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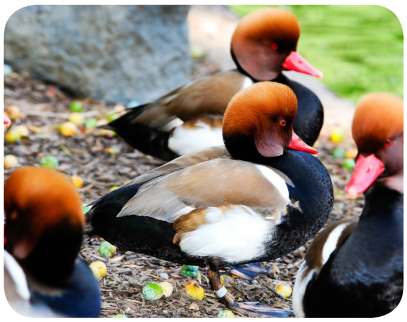
ANNUAL REPORT on surveillance for avian influenza in wild birds in the EU in 2009

European Union Reference Laboratory for Avian Influenza



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About the report

This Report was prepared by the European Union Reference Laboratory for Avian Influenza, Veterinary Laboratory Agency (VLA), Weybridge, Addlestone, Surrey, KT15 3NB, according to its work programme.

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The European Commission is responsible for the collection of surveillance data from Member States, which is done via an online reporting system operated by the Commission services of Directorate General for Health and Consumers (DG SANCO). For more information on the Commission's online reporting system please contact:
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The European Commission is responsible for the final revision of the Annual Report on surveillance for avian influenza in poultry in the European Union and its publication on the Commission's website:
http://ec.europa.eu/food/animal/diseases/controlmeasures/avian/eu_resp_surveillance_en.htm

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EXECUTIVE SUMMARY[1]

Avian Influenza (AI) is a highly contagious viral infection, which can affect all species of birds. Highly Pathogenic Avian Influenza (HPAI) can spread rapidly, causing serious disease with high mortality in many bird species and has so far comprised only H5 or H7 subtypes. The current H5N1 Highly Pathogenic Avian Influenza panzootic has affected over 60 countries across Asia, Africa and Europe, resulting in the loss of hundreds of millions of birds. Low Pathogenicity Avian Influenza (LPAI) can comprise subtypes H1 to H16 and usually causes a mild disease in poultry. LPAI strains of the H5 and H7 subtypes have the potential to mutate into HPAI following introduction to poultry populations. Birds of the Orders Anseriformes and Charadriiformes are thought to be the major reservoirs for LPAI viruses. Although historically HPAI infection has been rarely observed in wild birds and only in connection with poultry outbreaks, since the continuing outbreaks of H5N1 HPAI, wild birds have been implicated in the spread of the virus. Therefore wild bird surveillance and the reporting of the results have become compulsory since 2005 in the European Union.

A total of 54,086 wild birds, from 27 Member States of the European Union were tested during the 2009 survey. In 2009, one case of H5N1 HPAI was detected in a hunted Mallard Duck (*Anas platyrhynchos*) in Germany. This is similar to the situation in 2008 in that there was only one Member State - the United Kingdom – affected by the disease. Although, in 2008 more birds were found to be infected, this still constituted a single incident with all birds H5N1 HPAI positive found in close proximity in space and time. Additionally the 2008 birds were reported by passive surveillance in ten Mute Swans and a Canada Goose found dead in the UK, whereas the Mallard in 2009 was detected by active surveillance and appeared clinically normal. Consistent with this low level of H5N1 HPAI activity in wild birds is the fact that there were no outbreaks of this virus in EU poultry in 2009.

LPAI of subtypes H5 or H7 was detected in 162 of the birds sampled from 13 Member States: Austria (6), Belgium (6), Czech Republic (4), Germany (8), Hungary (17), Denmark (16), France (77), Italy (9), Netherlands (9), Slovenia (2), Spain (5), Sweden (1) and United Kingdom (2). Consistent with previous years, the majority of these infections were identified through active surveillance of dabbling ducks (*Anas spp.)*, geese (*Anser spp.* and *Branta spp.*) and swans (*Cygnus spp*.).

Evidence has accumulated for the potential for wild birds to transfer H5N1 HPAI from one area to another over relatively large distances. However the exact species involved and the role of wild birds in maintaining the virus is not clear. H5N1 HPAI is currently circulating in poultry in Asia and Africa. The areas where H5N1 HPAI is currently circulating include wetlands on major water-bird migratory flyways where large numbers of birds will spend time before moving into the EU. The EU survey provides detection of AI incidents in wild birds, independent of outbreaks in poultry, illustrating the value and role of wild bird surveillance as a potential early detection and monitoring system for the presence of H5N1 HPAI in the EU.

[1] DISCLAIMER: on data completeness please see page 33.

GLOSSARY AND ABBREVIATIONS

Animal Disease Notification System	ADNS
Avian Influenza	AI
European Union Reference Laboratory	EURL
European Food Safety Authority	EFSA
European Union	EU
Highly Pathogenic Avian Influenza	HPAI
Highly Pathogenic	HP
Higher-Risk Species	HRS
Low Pathogenic Avian Influenza	LPAI
Member State	MS
National Reference Laboratory	NRL
Nomenclature of Units for Territorial Statistics	NUTS

Table 1: Key to Member State and Non-Member State abbreviations

Abbreviation	Country
AT	Austria
BE	Belgium
BG	Bulgaria
CH	Switzerland
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GR	Greece
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom

Active surveillance: For the purpose of this report, active surveillance will be used as an equivalent to the surveillance of birds that were live without clinical signs, hunted without clinical signs and hunted with clinical signs.

Bird Origin: Relates to the collected information on the origin of the bird when sampled. The six categories are: live without clinical signs; live with clinical signs; injured; hunted without clinical signs; hunted with clinical signs and found dead.

Bridge Species: Species listed as those that may provide contact between risk species and poultry through sharing wetlands or farmlands with poultry (EFSA, 2006).

DG SANCO: Directorate General for Health and Consumers.

EU 27: Refers to the 27 Member States of the European Union.

EURING code: European Union for Bird Ringing; a 5-digit number allocated to a species or subspecies of bird.

Higher-Risk Species (HRS): Species listed as those with an increased probability of contributing to the transmission of the Asian-lineage H5N1 HPAI viruses within Europe as defined in the scientific report by EFSA (EFSA, 2006) and the EC guidelines (EC, 2007) (in total 29 species). The EURING codes corresponding to these species can be found at: http://www.euring.org/data_and_codes/euring_code_list/euring_exchange-code_2000.pdf

Incident: For the purpose of this report H5N1 HPAI detections were grouped into incidents based on proximity of a 10km radius, which is equivalent to the size of monitoring areas, and where subsequent detections of H5N1 HPAI within a 10km radius are deemed to be epidemiologically linked (EC, 2006b).

LPAI H5: Birds positive for LPAI of subtype H5 .

LPAI H7: Birds positive for LPAI of subtype H7.

LPAI other: Birds reported as LPAI of other subtypes.

NAI: Notifiable Avian Influenza. Influenza A virus of subtypes H5 or H7, according to the OIE definition (OIE, 2009).

NUTS 3: Nomenclature of Units for Territorial Statistics. At NUTS 3 level this refers to, for example, a region, district, county, municipal or unitary authority (depending on the MS).

Other Positives: Birds positive for Avian Influenza that were not clearly reported as either LPAI or HPAI.

Passive surveillance: For the purpose of this report, passive surveillance will be used as an equivalent to the surveillance of birds that were live with clinical signs, injured and found dead.

PCR: Polymerase chain reaction is a generic term for laboratory methodology that acts through the amplification of specific viral nucleic acid from clinical specimens.

Positive/ Infected: For the purpose of this report, a positive/ infected case of avian influenza is defined as a wild bird, from which at least one sample tested positive on either PCR or virus isolation.

VI: Virus isolation is a laboratory methodology that enables the propagation of infectious virus directly from clinical specimens.

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INTRODUCTION

Avian Influenza (AI) is a highly contagious viral infection, which can affect all species of birds. Highly Pathogenic Avian Influenza (HPAI) can spread rapidly, causing serious disease with high mortality in many bird species and has so far comprised only H5 or H7 subtypes. The current H5N1 Highly Pathogenic Avian Influenza panzootic has affected over 60 countries across Asia, Africa and Europe, resulting in the loss of hundreds of millions of birds. Low Pathogenicity Avian Influenza (LPAI) can comprise subtypes H1 to H16 and usually causes a mild disease in poultry. LPAI strains of the H5 and H7 subtypes have the potential to mutate into HPAI following introduction to poultry populations. Birds of the Orders Anseriformes and Charadriiformes are thought to be the major reservoirs for LPAI viruses. Although historically HPAI infection has been rarely observed in wild birds and only in connection with poultry outbreaks, since the continuing outbreaks of H5N1 HPAI, wild birds have been implicated in the spread of the virus. Therefore wild bird surveillance and the reporting of the results have become compulsory since 2005 in the European Union.

Wild bird surveillance for avian influenza in the EU is carried out according to Council Directive 2005/94/EC on Community measures to control avian influenza (EC, 2006a) and specific harmonised guidelines (EC, 2007). It is aimed at identifying the risk of introduction of AI viruses (LPAI and HPAI) into domestic poultry. The three main objectives of the surveillance are: The early detection of H5N1 HPAI in wild birds; the investigation of possible carrier or bridge species following an incident of H5N1 HPAI; and baseline monitoring of circulation of LPAI H5 and H7 strains in wild birds. The surveillance results reported here were collected between January and December 2009.

Voluntary surveillance for AI in wild birds in EU MS was first carried out in 2002-2003 under Commission Decision 2002/649/EC (EC 2002), although several MS had already been conducting wild bird surveillance prior to this. In response to the detections in wild birds and outbreaks in poultry, and the evolving epidemiological situation of H5N1 HPAI principally in Asia, activities with regard to wild bird surveillance were increased. Wild bird surveillance became compulsory in 2005 for all MS, and information collection on wild birds was extended and harmonised. Application of this system was demonstrated in 2006 and 2007 when H5N1 HPAI activity was relatively widespread in wild birds and incursions to poultry were limited and controlled (Hesterberg et al 2009).

In 2006, EFSA completed a scientific opinion on migratory birds and their possible role in the spread of HPAI (EFSA 2006). This included an assessment of birds of predominantly the Orders Anseriformes and Charadriiformes regarding their likelihood to introducing H5N1 HPAI following the criteria of gregariousness during migration / wintering periods (group size and group density), degree of mixing during migration wintering periods, main habitat during migration / wintering periods, and degree of mixing with other species. This opinion has lead to inclusion of a “Higher Risk Species” (HRS) list into the guidelines for targeting of surveillance.

OBJECTIVES

The main objective of this report is to present the surveillance results of 2009 and to discuss the main findings.

The objectives of the EU wild bird AI surveillance are:

> “Ensuring early detection of H5N1 HPAI by investigating increased incidence of morbidity and mortality in wild birds, in particular in selected “higher risk” species.
>
> In the event that H5N1 HPAI is detected in wild birds, then surveillance of live and dead wild birds shall be enhanced to determine whether wild birds of other species can act as asymptomatic carriers or “bridge species”.
>
> Continuing a “baseline” surveillance of different species of free-living migratory birds as part of continuous monitoring of LPAI viruses. Anseriformes (waterfowl) and Charadriiformes (shorebirds and gulls) shall be the main sampling targets to assess if they carry LPAI viruses of H5 and H7 subtypes

(which would in any case also detect H5N1 HPAI and other HPAI, if present). “Higher risk species” must be targeted in particular” (EC, 2007).

THE SURVEY PROGRAMMES

In 2009 the surveys were performed according to the guidelines laid down in Commission Decision 2007/268/EC (EC 2007) which are available at the DG SANCO website under:

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2007D0268:20090610:EN:PDF

For 2009, the survey programmes of the MS were evaluated and approved through the Decision 2008/897/EC (EC 2008).

Details of the survey programmes for each MS are available on the internet at: http://ec.europa.eu/food/animal/diseases/eradication/programme2009/2009_programmes_pres.pdf

Samples were tested in accordance with the diagnostic Manual for avian influenza (EC 2006b).

RESULTS

SAMPLING

OVERVIEW

During 2009, 54,536 birds were sampled in total. This includes 54,086 birds sampled by EU Member States (MS) as well as the 450 birds sampled in Switzerland (CH), the one non-MS (Figure 1). Detailed information regarding the number of birds sampled by MS in each quarter are displayed in Annex II and III a. In total 26 of the 27 EU MS submitted data for analysis with Lithuania (LT) not submitting any data. The Member State with the highest number of birds tested in 2009 was Germany (DE) (n=12,561), which approximates to nearly a quarter of the whole EU surveillance effort and 25% more than the number of birds sampled in the next most intensive programme (Netherlands (NL) n=10,066). Sixteen MS and the one non-MS sampled fewer than 1000 birds throughout the year.

