the risk is considered very low for viruses adapted to avian species. However, people should avoid touching sick or dead birds or their droppings unprotected or wear personal protective equipment when in direct contact. People developing respiratory symptoms including conjunctivitis within 10 days after contact with infected birds should be tested for influenza viruses.

Surveillance of avian influenza viruses in wild birds and poultry in the EU/EEA is important in order to detect newly introduced and circulating viruses and reduce the possible risk of exposure of humans to infected birds.

The risk of travel-related importation of human avian influenza cases from countries where the viruses are detected in poultry or wild birds is *very low* also considering the generally lower travel volume due to the ongoing COVID-19 pandemic. Sporadic human cases infected with A(H9N2) LPAI or A(H5N6) HPAI viruses outside of Europe underline the risk of transmission whenever people are exposed to infected birds.

⁷ Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work (seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC) - *OJ L 262, 17.10.2000*

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Abbreviations

ADNS	Animal Disease Notification System
AI	Avian influenza
CVO	Chief Veterinary Officer
ECDC	European Centre for Disease Prevention and Control
EFSA	European Food Safety Authority
EEA	European Economic Area
EU	European Union
EURL	European Union Reference Laboratory
FAO	Food and Agriculture Organization
HPAI	Highly pathogenic avian influenza
LPAI	Low pathogenic avian influenza
OIE	World Organisation for Animal Health
OSH	Occupational safety and health
PPE	Personal protection equipment
SCOPAFF	Standing Committee on plants, animals, food and feed
TOR	Terms of reference
WHO	World Health Organization

Appendix A – Terms of reference

A.1. Background and terms of reference as provided by the requestor

Avian influenza is an infectious viral disease in birds, including domestic poultry. Infections with avian influenza viruses in poultry cause two main forms of that disease that are distinguished by their virulence. The low pathogenic (LPAI) form generally only causes mild symptoms, while the highly pathogenic (HPAI) form results in very high mortality rates in most poultry species. That disease may have a severe impact on the profitability of poultry farming.

Avian influenza is mainly found in birds, but under certain circumstances infections can also occur in humans even though the risk is generally very low.

More than a decade ago, it was discovered that virus acquired the capability to be carried by wild birds over long distances. This occurred for the HPAI of the subtype A(H5N1) from South East and Far East Asia to other parts of Asia, Europe and Africa as well as to North America. In the current epidemic the extent of the wild bird involvement in the epidemiology of the disease is exceptional.

Since late October 2016 up to early February 2017, highly pathogenic avian influenza (HPAI) of the subtype A(H5N8) has been detected in wild migratory birds or captive birds on the territory of 21 Member States, namely Austria, Belgium, Bulgaria, Croatia, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. In 17 Member States the virus has spilled over to poultry holdings leading also to lateral spread between holdings in a few Member States, in particular in those with a high density of duck and geese holdings where the poultry cannot sufficiently be protected against contacts with wild birds. A second HP AI subtype A(H5N5) has been detected in wild birds and recently also in poultry holdings in Germany.

The number of infected migratory wild birds found dead and the geographical extent of these findings are posing an immense threat for virus introduction into poultry or captive birds holdings as demonstrated by the high number of outbreaks (~700 as of 08/02/2017).

In the event of an outbreak of avian influenza, there is a risk that the disease agent might spread to other holdings where poultry or other captive birds are kept. As a result it may spread from one Member State to other Member States or to third countries through trade in live birds or their products.

There is knowledge, legislation⁸, technical and financial tools in the EU to effectively deal with outbreaks of avian influenza in poultry and captive birds. However, the very wide virus spread by wild birds and the increased risk of direct or indirect virus introduction into poultry or captive bird holdings has led to the largest HPAI epidemic in the EU so far. This situation calls for a reflection and evaluation how preparedness, risk assessment, early detection and control measures could be improved.

The Commission and Member States are therefore in need of an epidemiological analysis based on the data collected from the disease affected Member States. The use of the EFSA Data Collection Framework is encouraged given it promotes the harmonisation of data collection. Any data that is available from neighbouring third countries should be used as well, if relevant.

Therefore, in the context of Article 31 of Regulation (EC) No. 178/2002⁹, EFSA should provide the technical and scientific assistance to the Commission based on the following Terms of Reference (TOR):

⁸ Council Directive 2005/94/EC of 20 December 2005 on Community measures for the control of avian influenza and repealing Directive 92/40/EEC. OJ L 10, 14.1.2006, p. 16.

⁹ Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31, 1.2.2002, p. 1–24.

1. Analyse the epidemiological data on highly pathogenic avian influenza (HPAI) and low pathogenic avian influenza (LPAI), where co-circulating or linked within the same epidemic, from HPAI disease affected Member States.
2. Analyse the temporal and spatial pattern of HPAI and LPAI as appropriate in poultry, captive birds and wild birds, as well the risk factors involved in the occurrence, spread and persistence of the HPAI virus in and at the interface of these avian populations.
3. Based on the findings from the points above, describe the effect of prevention and control measures.
4. Provide for regular quarterly reports updating on the avian influenza situation within the Union and worldwide, in particular with a view to describe the evolution of virus spread from certain regions towards the EU. In case of significant changes in the epidemiology of avian influenza, these reports could be needed more frequently. These reports should in particular closely follow the developments of zoonotic avian influenza viruses (such as HPAI A(H5N6) and LPAI A(H7N9)) in collaboration with the European Centre for Disease Prevention and Control (ECDC).

A.2. Interpretation of the terms of reference

In reply to TOR 1 and TOR 2, this scientific report gives an overview of the HPAI and LPAI outbreaks in poultry, captive and wild birds detected in Europe between 8 December 2020 and 23 February 2021 and reported by Member States and neighbouring countries via ADNS or OIE. Member States, where avian influenza outbreaks occurred in poultry, submitted additional epidemiological data to EFSA, which have been used to analyse the characteristics of the affected poultry establishments.

It was not possible to collect data for a risk factor analysis on the occurrence and persistence of HPAI virus within the EU. Risk factor analysis requires not only case-related information, but also data on the susceptible population (e.g. location of establishments, population structure), which should be collected in a harmonised manner across the EU. Limitations in the data collection, reporting and analysis were explained in the first avian influenza overview report (EFSA AHAW Panel, 2017).

If HPAI outbreaks in poultry are detected in the EU, a description of the applied prevention and control measures (TOR 3) is given in the case report provided by representatives from the affected Member States and attached as an annex. Information was collected for outbreaks occurred from 8 December 2020 up to 23 February 2021. The main topics covered are increasing awareness, release and repeal of housing orders, strengthening biosecurity, preventive culling, implementation of a regional standstill, bans on hunting and derogations from restriction zone implementation after a risk assessment.

Monitoring of the avian influenza situation in other countries (TOR 4) is based on data submitted via the OIE or reported to the FAO. The description focuses only on findings of avian influenza viruses occurring in countries that are considered to be of epidemiological interest for the EU/EEA and the UK or of public health relevance, specifically on HPAI A(H5N1), HPAI A(H5N2), HPAI A(H5N5), HPAI A(H5N6), HPAI A(H5N8), HPAI/LPAI A(H7N9) and LPAI A(H9N2). The background and epidemiology, detections, phenotypic and genetic characterisations are described based on information from confirmed human, poultry and wild bird cases that occurred between 8 December 2020 and 23 February 2021. Possible actions for preparedness in the EU are discussed.

This report mainly describes information that became available since the publication of the EFSA report for the period August – December 2020 (EFSA et al., 2020d) and that might affect the interpretation of risks related to avian influenza introduction and/or spread in Europe.

Appendix B – Data and methodologies

B.1. Data on animals

B.1.1. Overview of avian influenza outbreaks in Europe (TOR 1 and TOR 2)

Data on the avian influenza outbreaks that occurred in Europe from 8 December 2020 to 23 February 2021 submitted by Member States to the ADNS (European Commission, online-a) were taken into account for this report. In addition, HPAI-affected Member States were asked to provide more detailed epidemiological data directly to EFSA on the avian influenza outbreaks that occurred in poultry during the same period.

The information, which EU Member States affected by HPAI and LPAI presented to the Standing Committee on Plants, Animals, Food and Feed (SCOPAFF) meetings, and the evidence on HPAI and LPAI outbreaks provided in the info notes from the affected Member States to the European Commission, were consulted to extract the relevant information which is reported in Section 4.2.2. The PDFs of the SCOPAFF presentations are available on the European Commission website (European Commission, online-b).

Wild bird species have been categorised according to Table B1.

The public GISAID's EpiFlu Database was accessed to download newly released avian influenza sequences.

A descriptive analysis of the data collected is reported in Section 4.2.

Table B1. Categorisation of wild bird species for the detections between 5 October 2020 and 23 February 2021

Other wild bird species	Raptor	Waterfowl
Black-headed gull	Accipitridae	Barnacle goose
Common gull	Accipitriformes	Bean goose
Common pheasant	Common buzzard	Black swan
Common wood pigeon	Common kestrel	Brant goose
Corvidae	Eurasian eagle-owl	Canada goose
Common crane	Eurasian sparrowhawk	Charadriidae
Curlew	Falco sp.	Common eider
Curlew sandpiper	Northern goshawk	Common goldeneye
Dunlin	Peregrine falcon	Common moorhen
Eurasian magpie	Short-eared owl	Common shelduck
Eurasian oystercatcher	Strigiformes	Egyptian goose
Eurasian woodcock	Tawny owl	Eurasian coot
European herring gull	White-tailed eagle	Eurasian teal
Great black-backed gull		Eurasian wigeon
Black-headed gull		Gadwall
Great cormorant		Garganey
Great white egret		Goose
Grey heron		Great crested grebe
Gruidae		Greater white-fronted goose
Gull		Greylag goose
Knot		Little grebe
Larinae		Mallard
Lesser black-backed gull		Muscovy duck
Northern gannet		Mute swan
Northern lapwing		Pink-footed goose
Pheasant		Swan
Red knot		Tufted duck

Scolopacidae		Tundra bean goose
Sparrow		Whooper swan
Turdidae		Wigeon
Unknown wild bird		
White stork		
Yellow-legged gull		

B.1.1.1. Literature review on phenotypic characterisation of HPAI viruses circulating in the EU

Information on the phenotypic characterisation of AI viruses circulating in the EU was extracted from the scientific literature by performing a literature review.

