



Report from AI EURL on the developing situation with H5N8 HPAI

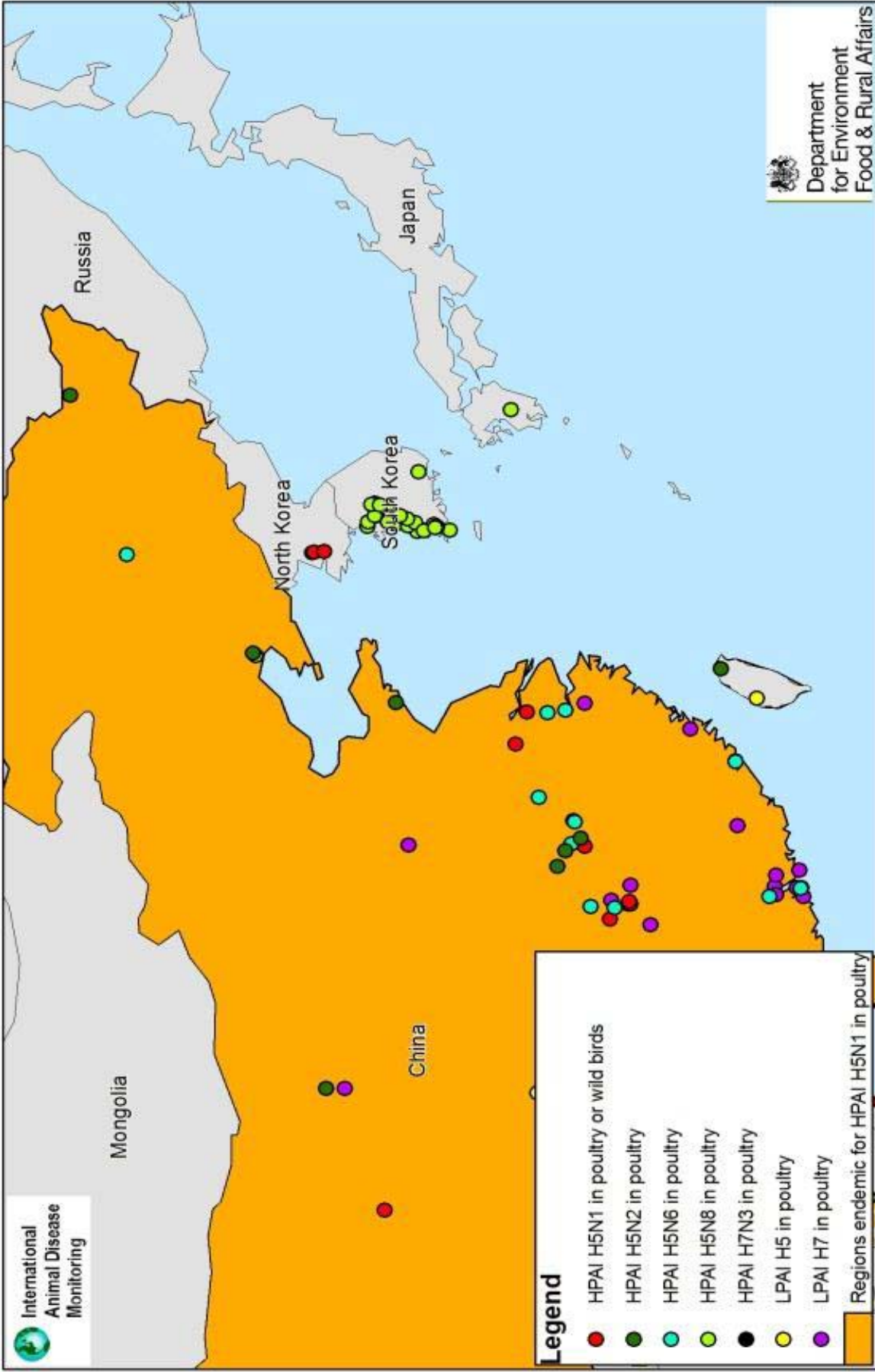
Ian Brown, Director EURL

Extraordinary PAFF Committee, section Animal Health and Welfare - 20 November 2014, Brussels



Current events

- H5N8 HPAI RO Korea
 - >12 million poultry killed/culled
 - 38 cases in poultry (ducks & chickens)
 - Positive detections in wild birds of H5N1 HPAI
- Spread to Japan of H5N8 HPAI
 - Modes of spread?
 - Single poultry incursion May 14
 - Wild bird positive Oct 14
- Detection of H5N8 in wild waterfowl China



Map prepared by IDM

Reports of Highly Pathogenic Avian Influenza Outbreaks in domestic poultry and wild birds in 2014 (endemic H5N1 countries highlighted)

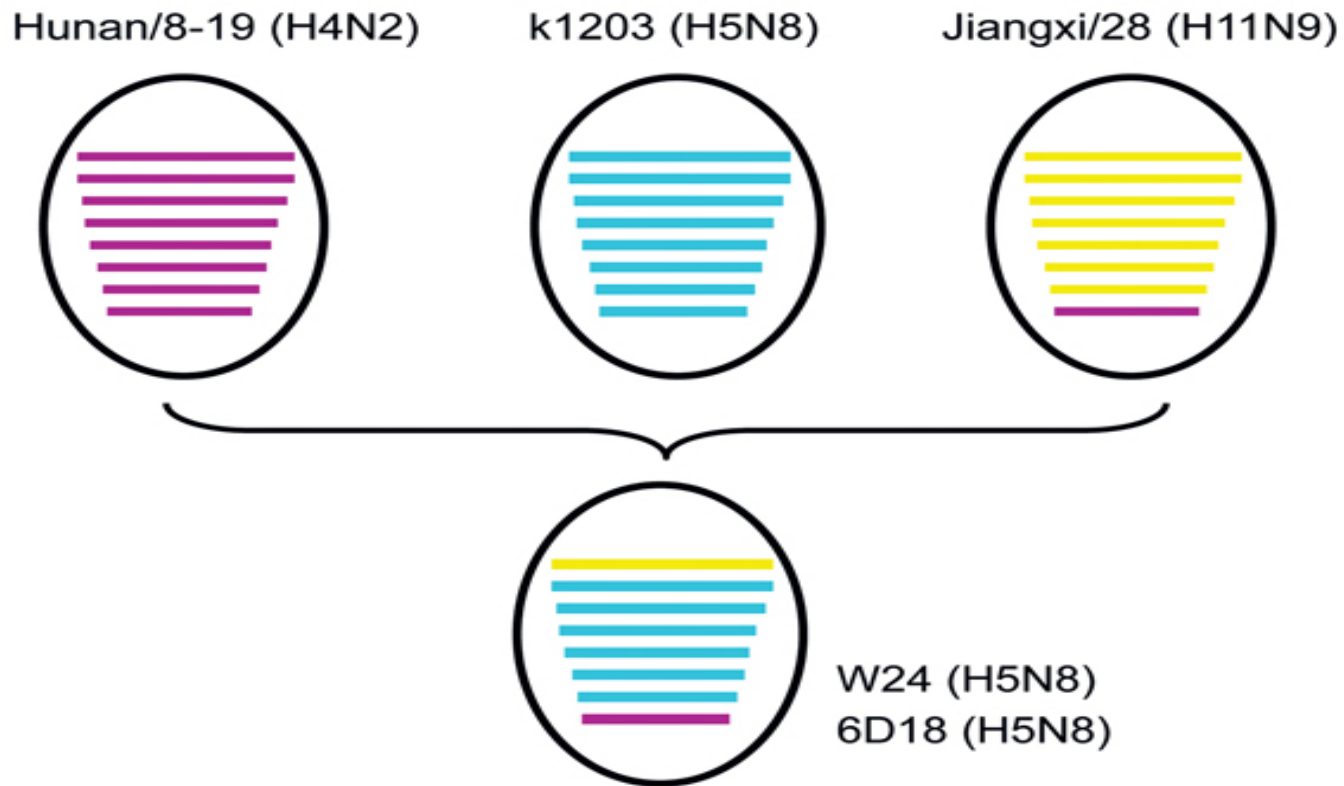
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Date created 06/11/2014
Actual Scale 1:20,000,000