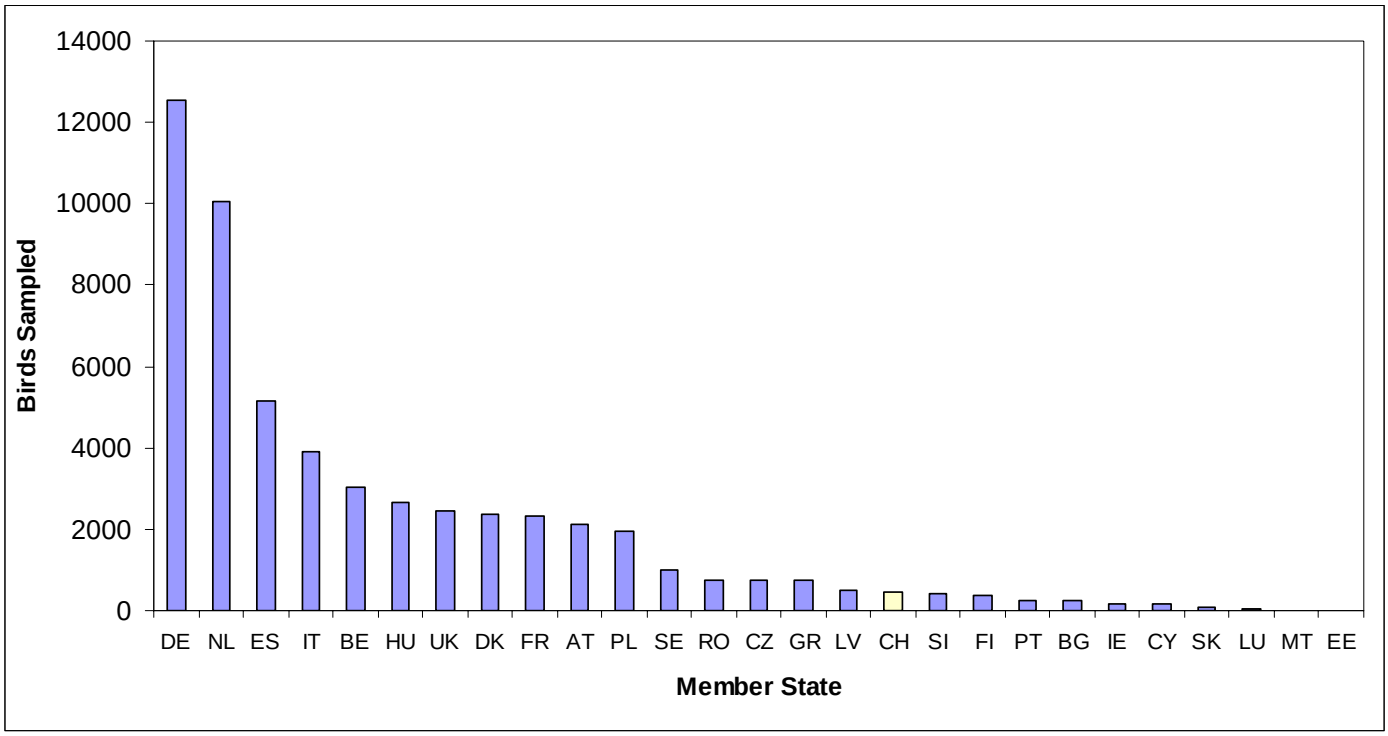


Figure 1: Total number of birds sampled in 2009 by EU Member State – This figure includes the data from one Non-Member State, Switzerland (CH) indicated by the yellow bar.

Table 2 displays the number of birds sampled in each MS during 2009 by type of surveillance. All MS conducted both active and passive surveillance, although the proportion of each varied highly between MS, reflecting results of the 2006, 2007 and 2008 surveillance.

Table 2: Birds sampled in 2009 by surveillance type and MS. The percentage of each surveillance type is shown in brackets – Non-MS Data is also displayed beneath the EU totals [(1)]

Member State	Number of Birds Sampled	Active Surveillance	Passive Surveillance
AT	2107 (3.9%)	729 (34.6%)	1378 (65.4%)
BE	3023 (5.5%)	2993 (99.0%)	30 (1.0%)
BG	247 (0.5%)	185 (74.9%)	62 (25.1%)
CY	170 (0.3%)	72 (42.4%)	98 (57.6%)
CZ	751 (1.4%)	532 (70.8%)	219 (29.2%)
DE	12561 (23.0%)	9588 (76.3%)	2973 (23.7%)
DK	2361 (4.3%)	2281 (96.6%)	80 (3.4%)
EE	12 (0.02%)	10 (83.3%)	2 (16.7%)
ES	5135 (9.4%)	4458 (86.8%)	677 (13.2%)
FI	384 (0.7%)	301 (78.4%)	83 (21.6%)
FR	2339 (4.3%)	1972 (84.3%)	367 (15.7%)
UK	2466 (4.5%)	1943 (78.8%)	523 (21.2%)
GR	741 (1.4%)	484 (65.3%)	257 (34.7%)
HU	2642 (4.8%)	2583 (97.8%)	59 (2.2%)
IE	181 (0.3%)	142 (78.5%)	39 (21.5%)
IT	3921 (7.2%)	3511 (89.5%)	410 (10.5%)
LU	40 (0.1%)	35 (87.5%)	5 (12.5%)
LV	507 (0.9%)	500 (98.6%)	7 (1.4%)
MT	20 (0.04%)	1 (5%)	19 (95.0%)
NL	10066 (18.5%)	9596 (95.3%)	470 (4.7%)
PL	1940 (3.6%)	1897 (97.8%)	43 (2.2%)
PT	247 (0.5%)	154 (62.3%)	93 (37.7%)
RO	752 (1.4%)	647 (86.0%)	105 (14.0%)
SE	989 (1.8%)	806 (81.5%)	183 (18.5%)
SI	415 (0.8%)	267 (64.3%)	148 (35.7%)
SK	69 (0.1%)	36 (52.2%)	33 (47.8%)
EU TOTAL	**54086**	**45723 (84.5%)**	**8363 (15.5%)**
CH	450 (0.8%)	415 (92.2%)	35 (7.8%)

Figure 2 displays the proportion of each surveillance type for all 27 MS. More than 84% of the birds across the EU were sampled by active surveillance (either hunted or live without clinical signs).

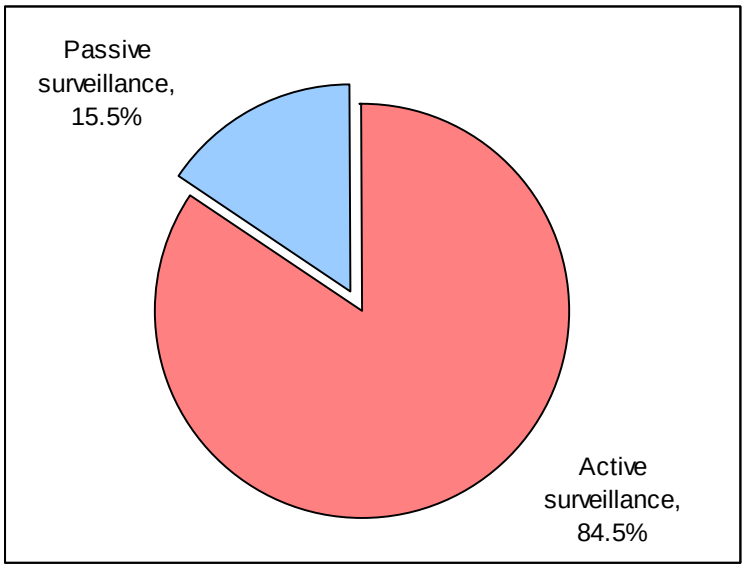


Figure 2: The proportion of birds sampled by surveillance type for all EU Member states – This does not include data from the one non-MS

GEOGRAPHICAL TARGETING

Figures 3 and 4 illustrate the distribution of active and passive surveillance respectively on a spatial scale by displaying the number of birds sampled. For all maps in the report the classification of sampling intensity is grouped by number of samples per 100 square kilometres - Low: <0.1, Medium: 0.1-1, High: 1-10, Very High: >10

Figure 3: Intensity of sampling by active surveillance (live and hunted birds) in EU MS in 2009.