Review question Update on the phenotypic characterisation of HPAI viruses circulating in the EU in domestic and wild birds within the last two years.

Search The PubMed database was searched by using subject index terms and free-text terms combined with the appropriate Boolean operators. Scientific articles added to the database from 15 August 2020 to 31 January 2021 were searched; the search was run on 1 February 2021.

Relevance criteria Scientific articles added to the database from 15 August 2020 to 31 January 2021 and reporting information on the presence or absence of clinical signs or pathological changes or mortality due to HPAI infection with viruses circulating within the last two years in the EU in domestic or wild birds.

Eligibility criteria Host species all domestic birds or wild birds present in the EU; the virus subtype should be reported; for experimental studies only, the age of the infected animals should be reported (at least as juvenile/adult).

Results The search retrieved 138 papers. The articles were subsequently screened against the relevance and eligibility criteria. One of the screened papers was in the end taken into consideration in the description of the phenotypic characterisation of HPAI viruses circulating in the EU in domestic and wild birds in the reporting period.

The search protocol and the results can be consulted at <https://doi.org/10.5281/zenodo.4054976>.

B.1.2. Overview of avian influenza outbreaks in other countries not reporting via ADNS (TOR 4)

Data from FAO EMPRES-i (FAO, online-a) on HPAI A(H5N1), HPAI A(H5N2), HPAI A(H5N5), A(H5N6), A(H5N8), HPAI and LPAI A(H7N9) in domestic, captive and wild birds, and environmental samples, were used to describe and to map the geographical distribution of avian influenza cases in domestic and wild birds in Africa, Asia and Europe on the basis of the observation dates. Data were extracted on 23 February 2021. Also, the OIE's World Animal Health Information Database (OIE, online) was consulted on 7 December to complement the information reported by FAO. To avoid over-complication of the maps, captive birds and environmental samples have been mapped as domestic birds. Although some of these kept animals may be wild species, in most of the cases captive birds, or, for environmental samples, the birds from which samples have been taken (mainly at live markets) will not move around and not spread the infection by migrating and for this reason have been considered as domestic birds in the maps provided in this report. Only when there was a strong discrepancy between the locality, the administrative regions and geocoordinates, and the outbreaks were not officially reported to the OIE, were the outbreaks not taken into account in the analysis.

B.1.2.1. Literature review on phenotypic and genetic characterisation of HPAI viruses circulating on other continents

Information on phenotypic and genotypic characterisation of HPAI viruses circulating on other continents and in other regions (Africa, Asia, the Middle East) in domestic or wild birds or mammals (excluding humans) were extracted from the scientific literature by performing a literature review.

Review questions Update on the phenotypic and genetic characterisation of HPAI viruses circulating on other continents and in other regions (Africa, Asia, the Middle East) in domestic or wild birds or mammals (excluding humans) within the last three years.

Search The PubMed database was searched by using subject index terms and free-text terms combined with the appropriate Boolean operators. Scientific articles added to the database from 15 August 2020 to 31 January 2021 were searched; the search was run on 1 February 2021.

Relevance criteria Scientific articles added to the database 15 August 2020 to 31 January 2021 that report information on the presence or absence of clinical signs, pathological changes or mortality or genotypic characterisation (only new information) due to HPAI infection with viruses circulating within the last three years in Asia, Africa or the Middle East in domestic or wild birds or mammals other than humans.

Eligibility criteria Host species all domestic birds or wild birds present in the EU or mammals other than humans; the virus subtype should be reported; for experimental studies only the age of the infected animals should be reported (at least as juvenile/adult).

Results The search retrieved 121 papers. The articles were subsequently screened against the relevance and eligibility criteria. Seven papers were in the end taken into consideration in the description of phenotypic and genotypic characterisation of HPAI viruses circulating on other continents and in other regions (Africa, Asia, the Middle East) in domestic or wild birds or mammals (excluding humans) in the reporting period.

The search protocol and the results can be consulted at <https://doi.org/10.5281/zenodo.4054976>.

B.2. Data on humans

The numbers of human cases due to infection with avian influenza viruses have been collected by ECDC. Multiple sources are scanned regularly as part of epidemic intelligence activities at ECDC to collect information about laboratory-confirmed human cases. Data were extracted and line lists developed to collect case-based information on virus type, date of disease onset, country of reporting, country of exposure, sex, age, exposure, clinical information (hospitalisation, severity) and outcome. All cases included in the line list and mentioned in the document have been laboratory-confirmed. Data are continuously checked for double entries and validity. The data on human cases cover the full period of time since the first human case was reported. Therefore, data on human cases refer to different time periods and are included irrespective of whether there have been any new human cases during the reporting period.

Annex A – Characteristics of the HPAI A(H5N8) and A(H5N5)-positive poultry establishments.

Table A.1: Characteristics of the HPAI A(H5N8) and A(H5N5)-positive poultry establishments by affected EU Member State (except France), from 26 November 2020 to 11 February 2021 (n=126). Unknown information are left as empty cells.

Country	Poultry species	Production category	Surveillance stream ^(a)	Presence of signs in the outbreaks	Outdoor access	Date of suspicion	Number of susceptible animals	Number of people exposed
Belgium	Turkey					26/01/2021	27230	
	Chicken	Breeding	Passive	Yes	No	31/01/2021	99500	
	Chicken	Egg	Outbreak related	Yes	No		19000	
Bulgaria	Duck	Fattening	Outbreak related	Yes	No		145000	
	Duck	Fattening	Outbreak related	Yes	No		55000	
Czechia	Mixed	Mixed	Passive	Yes	Yes	22/01/2021	32	2
	Mixed	Mixed	Passive	Yes	Yes	02/02/2021	53	2
	Mixed	Mixed	Passive	Yes	Yes	03/02/2021	61	2
	Mixed	Mixed	Passive	Yes	Yes	10/02/2021	61	3
Denmark	Other - Phasianus colchicus	Game	Passive	Yes	Yes	31/12/2020	5976	
Finland	Other - Phasianus colchicus	Game	Passive	Yes	Yes	08/02/2021	1335	5
Germany	Chicken	Egg	Passive	Yes	No	30/11/2020	28808	
	Turkey	Fattening	Passive	Yes	No	20/12/2020	16131	
	Turkey	Fattening	Passive	Yes	No	21/12/2020	13088	
	Turkey	Fattening	Passive	Yes	No	23/12/2020	12998	
	Geese	Breeding	Passive	Yes		24/12/2020	9068	
	Turkey	Fattening	Passive	Yes	No	25/12/2020	7347	
	Turkey	Fattening	Passive	Yes	No	26/12/2020	10300	
	Turkey	Fattening	Passive	Yes	No	26/12/2020	12261	
	Turkey	Fattening	Passive	Yes	No	26/12/2020	6872	
	Geese	Breeding	Passive	Yes		27/12/2020	2344	
	Chicken	Egg	Passive	Yes		27/12/2020	3	
	Duck	Unknown	Passive			28/12/2020	8	
	Chicken	Unknown	Passive	Yes		28/12/2020	79	
	Turkey	Fattening	Passive	Yes		29/12/2020	10360	
	Chicken	Egg	Passive	Yes	No	29/12/2020	201	
	Turkey	Fattening	Passive	Yes		01/01/2021	12832	
	Turkey	Fattening	Passive	Yes	No	02/01/2021	10178	
Turkey	Fattening	Passive	Yes	No	02/01/2021	7136		
Duck	Fattening	Passive	Yes	No	04/01/2021	17026		

	Turkey	Breeding	Passive	Yes	No	04/01/2021	13230	
	Turkey	Fattening	Passive	Yes	No	04/01/2021	14087	
	Chicken		Passive	Yes	No	05/01/2021	50	
	Turkey	Fattening	Passive	Yes		06/01/2021	8698	
	Turkey	Fattening	Passive	Yes		06/01/2021	14287	
	Turkey	Fattening	Passive	Yes	No	08/01/2021	13981	
	Turkey	Fattening	Passive	Yes	No	11/01/2021	9387	
	Chicken	Breeding	Passive	Yes	No	12/01/2021	21076	
	Chicken	Egg	Passive	Yes	No	12/01/2021	37035	
	Turkey	Fattening	Passive	Yes	No	12/01/2021	29735	
	Turkey	Fattening	Passive	Yes	No	14/01/2021	8545	
	Turkey	Fattening	Passive	Yes	No	15/01/2021	7449	
	Turkey	Fattening	Passive	Yes	No	15/01/2021	7458	
	Turkey	Fattening	Passive	Yes	No	17/01/2021	15816	
	Turkey	Fattening	Passive	Yes	No	20/01/2021	7290	
	Duck	Fattening	Outbreak related	Yes	No	20/01/2021	24730	
	Chicken	Fattening	Passive	Yes	No	23/01/2021	71904	
	Turkey	Fattening	Passive	Yes	No	22/01/2021	8057	
	Turkey	Fattening	Passive	Yes	No	26/01/2021	7345	
	Chicken	Egg	Passive	Yes	No	28/01/2021	19	
	Turkey	Fattening	Passive	Yes	No	28/01/2021	19479	
	Turkey	Fattening	Passive	Yes		31/01/2021	14332	
	Turkey	Fattening	Passive	Yes	No	06/02/2021	19550	
	Chicken	Breeding	Passive	Yes	No	08/02/2021	44749	
Hungary	Turkey	Fattening	Passive	Yes	No	04/01/2021	47452	
	Turkey	Fattening	Passive	Yes	No	04/01/2021	36973	
	Chicken	Egg	Passive	No	No	12/01/2021	101160	
	Chicken	Egg	Passive	No	No	31/01/2021	40067	
	Chicken	Egg	Passive	No	No	31/01/2021	45096	
	Chicken	Egg	Passive	No	No	01/02/2021	25661	
	Ireland	Turkey	Fattening	Outbreak related	Yes	Yes	09/12/2020	127
Italy	Mixed	Mixed	Passive	Yes	Yes	22/01/2021	14	
Lithuania	Mixed	Mixed	Passive	Yes	Yes	31/12/2021	27	5
Northern Ireland	Chicken	Egg				31/12/2020	32347	
	Chicken	Egg				04/01/2021	31104	
Poland	Chicken	Fattening	Passive	Yes	No	01/12/2020	117108	35
	Turkey	Egg	Passive	Yes	No	03/12/2020	269697	70
	Turkey	Fattening	Passive	Yes	No	03/12/2020	72394	58
	Chicken	Egg	Passive	Yes	No	04/12/2020	714473	75
	Chicken	Fattening	Passive	Yes	No	07/12/2020	34422	4
	Turkey	Fattening	Passive	Yes	No	11/12/2020	9162	45
	Chicken	Fattening	Passive	Yes	No	13/12/2020	12636	15
	Turkey	Egg	Passive	Yes	No	12/12/2020	199998	35