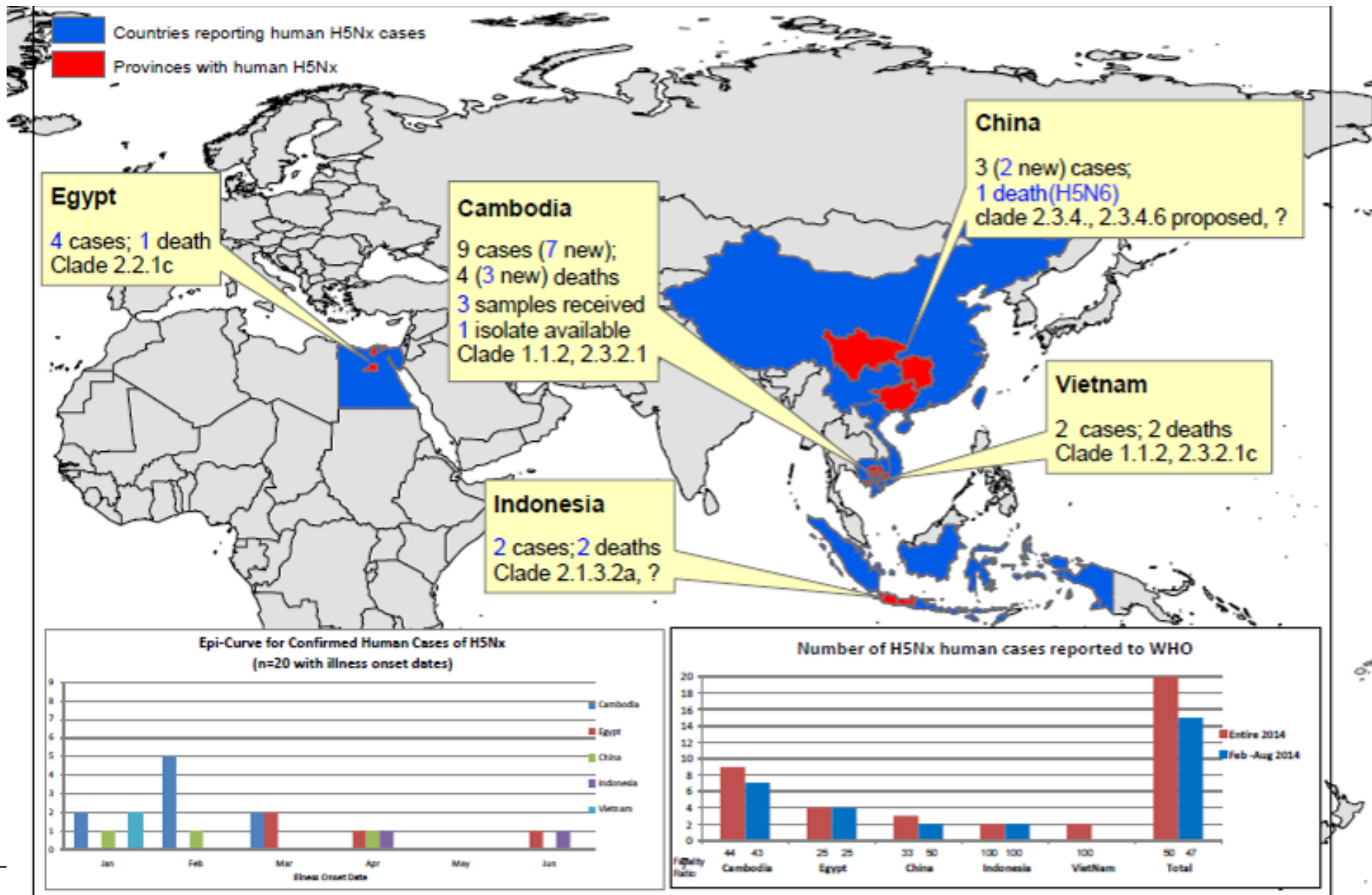


Origin of H5N8 HPAI

Wu et al. Novel reassortant influenza A(H5N8) viruses in domestic ducks, eastern China. Emerg Infect Dis <http://dx.doi.org/10.3201/eid2008.14033>



Geographic distribution of H5Nx human cases in 2014





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Wild birds role in spread?



