Surveillance for Avian Influenza in the European Union in 2015

EU Reference Laboratory for Avian Influenza,
APHA-Weybridge, UK

Animal &
Plant Health
Agency

Overview

- 2015 surveillance programme in
  - Poultry
  - Wild birds

- Additional epidemiological analyses at the EURL

http://ec.europa.eu/food/animals/animal-diseases/control-measures/avian-influenza/index_en.htm

Annual Report

on surveillance for avian influenza in poultry and in wild birds in Member States of the European Union in 2014

Animal & Plant Health Agency

Health and Food Safety

Annual Report

on surveillance for avian influenza in poultry and in wild birds in Member States of the European Union in 2013

Animal & Plant Health Agency

Health and Consumers

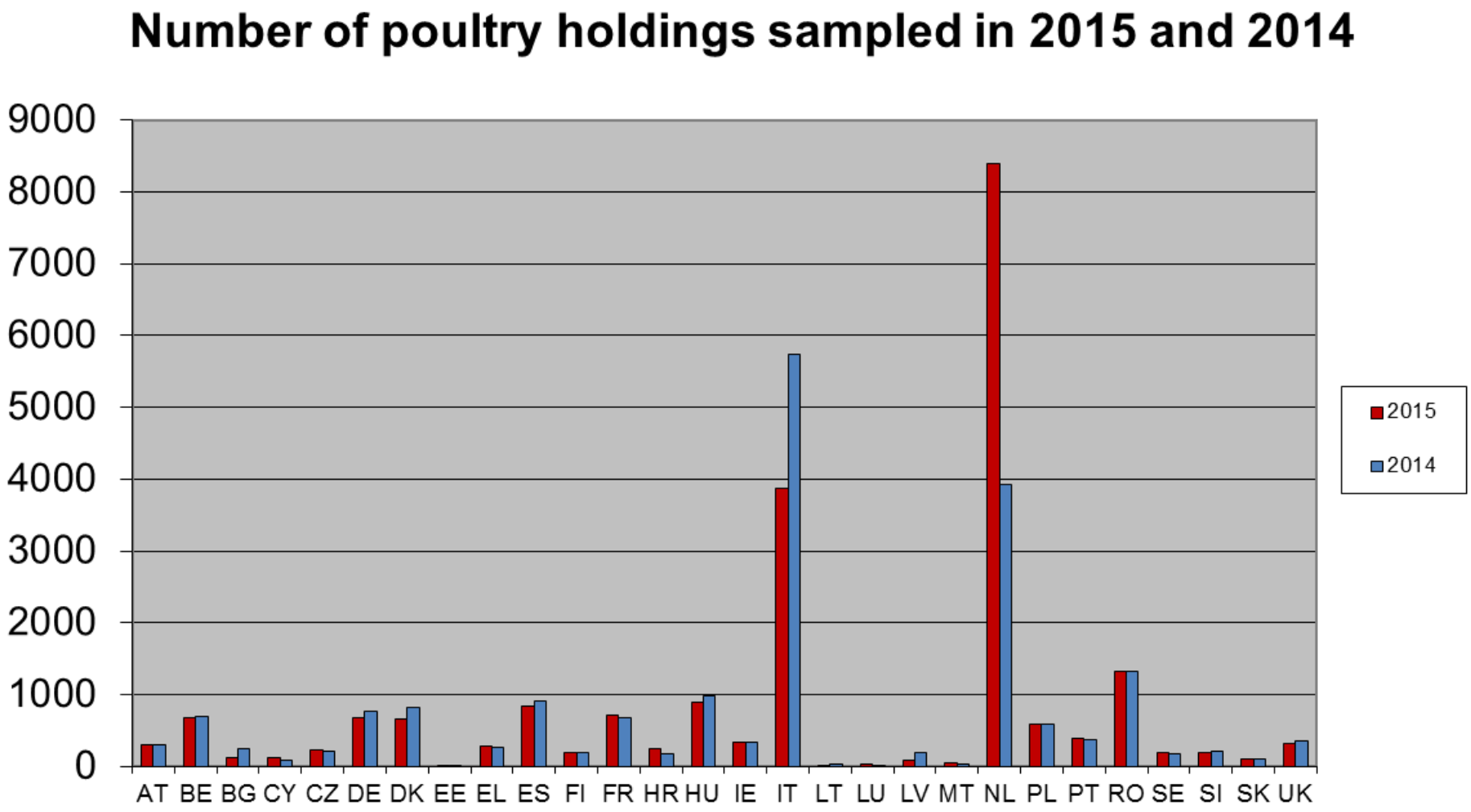
Surveillance for AI in Poultry in EU

- Objectives
  - Inform the competent authority of circulating avian influenza virus with a view to controlling the disease
  - Primarily serological surveillance for detection of evidence of exposure to AI of subtypes H5 and H7
  - Complement early detection systems (scanning/passive surveillance)