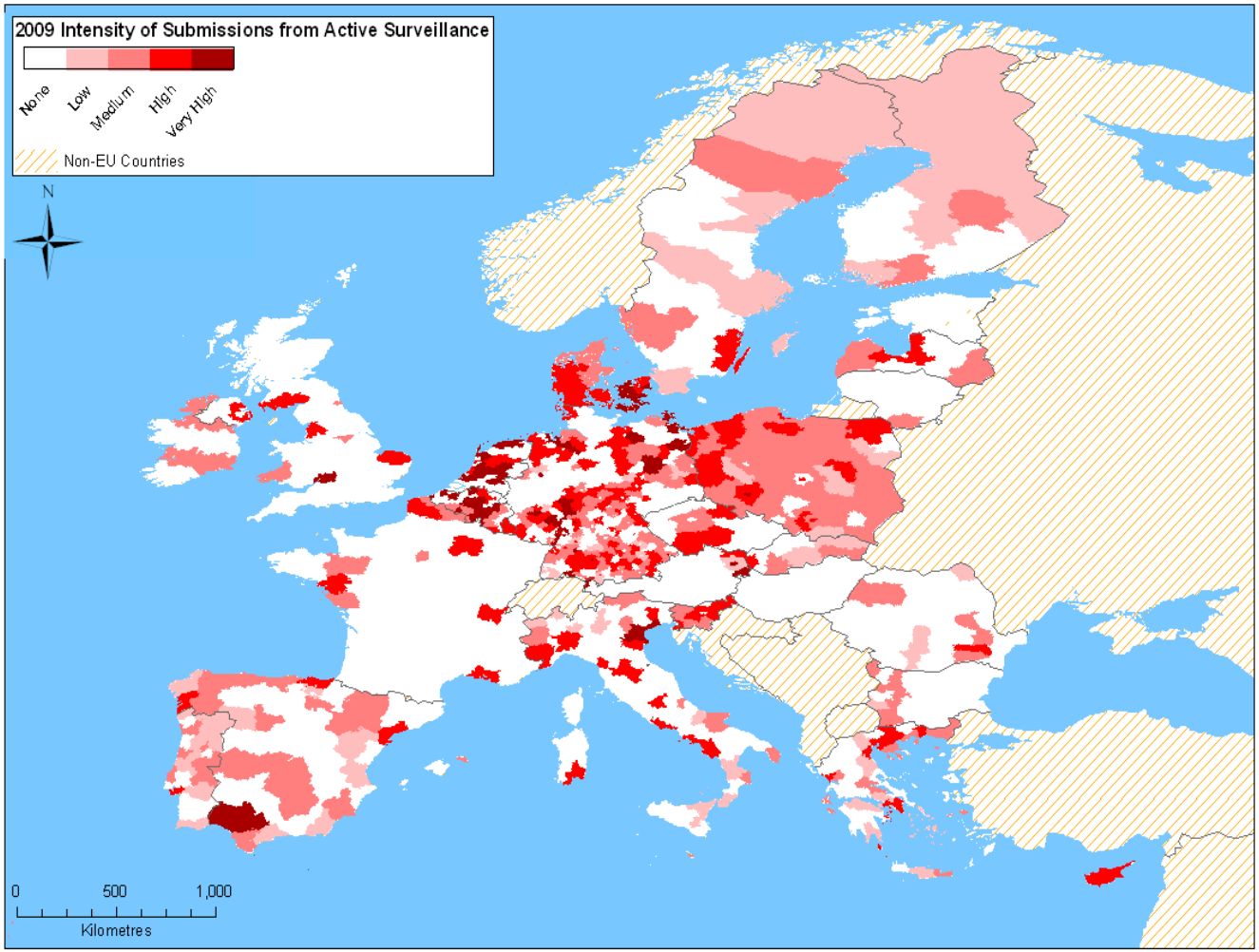
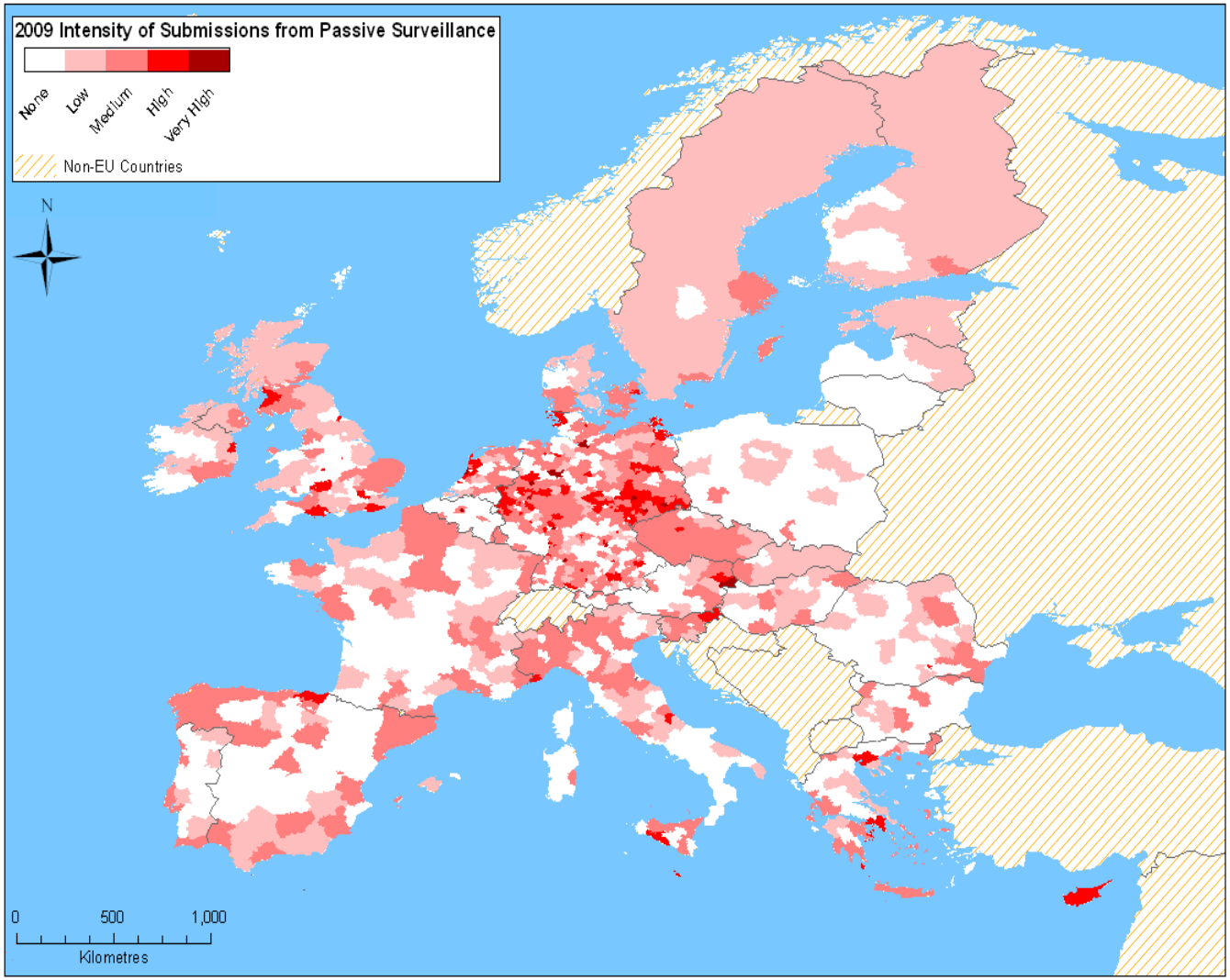
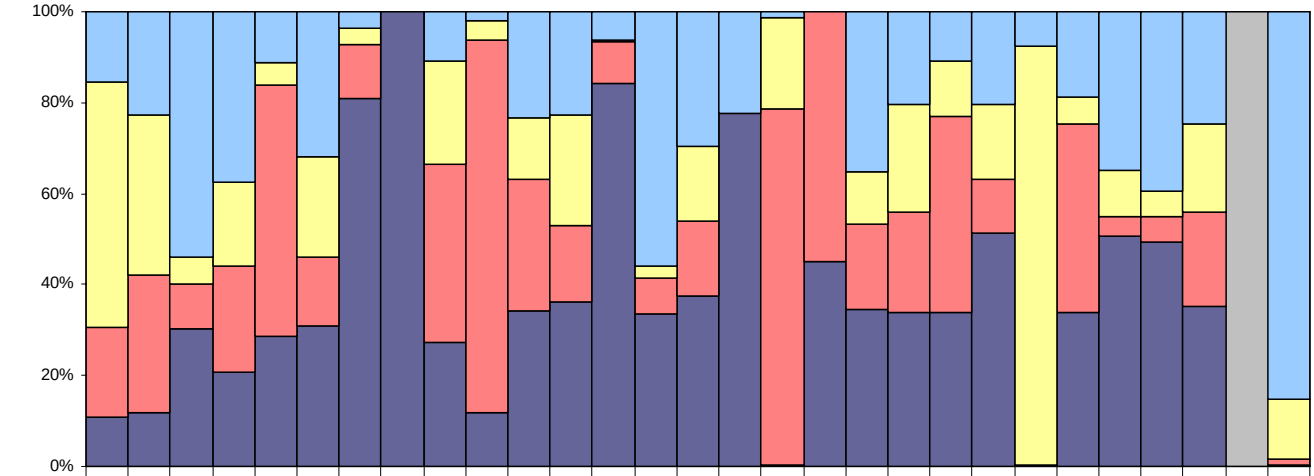


Figure 4: Intensity of sampling by passive surveillance (birds found dead, injured or live with clinical signs) in EU MS only in 2009.
All sampling is displayed at NUTS 3 level



SEASONAL TARGETING

Figure 5 displays the percentage of birds sampled by MS each quarter. For the EU overall, across all 27 participating MS, similar numbers of birds were tested in each of the first three quarters with a significant increase in the final quarter (Oct – Dec). Temporal targeting of sampling varied greatly among MS. Some MS focused their surveillance efforts in the winter months (1st and 4th quarter), such as Ireland (IE) and Luxembourg (LU). Other MS focused much more of the surveillance effort through the spring and summer months, such as Latvia. In other cases, the surveillance was relatively evenly distributed throughout the year, as was the case in France (FR). Figure 6 displays the percentage of birds sampled by quarter over all 27 MS.



	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU		CH
Jan-Mar	326	690	133	64	83	3989	84	0	552	7	550	167	165	101	1158	9	7	0	3554	397	27	153	74	78	24	977	13369		384
Apr-Jun	1137	1056	15	31	37	2783	84	0	1177	17	311	182	10	5	644	0	101	0	1133	459	30	123	913	24	7	132	10411		59
Jul-Sep	415	916	24	40	415	1902	279	0	2011	315	678	125	239	14	652	0	397	11	1894	428	106	91	2	173	3	142	11272		5
Oct-Dec	229	361	75	35	216	3887	1914	12	1395	45	800	267	2228	61	1467	31	2	9	3485	656	84	385	0	140	35	1215	19034		2

Figure 5: Proportion of all birds sampled in 2009 by quarter and MS. Raw numbers of birds sampled by quarter and MS are shown below. Non-MS data Switzerland (CH) is also shown in this figure

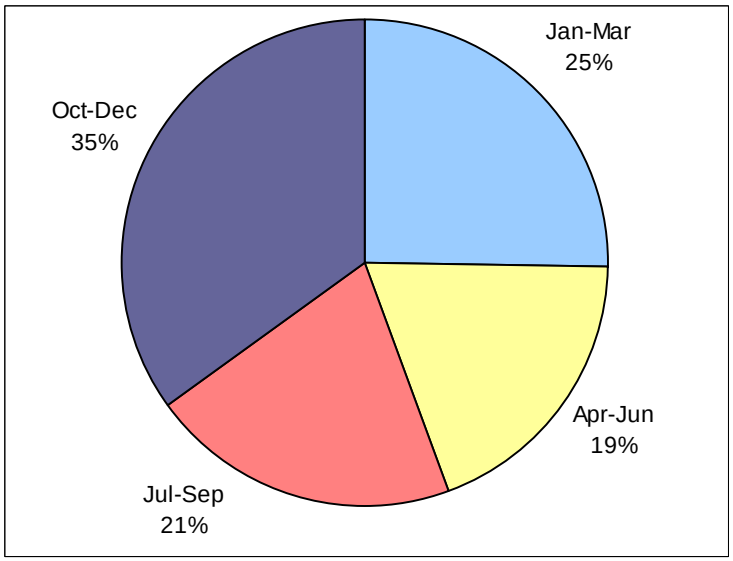


Figure 6: The proportion of birds sampled by quarter for the 27 EU MS – Data from Non-MS not included

Figure 7 displays the overall number of birds sampled in MS throughout 2009 by surveillance type. Active surveillance peaks in January and then reduces in the spring and summer months, before increasing from September through to December. Passive surveillance, however, remains relatively constant throughout the year with only a very slight decrease in levels during the late autumn and early winter.

Tables displaying the number of birds sampled according to surveillance type and MS are displayed in Annex I A.

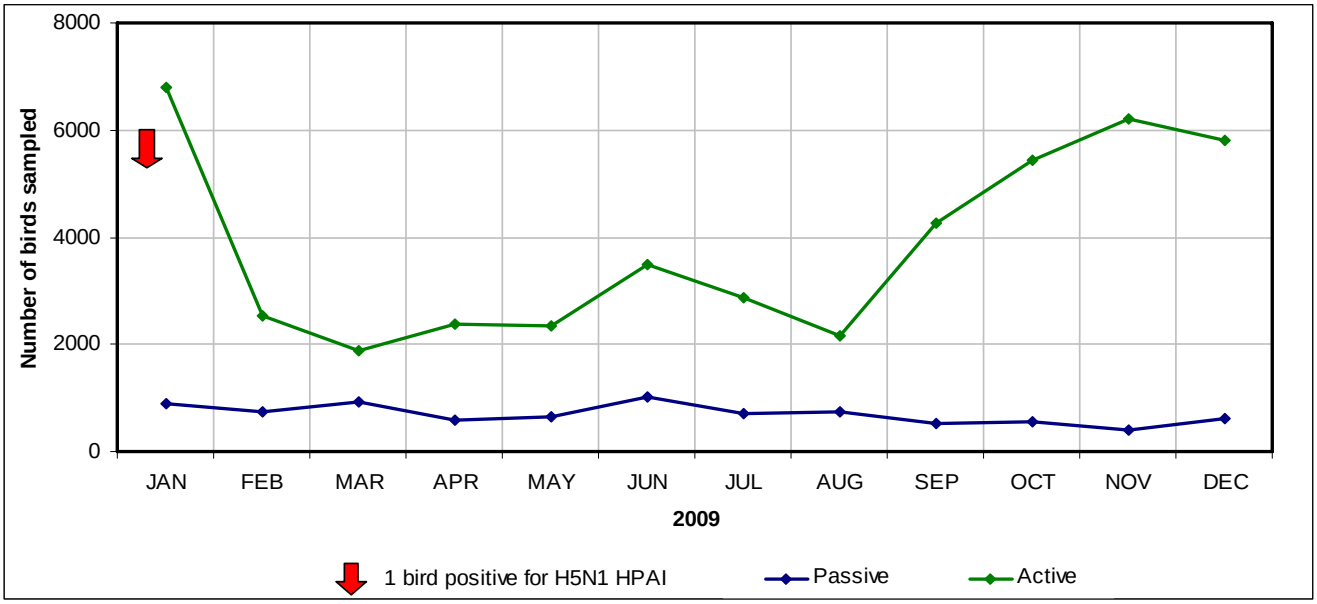


Figure 7: Total number of birds sampled by surveillance type during 2009 showing the incident of H5N1 HPAI (the positive bird is indicated with a single red arrow) – the monthly level of surveillance includes data from all EU MS plus the one non-MS Switzerland (CH).

TARGETING OF BIRD SPECIES

In total 54,086 birds of 22 Orders and at least 356 species were sampled in 2009. Table 3 displays the ten most frequently sampled Orders. As in 2006, 2007 and 2008, the three Orders in which most birds were sampled were: Anseriformes (ducks, geese and swans), Charadriiformes (gulls and waders) and Passeriformes (perching/ songbirds).