Virus replicates well in domestic ducks

Wild bird positive detections in several countries in E.Asia

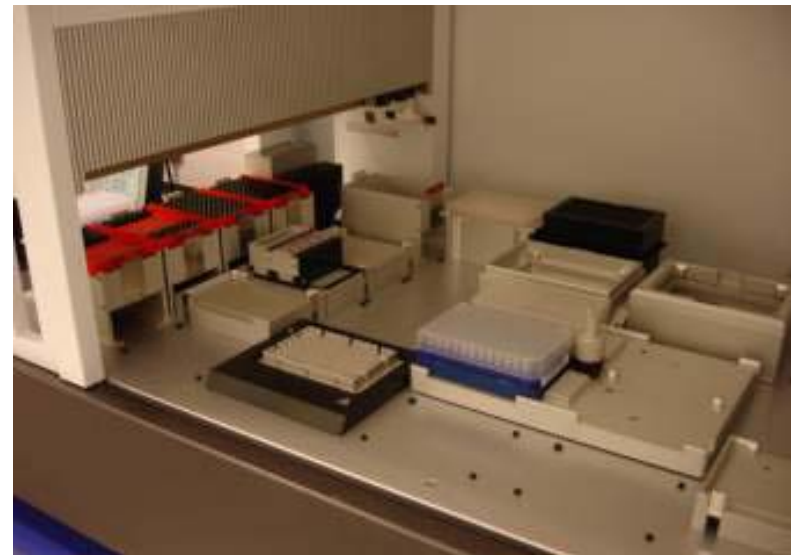
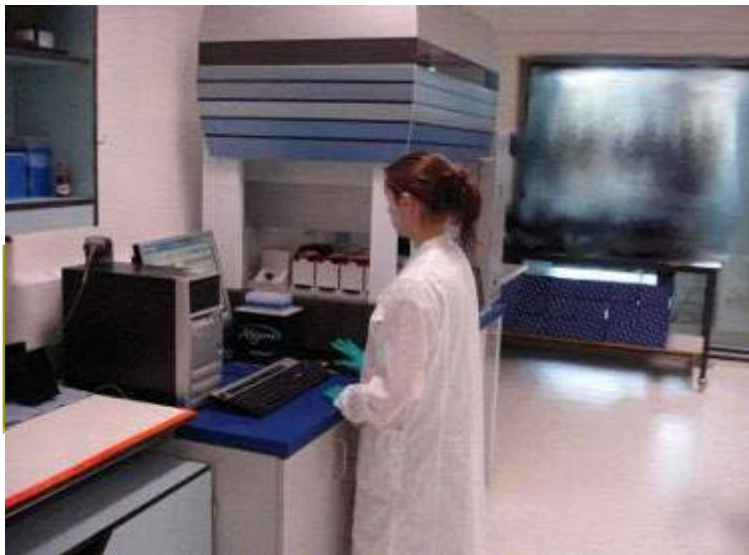


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Laboratory matters



Utility of standard tests as prescribed in the EU AI diagnostic manual (Decision 2006/437/EC)

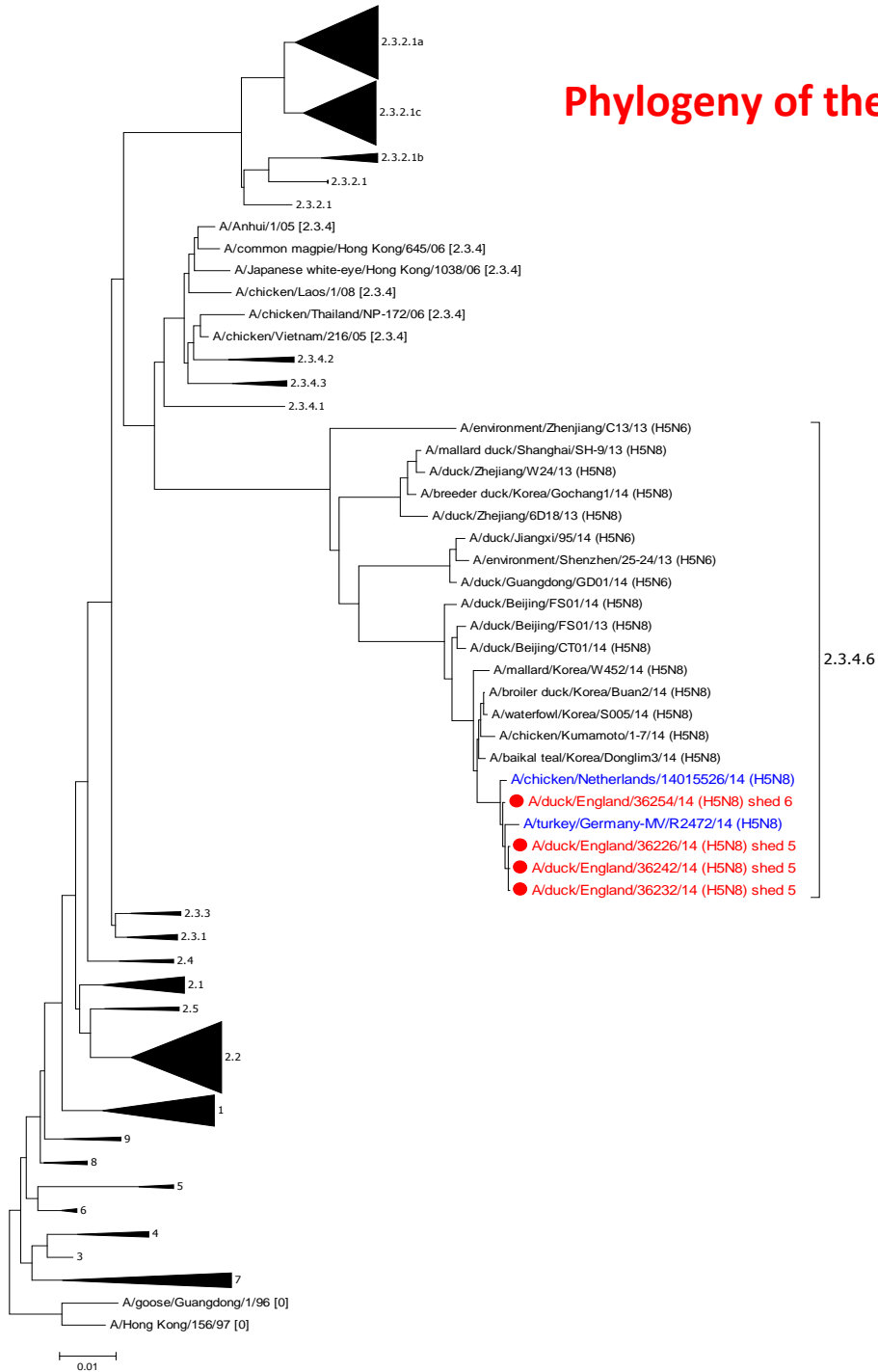
- Assume standard sampling as a minimum (20/20/20)
- Real time RT-PCR
 - Recommended M gene (influenza A test for screening)
 - Recommended H5 gene (specific detection of H5 AI)
 - Both tests are fit for purpose and will reliably detect H5N8 HPAI at flock level.
- Virus isolation
 - Virus grows well in embryonated fowls' eggs
- Serology
 - Only applicable in species where mortality does not approach 100%: domestic waterfowl & gamebirds
 - Sensitivity in early exposure window improved with specific H5N8 antigen
 - EURL addressing to supply MS's

Virus characterisation

- Pathogenicity determination
 - Lethal for galliformes with typical signs :
 - A/duck/England/36254/14 – IVPI 2.88
 - HA cleavage site motif conserved in three EU outbreaks to date RNSPLRE**RRRKR***GLF
- Genetic analyses
 - HA gene: >99.7% identity amongst viruses from three EU outbreaks;
>99.5 identity to viruses from Korea; <99.2% China and Japan, belonging to clade 2.3.4.6.
 - Whole genome
 - EURL have reviewed the UK strain for signatures that have been potentially associated with increased tropism for Mammalian species including humans
 - **The virus is still essentially avian in its phenotype and lacks some of the key changes increasing affinity for replication in humans**
 - Predicted sensitivity to antiviral drugs
- Genetic sequences
 - UK outbreak: Full genome @ GISAID Accession # EPI547670- EPI547677
 - DE outbreak: HA and NA at http://gisaid.org/EPI_ISL/167140
 - NL outbreak: Full genome to GISAID