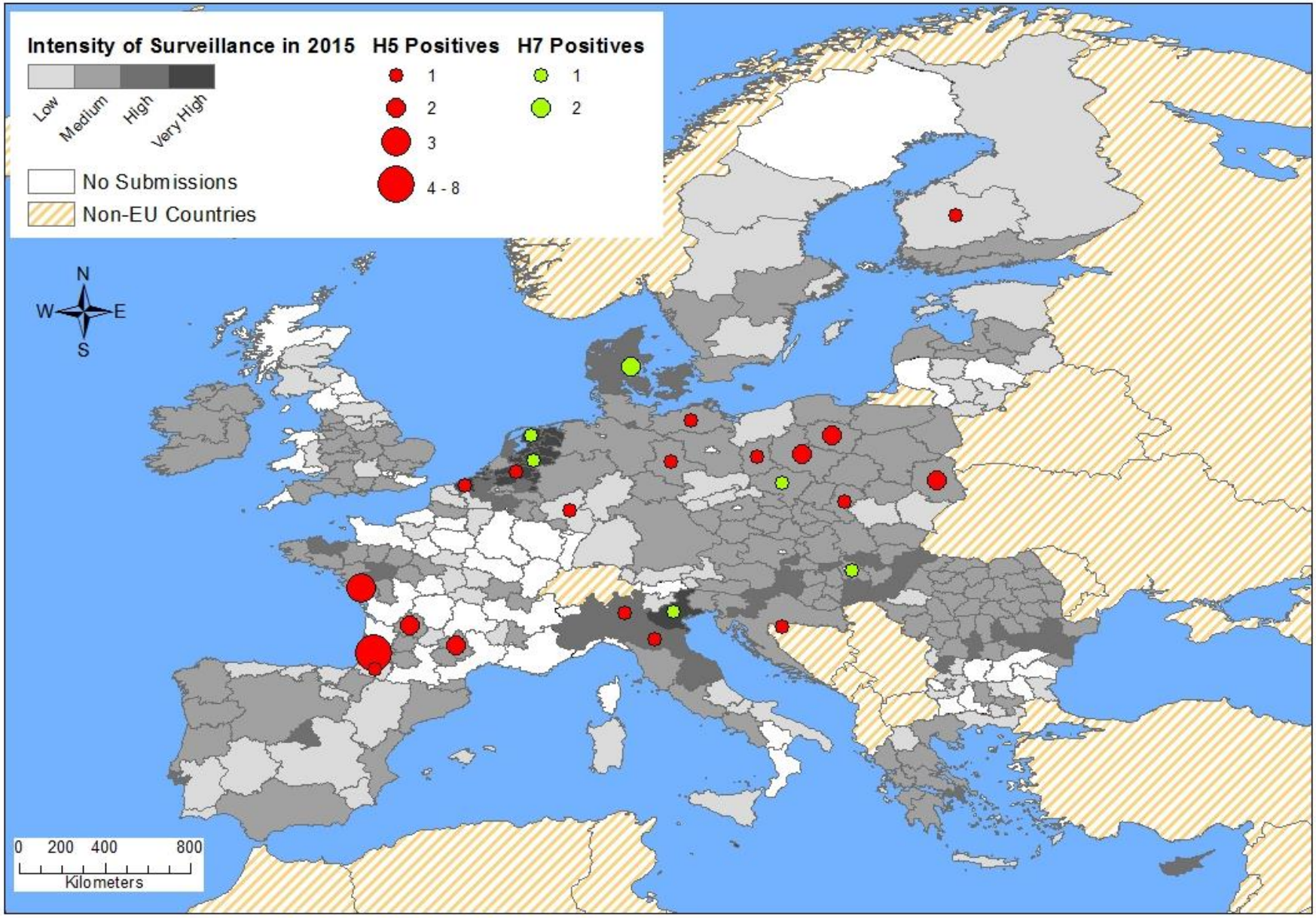
Poultry 2015 – Results

- 21,867 poultry holdings sampled by 28 MS (in 2014 19,813)
- Number of holdings sampled varied by MS from 7 – 8,395

Poultry 2015 – Results



2015 Poultry - Results



Poultry 2015 – Results (2014 blue)

33 (38) H5 seropositive holdings:

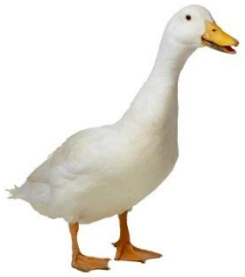
- Breeder Geese: 13 (9) in FR and PL
- Fattening Ducks: 7 (11) in BE, DE and FR
- Breeder Ducks: 6 (7) in FR
- Others: 4 (0) in DE and IT
- Free-range Laying Hens: 1 (4) in NL
- Fattening Geese: 1 (2) in FI
- Backyard Flocks: 1 (0) in HR
- Chicken Breeders: 0 (2)
- Conventional Laying Hens: 0 (2)
- Ratites: 0 (1)

Poultry 2015 – Results

Epidemiological follow up investigations following an H5 seropositive result

H5 seropositive holdings	Number of holdings	% of total H5 seropositives
Following H5 seropositive result, epidemiological follow-up visit 'Done'	**26**	**78.8**
Done: H5 detected by virological testing	8	24.2
Done: No detection by virological testing	18	54.5
Following H5 seropositive result, epidemiological follow-up visit 'Not done'	**7**	**21.2**
Not done: Sampling at slaughter	1	3.0
Not done: Birds slaughtered/killed	5	15.2
Not done: Other reason (Zoological collection)	1 (1)	3.0
Total number of H5 seropositive holdings	**33**	**100**

Poultry 2015 – Results (2014 blue)



7 (5) H7 seropositive holdings:

- Free-range Laying Hens: 3 (0) in DK and NL
- Breeder Geese: 2 (1) in HU and PL
- Backyard Flocks: 1 (0) in IT
- Farmed Game Birds (waterfowl): 1 (0) in DK
- Conventional Laying Hens: 0 (2)
- Others: 0 (2)

Poultry 2015 – Results

Epidemiological follow up investigations following a H7 seropositive result

H7 seropositive holdings	Number of holdings	% of total H7 seropositives
Following H7 seropositive result, epidemiological follow-up visit 'Done'	**7**	**100**
Done: H7 detected by virological testing	3	42.9
Done: No detection by virological testing	4	57.1
Following H7 seropositive result, epidemiological follow-up visit 'Not done'	**0**	**0**
Total number of H7 seropositive holdings	**7**	**100**

Poultry 2015 – Results

Summary

- Number of H5 seropositive holdings (33) was similar to 2014 (38).
- High proportion of detections in Ducks and Geese as in previous years.
- 26 H5 seropositive holdings underwent follow up testing and 8 were H5 virus positive.

- Number of H7 seropositive holdings (7) was similar to 2014 (5)
- Detections in Free-range Laying Hens, Breeder Geese, Backyard Flocks and Farmed Game Birds (waterfowl)
- All 7 H7 seropositive holdings underwent follow up testing and 3 were H7 virus positive.

- Surveillance effective in detection of H5 and H7 virus exposure and infection where clinical indicators may not trigger detection by other methods.