Table 4 displays the top 15 species sampled in 2009 throughout all 27 MS. Mallard (*Anas platyrhynchos*) was the most frequently sampled species in 2009 (n=16,364) as in 2006, 2007 and 2008. Black-headed Gull (*Larus ridibundus*) (n=3,807), Greylag Goose (*Anser anser*) (n=2,952) and Mute Swan (*Cygnus olor*) (n=2,011) were also sampled in high numbers. Nine of the ten most frequently sampled species were classed as Higher-Risk Species (HRS) with Pheasant (*Phasianus colchicus*) being the only non-HRS species listed (n=1,304). Table 4 also indicates that the top 15 species account for over two thirds of all birds tested in 2009. The large majority of non-HRS were sampled in very low numbers (66% of all birds sampled were HRS).

All of the figures quoted are based on the EU totals only, not including data from one Non-MS, Switzerland (CH).

Table 3: Bird Orders most frequently sampled in 2009

Order	Number sampled
Anseriformes	34171
Charadriiformes	8465
Passeriformes	2888
Falconiformes	1565
Gruiformes	1537
Galliformes	1482
Ciconiiformes	884
Columbiformes	725
Pelecaniformes	551
Phoenicopteriformes	551

Table 4: Bird Species most frequently sampled in 2009

Species	Number sampled
Anas platyrhynchos	16364
Larus ridibundus	3807
Anser anser	2952
Cygnus olor	2011
Anser albifrons	1931
Anas crecca	1617
Phasianus colchicus	1304
Anas sp.	1117
Branta canadensis	1018
Fulica atra	951
Anas penelope	899
Larus canus	703
Cygnus sp.	672
Anas clypeata	595
Anser fabalis	551

H5N1 HPAI POSITIVES

A differentiation is made between H5N1 HPAI infections and LPAI infections. Unless otherwise stated, all references made to H5N1 refer to highly pathogenic H5N1. In total one case of H5N1 HPAI infection was detected in 2009 in one MS, in Germany. Overall 0.002% of the sampled birds tested positive for H5N1 HPAI. In the MS experiencing H5N1 infection, Germany, the proportion of H5N1 HPAI positive birds was 0.008% (Table 5).

Table 5: Number and proportion of wild birds positive for H5N1 HPAI in 2009

	Member State	No. of birds sampled	No. of birds positive	Percentage of sampled birds testing positive
H5N1 HPAI	DE	12561	1	0.008%

Table 6: Details of H5N1 HPAI incidents in 2009

Member state	Incident duration	First species detected	Number and species H5N1 HPAI positive
DE	10/01/09-10/01/2009	*Anas platyrhynchos*	1 *A. platyrhynchos* (Mallard) - Hunted without clinical signs

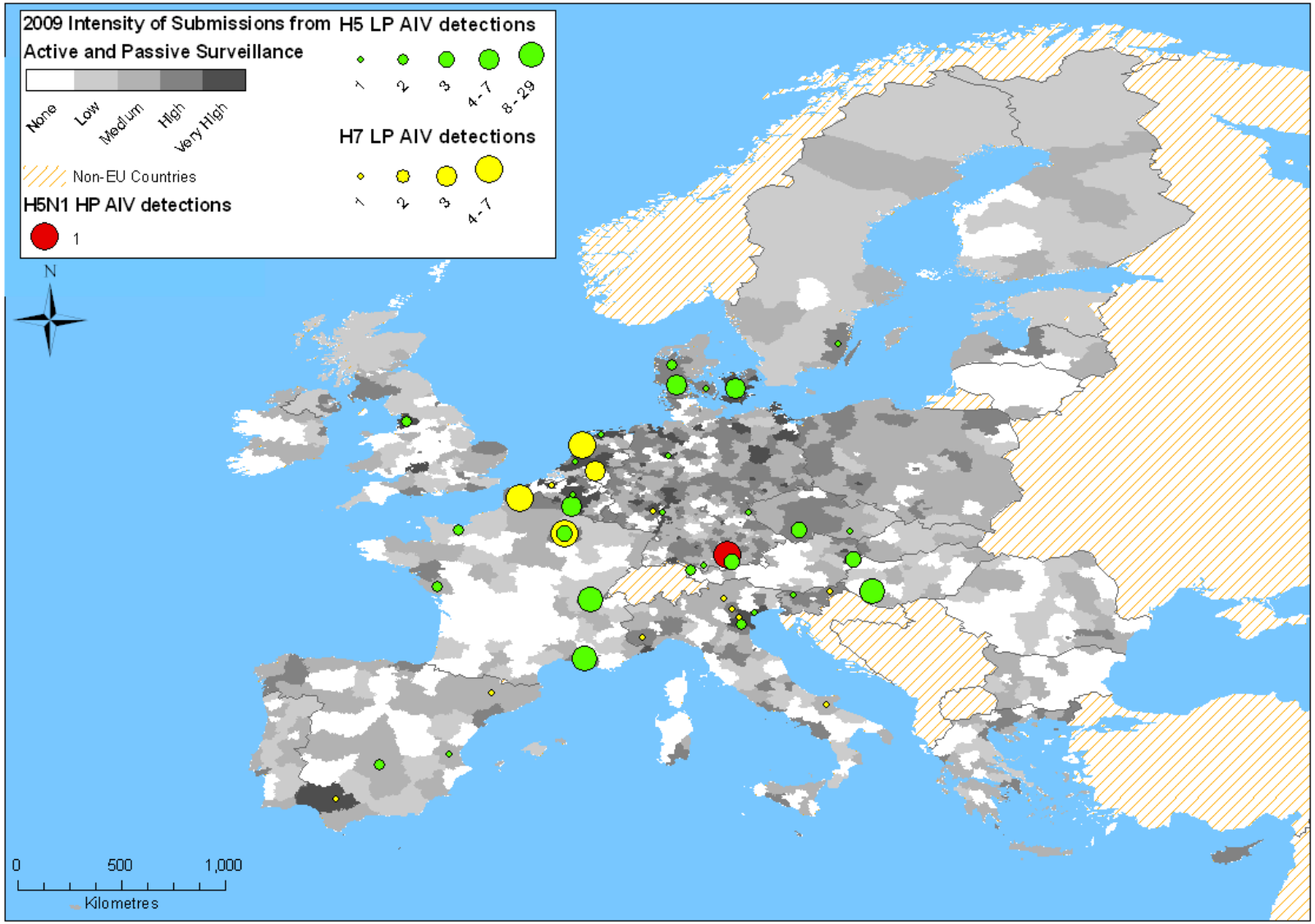
DESCRIPTIVE OVERVIEW OF H5N1 HPAI INCIDENTS IN WILD BIRDS

A single incident occurred in Germany in January 2009 (SCFCAH, 2009). No further cases in wild birds were detected. There were no outbreaks of H5N1 HPAI reported in poultry in the EU in 2009. The most recent outbreak

in poultry prior to 2009 was in October 2008 in Germany (DE).

Figure 8 displays the location of the H5N1 HPAI incident in a wild bird. A single incident occurred. The map also shows the location of H5/H7 LPAI findings in wild birds, discussed in the section on LPAI.

Figure 8: Intensity of sample submission from active and passive surveillance and distribution of H5N1 HPAI incident and LPAI detections (H5 and H7) in wild birds in EU MS in 2009



TEMPORAL PATTERN OF H5N1 WILD BIRD INCIDENTS

The timing and number of birds involved in the H5N1 HPAI incident in wild birds is presented in Figure 9, as well as the number of birds tested by week in the EU in 2009. Similarly to in 2008 the only incident of H5N1 HPAI occurred early in the year during the first month.

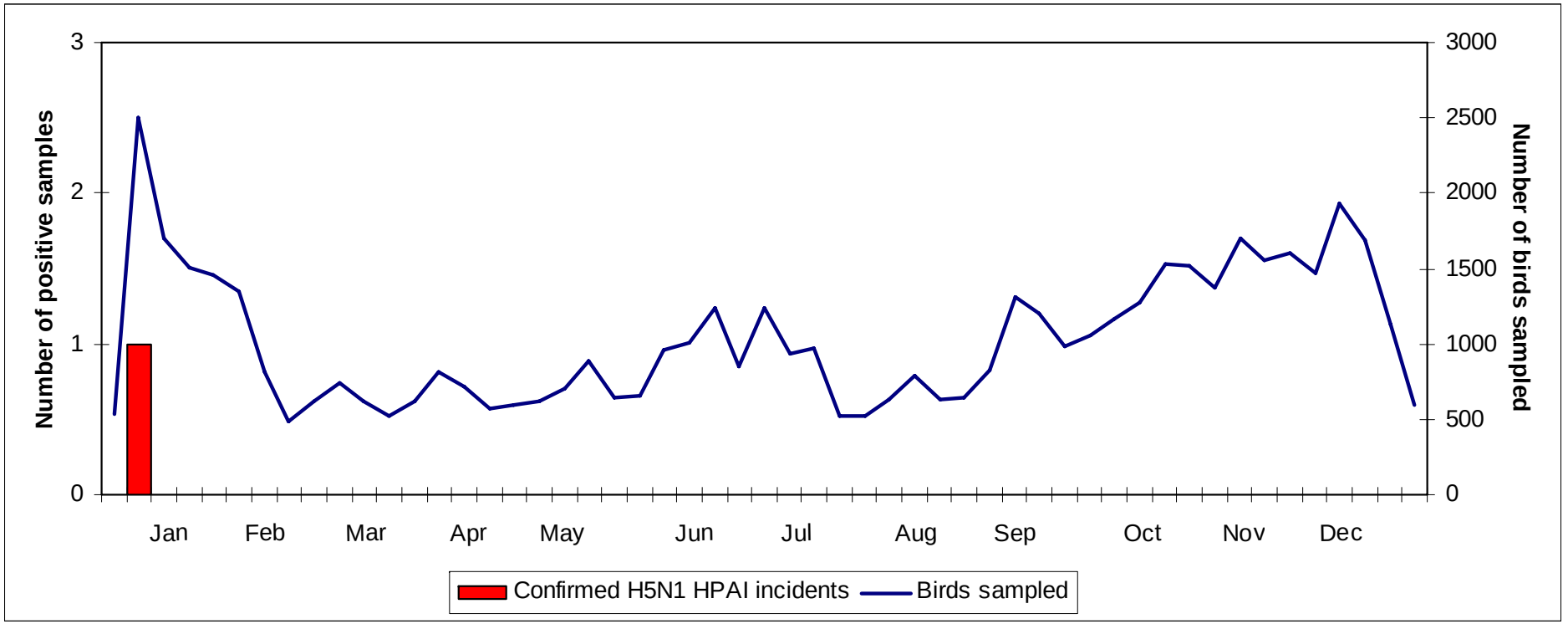


Figure 9: Number of H5N1 HPAI incidents in wild birds and number of wild birds sampled in the EU by week in 2009 – The number of birds sampled includes data from all EU MS and the one Non-MS

ORIGIN OF THE H5N1 INFECTED BIRDS

The single incident in 2009 was detected through active surveillance. The single bird testing positive for HPAI H5N1 was detected as a bird hunted without clinical signs. In 2006, 2007and 2008 a great majority of incidents were detected via passive surveillance and the majority of birds were found dead.

ORDER AND SPECIES OF BIRDS AFFECTED BY H5N1 HPAI INFECTIONS

Table 7 shows the Order of birds in which the H5N1 HPAI case was found in 2009 and the percentage of birds from this Order testing positive. Anseriformes were the only Order in which H5N1 HPAI was detected. Anseriformes also had detections of H5N1 HPAI in 2006, 2007 and 2008.

Table 7: Number tested and percentage positive for H5N1 HPAI in 2009 by Order (Data from EU MS only)

Order	Total number tested	Number positive for H5N1 HPAI (percentage of birds testing positive)
Anseriformes	34171	1 (0.003%)

Table 8 below displays the detection of H5N1 HPAI in the single species in which it was detected. Detailed information regarding the number of birds tested and positive birds by MS and species that were either of the HRS or tested positive for H5N1 HPAI or LPAI H5/H7 is displayed in Annex IV. The only species positive for H5N1 HPAI this year was a Mallard.

Table 8: Number of birds tested and number positive for H5N1 HPAI in 2009 by species – (Data from EU MS only)

Species	Total number tested	Number positive for H5N1 HPAI (percentage of birds testing positive)
Anas platyrhynchos	16364	1 (0.006%)

LPAI

This section focuses on the analysis of H5/H7 LPAI unless specifically mentioned.