Recommended tests are fit for purpose and will reliably detect H5N8 HPAI

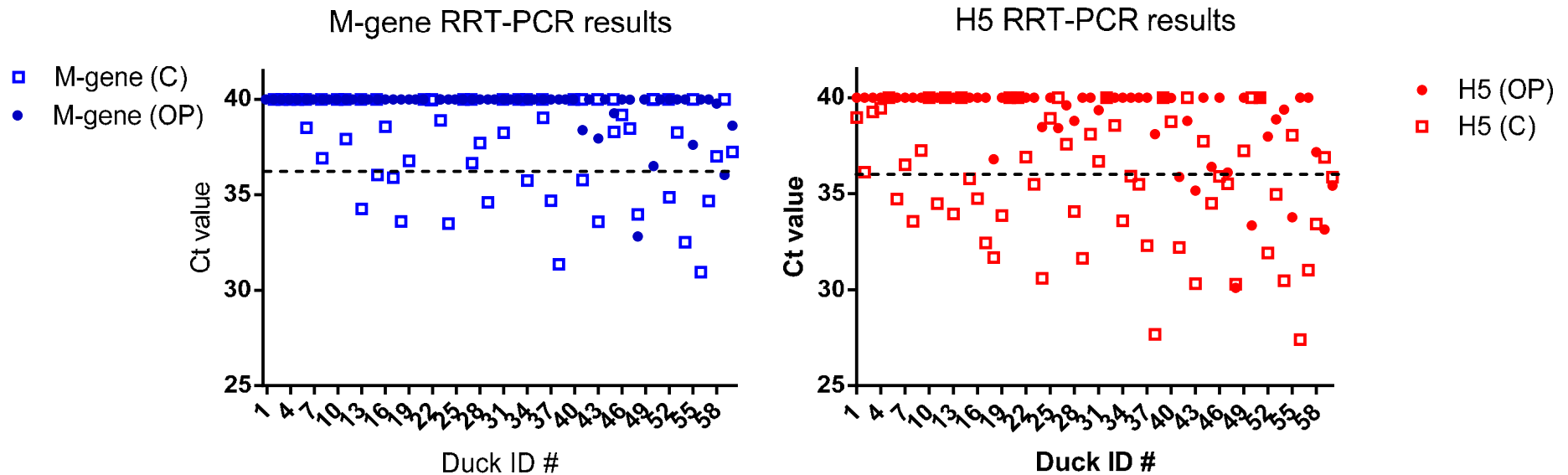
Phylogeny of the HA gene of H5N8



Diagnosis in ducks early experiences from UK case, November 2014

- Clinical disease signs: reduced egg drop, small increase in mortality
- Pathology
 - Not classically HPAI! Concurrent disease.
 - Severe air sacculittis, haemorrhagic eggs & follicles, peritonitis, coelomitis, splenomegaly, necrosis in pancreas
- Virus shedding
 - Approx 1-13 days
- Serology
 - High seroconversion in recovered birds; 95/5 all birds seropositive at c 14 days by HI
- Pathogenicity of isolated virus
 - Lethal for galliformes

AI RealTime PCR results: 60 ducks swabbed at infected premises



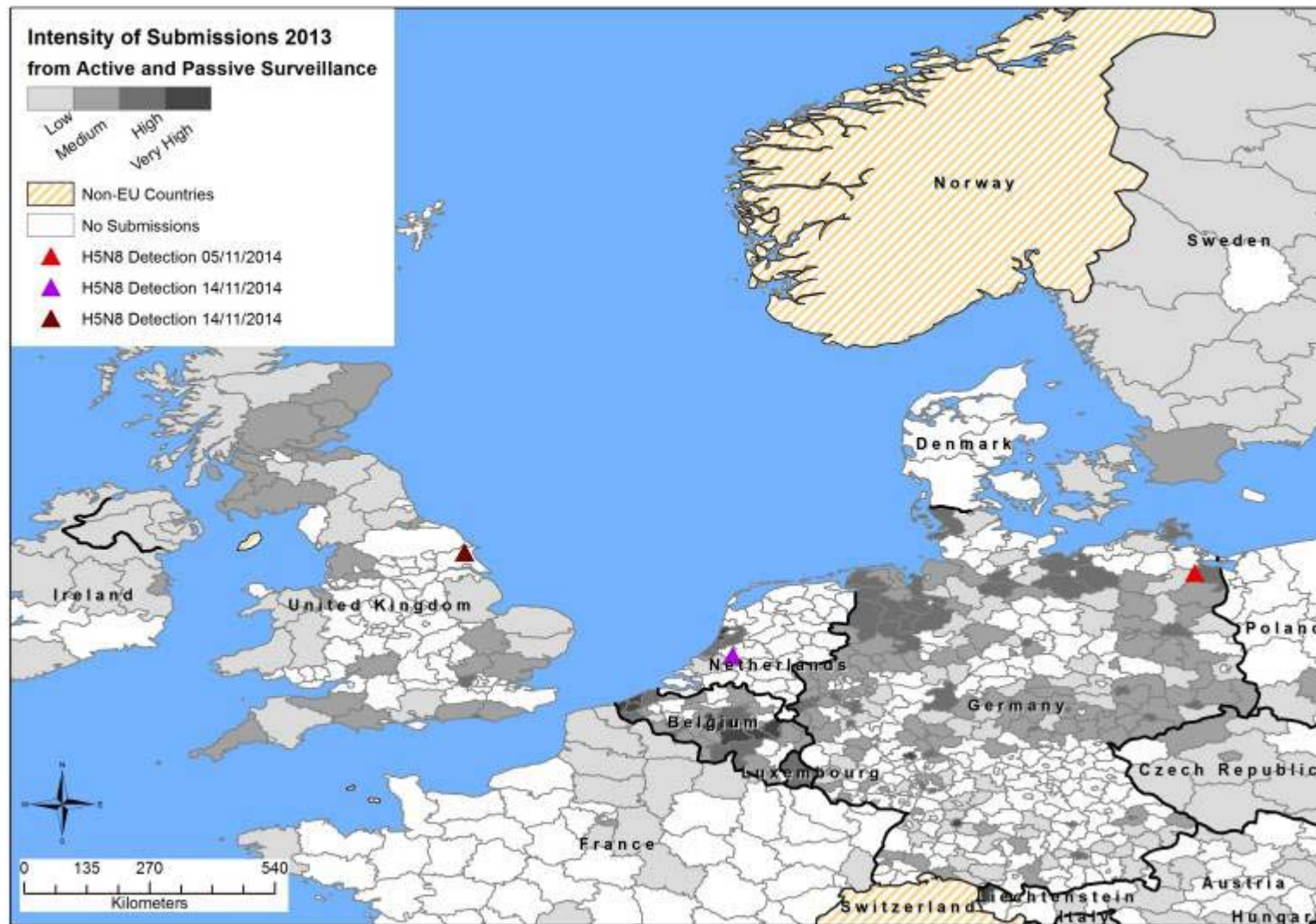
Rapid and preliminary review of wild bird avian influenza surveillance in the EU following detection of H5N8 HPAI in Germany, Netherlands and United Kingdom