Duck	Fattening	Outbreak related	Yes	No	11/12/2020	32965	31	
Mixed		Passive	Yes	Yes	14/12/2020	32	1	
Geese	Fattening	Passive	Yes	No	13/12/2020	30488	15	
Chicken	Fattening	Passive	Yes	No	15/12/2020	10403	20	
Turkey	Egg	Passive	Yes	Yes	17/12/2020	662	5	
Chicken		Passive	Yes	Yes	18/12/2020	81	1	
Chicken	Fattening	Passive	Yes	No	21/12/2020	31091	66	
Chicken	Breeding	Outbreak related	No	No	21/12/2020	600	8	
Mixed	Fattening	Passive	Yes	No	28/12/2020	53504	53	
Turkey		Passive	Yes	Yes	28/12/2020	195	1	
Turkey	Fattening	Passive	Yes	No	04/01/2021	29840	32	
Chicken	Egg	Passive	Yes	No	24/01/2021	124280	53	
Chicken	Egg	Passive	Yes	Yes	25/01/2021	27	4	
Turkey	Breeding	Outbreak related	Yes	No	29/01/2021	25129	9	
Chicken	Fattening	Passive	Yes	No	28/01/2021	86989	38	
Chicken	Fattening	Passive	No	No	29/01/2021	13865	14	
Turkey	Fattening	Passive	Yes	No	30/01/2021	38002	11	
Goose	Fattening	Passive	Yes	No	30/01/2021	23468	59	
Duck	Egg	Passive	Yes	Yes	03/02/2021	62	3	
Chicken	Fattening	Outbreak related	Yes	No	02/02/2021	13695	26	
Turkey	Egg	Outbreak related	Yes	No	04/02/2021	7480	16	
Turkey	Fattening	Passive	Yes	Yes	06/01/2021	11300	9	
Turkey	Breeding	Passive	Yes	Yes	09/01/2021	1964	14	
Mixed	Fattening	Passive	Yes	No	08/01/2021	15600	6	
Chicken	Fattening	Passive	Yes	No	12/01/2021	31166	12	
Mixed	Fattening	Passive	Yes	No	15/01/2021	13558	2	
Mixed	Breeding	Passive	Yes	No	16/01/2021	34283	15	
Mixed	Egg	Passive	Yes	No	22/01/2021	320141	75	
Chicken	Breeding	Passive	Yes	No	24/01/2021	27766	8	
Mixed	Mixed				10/02/2021	260		
Chicken	Egg				10/02/2021	10677		
Romania	Mixed	Mixed	Passive		14/01/2021	1198		
Slovakia	Chicken	Egg	Passive	Yes	Yes	22/01/2021	70	
Sweden	Turkey	Fattening	Passive	Yes	No	13/01/2021	2350	6

The Netherlands	Chicken	Breeding	Passive	Yes	No	02/01/2021	84864	26
	Chicken	Egg	Passive	Yes	No	17/01/2021	1928376	277
	Chicken	Mixed	Passive	Yes		02/12/2020	373	0
	Chicken	Fattening	Passive	Yes	No	06/12/2020	21600	0
	Chicken	Breeding	Passive	Yes	No	12/12/2020	27681	0
	Turkey	Fattening	Passive	Yes	No	01/01/2021	18539	0
United Kingdom	Turkey					26/11/2020	10500	
	Unknown					01/12/2020	25764	
	Turkey					01/12/2020	30000	
	Turkey					03/12/2020	28800	
	Mixed	Mixed				13/12/2020	47	
	Chicken						20	
	Chicken					09/12/2020	48	
	Chicken					16/12/2020	13	
	Mixed					11/12/2020	8097	
	Duck					24/12/2020	44	
	Chicken					24/12/2020	44	
	Unknown	Mixed				16/12/2020	129405	
	Unknown	Mixed				24/12/2020	6	

Data source: ADNS (12.11.2020) and Member States.

Table A.2: Characteristics of the HPAI A(H5N8) and A(H5N5)-positive poultry establishments in France, from 26 November 2020 to 11 February 2021 (n=422). Unknown information are left as empty cells.

Poultry species and production category	Number of outbreaks	Surveillance stream	Presence of signs in the Outbreaks	Number of susceptible animals
Duck, foie gras	159	Clinical surveillance	Yes	743,382
	5	Clinical surveillance	No	5,776
	1	Clinical surveillance		4,060
	18	Outbreak related	Yes	50,978
	116	Outbreak related	No	31,7021
	1	Outbreak related		
	2	Active surveillance	Yes	12,800
	3	Active surveillance	No	10,600
	1		Yes	1,250
Duck, breeding	3			10,770
	6	Clinical surveillance	Yes	47,098
	1	Clinical surveillance	No	2,790
	1	Clinical surveillance		
	1	Outbreak related	No	2,448
Duck, fattening	1	Active surveillance	No	2,500
	4	Clinical surveillance	Yes	16,435
Duck, other	1	Outbreak related	No	798
	1	Clinical surveillance	Yes	680
	4	Clinical surveillance		12,850
	1	Outbreak related	Yes	4,400
	5	Outbreak related	No	25,769

	5	Outbreak related		12,302
	1			
Geese, foie gras	1	Clinical surveillance	Yes	2,976
Geese, fattening	1	Outbreak related	No	750
Chicken, breeding	2	Clinical surveillance	Yes	24,848
Chicken, fattening	30	Clinical surveillance	Yes	336,454
	1	Clinical surveillance	No	6
	1	Outbreak related	Yes	8,700
	3	Outbreak related	No	34,400
Chicken, eggs	5	Clinical surveillance	Yes	58,970
	1	Outbreak related	Yes	89
	2	Outbreak related	No	15,050
Chicken, other	1	Clinical surveillance	Yes	20
	2	Clinical surveillance		17,600
Other species, fattening	5	Clinical surveillance	Yes	126,528
	1	Outbreak related	No	5,000
Mixed holding	15	Clinical surveillance	Yes	105,372
	1	Clinical surveillance	No	4,400
	1	Clinical surveillance		1,800
	7	Outbreak related	No	34,053
	1		Yes	55

Annex B – Applied prevention and control measures on avian influenza

Scope

This document provides a brief overview of specific prevention and control measures applied in the Bulgaria, Czechia, Denmark, Finland, Hungary, Italy, Lithuania, the Netherlands, Poland, Slovakia and Sweden from 25 November 2020 to 11 February 2021 in relation to avian influenza outbreaks in poultry and in wild birds. Information is only provided that is relevant to the implementation of measures such as increasing awareness of stakeholders and the general public, housing orders, strengthening biosecurity measures (other than poultry confinement), preventive culling, regional stand-stills, derogations on restriction zone implementation after risk assessment, hunting or any other relevant measures that have been applied. This document is made to support the EFSA working group in generating an overview on the application of the selected measures at EU level.

Timing of the applied prevention and control measures

Tables B.1–B.11 provide timelines for the main events that triggered actions in relation to the selected prevention and control measures in Bulgaria, Czechia, Denmark, Finland, Hungary, Italy, Lithuania, the Netherlands, Poland, Slovakia and Sweden. More information on the actions taken is provided in the sections below the tables.

B.1 Bulgaria

Aleksandra Miteva

Animal Health and Welfare, and Feed Control Directorate – Bulgarian Food Safety Agency

Timing of the applied prevention and control measures

Table 1 provides a timeline on the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.1: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
04-08/02/2021	Confirmation of primary outbreak of HPAI in poultry	Eradication of outbreaks, control and surveillance in accordance with Directive 2005/94/EC Enhanced official inspections for biosecurity Enhanced passive surveillance in wild birds Ban on keeping poultry outdoor Ban on poultry markets	Official vets, poultry farmers

Increasing awareness of the stakeholders and the general public

Meetings with representatives of the poultry associations aiming to keep them up to date with the epidemiological situation, present and further control measures to be enforced.

Housing orders

Precautionary measures such as keeping poultry indoors, taking steps to separate them from wild birds and ensuring feed and water is not accessible to wild birds were also required.

Preventive culling

Not applied

Regional stand still (beyond the restriction zones specified in the EU Regulation)

Not applied

Derogations on restriction zone implementation after risk assessment

Derogation in line with Directive 2005/94.

Hunting

Not forbidden

B.2 Czechia

Lucie Kalášková, Milada Dubská

State Veterinary Administration

Poultry

On 22 January 2021 the Regional Veterinary Administration for the South Bohemian Region received information about the death of 15 hens out of 32 poultry in a backyard holding in Dlouhá Lhota (South Bohemian Region). Official veterinarians checked the holding and samples of dead poultry were taken for laboratory testing at the State Veterinary Institute in Prague (SVI Prague) – National Reference Laboratory for Avian Influenza. The laboratory confirmed HPAI of subtype H5N8 later that day (the first outbreak of HPAI in poultry in 2021).