As some virus-positive birds were reported with virus pathotype “unknown”, “pending”, “missing” etc, birds that tested positive on PCR or virus isolation are reported in four groups in this section:

1) “LPAI H5” are birds positive for LPAI H5.

2) “LPAI H7” are birds positive for LPAI H7.

3) “LPAI other” are birds reported as LPAI of other “H” subtypes.

4) “Other Positives” are birds positive for influenza A by PCR or Virus isolation but were not reported as either LPAI or HPAI.

OVERVIEW OF LPAI RESULTS

In total 1,565 birds tested positive for subtypes other than H5N1 HPAI. This includes three positive birds from Switzerland (CH) a non-MS.

LPAI H5 was detected in 127 birds from 13 MS: Austria (5), Belgium (5), Czech Republic (4) Germany (8), Denmark (14), Hungary (17), France (63), Italy (3), Netherlands (1), Slovenia (1), Spain (3), Sweden (1) and United Kingdom (2).

LPAI H7 was identified in 35 birds from 9 MS: Austria (1), Belgium (1), Germany (1), Denmark (2), France (14), Italy (6), Netherlands (7), Slovenia (1) and Spain (2).

LPAI of other subtypes (LPAI Other) were detected in 653 birds from 12 MS, while “Other Positives” were detected in a further 749 birds in 13 MS.

Table 9 indicates the total number and proportion of wild birds testing positive for LPAI H5, LPAI H7, LPAI other subtypes and “Other Positives” by Member State. Figure 8 maps the geographical distribution of LPAI H5 and H7 positives. The three positive birds from the non-MS all come under the category of “Other LPAI” positives and none of these birds were H5 or H7.

Overall a very low proportion of birds tested positive for LPAI H5 (0.23%). This is slightly higher than the findings of 2006, 2007 and 2008 when an overall LPAI H5 proportion positive of 0.11%, 0.13% and 0.14% was detected respectively (Annex IV).

Detections of LPAI H7 in 2009 in the EU were similar to previous years at 0.06% compared with 0.02% (2006), 0.01% (2007) and 0.05% (2008).

Table 9: Total number and proportion of birds testing positive for LPAI H5, H7 and other subtypes for MS detecting LPAI viruses during 2009 – This includes the results from all EU MS and one non-MS shown separately

Member State	Total number of birds sampled	Number of H5 LPAI detections (proportion of total sampled)	Number of H7 LPAI detections (proportion of total sampled)	Other LPAI detections (proportion of total sampled)	"Other Positives" with pathotype unspecified (proportion of total sampled)
AT	2107	5 (0.24%)	1 (0.05%)	-	47 (2.23%)
BE	3023	5 (0.17%)	1 (0.03%)	8 (0.26%)	41 (1.36%)
CZ	751	4 (0.53%)	-	21 (2.80%)	
DE	12561	7 (0.06%)	1 (0.01%)	6 (0.05%)	226 (1.80%)
DK	2361	14 (0.59%)	2 (0.08%)	128 (5.42%)	6 (0.25%)
EE	12	-	-	-	2 (16.67%)
ES	5135	3 (0.06%)	2 (0.04%)	3 (0.06%)	13 (0.25%)
FI	384	-	-	23 (5.99%)	
FR	2339	63 (2.69%)	14 (0.60%)	-	343 (14.66%)
HU	2642	17 (0.64%)	-	14 (0.53%)	
IE	181	-	-	-	3 (1.66%)
IT	3921	3 (0.08%)	6 (0.15%)	30 (0.77%)	
LV	507	-	-	-	18 (3.55%)
NL	10066	2 (0.02%)	7 (0.07%)	413 (4.10%)	8 (0.08%)
PL	1940	-	-	2 (0.1%)	17 (0.88%)
SE	989	1 (0.10%)	-	-	
SI	415	1 (0.24%)	1 (0.24%)	2 (0.48%)	8 (1.93%)
UK	2466	2 (0.08%)	-	-	17 (0.69%)
EU TOTAL	**54086**	**127 (0.23%)**	**35 (0.06%)**	**650 (1.20%)**	**749 (1.38%)**
CH	450	-	-	3 (0.67%)	-

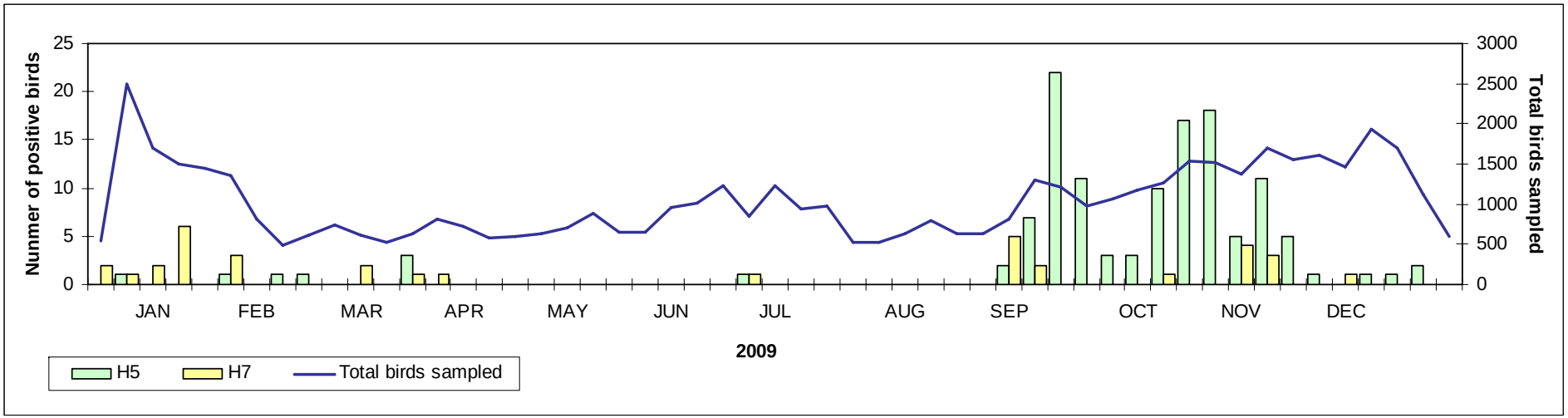
TIMING OF LPAI H5/H7 DETECTIONS

Figure 10 displays the calendar week of LPAI H5 and H7 detections by MS. Figure 11 displays the number of LPAI H5/H7 detections and the number of birds sampled by week. LPAI H5 was mainly found in the autumn, while LPAI H7 infections occurred throughout the year but were mainly found earlier in the year.

Figure 10: Number and week of detection of LPAI H5/ H7 positive birds by EU MS

	JAN				FEB				MAR					APR				MAY					JUN				JUL				AUG					SEP					OCT				NOV					DEC			
MS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
AT						1							3																										2														
BE												1																											4										1				
CZ																																				1											3							
DE				1		1			1																																1		3		1								
DK												1																											1			1	3	1	1	4		2	1			1		
ES		1												1																											2										1			
FR																																				6	5	22	2	6			8	11			8	4	3				2	
UK																																															2							
HU																																												17								
IT	2		1	1											1												1													1		1								1			
NL		1	1	3		2		1																													1															
SE																										1																											
SI				1																																1																
EU Total	**2**	**2**	**2**	**6**	**0**	**4**	**0**	**1**	**1**	**0**	**0**	**2**	**3**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**12**	**24**	**11**	**3**	**3**	**10**	**18**	**18**	**5**	**15**	**8**	**1**	**0**	**2**	**1**	**2**	**0**

Figure 11: Number of LPAI H5 and H7 detections and the number of birds sampled in the EU by week in 2009 – total birds sampled by week includes data from all EU MS and 1 non-MS



Temporal Pattern

As was the case in 2008 there is an apparent seasonality to the occurrence of H5 and H7 LPAI. The majority of H5 LPAI detections appeared between September and December, with a few detections in January to March. This coincides with the peak time for active sampling and may not reflect a seasonal trend. Approximately half the H7 detections occurred between January to early April while the remainder occurred between September and December.

ORIGIN OF LPAI H5/H7 POSITIVE BIRDS

Table 10 displays the number of LPAI H5/H7 detections by Member State and shows the proportion of these detections by each surveillance type. Fewer LPAI H5/H7 positive birds were identified through Passive surveillance than Active surveillance. In 2008 the proportion of Passive surveillance that yielded positive detections of either LPAI H5 or H7 was 0.01% (n=9812), while in 2009 this figure was 0.2% (n=8,363).

Active surveillance had a similar level of detection to 2008 (0.26%) with 0.31% of birds tested by Active surveillance (n=45,723) returning a positive result for H5 or H7 LPAI.

Table 10: Number and percentage of Birds positive for LPAI H5 or H7 by surveillance type in 2009 (EU MS only).

Member State	Total sampled	Total number H5/H7 positive birds	Percentage of birds positive for LPAIV H5 or H7	Active Surveillance Total number of H5/H7 positives	Active Surveillance Proportion of birds positive for LPAIV H5/H7	Passive Surveillance Total number of H5/H7 positives	Passive Surveillance Proportion of birds positive for LPAIV H5/H7
AT	2107	6	0.28%	3	0.41% (n=729)	3	0.22% (n=1378)
BE	3023	6	0.20%	6	0.20% (n=2993)	0	0% (n=30)
CZ	751	4	0.53%	4	0.75% (n=532)	0	0% (n=219)
DE	12561	8	0.06%	7	0.07% (n=9588)	1	0.03% (n=2973)
DK	2361	16	0.68%	15	0.66% (n=2281)	1	1.25% (n=80)
ES	5135	5	0.10%	3	0.07% (n=4458)	2	0.30% (n=677)
FR	2339	77	3.29%	68	3.45% (n=1972)	9	2.45% (n=367)
UK	2466	2	0.08%	2	0.10% (n=1943)	0	0% (n=523)
HU	2642	17	0.64%	17	0.66% (n=2583)	0	0% (n=59)
IT	3921	9	0.23%	9	0.26% (n=3511)	0	0% (n=410)
NL	10066	9	0.09%	9	0.09% (n=9596)	0	0% (n=470)
SE	989	1	0.10%	1	0.12% (n=806)	0	0% (n=183)
SI	415	2	0.48%	1	0.37% (n=267)	1	0.68% (n=148)
EU Total	**54086**	**162**	**0.30%**	**145**	**0.31% (n=45723)**	**17**	**0.20% (n=8363)**

ORDER AND SPECIES OF BIRDS POSITIVE FOR LPAI H5 H7

Order

LPAI H5 and LPAI H7 were detected in Anseriformes, Charadriiformes and Pelecaniiformes. “Other Positives” were detected in Gruiformes, Passeriformes, Galliformes, Gaviiformes and Anatidae (Table 11).

Table 11: Detections of LPAI by Order in EU MS in 2009 (Non-MS data not included)

Order	Total sampled	Positive for LPAI H5	Positive for LPAI H7	Other LPAI positives	"Other Positives" Pathotype undetermined
Anseriformes	34171	122	35	574	693
Charadriiformes	8465	3	-	52	38
Gruiformes	1537	-	-	1	15
Pelecaniformes	551	2	-	6	-
Passeriformes	2888	-	-	2	1
Galliformes	1482	-	-	3	-
Gaviiformes	12	-	-	-	1
Anatidae	1	-	-	-	1
Species unknown	223	-	-	1	-

Species

Further details and tables regarding sampling and results for Higher-risk and other species by MS can be found in Annex IV. Observations of LPAI H5 in 2009 were made in dabbling ducks, geese and swans, gulls and cormorants (Table 12).

In 2009 most observations of LPAI H5 were made in Mallards (Anas platyrhynchos). In all species in 2009 the proportion positive was below one percent, which is broadly consistent with the detection rate in years 2006, 2007 and 2008. All detections of LPAI H7 were made in dabbling ducks and geese in 2009 (Table 12). Results from 2008 were similarly limited to dabbling ducks and swans.

In total 36 species tested positive for AI subtypes other than HPAI. Of these species, 22 were Anseriformes. Six species were Charadriformes, three were Gruiformes with two species Passerines and one species from each of Pelecaniformes, Gaviiformes and Galliformes.