Prepared by EURL for Avian Influenza
APHA-Weybridge, 19/11/14

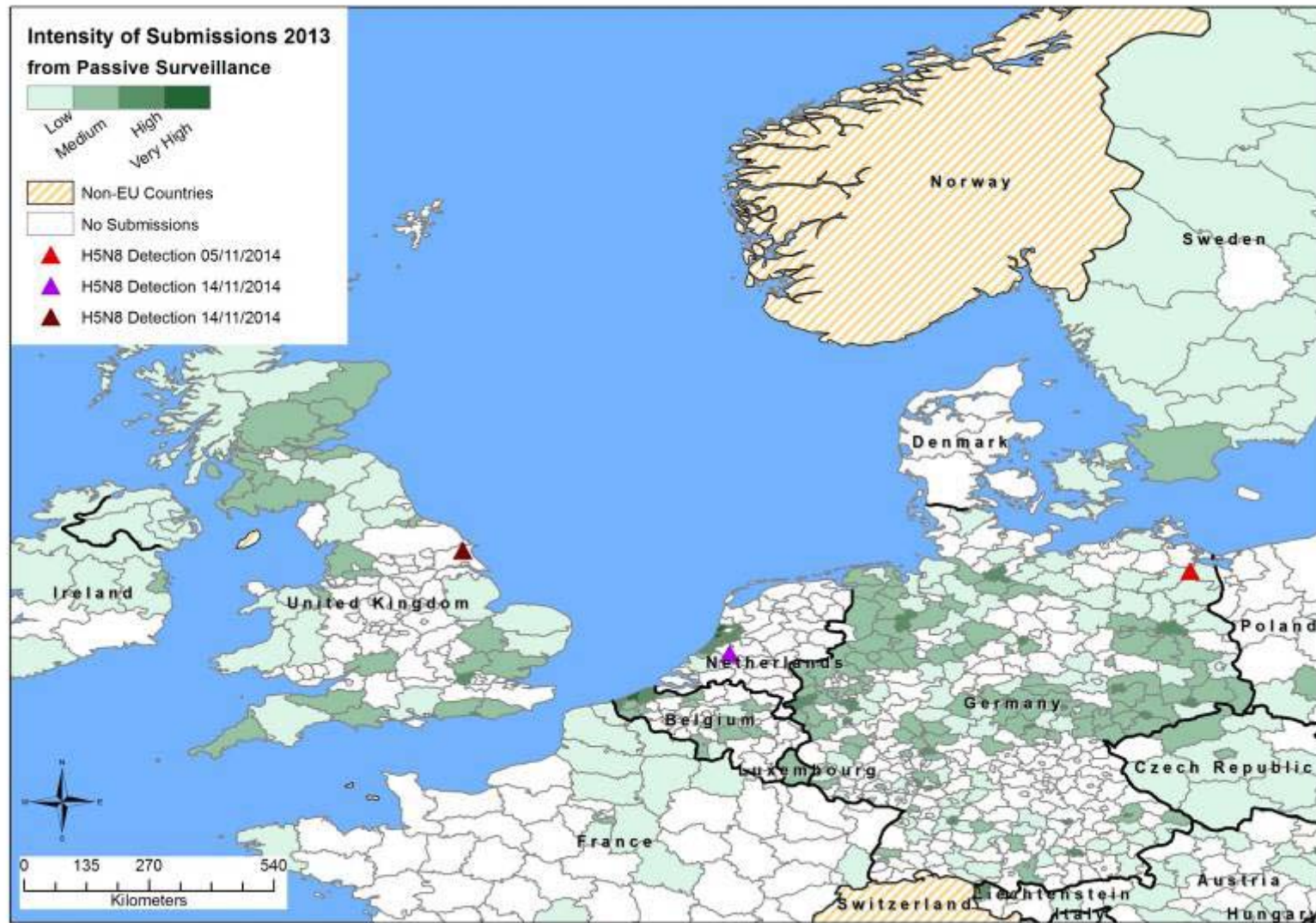


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Active and Passive surveillance intensity of submissions in Western Europe in 2013