Passive surveillance for AI in wild birds in EU 2015

Objectives (2010/367/EU)

Timely detection of HPAI of the subtype H5N1 in wild birds in order to protect poultry and safeguard veterinary public health.

a) Risk based passive surveillance

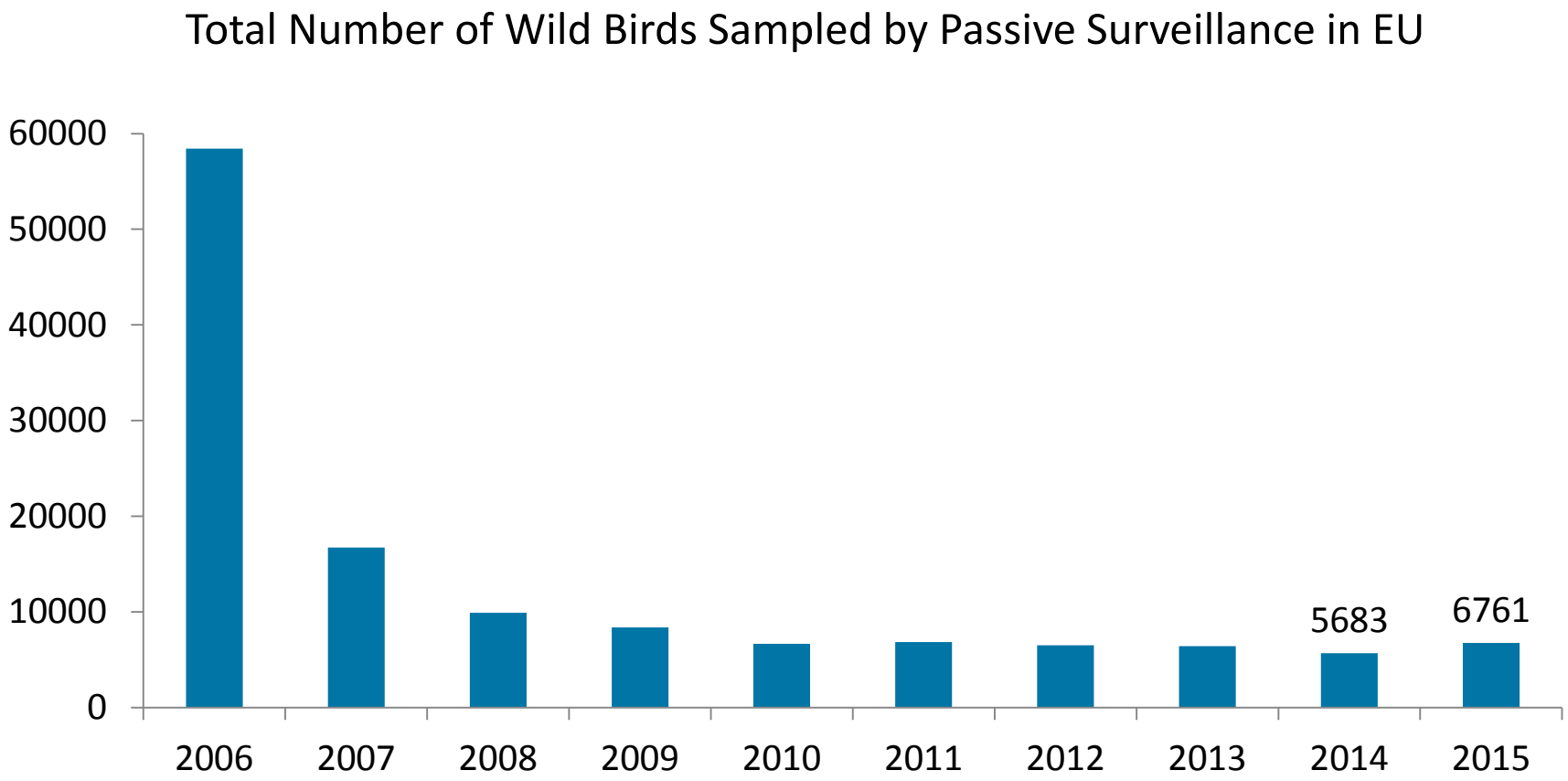
b) Target species to be prioritised

c) Areas close to water bodies and high density poultry holding areas targeted

d) Epidemiologists, ornithologists and conservationists to be consulted

e) Enhanced surveillance to be implemented if the epidemiological situation requires.