Emergency veterinary measures have been taken in accordance with Council Directive 2005/94/EC introducing Community measures for the control of avian influenza. All measures – culling of all remaining poultry (in total 17 birds), disposal of carcasses and poultry products and preliminary cleaning and disinfection were carried out on 23 January 2021. Protection and surveillance zones (at 3 and 10 km) have been established around the affected holding in accordance with the EU legislation.

The final cleaning and disinfection were carried out on 27 January 2021.

The epidemiological investigation is ongoing. The most probable introduction of virus into the holding was via wild birds (direct contact of poultry and wild birds at a nearby pond).

Wild birds

From 26 November 2020 to 29 January 2021 in total three cases of HPAI of subtype H5N8 in wild birds was confirmed in Czechia (nine wild birds). All HPAI-positive wild birds were founded dead in the South Bohemian Region.

Overview:

- I. Date of confirmation HPAI – 21.1.2021, two mute swans (*Cygnus olor*)
- II. Date of confirmation HPAI – 25.1.2021, one mute swan (*Cygnus olor*) and five mallards (*Anas platyrhynchos*)
- III. Date of confirmation HPAI – 25.1.2021, one mute swan (*Cygnus olor*)

Timing of the applied prevention and control measures

Table B.2 provides a timeline of the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.2: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
22/10/2020	The new case of HPAI in wild birds in Europe (EU) in 2020	Information letter about the avian influenza (AI) situation in the EU and about the necessity prevention measures on poultry holdings	Poultry organisation, breeders of captive birds, private veterinarians and Regional Veterinary Administrations

From 22/10/2020	New occurrence of HPAI in wild birds and in poultry in the EU	Regular updating of the website of the State Veterinary Administration about the AI situation in the EU: https://www.svscr.cz/zdravi-zvirat/ptaci-chripka-influenza-drubeze/vysocepatogenni-aviarni-influenza/	General public, all breeders
04/11/2020	New outbreaks of HPAI in poultry in the EU	Letter to Regional Veterinary Administrations – continuation of increased control (biosecurity) of poultry holdings in contact with AI-affected countries	Regional Veterinary Administrations
25/11/2020	The outbreak of HPAI in poultry in neighbouring country	Information letter about the AI situation in the EU and about necessary prevention measures in poultry holdings	Poultry organisation, breeders of captive birds, private veterinarians and Regional Veterinary Administrations
21/01/2021	Confirmation of HPAI H5N8 in wild birds (two mute swans) in the South Bohemian Region	Information letter Press release related to the first case of HPAI in wild birds in Czechia	Poultry organisation, breeders of captive birds, private veterinarians and Regional Veterinary Administrations General public, all breeders
22/01/2021	Confirmation of HPAI H5N8 on a poultry farm (Dlouhá Lhota, South Bohemian Region)	Publication of extraordinary veterinary measures for outbreak of HPAI in Dlouhá Lhota Press release related to the first HPAI outbreak in poultry in the Czech Republic and to extraordinary veterinary measures taken Publication of extraordinary veterinary measures for restricted zone	Breeder in the outbreak General public, all breeders All keepers in the restricted zone
25/01/2021	Confirmation of HPAI H5N8 on a poultry farm (Dlouhá Lhota, South Bohemian Region)	Information letter about the first outbreak of HPAI in poultry in Czechia	Poultry organisation, breeders of captive birds, private veterinarians and Regional Veterinary Administrations
26/01/2021	Confirmation of new cases of HPAI H5N8 in wild birds in Czechia	Press release related to new HPAI case in wild birds Publication of extraordinary veterinary measures for the whole territory of Czechia to control the spread of HPAI – ban of all gatherings of birds (e.g. fairs, exhibitions, sales, pigeon racing, competitions); commercial holdings – all species of birds to be kept inside; biosecurity measures; restriction of poultry movement	General public, all breeders

Increasing awareness of the stakeholders and the general public

The information about avian influenza situation in 2018 was regularly updated on the website of the State Veterinary Administration - <https://www.svscr.cz/zdravi-zvirat/ptaci-chripka-influenza-drubeze/vyskyt-ptaci-chripky-v-evrope-a-ve-svete-2018/>

Housing order

Extraordinary veterinary measures, which are issued by the Regional Veterinary Administration in the event of an outbreak and which are binding for a defined restricted area around this outbreak (for protection and surveillance zone), also stipulate biosecurity measures for backyard farms in protection zones with the aim of preventing the contact of poultry with wild birds and their subsequent possible infection.

Strengthening biosecurity measures (other than housing order)

On 26 January 2021 the State Veterinary Administration issued the extraordinary veterinary measures for the whole territory of Czechia to control the spread of HPAI in connection with the occurrence of HPAI in wild birds and in poultry (see above).

Increased control (biosecurity) of poultry holdings in contact with avian influenza affected countries was performed.

The general public was informed through the press on compliance with biosecurity measures on poultry farms, and instructed to observe the current disease situation on the website of the State Veterinary Administration:

<https://www.svscr.cz/zdravi-zvirat/ptaci-chripka-influenza-drubeze/ptaci-chripka-v-cr/>

Preventive culling

This was not applied.

Regional stand-still (beyond the restriction zones specified in the EU Regulation)

A regional stand-still beyond the restriction zone was not applied in Czechia.

Derogations on restriction zone implementation after risk assessment

This was applied in connection with the first HPAI outbreak in poultry (South Bohemian Region) and it was carried out in accordance with Council Directive 2005/94/EC.

Hunting

The releasing of poultry (pheasant, mallard) and other captive birds for restocking purposes was forbidden in the restricted zone (extraordinary veterinary measure) established around the outbreak.

B.3 Denmark

Hanne Christensen, Sanne Wiingreen and Pernille Dahl Nielsen

Danish Veterinary and Food Administration

Timing of the applied prevention and control measures

Table B.3 provides a timeline of the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.3: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
28/11/2020	Contact with the Danish association of racing pigeons and falconers.	Pigeons and birds of prey in captivity were allowed to take exercise flights based on a risk assessment.	General public and poultry associations
09/12/2020	Outbreak of HPAI in 'other captive birds'	Culling of all birds at the infected holding. After a risk assessment it was decided to establish zones. A protection and surveillance zone of 3 and 10 km was established	General public, poultry industry and poultry associations.

		<p>around the holding and necessary measures in accordance with Council Directive 2005/94/EC were implemented.</p> <p>Press release to increase the public awareness of avian influenza, biosecurity and how to contact the Danish Veterinary and Food Administration (DVFA) in the event of findings of dead wild birds.</p>	
08/12/2020	Risk assessment by the DVFA in association with trade (biosecurity)	Imposing a control campaign of the cleansing and disinfection standard of foreign poultry transport vehicles.	Poultry industry
01/01/2021	Outbreak of HPAI in the 'game bird poultry'	<p>Culling of all birds at the infected holding.</p> <p>Establishment of a protection and surveillance zone of 3 and 10 km around the holding and implementation of the necessary measures in accordance with Council Directive 2005/94/EC.</p> <p>Press release to increase the public awareness of avian influenza, biosecurity and how to contact the DVFA in case of findings of dead wild birds.</p>	General public, poultry industry and poultry associations
18/01/2021	AI epidemic in wild birds	Capturing of wild pheasants for restocking supplies of game birds is temporarily stopped	Poultry industry (game bird holdings)

Increasing awareness of the stakeholders and the general public

The strategy from the last report (VIII) is still in place

DVFA has continuously informed the public and stakeholders about the situation using press releases, news and facts updates on the DVFA homepage, and Facebook. The staff of the DVFA call centre are prepared to answer questions from the public (via FAQ's).

Representatives from the poultry industry participate in meetings in the AI expert group, giving the opportunity to exchange useful information and reach the stakeholders quickly.

DVFA uses the app for smartphones called 'FugleinfluenzaTip' ('Bird flu Tip') in order to make it easier for the public to notify the DVFA if they find dead wild birds. This app allows citizens to send exact data about findings of dead wild birds including the location and a photo. The submitted data are directly transferred to the DVFA wild bird database and allocated for collection by the Veterinary Inspection Units. The avian influenza situation in wild birds can be followed on the Danish avian influenza database.

Due to the avian influenza situation and experience from the avian influenza outbreak on 16 November, DVFA decided to change the criteria for reporting a suspicion of avian influenza. Changes in production parameters and mortality that would normally only raise an "early warning" of AI will now result in a suspicion and be handled very quickly. Both private and official veterinarians have been informed about this including the National Reference Laboratory.

Criteria for an 'early warning' (now suspicion):

Event of one or more of the following incidents in the herd:

- 1) A decrease in intake of feed or water of more than 20% within a day.

2) A decrease in egg production, in addition to the normal production level, of a total of more than 5% over two days.

3) An excess mortality of 3% within three days in relation to the expected mortality for the type of poultry and age in question.

Housing order

The housing from the last report (VIII) is still in place:

The DVFA has followed a pre-determined strategy for implementation of measures in case of an HPAI epidemic. A rapid risk assessment performed after findings of HPAI in several wild birds in the northern part of Germany resulted in the risk level being raised from 'very low' to 'high'. Consequently, a housing order was implemented on 6 November 2020 applicable to the whole country. The DVFA considers Denmark as one risk area due to its small size, the geographical position with many resting migratory birds, the long coast line and wide areas with wetlands and fjords.

The housing order is applicable for all production categories including zoos, professional and non-professional poultry holdings including other captive birds. The definition of housing: poultry/other captive birds have to be kept inside or fenced under roof, net or wire. Ducks, geese and ostriches are excepted from covering if wild birds can be effectively prevented from landing in the enclosure using other methods. Enclosures $\leq 40 \text{ m}^2$ are also excepted from covering. Furthermore, zoo birds that have been vaccinated against avian influenza are excepted from the requirements.

The housing order is implemented based on a national legal act. Information to the public was given through the media (press release), the DVFA homepage and Facebook.