Table 12: Detections of LPAI H5 and H7 by species in EU MS in 2009 – (Non-EU MS data not included)

Species	Total sampled	Positive LPAI H5	Positive LPAI H7	Total positive for AIV (excluding HPAI)
Anas crecca	1617	8	-	70
Anas Clypeata	549	-	2	5
Anas penelope	899	2	-	20
Anas platyrhynchos	16364	65	27	1015
Anas querquedula	309	24	1	95
Anas sp.	1117	15	-	29
Anser albifrons	1931	1	1	120
Anser erythropus	3	1	-	1
Anser fabalus	551	-	2	9
Anser spp.	548	1	-	3
Aythya ferina	369	2	-	3
Cygnus cygnus	528	1	-	2
Cygnus olor	2011	-	1	11
Larus ridibundus	3807	3	-	61
Oxyura jamaicensis	67	2	-	2
Phalacrocorax carbo	474	2	-	8
Tadoma tadoma	487	-	1	11
Totals	N/A	128	35	N/A

Totals for number of birds sampled are not included as the EU total includes samples taken from other species with no H5 or H7 detected.
Totals for number of birds positive for AIV are not included as the EU total includes positive samples taken from other species with no H5 or H7 detected.

DISCUSSION

Avian Influenza (AI) is a highly contagious viral infection, which can affect all species of birds. Highly Pathogenic Avian Influenza (HPAI) can spread rapidly causing serious disease with high mortality in many poultry species and has so far comprised only H5 or H7 subtypes of influenza A. The current H5N1 HPAI epizootic has affected over 60 countries across Asia, Africa and Europe, resulting in the loss of hundreds of millions of birds. Historically HPAI infection has rarely been observed in wild birds, and then only in connection with poultry outbreaks. However, since the current H5N1 HPAI epizootic, wild birds have been implicated in the long distance spread of this virus. Currently the exact species involved and the role of wild birds in maintaining the virus is not clear. This virus is currently circulating in poultry in parts of central and east Asia and northeast Africa.

Low Pathogenicity Avian Influenza (LPAI) can comprise subtypes H1 to H16 and usually causes a mild disease in poultry. LPAI strains of the H5 and H7 subtypes have the potential to mutate into HPAI following introduction to poultry populations. Birds of the Orders Anseriformes and Charadriiformes are thought to be the major reservoirs for LPAI viruses.

The first objective of AI surveillance in wild birds in the EU is to ensure early detection of H5N1 HPAI through the investigation of increased mortalities. The detection of incidents in wild birds not associated with outbreaks in poultry illustrates the value of wild bird surveillance in the early detection of the presence of H5N1 HPAI in a country. Detections of such infections require the implementation of control measures (EC 2006a) and are important to maintain and raise vigilance amongst the poultry sector, especially keepers of free-range poultry.

The second objective of EU wild bird surveillance relates to the investigation of asymptomatic carriers and bridge species in the event of H5N1 HPAI detection. Evaluation of the importance of carrier and bridge species is perhaps best fully investigated through a multidisciplinary approach with ornithologists, ecologists, virologists and epidemiologists; since such an approach can evaluate factors such as size of local populations, local and migratory bird movements, and functional links with the affected site, all of which are relevant to the principle of bridge species. Information collection and dissemination on the epidemiology of wild bird incidents and influential factors, such as details of resident wild bird populations and environmental sampling, could play an important role in increasing the knowledge on the epidemiology of H5N1 HPAI in wild birds.

The third objective of the EU wild bird surveillance, the baseline surveillance of LPAI H5 and H7 in wild birds, appears to be best addressed through active surveillance of live birds. As consistent with previous years, the large majority of LPAI infections in 2009 were identified through active surveillance of HRS, especially Anseriformes (ducks, geese and swans). During 2009 0.31% of birds sampled by Active Surveillance tested positive for H5 or H7 LPAI. The proportion of birds testing positive by Passive Surveillance (0.20%) was markedly higher than 2008 (0.01%).

A total of 54,086 wild birds, from 27 Member States of the European Union were tested during the 2009 survey. An additional 450 birds were sampled by a non Member State (Switzerland). As in 2008, H5N1 HPAI was reported from only one MS. The incident was detected through testing of samples from a Mallard *(Anas platyrhynchos*) that was part of a group of 35 birds, of mixed species, shot in Germany in January 2009. The bird appeared clinically normal and of the 34 other birds shot with the infected Mallard, none were positive for any subtype of AI virus. While this is in contrast to the situation seen in the only incident of 2008 in the EU, there are similarities with the detection of H5N1 HPAI virus in a Pochard (*Aythya ferina*) in March 2008 in Switzerland. In this incident the virus was detected in a live caught bird. The Pochard was caught along with five other birds of three different species including two other duck species (Templeman 2008). None of the other birds tested positive for Influenza A virus.

LPAI of subtypes H5 or H7 was detected in 162 birds from 13 Member States: Austria (6), Belgium (6), Czech Republic (4), Germany (8), Hungary (17), Denmark (16), France (77), Italy (9), Netherlands (9), Slovenia (2), Spain (5), Sweden (1) and the United Kingdom (2). Consistent with previous years, the large majority of these infections were identified through active surveillance of HRS, especially those of the order Anseriformes (ducks, geese and swans). The results of this and previous year's surveillance show consistent presence of H5 and H7 LPAI in wild birds in the EU indicating a continual risk to poultry in this area.

There are several aspects of the data that should be considered when interpreting the results: cluster effects occur and were not accounted for in the analysis; surveillance programmes were variable between MS with respect to a number of parameters including sample size, weighting between active and passive surveillance and targeting of species and areas. Therefore limited inferences can be made by direct comparisons of detections in different MS, species and seasons. The non-random nature of the sampling means that proportion positive observed in a species, Member State or time period, cannot be assumed to be the true prevalence in the population sampled.

In 2009, unlike previous years, the only detection of H5N1 HPAI was made through the testing of hunted birds via active surveillance. In previous years, passive surveillance has appeared more sensitive for the detection of H5N1 HPAI, which appears intuitive as birds may be more likely to die from infection with a virus of higher pathogenicity as has been demonstrated for a variety of bird species. However experimental studies in captive bred mallards (*Anas platyrhynchos*) suggest that individuals of this species may be able to be infected with H5N1 HPAI without apparent deleterious effects (Keawcharoen et al, 2008). Active surveillance appears more sensitive than passive surveillance for the detection of LPAI, perhaps because localised infection with LPAI virus is in contrast to the systemic infection that occurs with HPAI infection and results in a significantly lower detectability of LPAI virus in birds found dead. It is interesting to note that the low level of H5N1 HPAI detections in wild birds in 2009 is consistent with a lack of H5N1 HPAI cases in EU poultry in the same year, on contrast to 2006 and 2007 when multiple detections were made in wild birds and poultry (Hesterberg et al, 2009).

The proportion of all wild bird samples that yielded any AI virus is small (2.8% in 2009 and around 2-3% in other years) and a minority are HPAI or LPAI H5 or H7; the targets of this surveillance. Therefore, the majority of the resource dedicated to wild bird surveillance detects an absence of infection in individual birds. While this "negative"

data is of value, the low proportion of wild bird populations that are sampled and heterogeneity in bird movements and disease ecology allows only modest confidence in determining a population or region to be free of infection at any point in time.

There may be opportunities to increase targeting of passive surveillance by utilising existing migratory information in conjunction with outbreak data to identify priority areas for surveillance in real time. If, for example, an outbreak occurs in an area neighbouring the EU or within the EU, migratory data such as available through the BTO migration mapping tool (Atkinson et al., 2007) could be used to identify areas of increased vigilance for passive surveillance, based upon the areas and times migratory species are likely to arrive from affected regions. Also, following the detection of an H5N1 HPAI outbreak within or outside the EU, increased surveillance could be conducted based on the locations and times that migratory species are likely to arrive from the affected area and the proximity of these species to poultry holdings. In addition local weather conditions, especially the 0ºC isotherm, have been associated with waterbird aggregations and H5N1 HPAI outbreaks in wild birds in Europe (Reperant et al, 2010). However, it should be noted that some migratory species introducing the virus to the EU may not die or display clinical signs when infected. Continuous analysis of the results of avian influenza surveillance in the light of the global picture of avian influenza and scientific research in this field, accompanied by ongoing review of the EU guidelines for AI surveillance will further improve avian influenza prevention and control as well as the appropriate allocation of resources in this area.

MATERIALS AND METHODS

THE TESTING OF SAMPLES

Laboratory tests were carried out in accordance with the EU diagnostic manual for avian influenza (EC, 2006b).

It was recommended that samples should initially be tested using M gene PCR (to detect presence of AI virus), with rapid testing of positives for H5, and if possible N1, and that analysis of the haemagglutinin cleavage site should be undertaken to determine the pathogenicity of the AI virus (EC, 2006c).

DATA PROCESSING

The data presented in this report is limited to data collected under Commission Decision 2007/268/EC submitted to the database in the required format. Consequently the data may differ from other reporting systems such as the Animal Disease Notification System (ADNS). HRS were based on the guidelines 2007/268/EC and the EFSA scientific opinion (EFSA, 2006).

Maps were produced using the ArcMap function of Arc GIS version 9.2.

Samples are displayed at NUTS 3 level.

DATA COMPLETENESS (EU 27)

The data presented in this report is limited to data collected under surveillance programmes approved for 2009 under Commission Decision 2008/897/EC (EC 2008).

It must be noted that there are some data that could not be taken on board in the analysis due to technical problems with the online submission and reception at the Commission data base detected after finalisation of the data analysis. This concerns Hungary (460 birds missing) and Slovenia (3 additional birds recorded), however no birds positive for HPAI H5N1.

Note: Graphs and tables in this report were created using the information that was available and records where no information was available were omitted in some instances. Since with the exception of missing subtype/pathotype information this only concerned in a very low proportion of records this is not thought to have impacted on the overall results, but should be kept in mind when comparing tables that made use of this information and where it was impractical for reasons of readability and interpretability to display the proportion of missing data.

SPECIES OF BIRDS

Species information was of high quality and almost complete with 50,519 birds identified to species level (92.6%), while a further 3310 (6.1%) were identified to genus. Only 707 (1.3%) submissions were from unidentified species and of these 484 were due to incorrect EU Ring codes being used on the submissions.

BIRD ORIGIN

Information on the origin of the bird at sampling was complete with 100% of birds sampled for the year 2009 having this information submitted.

SUBTYPE / PATHOTYPE INFORMATION

Of the 1565 birds testing positive, 1105 (70.1%) had subtype information supplied and 816 (52.1%) were identified as either LPAI or HPAI.

DATE OF SAMPLING

For all birds sampled in 2009, all MS provided a localisation date (from when the bird was sampled in the field).

SPATIAL INFORMATION

Of the submitted spatial information for 2009, 27,429 (50% of birds sampled during this period) where provided with NUTS codes 4 or better for mapping. A further 27,107 (50%) birds could be located at NUTS 3 via co-ordinates provided

ASSUMPTIONS

An incident was defined in this report as H5N1 HPAI infected bird(s) that were found within 10 km (size of the monitoring area (EC, 2006a)) of another H5N1 HPAI infected bird.

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ANNEX I – DIAGNOSIS

This section reports the samples collected and the associated test results. The present guidelines (EC 2007) recommend oro-pharyngeal (tracheal) and cloacal swabs to be collected from healthy free living birds and cloacal and oro-pharyngeal swabs and/ or tissues from dead or shot birds. The totals for testing regimes are shown below.