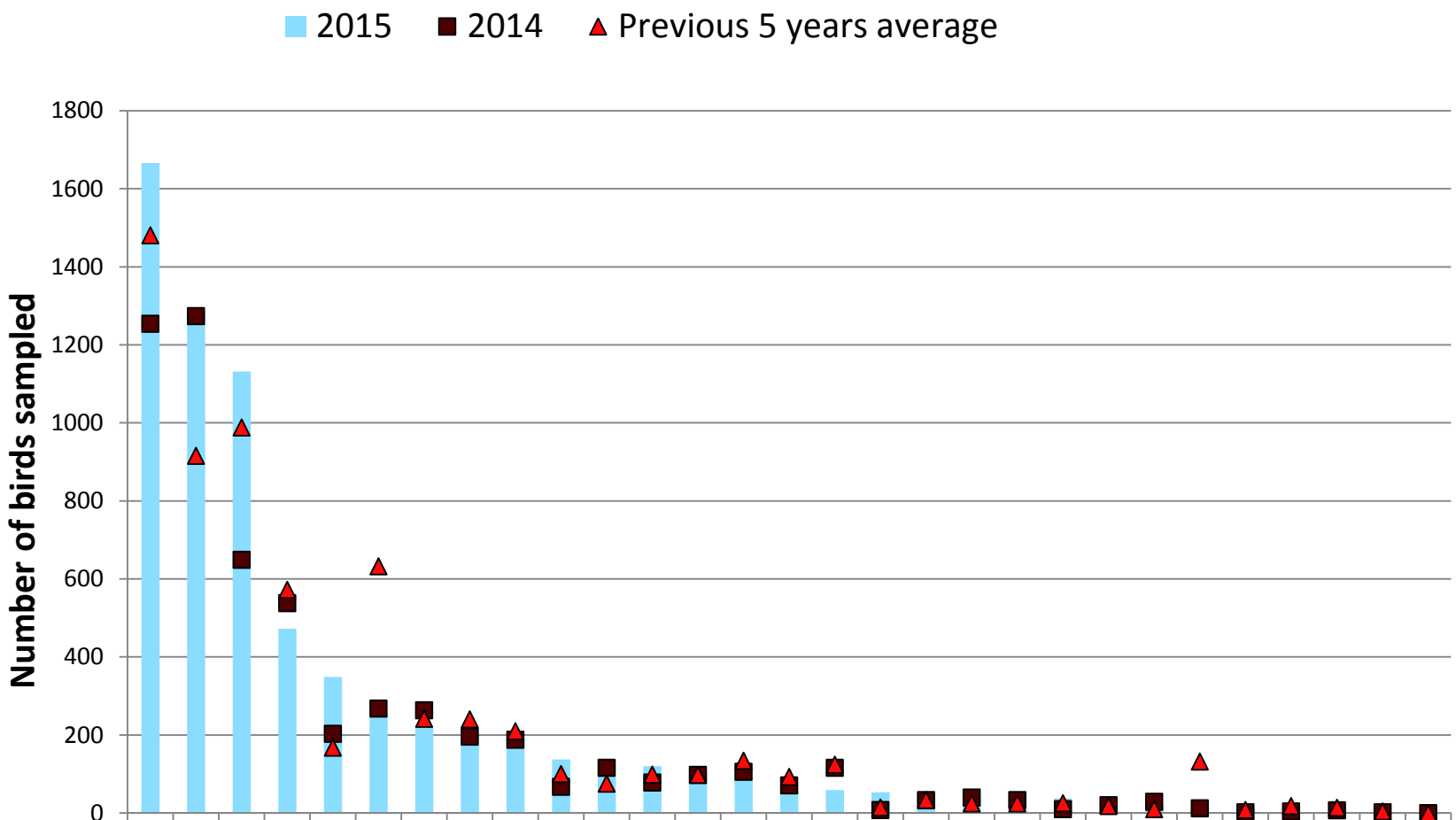
Passive surveillance for AI in wild birds in EU 2015



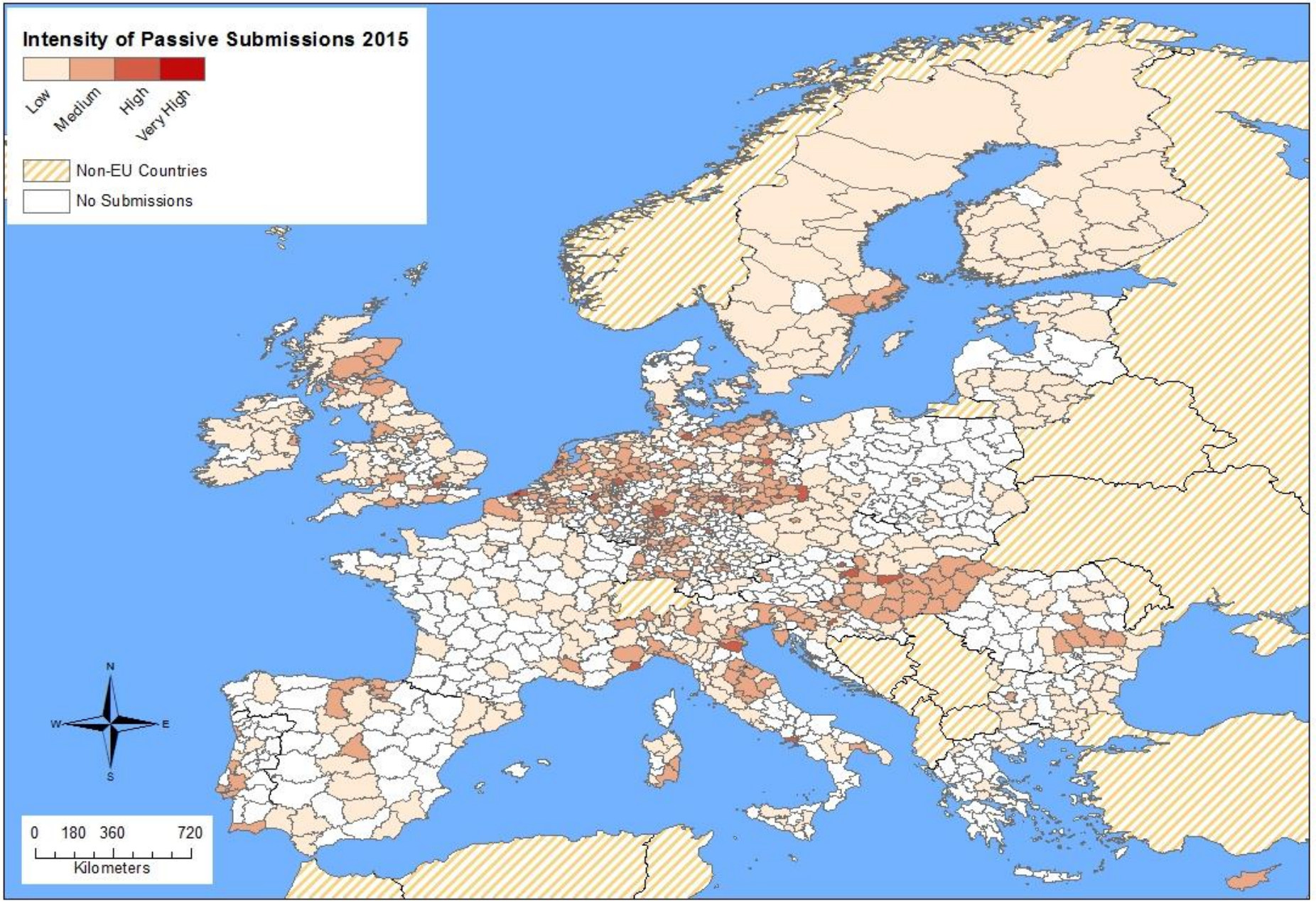
~19% more than 2014

5.2% more than 5 year average (one-side p-value=0.0185)

Passive surveillance for AI in wild birds in EU 2015



	DE	HU	IT	UK	BE	ES	SE	NL	RO	AT	PT	FR	FI	SI	CZ	CY	BG	HR	PL	IE	DK	SK	LT	GR	EE	LU	CH	LV	MT
2015	166	128	113	472	349	256	219	197	193	137	134	120	102	92	60	59	53	48	40	37	37	26	21	11	9	1	1	0	0
2014	125	127	649	538	203	268	263	196	188	67	116	78	98	106	71	116	8	33	40	33	10	20	29	12	2	4	7	2	0
Previous 5 years average	148	916	988	572	168	632	242	240	209	100	75	98	98	134	93	124	14	33	24	24	25	18	10	132	7.4	18	13	4.3	0



Intensity of sampling by **PASSIVE** surveillance (birds found dead, injured or live with clinical signs) in EU MS in 2014.