New derogations to the housing order:

On 28 November 2020 pigeons and birds of prey in captivity were allowed to make exercise flights based on a risk assessment.

Housing order:

<https://www.retsinformation.dk/eli/ta/2020/1707>

Press release:

<https://www.foedevarestyrelsen.dk/Nyheder/Aktuelt/Sider/F%C3%B8devarestyrelsen-tillader-igen-motionsflyvning-for-duer-og-rovfugle-fra-28.-november.aspx>

Strengthening biosecurity measures (other than housing order)

The strengthening from the last report VIII are still in place:

On 6 November 2020, fairs, markets, shows or other gatherings of poultry or other captive birds were prohibited across the whole country.

Regardless of the AI situation, the following risk mitigation measures always have to be followed in all poultry farms:

- Poultry or other captive birds must be fed and watered indoors or under fixed roofs or fixed coverings, ensuring that larger wild birds cannot come into contact with the feed and water.
- Poultry and other captive birds are not allowed to have access to surface water or rainwater.
- Ponds/lakes in outdoor poultry areas have to be shielded from larger wild birds.
- Ducks and geese have to be kept physically separated from other poultry.

Preventive culling

On 8 December 2020, Denmark imposed random checks on the cleansing and disinfection standards of foreign poultry transport vehicles and crates. The prioritized control campaign continues in Q1 of 2021

and is performed on empty foreign poultry vehicles going to Danish poultry holdings primarily in connection with partial collection of broilers for slaughter in other EU-countries.

The background for this action is the ongoing epidemiological situation of HPAI in other EU-countries from which the transport vehicles arrive. The aim is to minimise the potential risk of introducing avian influenza by faecal contamination of crates being brought into the poultry houses. If the crates prior to these transports have been used for the transport of broilers in the incubation phase of AI there may be a risk for the introduction of avian influenza in poultry houses where only a part of the broiler population are removed. Denmark has found during earlier control campaigns that many of the crates for poultry transports were contaminated with poultry droppings.

According to article 18(7) of Council Directive 2009/158/EC 'The vehicles and, if they are not disposable, the containers, crates and cages shall, before loading and unloading, be cleansed and disinfected in accordance with the instructions of the competent authority of the Member State concerned'.

Regional stand-still (beyond the restriction zones specified in the EU Regulation)

No preventive culling in the report period.

Derogations on restriction zone implementation after risk assessment

Derogations on restriction zone implementation were not applied in relation to the two outbreaks in the report period.

Hunting

On 18 January 2021 capturing of wild pheasants for restocking of game supply was temporarily stopped and at present a risk assessment is being performed. Normal hunting was still allowed during the period.

B.4 Finland

Tiia Tuupanen

Finnish Food Authority

Timing of the applied prevention and control measures

Table B.1 provides a timeline of the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.4: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
November 2020–February 2021	HPAI in Europe and HPAI cases in wild birds and in a game bird farm in Finland	Increasing awareness	Keepers of poultry and captive birds, general public, hunters, veterinarians
22/01/2021	HPAI H5N8 in wild birds in Janakkala, Southern Finland	Establishment of a restriction zone of 10 km	Keepers of poultry and captive birds in the area
08/02/2021	HPAI in wild birds in neighbouring countries and in Finland	Housing order	Keepers of poultry and captive birds
10/02/2021	HPAI H5N8 in a game bird farm in Janakkala, Southern Finland	Stamping out of all poultry on the infected farm Establishment of a protection zone 3 km and a surveillance zone 10 km	

Increasing awareness of the stakeholders and the general public

Information of the epidemiological situation related to AI and recommendations and guidance to keepers of poultry and other captive birds, hunters, veterinarians and the general public is published on the websites of the Finnish Food Authority and shared via social media and press releases.

<https://www.ruokavirasto.fi/viljelijat/elaintenpito/elainten-terveys-ja-elaintaudit/elaintaudit/>

<https://www.ruokavirasto.fi/viljelijat/elaintenpito/elainten-terveys-ja-elaintaudit/elaintaudit/siipikarja/lintuinfluenssa/lintuinfluenssa-suomessa/>

Information is also sent by e-mails to official veterinarians and poultry organisations and other stakeholders.

Several meetings of the AI expert group.

Housing order

The housing order has been in force since 22 January 2021 in the restriction zone (10 km) which was established due to a HPAI H5N8 outbreak in wild pheasants in Janakkala, Southern Finland.

The keeping of poultry and other captive birds in the open air is prohibited from 8 February 2021 to 31 May 2021, unless the birds are protected against contact with wild birds by nets and roofs. The prohibition does not apply to zoos, racing pigeons and ratites. Requirements are in force in the whole country of Finland. Decree of the Ministry of Agriculture and Forestry 106/2021, <https://www.finlex.fi/fi/laki/alkup/2021/20210106>.

Strengthening biosecurity measures (other than housing order)

The following requirements are in force across the whole country (Decree of the Ministry of Agriculture and Forestry 814/2017, <https://www.finlex.fi/fi/laki/alkup/2017/20170814>)

- The supply of feed and drinking water for poultry must be arranged indoors or in a place where wild waterfowl or raptors cannot reach.
- Where water reservoirs necessary for the welfare of poultry are in place at the site, the entry of wild waterfowl and raptors must be prevented.
- Water for poultry should not originate in surface waters from a place where there is a large number of wild waterfowl, unless the water before administration to poultry is heated or disinfected in such a way that possible avian influenza virus is destroyed by the treatment.
- The feed for poultry must be stored protected from wild birds and other animals.

Preventive culling

Not applied.

Regional stand-still (beyond the restriction zones specified in the EU Regulation)

Not applied.

Derogations on restriction zone implementation after risk assessment

Not applied.

Hunting

Hunting is allowed.

B.5 Hungary

Georgina Helyes

National Food Chain Safety Office

Timing of the applied prevention and control measures

Table B.5 provides a timeline of the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.5: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
06/01/2021	First poultry outbreak in Komárom-Esztergom county in 2021	Increasing awareness, release housing order, repeal housing order (poultry confinement), strengthening biosecurity, implement regional stand still, implement preventive culling, implement derogations on restriction zone	Stakeholders, general public, poultry associations
14/01/2021	First poultry outbreak in Bács-Kiskun county in 2021	implementation after risk assessment	

Increasing awareness of the stakeholders and the general public

All information about avian influenza is available on the website of the National Food Chain Safety Office. <https://portal.nebih.gov.hu/madarinfluenza>

The Chief Veterinary Officer (CVO) and head of the National Disease Control Centre has communicated the most important information about the epidemic to the national media.

Housing order

On 25 November 2020 the 4/2020 CVO Decision entered into force which ordered the closed keeping of poultry (including backyard) across the whole country.

Strengthening biosecurity measures (other than housing order)

The 3/2017 CVO Decision about strengthening biosecurity requirements has been in force since the 2016/2017 HPAI epidemic.

From 11 November 2020:

- Checks and controls:
 - enhanced checks by the local authorities
 - spot visits by the central competent authority
 - checks with drones.

Preventive culling

In Bács-Kiskun county:

- In the restricted area the depopulation of all waterfowl holdings (seven holdings) was implemented by preventive killing.
- In the protection zone the depopulation of all poultry holdings was implemented by preventive killing or slaughtering.

Regional stand still (beyond the restriction zones specified in the EU Regulation)

From 11 November 2020:

- Whole territory of Hungary is considered as a high-risk area (routes of migratory birds and resting places are present in all regions in Hungary)
- Compulsory sampling if transported for further keeping (excluding day-old chicks) in waterfowl – within 72 hours, swabs – don't have to wait for the result
- Compulsory sampling before the release of poultry for restocking supplies of game birds – within 72 hours, swabs – have to wait for the result.

Derogations on restriction zone implementation after risk assessment

Based on a risk assessment in accordance with Council Directive 2005/94/EC, poultry was transported out of the restricted zones after laboratory examination for immediate slaughter, breeding eggs and day-old-chicks were transported from the surveillance zone to a free area.

Hunting

Enhanced active and passive surveillance of wild birds:

- Birdlife Hungary (the leading non-profit, apolitical, and charitable, nature conservation organisation in Hungary): searching for dead wild birds, cooperating in active monitoring of wild birds (oropharyngeal/tracheal or cloacal swab samples from live wild birds during bird-ringing)
- National parks: searching for dead wild birds
- Sampling of hunting bags: in Bács-Kiskun county near to the area of the poultry outbreaks

B.6 Italy

Scolamacchia Francesca, Dorotea Tiziano, Mulatti Paolo

Istituto Zooprofilattico Sperimentale delle Venezie, Legnaro (Padua) - Italy

Timing of the applied prevention and control measures

Table B.6 provides a timeline on the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.6: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
23/01/2021	First outbreak of HPAI serotype H5N8 on a backyard/hobby farm	Control measures as provided by Council Directive 2005/94/EC: Culling, disposal of carcasses, cleaning and disinfection procedures. Establishment of protection and surveillance zones (3 and 10 km). Restrictions on movements of poultry and poultry products (with derogations). Epidemiological investigation. Clinical examinations and collection of samples in the protection zone	

Increasing awareness of the stakeholders and the general public

Details on AI outbreaks that occurred in Italy and of the epidemiological situation at the European level are provided and updated on the website of Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe), where the National and European Reference Laboratory for Avian Influenza and Newcastle Disease has dedicated sections: <https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/italy-update/>; <https://www.izsvenezie.com/reference-laboratories/avian-influenza-newcastle-disease/europe-update/>.

Other websites at the local/national level from various stakeholder groups and association (e.g. associations of poultry farmers, national and regional veterinary associations, etc) link directly to the IZSVe website for updates on the AI epidemiological situation, allowing a broader audience to be reached.

Official communications by Competent Authority (Ministry of Health) on a new positive event is forwarded for information to poultry farmer unions, poultry production companies, and veterinary associations. Updates on the epidemiological situation are also forwarded to the Directorate for Health and Food Safety of the European Commission, and the World Organisation for Animal Health (OIE).