Annex I: Table 1: Number and proportion of samples collected by Status of bird 2009 (EU data only)

Sample type	Status of Bird					
	Found dead	Hunted with clinical signs	Hunted without clinical signs	Injured	Live with clinical signs	Live without clinical signs
Blood	2	0	0	13	6	109
Cloacal	1308	63	2487	97	58	8740
Other	144	0	31	1	0	3051
Tissue	1927	25	714	5	15	231
Tracheal	1631	32	708	14	17	1407
Faecal	16	5	76	2	0	7871
Cloacal and Tissue	4	0	1	0	3	0
Cloacal and Blood	0	0	0	0	0	15
Cloacal and Faecal	0	0	0	0	0	4
Cloacal and Other	1	0	0	0	0	9
Cloacal and Tracheal	2651	22	5363	226	110	14152
Cloacal, Faecal and Tracheal	1	0	0	0	0	2
Cloacal, Faecal, Tracheal and Other	0	0	0	0	0	1
Cloacal, Tracheal and Blood	2	0	0	0	0	100
Cloacal, Tracheal and Other	0	0	0	0	0	21
Cloacal, Tracheal, Tissue	20	2	65	0	0	1
Faecal and other	2	0	0	0	0	0
Faecal and Tissue	44	0	0	0	2	0
Feecal and Tracheal	0	0	0	0	2	398
Faecal, Tracheal and Tissue	4	0	0	0	0	0
Tracheal , Tissue and blood	0	0	0	0	0	1
Tracheal and Tissue	34	0	16	0	0	0

The majority of live caught birds were sampled either by cloacal swab or faeces; around 40% of the birds were sampled with cloacal and oro-pharyngeal (tracheal) swabs. In hunted birds over 56% of the samples were cloacal and oro-pharyngeal (tracheal) swabs. Sixteen percent of dead birds were tested by cloacal sample only; however the majority of samples were cloacal and oro-pharyngeal (tracheal) samples and/or tissue.

H5N1 positives

Table 2 displays the H5N1 diagnostic test results for each sample type collected for dead birds. No sample tested positive by virus isolation.

Annex I: Table 2: Test-results and samples taken of dead birds positive to H5N1 HPAI (EU data only)

Sample type	Total positives	PCR + VI+	PCR + VI-	PCR+ VI N/A
Cloacal	1	0	0	1
Tracheal	1	0	0	1

Other Positives (LPAI, including pathotype not reported, unidentifiable and pending)

Table 3 shows the test results of samples collected from live birds that were positive for "other subtypes" (not H5 HPAI). For all sample types a high proportion of those tested by both PCR and virus isolation were PCR positive only and VI negative. Table 4 and 5 display the test results for hunted and dead birds respectively. In all categories for a relatively high proportion of birds that were positive on PCR, virus isolation was negative when both PCR and virus isolation were performed. Just over 20% of positive live birds that had oro-pharyngeal (tracheal) and cloacal swabs collected, only tested positive on the oro-pharyngeal (tracheal) swab. Just over 52% of positive live birds that had an oro-pharyngeal (tracheal) and cloacal swab taken only tested positive on the cloacal swab. For birds from which faecal and oro-pharyngeal (tracheal) swabs were collected, there was no bird that tested positive in both tests.

Annex I: Table 3: Test-results and samples taken for live birds without clinical signs positive to subtypes other than H5N1 HPAI (EU data only)

Sample type	Total positive	Test 1				Test 2			
		PCR + VI+	PCR + VI-	PCR+ VI N/A	PCR- Test2 +	PCR + VI+	PCR + VI-	PCR+ VI N/A	PCR- test1 +
Cloacal only	413	49	80	284	N/A				
Faecal only	36	2	17	17	N/A				
Tracheal only	71	0	0	71	N/A				
Other only	96	33	50	13	N/A				
Faecal(1) and Tracheal(2)	1	0	0	1	0	0	0	1	0

Cloacal(1) and Tracheal(2)	495	50	285	61	99	3	173	60	259

Table 5 and 5 display the test results for collected samples in hunted and dead birds that tested positive for AI for other subtypes than H5N1 HPAI. Just over 7% of positive hunted birds that had oro-pharyngeal (tracheal) and cloacal swabs collected, only tested positive on the oro-pharyngeal swab. Just over 72% of positive hunted birds that had an oro-pharyngeal (tracheal) and cloacal swab taken only tested positive on the cloacal swab.

None of the positive found dead birds that had both oro-pharyngeal (tracheal) and cloacal swabs collected, only tested positive on the oro-pharyngeal swab. Over 53% of positive found dead birds that had an oro-pharyngeal (tracheal) and cloacal swab taken only tested positive on the cloacal swab.

Annex 1: Table 4: Test-results and samples taken for hunted birds with and without clinical signs positive to subtypes other than H5N1 HPAI (excludes Non-EU data)

		Test 1				**Test 2**			
Sample type	**Total positive**	**PCR + VI+**	**PCR + VI-**	**PCR+ VI N/A**	**PCR- Test 2+**	**PCR + VI+**	**PCR + VI-**	**PCR+ VI N/A**	**PCR- test1 +**
Cloacal only	47	11	13	23	N/A				
Tracheal only	3	0	3	0	N/A				
Tissue only	2	0	2	0	N/A				
Cloacal(1) and Tracheal(2)	261	34	134	73	20	5	22	45	189

Annex I: Table 5: Test-results and samples taken dead birds positive to subtypes other than H5N1 HPAI (excludes Non-EU data)

		Test 1				**Test 2**			
Sample type	**Total positive**	**PCR + VI+**	**PCR + VI-**	**PCR+ VI N/A**	**PCR- Test2 +**	**PCR + VI+**	**PCR + VI-**	**PCR+ VI N/A**	**PCR- test1 +**
Tissue only	23	2	12	9	N/A				
Tracheal only	15	2	1	12	N/A				
Cloacal only	17	3	5	9	N.A				
Cloacal(1) and Tracheal(2)	86	12	33	42	0	1	27	12	46

ANNEX II – TYPE OF SURVEILLANCE BY QUARTER

The following Tables 1 and 2 display the number of birds sampled in 2009, by both passive and active surveillance. This excludes birds sampled where the status or surveillance type was unknown

Annex II: Table I: Number of birds tested in active surveillance by Member State (live and hunted, healthy birds)

	Quarter							
Member State	**1**		**2**		**3**		**4**	
	Hunted	**Live**	**Hunted**	**Live**	**Hunted**	**Live**	**Hunted**	**Live**
AT	2	70	0	385	0	79	0	193
BE	145	545	0	1043	300	605	0	355
BG	21	81	1	7	14	6	0	55
CY	6	32	0	14		4	2	14
CZ	0	4	0	0	348	0	180	0
DE	352	2491	50	2100	156	1246	792	2401
DK	0	31	0	81	33	226	1038	872
EE	0	0	0	0	0	0	6	4
ES	10	385	21	969	10	1863	38	1162
FI	3	0	0	0	239	42	17	0
FR	0	489	35	224	93	373	154	604
GR	88	24	11	115	25	62	51	108
HU	113	41	0	0	20	202	1954	253
IE	81	0	0	0	0	0	61	0
IT	764	302	22	564	218	240	1076	325
LT	0	0	0	0	0	0	0	0
LU	0	5	0	0	0	0	0	30
LV	1	0	0	100	369	28	2	0
MT	0	0	0	0	0	1	0	0
NL	0	3403	0	1022	0	1762	0	3409
PL	0	372	0	451	0	418	0	656
PT	4	0	0	22	0	74	0	54
RO	109	2	74	37	45	3	210	167
SE	11	0	9	786	0	0	0	0
SI	19	0	0	0	65	76	107	0
SK	4	0	0	0	0	1	31	0
UK	0	830	0	9	0	40	0	1064
EU TOTAL	**1645**	**9130**	**212**	**7853**	**1910**	**7339**	**5668**	**11753**
CH	22	337	0	54	2	0	0	0

Annex II: Table 2: Number of birds tested in passive surveillance by Member State (injured, diseased and dead birds)

	Quarter			
Member State	**1**	**2**	**3**	**4**
AT	254	752	336	36
BE	0	13	11	6
BG	31	7	4	20
CY	26	17	36	19
CZ	79	37	67	36
DE	1146	633	500	694
DK	53	3	20	4
EE	0	0	0	2
ES	157	187	138	195
FI	4	17	34	28
FR	61	52	212	42
GR	55	56	38	108
HU	11	10	17	21
IE	20	5	14	0
IT	92	58	194	66
LT	0	0	0	0
LU	4	0	0	1
LV	6	1	0	0
MT	0	0	10	9
NL	151	111	132	76
PL	25	8	10	0
PT	23	8	32	30
RO	42	12	43	8
SE	63	118	2	0
SI	59	24	32	33
SK	20	7	2	4
UK	147	123	102	151
EU Total	**2571**	**2206**	**1929**	**1544**
CH	25	5	3	2

ANNEX III – NUMBER OF BIRDS OF HIGHER-RISK SPECIES AND NON-HIGHER RISK SPECES SAMPLED BY MS AND QUARTER

Table 1

	1		2		3		4	
Member State	**HRS**	**Non HRS**	**HRS**	**Non HRS**	**HRS**	**Non HRS**	**HRS**	**Non HRS**
AT	301	25	752	385	229	186	101	128
BE	539	151	331	725	756	160	240	121
BG	66	67	2	13	1	23	32	43
CY	6	58	0	31	0	40	0	35
CZ	54	29	27	10	413	2	209	7
DE	2256	1733	1617	1166	1067	835	2910	977
DK	49	35	1	83	180	99	1600	314
EE	0	0	0	0	0	0	12	0
ES	260	292	750	427	1157	854	945	450
FI	1	6	13	4	233	82	22	23
FR	397	153	158	153	496	182	680	120
GR	102	65	1	181	1	124	36	231
HU	46	119	3	7	90	149	1068	1160
IE	93	8	3	2	14	0	60	1
IT	628	530	49	595	138	514	1057	410
LU	5	4	0	0	0	0	31	0
LV	2	5	100	1	379	18	2	0
MT	0	0	0	0	1	10	1	8
NL	3359	195	684	449	1467	427	3199	286
PL	251	146	249	210	268	160	407	249
PT	0	27	4	26	6	100	0	84
RO	51	102	53	70	12	79	203	182
SE	2	72	585	328	0	2	0	0
SI	66	12	9	15	91	82	119	21
SK	2	22	0	7	0	3	8	27
UK	805	172	63	69	103	39	1089	126
EU Total	**9341**	**4028**	**5454**	**4957**	**7102**	**4170**	**14031**	**5003**
CH	360	24	58	1	3	2	2	0

ANNEX IV - OVERVIEW OF RESULTS FOR HIGHER-RISK AND OTHER SPECIES

Table 1 displays the detection of H5N1 HPAI and number of that host species sampled in each Member State.

Table 2 displays the detections of LPAI H5 that were reported in HRS and the number of those species sampled in each MS.

Table 3 displays the detections of LPAI H5 reported in non-HRS species and the number of those species sampled in each MS.

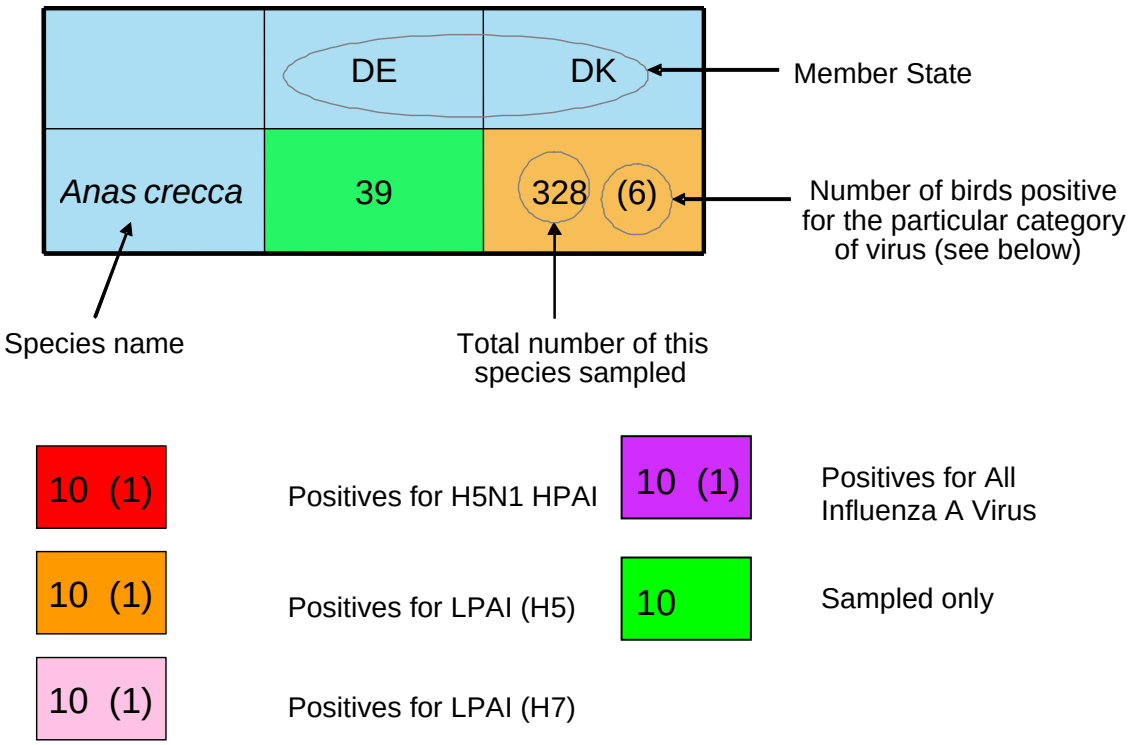
Table 4 displays the detections of LPAI H7 that were reported in HRS and the number of those species sampled in each MS.