Passive surveillance for AI in wild birds in EU 2015

6,761 Birds sampled in 2015 - belonging to 24 Orders and 263 species

The most frequently sampled Orders

Order	2015
Anseriformes	1893
Passeriformes	1068
Falconiformes	966
Charadriiformes	750
Columbiformes	622
Galliformes	442

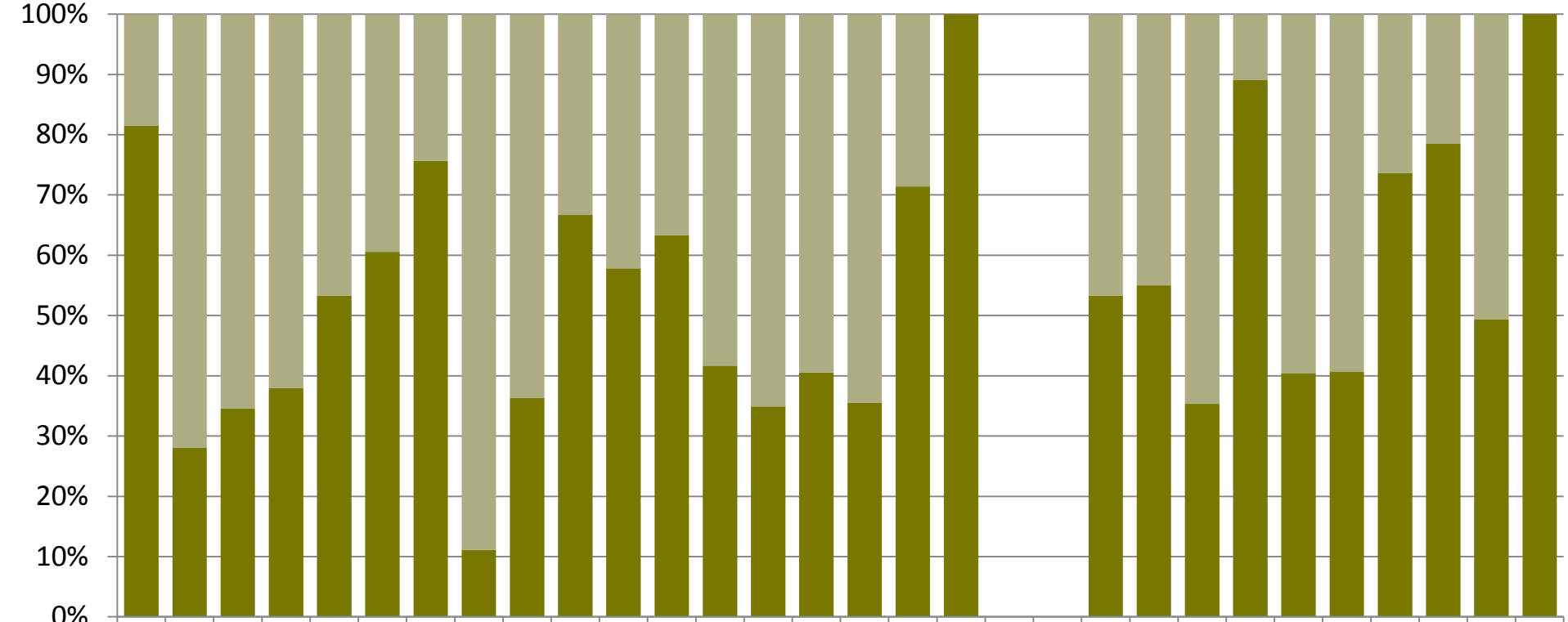
Passive surveillance for AI in wild birds in EU 2015

6,417 Birds sampled in 2013 - belonging to 24 Orders and 263 species

The most frequently sampled Orders

Order	2015 (% change)	2014	2013
Anseriformes	1893 (+12)	1684	1408
Passeriformes	1068 (+4)	1027	1343
Falconiformes	966 (+61)	559	757
Charadriiformes	750 (+40)	534	558
Columbiformes	622(+20)	518	628
Galliformes	442 (-21)	200	757

Proportion of birds sampled by passive surveillance that were Target Species



	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU	CH
non-TS	24	251	34	36	28	500	9	8	7	82	43	44	28	839	22	691	6	0	0	0	92	9	86	21	127	54	5	92	313	0
TS	106	98	18	22	32	768	28	1	4	164	59	76	20	450	15	381	15	1	0	0	105	11	47	171	86	37	14	336	306	1

About half of the birds sampled (49.4%) were Target Species

Passive surveillance for AI in wild birds in EU 2015 – preliminary results

The most frequently sampled species

Species	2015
Anas platyrhynchos	735
Phasianus colchicus	376
Cygnus olor	349
Buteo buteo	324
Larus argentatus	306
Falco tinnunculus	198
Streptopelia decaocto	154