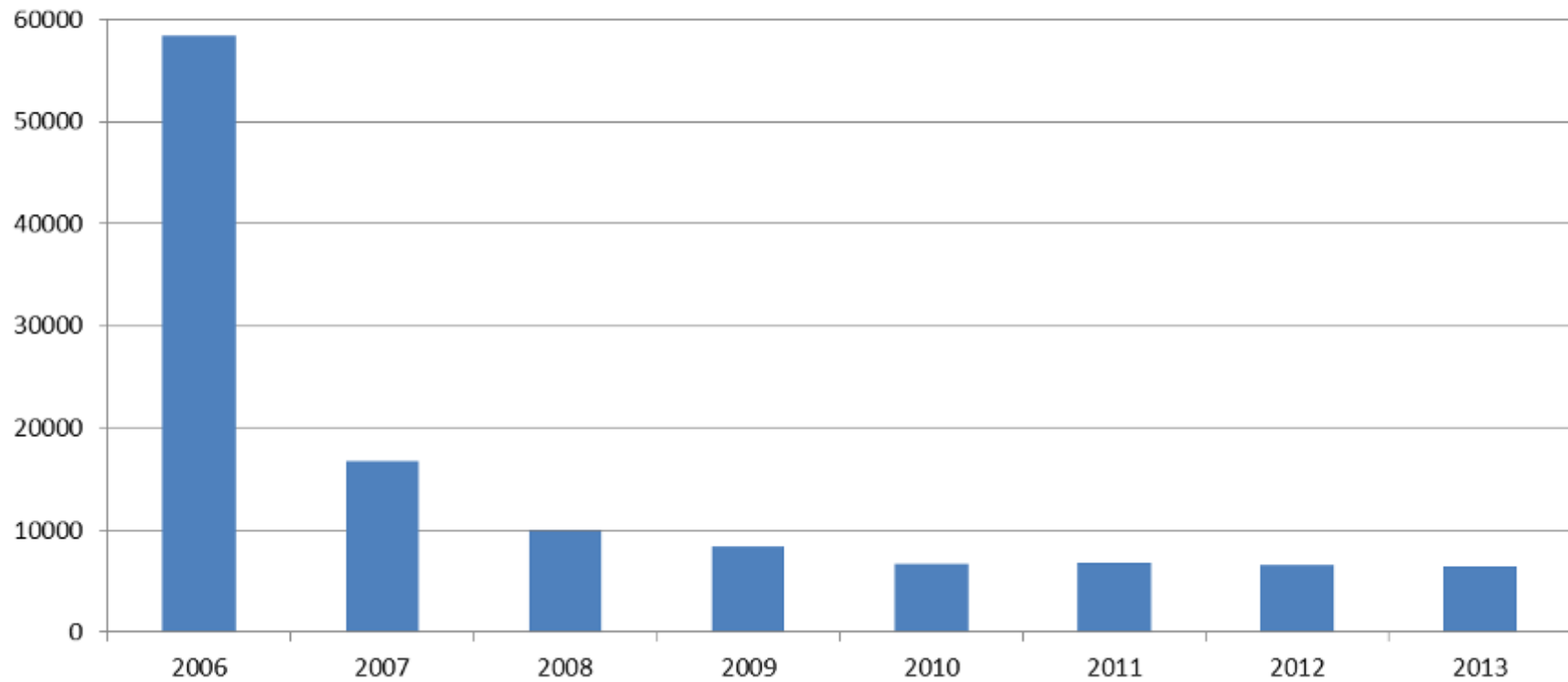


Active and Passive surveillance intensity of submissions in Western Europe in 2013