Housing order

Following the alert raised by EFSA, ECDC and the EURL for Avian Influenza and Newcastle Disease in September 2020 (<https://www.efsa.europa.eu/en/news/avian-influenza-eu-alert-new-outbreaks>), the Ministerial provision n° 21329 was issued on 2 October 2020. This provision implemented, among other mitigating measures, a housing order in high-risk areas for the introduction and spread of HPAI viruses (as defined to follow up on the provisions of the Implementing Decision (EU) no. 2018/1136). The housing order was extended to the whole national territory by Ministerial provision n° 25509 of 26 November 2020 and is still in force.

Strengthening biosecurity measures (other than housing order)

In accordance with Ministerial provision n° 21329 of 2 October 2020, enhanced biosecurity measures should be applied in high-risk areas for the introduction and spread of H5/H7 HPAIV, in particular:

- implementation of proper cleaning and disinfection protocols, in particular for tools and equipment introduced into premises where poultry is kept;
- ban on access of unauthorised personnel to the poultry premises;
- record of movement of vehicles or people entering and leaving the poultry premises;
- correct storage and disposal of carcasses;
- correct storage and disposal of manure;
- correct storage of (clean) litter, which must be adequately covered and protected from any direct and indirect contact with wild birds;
- if the farm uses surface water for watering birds, this must be properly disinfected;
- appropriate disinfection methods should be arranged at the entrance and exit of buildings that house poultry or other captive birds, as well as at the entrance and exit of the poultry farm.

Early detection

In accordance with Ministerial provision n° 21329 of 2 October 2020, significant productive or sanitary changes observed in holdings must be reported immediately to the veterinary services, such as:

- decrease in feed and/or water consumption,
- decreased production of eggs,
- clinical symptoms,
- increased mortality rate.

Preventive culling

N/A

Regional stand still (beyond the restriction zones specified in the EU Regulation)

N/A

Derogations on restriction zone implementation after risk assessment

N/A

Hunting

No restrictions on hunting have been implemented

Additional control measures

In accordance with Ministerial provisions n° 21329 of 02 October 2020, n° 23822 of 04 November 2020 and n° 25509 of 26 November 2020, additional control measures have been established:

- the release of birds intended for repopulating wild game is suspended;
- enhanced surveillance during fairs, bird exhibitions and any other gatherings of poultry or other captive birds;

- the use of live decoy birds belonging to the orders Anseriformes and Charadriiformes for hunting is suspended;
- information campaign for stakeholders and the general public in order to strengthen passive surveillance activities in wild birds.

B.7 Lithuania

Vilija Grigaliuniene, Paulius Bušauskas, Gediminas Pridotkas

State food and veterinary service of Lithuania (SFVS) and National food and veterinary risk assessment institution (NFVRAI)

Timing of the applied prevention and control measures

Table B.7 provides a timeline on the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.7: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
8/1/2021	three cases of HPAI in wild birds (Mute Swans <i>Cygnus olor</i>) found in the Klaipeda municipality and Raseiniai municipality near the water bodies (ADNS 2021/1, 2021/2 and 2021/3).	As there are no poultry holdings in the close surroundings of the area concerned, no control zone was established. Enhanced passive surveillance of all commercial poultry holdings and prohibition of exhibitions, fairs and markets were implemented. Additional measures such as a prohibition on using water from ponds, wells or any source of water susceptible to being accessed by wild birds, prohibition on giving feed and drinking water to all birds outside the buildings are implemented by the Order of the Director of SFVS from 6 February 2017. During the risk seasons of bird migration in autumn and spring, additional biosecurity measures are applied. According to the Order of the Director of SFVS No B1-1007, amendment No B1-37 from 21 January 2020 it is obligatory to keep all domestic poultry indoors or in fenced and covered aviaries, securing them from any contact with migratory birds. Exact dates of the seasonal bird migrations are announced on the website of the SFVS. This order was activated on 2020 September and is still ongoing.	Government, Ministry of Agriculture of the Republic of Lithuania, Fire and Rescue Department of Lithuania, Ministry of Environment of the Republic of Lithuania, Ministry of National Defence Republic of Lithuania, Lithuanian Poultry Association, Lithuanian Association of Trade Companies, Lithuanian Association of Veterinarians, Lithuanian Association of Ornithologists, Lithuanian Hunters Association, general public.
8/1/2021		The SFVS on 31 December 2020 received notification from the owner about the sudden death of a few hens and a turkey without other clinical signs. The official veterinarians went to the holding on the same day and three dead hens and one dead turkey were taken as part of passive surveillance for AI and sent to the National Food and Veterinary Risk Assessment Institute (National Reference Laboratory) for AI testing. The temporary restrictions were imposed immediately until the	Government, Ministry of Agriculture of the Republic of Lithuania, Fire and Rescue Department of Lithuania, Ministry of Environment of the Republic of Lithuania, Ministry of National Defence of the Republic of Lithuania, Lithuanian Poultry Association, Lithuanian Association of Trade

		<p>laboratory results were available. HPAI H5N8 was confirmed in all samples tested on 7 January 2021.</p> <p>All measures in accordance with Council Directive 2005/94/EC were taken on the same day, on 8 of January 2021:</p> <ul style="list-style-type: none"> • All poultry at the backyard holding were killed without delay under official supervision; • All carcasses and eggs on the backyard holding were disposed of under official supervision by burial on the territory of the holding; • All substances and waste likely to be contaminated, such as feed, manure and bedding were buried on the territory of the holding; • The whole territory and the place, where poultry were kept, were disinfected with the authorised disinfectant against AI. <p>Immediately following an outbreak of HPAI, the SFVS established:</p> <p>(a) a protection zone with a radius of at least 3 km around the holding;</p> <p>(b) a surveillance zone with a radius of at least 10 km around the holding, including the protection zone.</p> <p>In the 3 km protection zone there are no other poultry holders; in the 10 km surveillance zone there are no commercial poultry holdings.</p>	<p>Companies, Lithuanian Association of Veterinarians, Lithuanian Association of Ornithologists, Lithuanian Hunters Association, general public.</p>
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Increasing awareness of the stakeholders and the general public

In accordance with the Order of Director of SFVS No B1-995 from 30 October 2015 'Biosecurity requirements for poultry farms', which came into force on 1 May 2016 (<https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/4f9a7c207f4a11e59a1ed226d1cbceb5?positionInSearchResults=0&searchModelUUID=d66a48d8-42a0-4415-9cde-cbf7b677a2e7>) biosecurity requirements for poultry farms are established.

In accordance with the Order of the Director of SFVS No B1-1007, amendment No B1-37 from 21 January 2020 (<https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/037cc990742111e49a96c02208537122/asr>) it is obligatory to keep all domestic poultry indoors or in fenced and covered aviaries, securing them from any contact with migratory birds. Exact dates of the seasonal bird migrations are announced on the website of the SFVS. In 2020 (16 August – 16 November) SFVS published six articles relevant to AI and biosecurity requirements, monitoring results or warning about AI close to Lithuania, and reminding the public about the SFVS order to keep poultry indoors.

Date	Article	Link
8/9/2020	The autumn migration of birds is a reminder of the imminent danger of bird flu	https://vmvt.lt/naujienos/rudenine-pauksciu-migracija-primena-apie-vel-artejanti-apie-pauksciu-gripo-pavoju
30/9/2020	SFVS: Lithuanian poultry meat exports to Japan will not stop even if there is a bird flu outbreak	https://vmvt.lt/naujienos/vmvt-lietuviskos-paukstienos-eksportas-i-japonija-nenutruks-net-ir-pasireiskus-pauksciu
8/10/2020	In preparation for possible outbreaks of bird flu in Lithuania, state-level civil protection tabletop exercises are taking place	https://vmvt.lt/naujienos/ruosiantis-galimam-pauksciu-gripo-protruikiui-lietuvoje-vyksta-valstybes-lygio-civilines

23/10/2020	HPAI detected in the Netherlands: two dead swans found	https://vmvt.lt/naujienos/olandijoje-nustatytas-didelio-patogeniskumo-pauksciu-gripo-atvejis-rastos-dvi-nugaisusios
4/11/2020	Outbreaks of avian influenza are reported in three European countries	https://vmvt.lt/naujienos/trijose-europos-valstybese-fiksuojami-pauksciu-gripo-atvejai
12/11/2020	Due to the avian influenza spreading in Europe, only strict compliance with biosecurity requirements will help to protect farms	https://vmvt.lt/naujienos/pauksciu-gripui-nesitraukiant-europos-ukius-apsaugoti-pades-tik-griezta-biosaugos

Housing order

During the risk seasons of bird migration in autumn and in spring, additional biosecurity measures are applied. According to the Order of the Director of SFVS No B1-1007, amendment No B1-37 from 21 January 2020, <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/037cc990742111e49a96c02208537122/asr> it is obligatory to keep all the domestic poultry indoors or in fenced and covered aviaries, securing them from any contact with migratory birds. Exact dates of the seasonal bird migrations are announced on the website of the SFVS. The autumn migration period was announced on article published 8/9/2020 "The autumn migration of birds is a reminder of the imminent danger of bird flu" (<https://vmvt.lt/naujienos/rudenine-pauksciu-migracija-primena-apie-vel-artejanti-apie-pauksciu-gripo-pavoju>)

Strengthening biosecurity measures (other than housing order)

Due to the situation of Covid-19, no additional inspections were carried out at the poultry farms.

Preventive culling

Immediately following an outbreak of HPAI, the SFVS has established: a protection zone with a radius of at least 3 kilometers around the holding and a surveillance zone with a radius of at least 10 kilometers around the holding, including the protection zone.

In 3 km protection zone there are no other poultry holders, in 10 km surveillance zone there are no commercial poultry holdings.

Regional stand still (beyond the restriction zones specified in the EU Regulation)

No additional restriction zones established.

Derogations on restriction zone implementation after risk assessment

It was not applied.

Hunting

No measures applied.