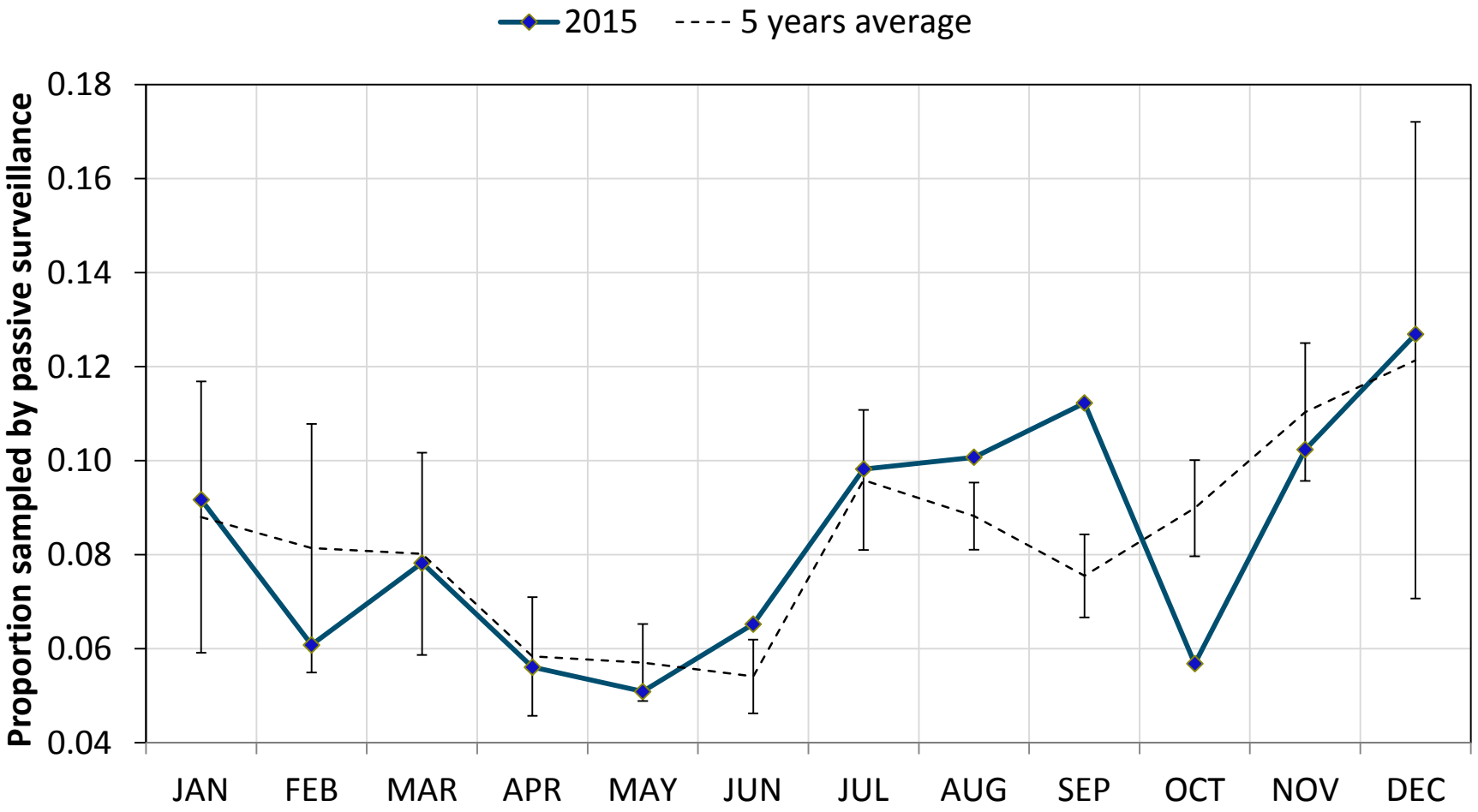
Passive surveillance for AI in wild birds in EU 2015 – preliminary results