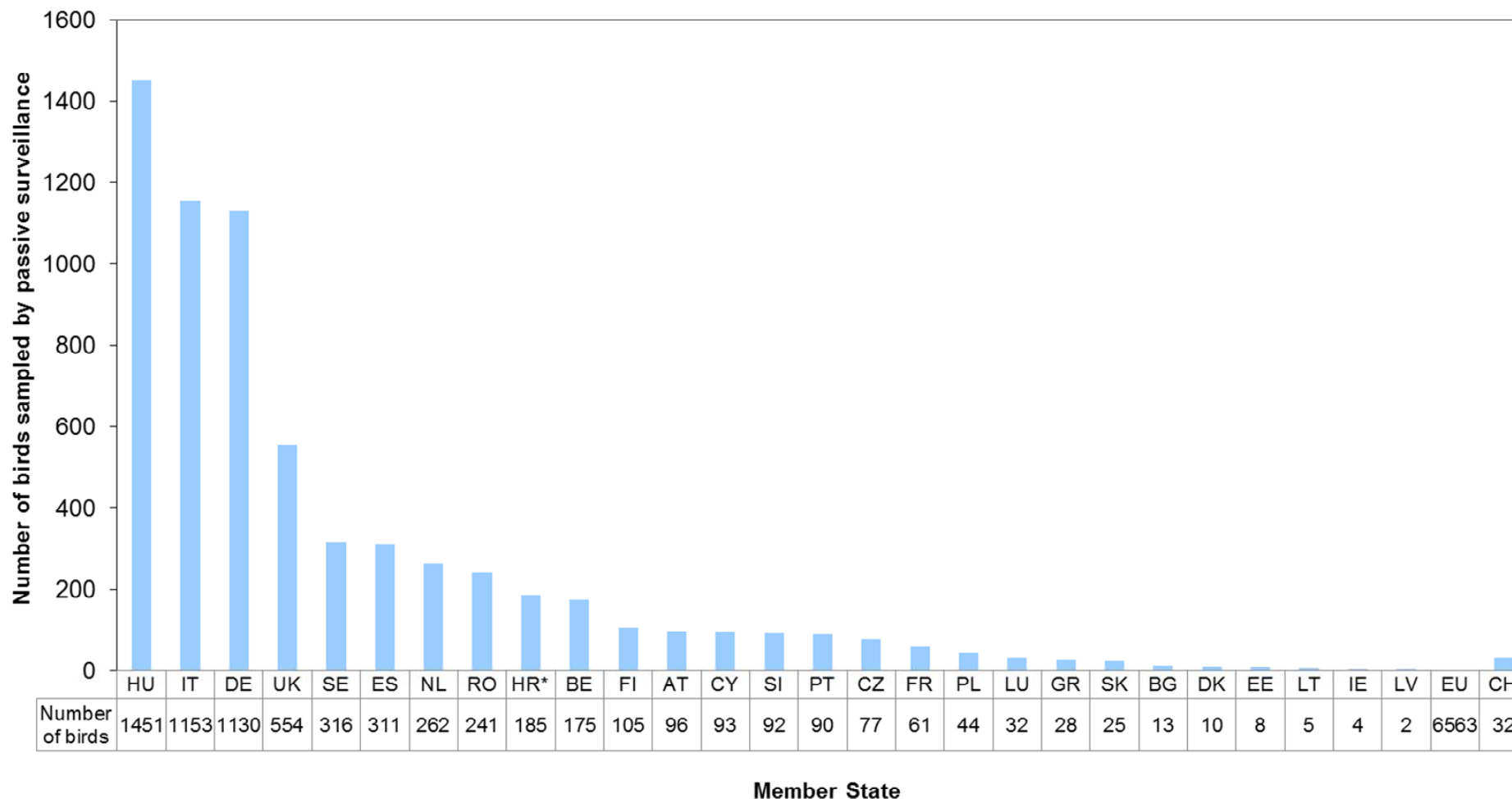


EU Wild Bird Surveillance, all Member States, 2006 - 2013

Total Number of Wild Birds Sampled by Passive Surveillance in EU

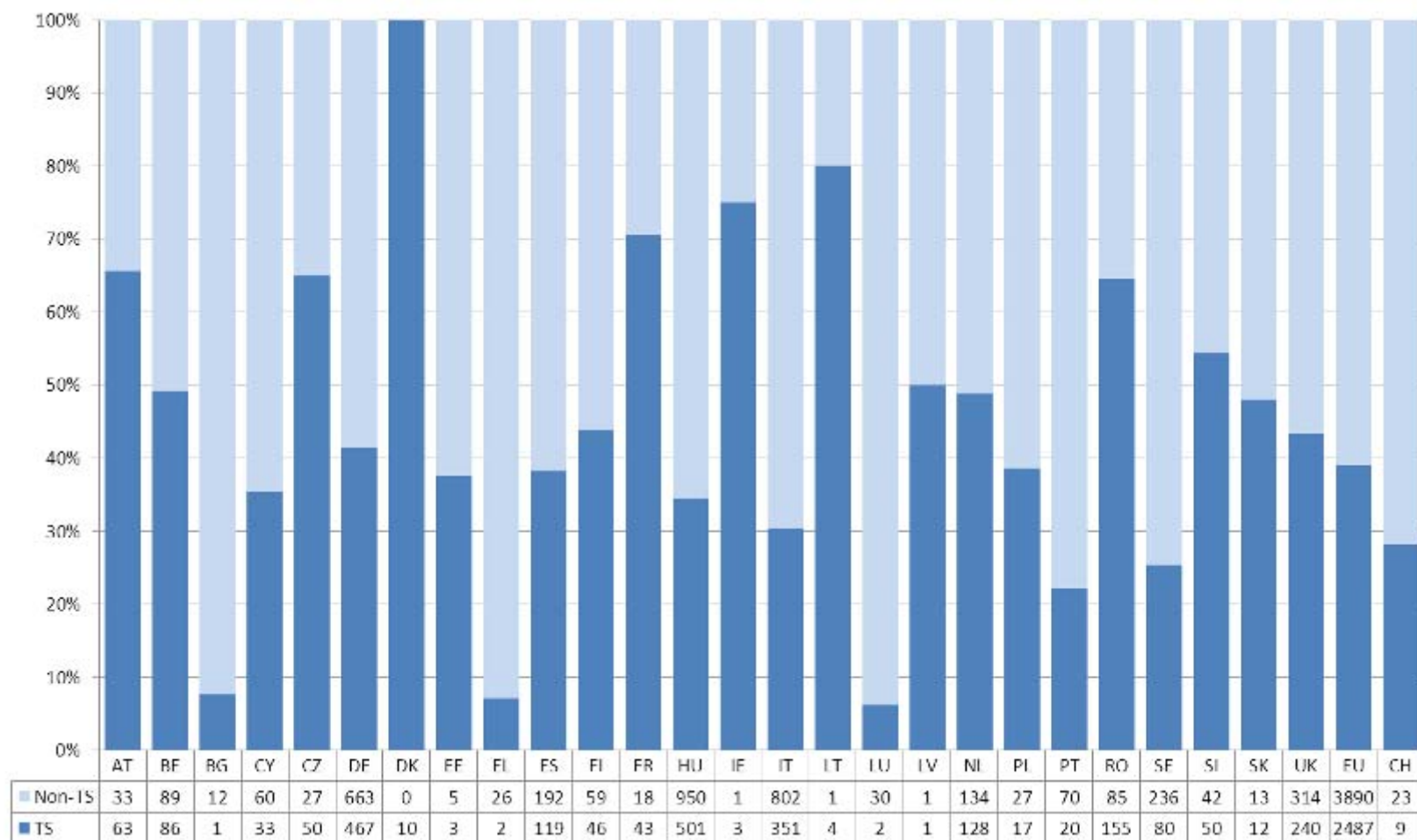


Number of wild birds sampled via passive surveillance by MS in 2013

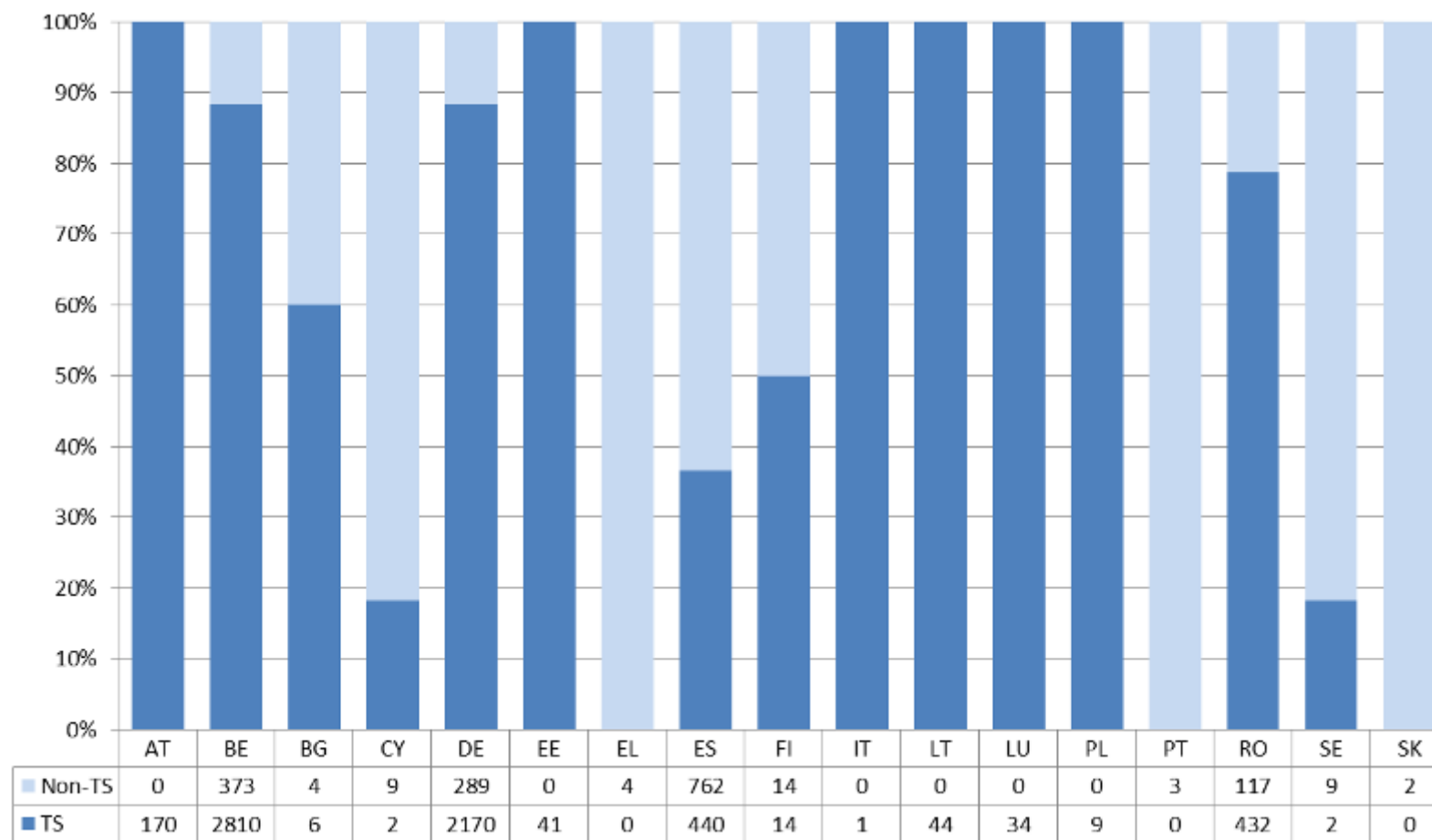


*Croatia (HR) joined the EU in July 2013

Proportion of Target Species sampled, by passive surveillance of wild birds by MS in 2013



Proportion of Target Species sampled, by active surveillance of wild birds by MS in 2013