The specific species of birds have special hunting periods. All hunting periods are specified on 27 June 2020 No. 258 on Hunting rules applied of Minister of Ministry of Environment of the Republic of Lithuania <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/TAIS.104124/asr>

B.8 The Netherlands

MAH Spierenburg DVM LLM

Netherlands Food and Consumer Product Authority (NVWA), Ministry of Agriculture, Nature and Food Quality (Min LNV)

Timing of the applied prevention and control measures

Table B.8 provides a timeline of the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.8: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
20/10/2020	First HPAI-positive wild bird finding on 17 October: 1 mute swan (<i>Cygnus Olor</i>) was found dead in a wetland area. On 20 October the national reference laboratory confirmed HPAI Virus H5N8 in the samples from the swan.	Measurements for the whole country: As of 20 October 2020: 1. housing order for commercial poultry confinement and housing order for hobby birds and other non-commercial captive birds confinement; 2. Measures regarding cover and application of litter on duck holdings.	Poultry associations, general public, etc.
28/10/2020	First outbreak of HPAI, serotype H5N8, positive commercial poultry holding (parent breeding)	Measurements for protection and surveillance zone: As of 28 October 2020 culling HPAI-positive commercial poultry holding, implement protection (3 km) zones and surveillance (10 km) zones around the HPAI-positive commercial poultry holding with transport restrictions for all birds including commercial poultry and poultry products, sperm, manure and feed as well as transport restrictions for domestic mammals, feed, sperm, milk and manure of these domestic mammals. Ban on hunting ducks or hunting in general in wet areas with waterfowl Measurements for the whole country: As of 28 October 2020 these measures were also implemented: 3. ban on visiting commercial poultry holdings and other holdings or locations where birds are held; 4. mandatory visitor registration; 5. ban on races and exhibitions with birds; 6. ban on hunting ducks or hunting in general in wet areas with waterfowl; 7. mandatory clinical examination of birds for transport to or from commercial poultry holdings; 8. mandatory intensive clinical examination ante mortem of ducks and turkeys at slaughterhouses; 9. using a hygiene protocol for visiting commercial poultry holdings; 10. increasing awareness, repealing housing order (commercial poultry confinement), strengthening biosecurity, intensified wild bird monitoring	
04/11/2020	Second outbreak of HPAI, serotype H5N8, positive commercial poultry holding (laying hen holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	

09/11/2020	Third outbreak of HPAI, serotype H5N8, positive commercial poultry holding (laying hen holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	
13/11/2020	Fourth outbreak of HPAI, serotype H5N8, positive commercial poultry holding (fattening duck holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	
20/10/2020–15/11/2020	30 HPAI H5N8-positive wild bird findings and 4 HPAI H5N1-positive wild bird findings	Measurements for the whole country: as above.	
21/11/2020	Fifth outbreak of HPAI, serotype H5N8, positive commercial poultry holding (fattening chicken holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	
22/11/2020	Sixth outbreak of HPAI, serotype H5N8, positive commercial poultry holding (laying hen chicken holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	
7/12/2020	Seventh outbreak of HPAI, serotype H5N8, positive commercial poultry holding (mixed chicken holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	
7/12/2020	Eighth outbreak of HPAI, serotype H5N8, positive commercial poultry holding (fattening chicken holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	
14/12/2020	Ninth outbreak of HPAI, serotype H5N1, positive commercial poultry holding (breeding chicken holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	
5/1/2021	Tenth outbreak of HPAI, serotype H5N8, positive commercial poultry holding (fattening turkey holding)	Measurements for protection and surveillance zone: as above. Measurements for the whole country: as above.	

Increasing awareness of the stakeholders and the general public

Development of biosecurity measures during crisis in contact with poultry sector. Communication both by Ministry and poultry sector as follows. Directly published on government website (www.rijksoverheid.nl): Legal information/Information to Parliament/Information for press/Questions & Answers/Phone centre for questions from both poultry owners and general public, in direct contact with poultry advisers/Communication department in close contact with press/Meeting for all stakeholders and communication by media with general public.

Housing order

The housing order was implemented in mandatory national legislation as 20 October 2020 after an executed risk assessment by the Commission of animal disease experts which consists in this matter of

avian influenza experts. This Commission advises the CVO and the Minister to introduce measures against HPAI. The trigger to implement the housing order was the HPAI H5N8 wild bird finding (one mute Swan (*Cygnus Olor*) was found dead in a wetland area) on 20 October 2020.

Strengthening biosecurity measures (other than housing order)

We have concluded multiple years' service level agreements with suppliers who can deliver cleaning and disinfection equipment 24h/7days within 4 hours of calling by the Dutch government for culling at every location in the whole country.

Preventive culling

This was applied in the second outbreak of HPAI serotype H5N8 on a commercial poultry holding (laying hen holding) on 4 November 2020. There was one other commercial poultry holding in the 1 km zone (chicken breeding holding) which was preventively culled. In the first and third outbreaks there were no other commercial poultry holdings in the 1 km zone around the index holdings. In the fourth outbreak there was one other poultry holding in the 1 km zone but this poultry holding was not culled because this holding was more than 500 m from the index holding and there were no other poultry holdings in the 1 km zone of this holding and the screening test results by PCR and serology were negative.

Regional standstill (beyond the restriction zones specified in the EU Regulation)

No, only the 1 km/3 km and 10 km zones (protection and surveillance zones).

Derogations on restriction zone implementation after risk assessment

No

Hunting

There is a ban implemented on hunting ducks or hunting in general in wet areas with waterfowl.

B.9 Poland

Katarzyna Wawrzak and Magdalena Gawędzka

General Veterinary Inspectorate

Timing of the applied prevention and control measures

Table B.9 provides a timeline of the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.9: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
07.12.2021	Confirmation of 2020/36 and 2020/37 (fourth and fifth outbreaks in second half of 2020) HPAI outbreak in Poland	Videoconference of CVO with RVOs. Detailed guidelines were provided to carry out epizootic investigation, also CVO's investigative teams were formed	Veterinary Inspection
15.12.2021	Notification of four outbreaks of HPAI in Poland	First draft of increased biosecurity measures regulation was discussed	
09.01.2021	First wild bird finding in 2021	CVO ordered to organise search parties to look for dead or moribund birds	Veterinary Inspection, Voivodship Crisis Management Centres, State Fishing Guard, Territorial Defence Forces
		On 20 January 2021 CVO ordered additional trainings for official	Veterinary Inspection

		veterinarians issuing health certificates	
		During a videoconference on 09.02.2021 with poultry associations proposed biosecurity measures were discussed; other HPAI risks were also raised	Poultry Associations

Increasing awareness of the stakeholders and the general public

Information published on the website of the General Veterinary Inspectorate: <https://www.wetgiw.gov.pl/nadzor-weterynaryjny/grypa-ptakow>

Training organised by poultry associations with the veterinary services.

The CVO organised a videoconference with poultry associations to discuss additional biosecurity measures for commercial farms, that are currently proceeding as a regulation of Minister of Agriculture and Rural Development; different HPAI risks were also raised.

Housing order

Orders and prohibitions for poultry breeders in protection and risk zones designated around HPAI outbreaks are set out in the Regulation of the Minister of Agriculture and Rural Development of 18 December 2007 on eradication of avian influenza (implementation of Council Directive 2005/94/EC).

Requirements in the field of biosecurity applicable to poultry breeders throughout the country are set out in the Regulation of the Minister of Agriculture and Rural Development of 4 April 2017 on the ordinance of measures related to the occurrence of HPAI. This regulation imposes the following obligations on breeders:

- an order to keep poultry in a way that limits its contact with wild birds,
- reporting to the District Veterinary Officer places where poultry or other birds are kept, excluding birds kept permanently in living quarters,
- keeping the poultry in a way that excludes its access to water bodies to which wild birds have access,
- storing bird feed in a way that prevents contact with wild birds and their droppings,
- feeding and watering poultry and captive birds in a manner that protects feed and water from access by wild birds and their droppings,
- laying disinfection mats in front of the entrances and exits of livestock buildings in which poultry is kept, in a number ensuring the security of entrances and exits from these buildings – in the case of farms where poultry is kept in a non-running system,
- use by persons entering livestock buildings in which poultry is kept, protective clothing and safety footwear, intended for use only in the given building – in the case of farms where poultry is kept in a non-running system,
- personal hygiene rules applied by persons performing poultry-handling operations, including washing hands before entering livestock buildings,
- cleaning and disinfection of equipment and tools used for handling poultry before each use,
- abstentions by persons who have participated in hunting birds in the last 72 hours from carrying out poultry-handling activities,
- carrying out daily inspections of poultry flocks and keeping records containing, in particular, information on the number of dead birds, decrease in feed intake or lay,
- a ban on watering poultry and birds kept by humans with water from tanks to which wild birds have access, and
- a ban on bringing (on foot or by vehicle) to the holding where poultry is kept, corpses of wild birds or carcasses of game birds.

Strengthening biosecurity measures (other than housing order)

The Regulation of the Minister of Agriculture and Rural Development of 4 April 2017 regarding the ordinance of measures related to the occurrence of HPAI introduces into the territory of the Republic of Poland, among other measures, an order to keep the poultry in a way that limits its contact with wild birds or to store feed for birds in a way that prevents contact with wild birds and their droppings. The measures specified in the provisions of this Regulation are also applied during the outbreak of HPAI in the territory of the Republic of Poland.

In addition, information on avian influenza is available on the website of the CVO (link: <https://www.wetgiw.gov.pl/nadzor-weterynaryjny/grypa-ptakow>), including a description of the biosecurity rules (<https://www.wetgiw.gov.pl/nadzor-weterynaryjny/zasady-ochrony-drobiu-przed-grypa-ptakow>).