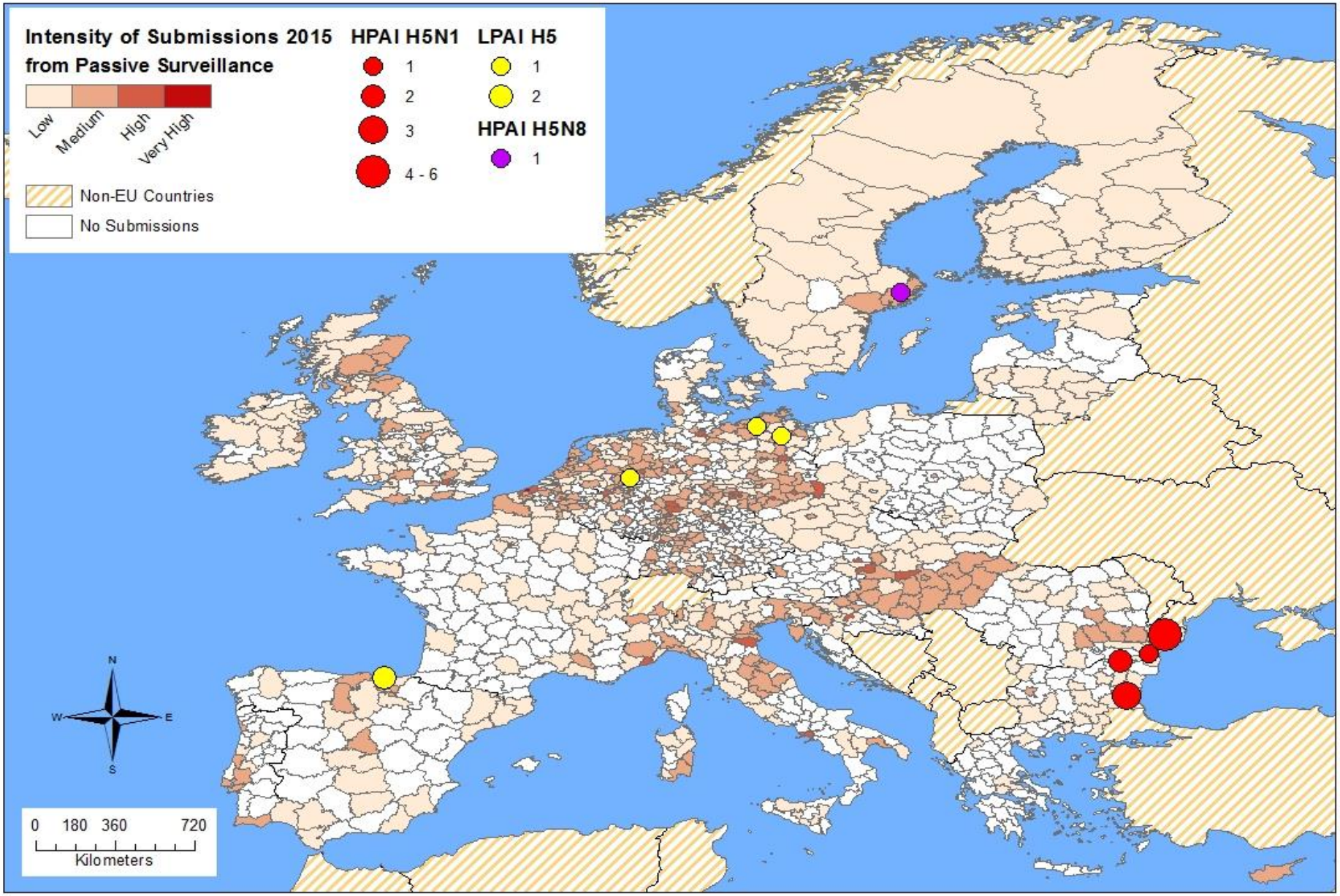
The most frequently sampled species

Species	2015 (% change)	2014	2013
Anas platyrhynchos	735 (-6)	785	652
Phasianus colchicus	376 (-24)	496	526
Cygnus olor	349 (+27)	274	288
Buteo buteo	324 (+128)	142	262
Larus argentatus	306 (+120)	139	163
Falco tinnunculus	198 (+78)	111	100
Streptopelia decaocto	154 (+66)	106	141

Passive surveillance for AI in wild birds in EU 2015

Temporal pattern





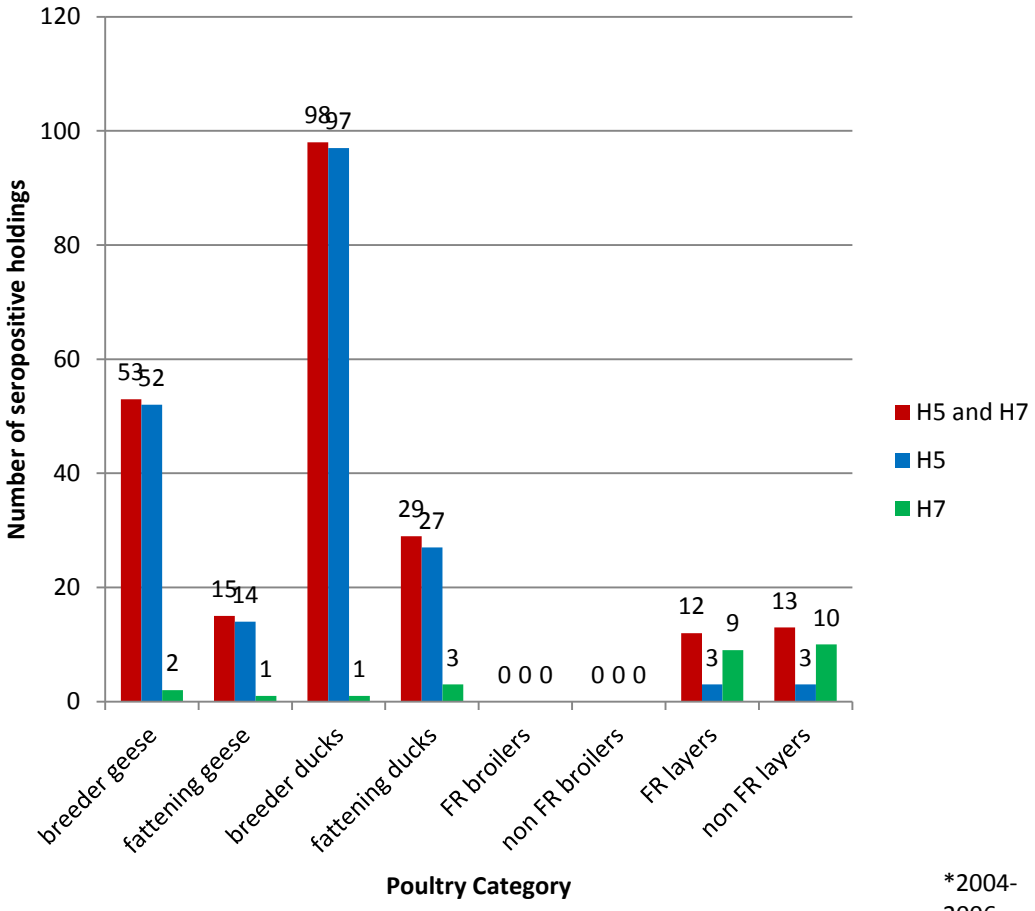
Detections of Avian Influenza by **PASSIVE** surveillance (birds found dead, injured or live with clinical signs) in EU MS in 2015.

Wild bird surveillance summary

- Multiple detections of HPAI in 2015 - H5N8 (2.3.4.4) and H5N1 (2.3.2.1c)
- HPAI detected via passive and active surveillance - EFSA activity
- HPAI 2.3.4.4 clade virus detections in wild birds in 2016 in Russia (June) and North America (August)
- Winter 2016/17??

Additional epidemiological analyses:

- Analysis of seropositive findings - poultry type (free range and non free range LH), Member State, year