Member State	Target number of birds to sample	Number of birds actually sampled in 2013	Surveillance design												
			EU Target Species	Location						Mass mortalities	Searching for birds	Collaboration with hunting or ornithological interest groups	General public	Temporal targeting	
				Proximity to water	Proximity of poultry holdings	Density of poultry holdings	Density of target species	Where HPAI found previously	Epi linked areas						Increased mortalities
AT	2,000	266	(1)												
BE	500	3,358	✓ (2)				✓				✓		✓	✓	
BG	210	23	✓								✓				
CY	250	116	(1)												
CZ	300	77	(3)	✓	✓			✓	✓	✓	✓				
DE	1,570	3,589	✓	✓			✓	✓							
DK	300	10	✓	✓	✓	✓									
EE	100	49	(4)												✓
EL	250	32	✓	✓		✓	✓	✓	✓			✓(5)	✓	✓	
ES	(1)	2,772	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	
FI	100	133	✓												
FR	1,000	61	(6)	✓			✓								
HU	1,400	1,451	✓	✓	✓			✓	✓	✓	✓				
IE	500	4	✓	✓		✓					✓		✓	✓	
IT	1,000	1,154	✓	✓	✓	✓			✓	✓	✓	✓(5)			
LT	100	49	✓	✓	✓					✓	✓		✓		
LU	40	66	(1)								✓				
LV	50	2	(7)												
MT	50	0	(8)										✓	✓	
NL	1,000	262	✓	✓	✓	✓			✓			✓(5)	✓	✓	
PL	100	53	✓	✓	✓				✓			✓(5)			
PT	350	93	✓	✓	✓		✓			✓			✓		
RO	240	790	✓	✓	✓	✓		✓	✓	✓		✓(5)	✓		
SE	1,000	327	(1)									✓(5)			
SI	200	92	✓	✓	✓	✓						✓(5)	✓		
SK	200	27	✓	✓	✓	✓				✓		✓(5)	✓		
UK	850	554	✓			✓	✓				✓	✓		✓	

If the H5N8 HPAI virus recently detected in poultry in Germany, the Netherlands and the United Kingdom were to be present in wild bird populations in the EU **and** cause significant morbidity or mortality, **then the passive surveillance activities of MS would have utility for the detection of this virus as part of an early warning system** first developed in 2006. The limited number of birds currently tested however is likely to result in a low sensitivity of the current surveillance system.

Summary

- Following the recent incidents involving detection of H5N8 HPAI in poultry in Germany, the Netherlands and the United Kingdom, the EURL have reviewed data available on the wild birds tested as part of the EU surveillance system from 2013, and preliminary data for 2014, in terms of spatial, temporal and species configuration. We have also included some ornithological data available in the public domain.
- A passive surveillance system (testing birds found dead or ill) for avian influenza in wild birds is in place in EU Member States (MS) according to Commission Decision 2010/367/EU with the objective of timely detection of HPAI of subtype H5N1.
- Infection with H5N8 HPAI lineage 2.3.4.6 has been found in many wild birds found dead in the Republic of Korea and also an apparently healthy wild mallard in eastern China (*Anas platyrhynchos*) over the last 12 months.
- Several of the species found infected with this lineage of H5N8 HPAI in East Asia also occur in Europe e.g. mallard, bean goose (*Anser fabalis*), white-fronted goose (*Anser albifrons*).

Summary (cont)

- Wild waterbird flyways from the areas affected in Asia are predominantly north-south in orientation and movement to EU MS of a significant number of these birds is highly unlikely. However, contiguous populations of some relevant species exist through this region and movements of wild birds in west and central Asia to EU MS are more likely e.g. Common Pochard (*Aythya ferina*).
- If this virus were to be present in wild bird populations in the EU and cause significant morbidity or mortality, the wild bird passive surveillance activities of MS would have utility for the detection of this virus.
- The sensitivity of the surveillance system in wild birds is likely to vary among MS and among regions within MS.
- While the sensitivity of the surveillance is not equivalent to the number of wild birds tested over a period of time, this measure is likely to be an indicator of sensitivity when considering the relevance of the species involved.
- Rapid evaluation indicates that the EU recommended diagnostic tests (Decision 2010/367/EU) for the detection of influenza A viruses and specifically H5 by PCR as prescribed in the EU AI diagnostic manual (Decision 2006/437/EC) are fit for purpose and will reliably detect H5N8 HPAI.

2014 Surveillance Data by species for Germany

Country	SurveillanceType	EU-Ring Code	Species	Submissions	Target Species
DE	Active	01860	Anas platyrhynchos	744	YES
DE	Active	01610	Anser anser	614	YES
DE	Active	01590	Anser albifrons	172	YES
DE	Active	01659	Anser spp.	152	NO
DE	Active	01680	Branta bernicla	136	YES
DE	Passive	02870	Buteo buteo	123	YES
DE	Active	01540	Cygnus cygnus	113	YES
DE	Passive	01860	Anas platyrhynchos	98	YES
DE	Passive	03940	Phasianus colchicus	88	NO
DE	Passive	06829	Columba sp.	85	NO
DE	Passive	01559	Cygnus sp.	82	YES
DE	Passive	02919	Buteo spp.	65	NO
DE	Active	01559	Cygnus sp.	63	YES
DE	Active	01670	Branta leucopsis	63	YES
DE	Active	01530	Cygnus columbianus	60	YES
DE	Active	01660	Branta canadensis	55	YES
DE	Active	05820	Larus ridibundus	50	YES
DE	Passive	01949	Anas sp.	48	NO
DE	Passive	16490	Carduelis chloris	43	NO
DE	Active	06009	Larus sp.	40	NO
DE	Active	01520	Cygnus olor	38	YES
DE	Passive	11870	Turdus merula	31	NO

2014 Surveillance Data by species for the United Kingdom

Country	SurveillanceType	EU-Ring Code	Species	Submissions	Target Species
UK	Passive	00000	Species unknown	82	NO
UK	Passive	01860	Anas platyrhynchos	72	YES
UK	Passive	01520	Cygnus olor	56	YES
UK	Passive	02870	Buteo buteo	26	YES
UK	Passive	06360	Alca torda	22	NO
UK	Passive	05820	Larus ridibundus	20	YES
UK	Passive	01540	Cygnus cygnus	19	YES
UK	Passive	01660	Branta canadensis	19	YES
UK	Passive	02390	Milvus milvus	18	YES
UK	Passive	02919	Buteo spp.	15	NO
UK	Passive	01949	Anas sp.	13	NO
UK	Passive	05920	Larus argentatus	10	NO

2014 Surveillance Data by species for the Netherlands

Country	SurveillanceType	EU-Ring Code	Species	Submissions	Target Species
NL	Passive	06340	Uria aalge	12	NO
NL	Passive	01520	Cygnus olor	7	YES
NL	Passive	00020	Gavia stellata	7	NO
NL	Passive	01860	Anas platyrhynchos	5	YES
NL	Passive	05920	Larus argentatus	5	NO
NL	Passive	00090	Podiceps cristatus	4	YES
NL	Passive	05820	Larus ridibundus	3	YES
NL	Passive	01220	Ardea cinerea	3	YES
NL	Passive	04290	Fulica atra	3	YES
NL	Passive	15390	Garrulus glandarius	3	NO

Acknowledgements

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 - Epi – Andrew Breed, Adam Brouwer

Thank you for your attention

<http://flu-lab-net.eu/>