Preventive culling

Pursuant to the Regulation of the Minister of Agriculture and Rural Development of 18 December 2007 on eradication of avian influenza, slaughter/preventive killing of poultry may be implemented in a protection zone, i.e. 3 km around the HPAI outbreak. The competent authority to make a decision in this matter is the District Veterinary Officer. Decisions regarding the slaughter/preventive killing of poultry, related to the occurrence of HPAI in a given protection zone, are taken on the basis of a risk assessment, which takes into account, *inter alia*, the following areas: the specificity of poultry production in a given district together with the number of commercial/non-commercial farms, possible pathways of the pathogen spread in the environment and potential ways of entering the farm, among others the manner of its protection, as well as topographic conditions of the area, infrastructure and all other circumstances affecting decision taking in the matter in question.

Within the period covered by the report, after confirmation of the HPAI outbreak on 24 November 2020, preventive culling was carried out by Veterinary Inspection at 24 holdings (926 birds were killed), also birds were culled at six holdings identified as contacts (259,212 birds were killed).

Regional standstill (beyond the restriction zones specified in the EU Regulation)

In the period covered by the report a regional standstill was not applied.

Derogations on restriction zone implementation after risk assessment

Pursuant to the Regulation of the Minister of Agriculture and Rural Development of 18 December 2007 on eradication of avian influenza, derogations on restriction zone implementation may be implemented if HPAI is confirmed in other birds kept in a non-commercial holding, a zoo, a circus, a pet shop, a wildlife park or in a fenced area where other birds are kept or reared for purposes related to shows, education or the protection and conservation of endangered species or officially registered rare breeds of poultry or other captive birds and conducting basic or applied scientific research, provided such derogations do not prevent disease control.

In the period covered by the report no derogation was used.

Hunting

Due to restrictions implemented due to COVID-19 pandemic, hunting is limited. Collective hunts are not performed.

B.10 Slovakia

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Timing of the applied prevention and control measures

Table B.10 provides a timeline of the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table B.10: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
22.01.2021	First poultry outbreak	All relevant measures ordered by DVFA in accordance with 2005/94/EC and Slovak national legislation for outbreak, protection zone and surveillance zone	Stakeholders, general public, private vets

Increasing awareness of the stakeholders and the general public

Information in relation to avian influenza via to relevant website: https://www.svps.sk/zvierata/choroby_chripka.asp

Housing order

Special emergency veterinary measures of the CVO of the Slovak Republic due to HPAI avian influenza are published on the website: https://www.svps.sk/zvierata/mno_4373_05.asp

Strengthening biosecurity measures (other than housing order)

Checks on poultry health regarding avian influenza (including compliance with biosecurity measures) have been ordered by SVFA to DVFAs in relation to commercial poultry farms, not for backyard holdings. It started in December 2013.

Preventive culling

This was not applied.

Regional standstill (beyond the restriction zones specified in the EU Regulation)

A regional standstill beyond the restriction zones was not applied.

Derogations on restriction zone implementation after risk assessment

Derogations on restriction zone implementations after risk assessment were not applied.

Hunting

Not prohibited.

B.11 Sweden

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Timing of the applied prevention and control measures

Table A.11 provides a timeline of the main events that triggered actions in relation to the selected prevention and control measures. More information on the actions taken is provided in the sections below.

Table A.11: Overview of main actions

Date	Event that triggered action	Type of action taken	Target audience (if applicable)
22/12/2020	HPAI H5N8 confirmed in other captive birds in Svedala.	Stamping out of all poultry at the infected holding.	
03/01/2021	HPAI H5N8 confirmed in a broiler breeder in Sjöbo	Stamping out of all poultry at the infected holding, including non-infected separate epidemiological units. 3 km protection zone and 10 km surveillance zone around the infected premises in accordance with Directive 2005/94.	

14/01/2021	HPAI H5N8 confirmed in a turkey flock in Skurup	Stamping out of all poultry at the infected holding. 3 km protection zone and 10 km surveillance zone around the infected premises in accordance with Directive 2005/94.	
18/01/2021	HPAI H5N5 confirmed in a large layer unit in Mönsterås	Stamping out of all poultry at the infected holding. 3 km protection zone and 10 km surveillance zone around the infected premises in accordance with Directive 2005/94.	

Increasing awareness of the stakeholders and the general public

Press releases sent out in conjunction with confirmed outbreaks to raise awareness. Information on websites of Swedish Board of agriculture (SBA) and Swedish National Veterinary Institute (NVI) and County administrative boards (CAB) updated with latest information and advice to poultry keepers.

Regular meetings with representatives for poultry associations, the farmers' union and representatives of the industry to share information.

Information on new events shared directly with poultry associations and other organisations with interest in, for example, hobby flocks or captive birds.

Regular social media updates.

Map of findings of HPAI in wild birds updated with each new finding:

<https://www.sva.se/djurhalsa/smittlage/karta-over-fagelinfluensa-hos-vilda-faglar/>

Housing order

A rapid risk assessment from NVI on 5 October advised that there was higher risk for incursion of avian influenza to Swedish poultry so a housing order was decided on by SBA on 6 October. The housing order is in place until further notice from SBA. Information was sent out as a press release and directly to the poultry association. The CAB are responsible for official controls of the compliance of the housing order.

Strengthening biosecurity measures (other than housing order)

Captive birds including hobby flocks should be fenced in to prevent contact with wild birds. Ponds or water should be covered, and food and water should be given indoors or under cover. Further biosecurity advice is given and communicated on the websites of the SBA and NVI and through the poultry associations.

Strengthened biosecurity advice has been communicated through several channels to poultry producers, feed companies and other stakeholders that visit poultry farms.

Preventive culling

The outbreak confirmed in a broiler breeder on 3 January affected a holding with seven different epidemiological units, of which six had ongoing production at the time of the outbreak. Disease was confirmed in three units and the others were culled preventively.

Regional standstill (beyond the restriction zones specified in the EU Regulation)

N/A

Derogations on restriction zone implementation after risk assessment

Based on a risk assessment, restriction zones were not implemented for the outbreak in other captive birds in Svedala on 22 December 2020.

Hunting

No regulations or recommendations on hunting have been implemented.

Annex C – Data on wild bird

Table C.1: Wild birds species reported to ADNS and OIE as HPAI infected between 8 December 2020 and 23 February 2021, 8 a.m. (CET) (on one single reported detection of HPAI in wild birds, more than one bird might be involved)

Category of wild bird species	Wild bird species	Number of HPAI detections where the wild bird species was reported
Other wild bird species	Red knot (<i>Calidris canutus</i>)	31
	Black-headed gull (<i>Larus ridibundus</i>)	4
	Mixed species*	4
	European herring gull (<i>Larus argentatus</i>)	3
	Gull (Larinae)	3
	Pheasant	2
	Common gull (<i>Larus canus</i>)	2
	Eurasian woodcock (<i>Scolopax rusticola</i>)	2
	Scolopacidae	2
	Great white egret (<i>Ardea alba</i>)	2
	Grey heron (<i>Ardea cinerea</i>)	2
	Yellow-legged gull (<i>Larus michahellis</i>)	1
	Great black-backed gull (<i>Larus marinus</i>)	1
	Northern lapwing (<i>Vanellus vanellus</i>)	1
	Curlew (<i>Numenius sp</i>)	1
	Sparrow (<i>Passer sp</i>)	1
	Dunlin (<i>Calidris alpina</i>)	1
	Great cormorant (<i>Phalacrocorax carbo</i>)	1
	Eurasian oystercatcher (<i>Haematopus ostralegus</i>)	1
	Corvidae	1
	Knot (<i>Calidris spp</i>)	1
	Great black-headed gull (<i>Larus marinus</i>)	1
	Turdidae	1
	Little egret (<i>Egretta garzetta</i>)	1
	Unknown species	1
	Common starling (<i>Sturnus vulgaris</i>)	1
Northern gannet (<i>Morus bassanus</i>)	1	
Raptor	Common buzzard (<i>Buteo buteo</i>)	20
	Accipitriformes	6
	Peregrine falcon (<i>Falco peregrinus</i>)	6
	Common kestrel (<i>Falco tinnunculus</i>)	4
	Northern goshawk (<i>Accipiter gentilis</i>)	2
	Eurasian eagle-owl (<i>Bubo bubo</i>)	2
	Accipitridae	1
	White-tailed eagle (<i>Haliaeetus albicilla</i>)	1
	Eurasian sparrowhawk (<i>Accipiter nisus</i>)	1
Waterfowl	Barnacle goose (<i>Branta leucopsis</i>)	75
	Mute swan (<i>Cygnus olor</i>)	68
	Greylag goose (<i>Anser anser</i>)	52
	Whooper swan (<i>Cygnus cygnus</i>)	42
	Swan (<i>Cygnus sp</i>)	25
	Mallard (<i>Anas platyrhynchos</i>)	8
	Eurasian wigeon (<i>Mareca penelope</i>)	5

Eurasian teal (<i>Anas crecca</i>)	5
Pink footed goose (<i>Anser brachyrhynchus</i>)	3
Bean goose (<i>Anser fabalis</i>)	3
Black swan (<i>Cignus atratus</i>)	3
Canada goose (<i>Branta canadensis</i>)	1
Garganey (<i>Spatula querquedula</i>)	2
Goose	2
Greater white-fronted goose (<i>Anser albifrons</i>)	2
Mixed**	2
Tundra bean goose (<i>Anser serrirostris</i>)	1
Wigeon (<i>Anas penelope</i>)	1
Common goldeneye (<i>Bucephala clangula</i>)	1
Muscovy duck (<i>Cairina moschata</i>)	1
Great crested grebe (<i>Podiceps cristatus</i>)	1
Tufted duck (<i>Aythya fuligula</i>)	1
Total	421

* The following species were found infected in the 4 detections, respectively: 73 red knot and 1 Eurasian curlew (*Numenius arquata*); nine sparrows and two magpies; three storks (*Ciconia ciconia*) and one goose (*Anser anas*); one cormorant (*Phalacrocorax sp*) and a mute swan

** The following species were found infected in each of the 2 detections: 1 mute swan and 5 wild ducks; one mallard and eight mute swans