Table 5 displays detections of all AI types in HRS by MS.

Table 6 displays detections of all AI types in non-HRS by MS.

The aim of these tables is to provide context of AI detections taking into account bird species and the number of birds sampled by MS.

KEY TO TABLES



Annex IV: Table 1: Detection of H5N1 HPAI and number of that host species sampled in each Member State.

Species	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU	CH
Anas platyrhynchos	347	609	86	5	592	3073 (1)	1021	4	1703	132	957	33	1009	17	958		356		3378	667	5	145	530	200	8	529	16364 (1)	185

Annex IV: Table 2: Detections of LPAI H5 (in brackets) that were reported in HRS and the number of those species sampled in each MS.

Species	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU Total	CH
Anas crecca	37					39	328 (6)		74	38	71 (1)	29	35	57	442 (1)		20	1	57			16	1			372	1617 (8)	
Anas penelope		1				71	66	2	18	30	1	10		67	180 (1)		12		429 (1)				4			8	899 (2)	
Anas platyrhynchos	347 (2)	609 (4)	86	5	592 (4)	3073 (2)	1021 (8)	4	1703 (1)	132	957 (26)	33	1009 (14)	17	958 (1)		356		3378	667	5	145	530 (1)	200 (1)	8	529 (1)	16364 (65)	185
Anas querquedula	1			1		9			1		214 (24)	2	6		48		13			14							309 (24)	
Anser albifrons						334	22				29		65 (1)						1473(1)	6	2						1931 (2)	
Anser erythropus													2 (1)														2 (1)	3
Aythya ferina		8(1)				7	1		5		167	3			36		3		1							50 (1)	281 (2)	88
Cygnus cygnus	2					86 (1)				19	37			6	16	36	9		1	6			4		1	305	528 (1)	
Larus ridibundus	794 (3)	42			2	346	91		45	26	187	2	7		14		20		2127	52	1	16	9	1		25	3807 (3)	

Annex IV: Table 3: Detections of LPAI H5 (in brackets) reported in non-HRS species and the number of those species sampled in each MS.

Species	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU Total	CH
Anser spp.			25			386 (1)			1				1		14												427 (1)	
Oxyura jamaicensis											67 (2)																67 (2)	
Phalacrocorax carbo	7	1				198	82		8			2	32 (2)		100	1			15				2	1	1	5	455 (2)	6
Anas sp.			12	36		586 (3)			10(2)		93 (10)	1			53					313	8			1		4	1117 (15)	1

Annex IV: Table 4: Detections of LPAI H7 (in brackets) that were reported in HRS and the number of those species sampled in each MS.
(all species shown are HRS with exception of Tadorna tadorna)

Species	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU	CH
Anas clypeata	1					2	5		441 (1)	4	6	8	1		90 (1)		21		16								595 (2)	1
Anas platyrhynchos	347 (1)	609	86	5	592	3073 (1)	1021 (2)	4	1703 (1)	132	957 (14)	33	1009	17	958 (4)		356		3378 (4)	667	5	145	530	200	8	529	16364 (27)	185
Anas querquedula	1			1		9			1		214	2	6		48 (1)		13			14							309 (1)	
Anser albifrons						334	22				29		65						1473 (1)	6	2						1931 (1)	
Anser fabalis						227		2					16						216 (2)	84		1	5				551 (2)	
Cygnus olor	35	295	2		107	617	141		4	1	20	17	12	20	8		20		57	215	1	50	4	83 (1)	1	301	2011 (1)	24
Tadorna tadorna	24	145 (1)				3	34		6			3	1						4				86	1		180	487 (1)	

Annex IV: Table 5: Detections of all AI types (in brackets) in HRS by MS.

Species	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU	CH
Anas acuta						3	42 (1)		14	3 (1)	4	3		1	36 (1)		5 (1)		5			2				201 (3)	319 (7)	
Anas clypeata	1					2	5		441 (2)	4	6	8	1		90 (2)		21 (1)		16								595 (5)	1
Anas crecca	37 (2)					39 (1)	328 (46)		74 (2)	38 (2)	71 (2)	29	35	57 (1)	442 (10)		20 (1)	1	57 (1)			16	1			372 (2)	1617 (69)	
Anas penelope		1				71 (1)	66 (3)	2	18	30	1	10		67 (2)	180 (1)		12		429 (13)				4			8	899 (20)	
Anas platyrhynchos	347 (14)	609 (33)	86	5	592 (25)	3073 (193)	1021 (86)	4 (2)	1703 (13)	132 (20)	957 (296)	33	1009 (28)	17	958 (18)		356 (13)		3378 (240)	667 (11)	5	145	530 (1)	200 (11)	8	529 (11)	16364 (996)	185 (1)
Anas querquedula	1			1		9			1		214 (93)	2	6		48 (1)		13 (1)			14							309 (95)	
Anser albifrons						334 (12)	22				29 (5)		65						1473 (103)	6	2						1931 (120)	
Anser anser	110	2	13		1	1800 (6)	10	2	570		9		44		1				279 (1)	64		14	2			31	2952 (7)	
Anser brachyrhynchus						20														9						8	37	
Anser erythropus									1				2 (1)														3 (1)	
Anser fabalis						227 (1)		2					16						216 (8)	84		1	5				551 (9)	
Aythya ferina		8 (1)				7	1		5		167	3			36		3		1							50 (1)	281 (2)	88 (1)
Aythya fuligula		15 (2)				19	7		1	9		1		1			4		2				6			15	80 (2)	121 (1)
Branta bernicla																			102	10			1			3	116	
Branta canadensis		581				333	3				12								8	3			2			76	1018	
Branta leucopsis						236 (2)		2		3	1								139 (12)		1		1			70	453 (14)	
Branta ruficollis						14																					14	
Cygnus columbianus						106								1													107	
Cygnus cygnus	2					86 (1)				19	37 (1)			6	16	36	9		1	6			4		1	305	528 (1)	
Cygnus olor	35	295 (8)	2		107	617 (1)	141		4	1	20 (1)	17	12	20	8		20		57	215	1	50	4	83 (1)	1	301 (1)	2011 (11)	24
Fulica atra	35 (2)	173 (1)			1	372 (10)	10		140	1	13	29	7		43				37			68		1		21	951 (13)	4
Larus canus		80				63	82 (1)		1	3	3							1	375	45 (1)		4	1			45 (1)	703 (2)	
Larus ridibundus	794 (15)	42			2	346	91		45	26	187	2	7		14		20		2127 (46)	52	1	16	9	1		25	3807 (61)	
Limosa limosa									66				1														67	
Netta rufina	1					16													3								20	
Philomachus pugnax	13	2							1														9				25	
Pluvialis apricaria		58					1												3				1				63	
Vanellus vanellus	7					57			23			3	2						1			3	7				103	
Marmaronetta angustirostris									4																		4	

Annex IV Table 6: Detections of all AI types (in brackets) in non-HRS by MS.

Species	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU total	CH
Actitis hypoleucos		25 (1)							6			1	1		2				2		2						39 (1)	
Aix sponsa		1				7 (1)																					8 (1)	
Alopochen aegyptiacus		30				334			5 (1)				2						58			3				1	433	
Anas sp.			12	36		586 (5)			10 (2)		93 (20)	1			53 (1)					313 (1)	8			1		4	1117 (28)	1
Anas strepera	1	9				44	43 (3)		5		23	4			103		9		72			7	4			21	345 (3)	
Anser spp.			25			386 (2)			4				1		14					117 (1)		1					548 (3)	
Arenaria interpres		15 (1)					6		2										318 (3)		3		1				345 (4)	
Bucephala clangula										28			2	2			9 (1)										41(1)	
Cairina moschata	136 (1)				1							5			3						1	1					147 (1)	
Ciconia ciconia	1		3			17			48			36	27		2						6	11		14			165	
Corvus corvix						62 (1)							1									11				10	84 (1)	
Cygnus sp.	63 (2)		5			461 (1)			1			4			14		1			109					11	3	672 (3)	
Erithacus rubecula						2			12			11	27		70											2	124	
Gallinula chloropus		13				11	1		20		55	3	3		48				23 (1)			5				10	192 (1)	
Gavia stellata						1 (1)									1							6				1	9 (1)	
Larus argentatus	1	33					56		19	47	28	12			44				173	21	1					8	443	
Larus argentatus cachinnans	261 (17)								9		6	75	21						1					16			389 (17)	
Larus fuscus		15				7				2	52								71		1	5					153	
Larus marinus		1					4		1	1									9				4				20	
Larus sp.	66			10		21			113						7 (1)					51 (1)	13			3		2	286 (1)	
Oxyura jamaicensis											67 (2)																67 (2)	
Phalacrocorax carbo	7	1				198	82 (4)		21			2	32 (2)		100 (2)	1			15				2	1	1	5	468 (8)	6
Phasianus colchicus				1	12	155	123 (3)				1	16	871	1	62					21		9	1		29	1	1303 (3)	1
Pica pica						11			6	3		29	9		214 (2)							55	9			1	337 (2)	
Plectropterus gambensis		1 (1)																									1 (1)	
Rallidae						62 (2)																					62 (2)	
Species unknown	2	26		1		13			156 (1)				4		11			1			2	2				5	223(1)	
Sterna sandvicensis		42													26						1		1				70	
Tadorna tadorna	24	145 (7)				3	34 (3)		6			3	1						4 (1)				86	1		180	487 (11)	
Tringa totanus	14	27					1								2				35 (1)		3		9				91 (1)	

ANNEX V – SCIENTIFIC AND ENGLISH NAMES OF BIRD SPECIES

Annex V: Table 1: All Higher Risk Species as well as all other birds that tested positive for AI in 2009 giving English and Latin names

Scientific name	English name
Actitis hypoleucos	Common Sandpiper
Aix sponsa	Wood Duck
Alopochen aegyptiacus	Egyptian Goose
Anas Acuta	Northern Pintail
Anas clypeata	Northern Shoveler
Anas crecca	Common Teal
Anas penelope	Eurasian Wigeon
Anas platyrhynchos	Mallard
Anas querquedula	Garganey
Anas sp.	Dabbling duck spp
Anas strepera	Gadwall
Anser albifrons	White-fronted Goose
Anser anser	Greylag Goose
Anser brachyrhynchus	Pink-footed Goose
Anser erythropus	Lesser White-fronted Goose
Anser fabalis	Bean Goose
Anser spp.	Goose spp
Arenaria interpres	Ruddy Turnstone
Aythya ferina	Common Pochard
Aythya fuligula	Tufted Duck
Branta bernicla	Brent Goose
Branta canadensis	Canada Goose
Branta leucopsis	Barnacle Goose
Branta ruficollis	Red-breasted Goose
Bucephala clangula	Common Goldeneye
Cairina moschata	Muscovy Duck
Corvus cornix	Hooded Crow
Cygnus columbianus	Tundra/Bewick's Swan
Cygnus cygnus	Whooper Swan
Cygnus olor	Mute Swan
Cygnus sp.	Swan spp
Fulica atra	Eurasian Coot
Gallinula chloropus	Common Moorhen
Gavia stellata	Red-throated Loon
Larus argentatus	Herring Gull
Larus canus	Common (Mew) Gull
Larus ridibundus	Black-headed Gull
Larus sp.	Gull spp
Limosa limosa	Black-tailed Godwit
Netta rufina	Red-crested Pochard
Oxyura jamaicensis	Ruddy Duck
Phalacrocorax carbo	Great Cormorant
Phasianus colchicus	Common Pheasant
Philomachus pugnax	Ruff
Pica pica	Eurasian Magpie
Pluvialis apricaria	Golden Plover
Rallidae	Rail spp
Tadorna tadorna	Common Shelduck
Tringa totanus	Common Redshank
Vanellus vanellus	Northern Lapwing

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