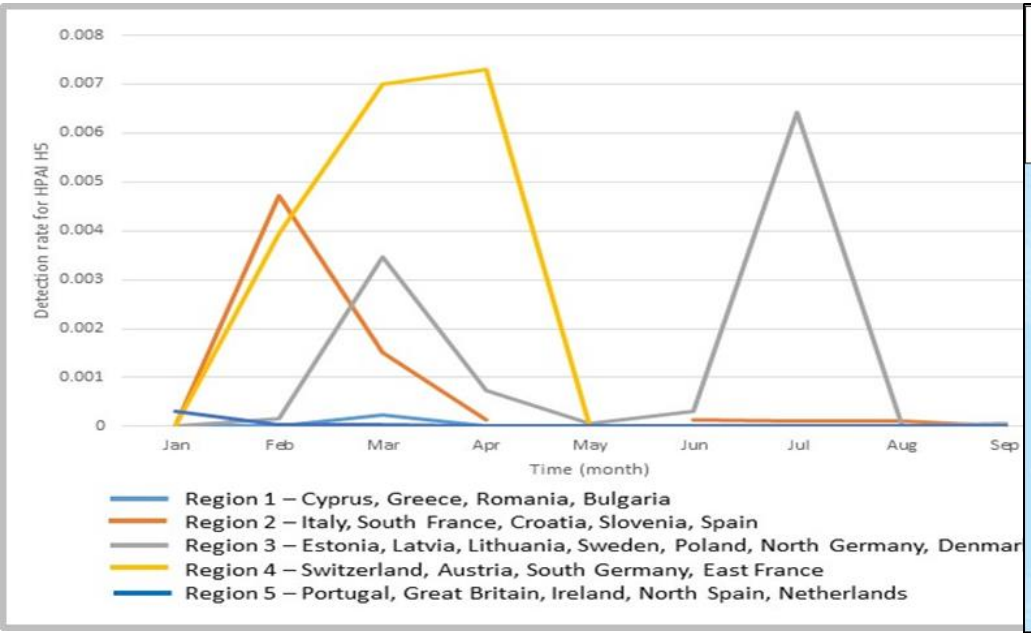


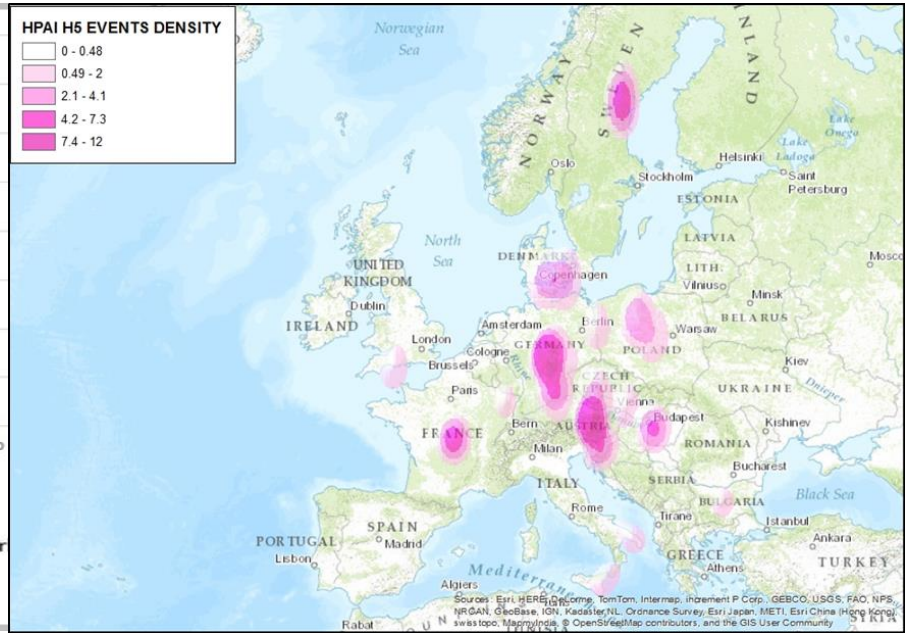
*2004-2006

	H5 adjusted OR:	95% CI[1]	H7 adjusted OR:	95% CI[1]
Year				
2004	1		1	
2005	1.26	0.81, 1.98	**0.17**	**0.07, 0.45**
2006	1.25	0.80, 1.95	**0.26**	**0.13, 0.54**
2007	1.48	0.78, 2.80	**0.17**	**0.09, 0.35**
2008	1.47	0.79, 2.77	**0.11**	**0.06, 0.23**
2009	1.65	0.87, 3.12	**0.20**	**0.11, 0.36**
2010	1.36	0.72, 2.57	**0.07**	**0.03, 0.16**
Poultry category[2]				
Chicken Breeders	0.5	0.08, 3.06	**0.26**	**0.07, 0.98**
Broilers	-[3]		**0.20**	**0.04, 0.99**
Laying-hens	2.27	0.48, 10.7	**0.14**	**0.03, 0.67**
Non-free-range laying-hens	1		1	
Ratites	**8.78**	**1.75, 44**	0.30	0.04, 2.45
Free-range laying-hens	1.70	0.34, 8.49	2.80	1.00, 7.85
Fattening turkeys	1.90	0.45, 8.00	**1.97**	**1.02, 3.81**
Other	**9.91**	**2.60, 38**	**2.66**	**1.11, 6.36**
Backyard flocks	2.04	0.45, 9.20	**5.36**	**2.67, 10.7**
Game birds	**16.9**	**4.84, 59**	1.60	0.70, 3.65
Fattening Ducks	**29**	**8.25, 99**	2.65	0.73, 9.59
Fattening Geese	**67**	**18.3, 249**	1.88	0.26, 13.6
Ducks & Geese	**105**	**28, 394**	**4.04**	**1.64, 9.95**
Breeder Ducks	**148**	**44, 497**	3.14	0.40, 25
Breeder Geese	**343**	**102, 1148**	**13.2**	**2.79, 62**
EU member state[3]:				
Romania	**0.06**	**0.01, 0.21**	-[4]	
Netherlands	**0.16**	**0.05, 0.60**	1.45	0.35, 6.03
Poland	**0.29**	**0.13, 0.69**	1.66	0.17, 16.0
Spain	**1**		1	
Germany	**0.42**	**0.19, 0.92**	2.78	0.63, 12.3
Ireland	1.62	0.21, 12.5	-[4]	
Italy	**0.26**	**0.13, 0.52**	**20**	**7.77, 52**
UK	1.57	0.83, 2.97	**10.9**	**2.69, 44**
Czech Republic	2.03	0.96, 4.32	-[4]	
Finland	2.92	0.96, 8.91	-[4]	
Sweden	**3.72**	**1.59, 8.72**	**20**	**4.01, 99**
Denmark	**3.09**	**1.67, 5.72**	**30**	**9.01,995**
Belgium	**5.62**	**2.83, 11.1**	**15.3**	**4.09, 57**
France	**5.53**	**3.31, 9.22**	3.45	0.95, 12.5

Additional epidemiological analyses:

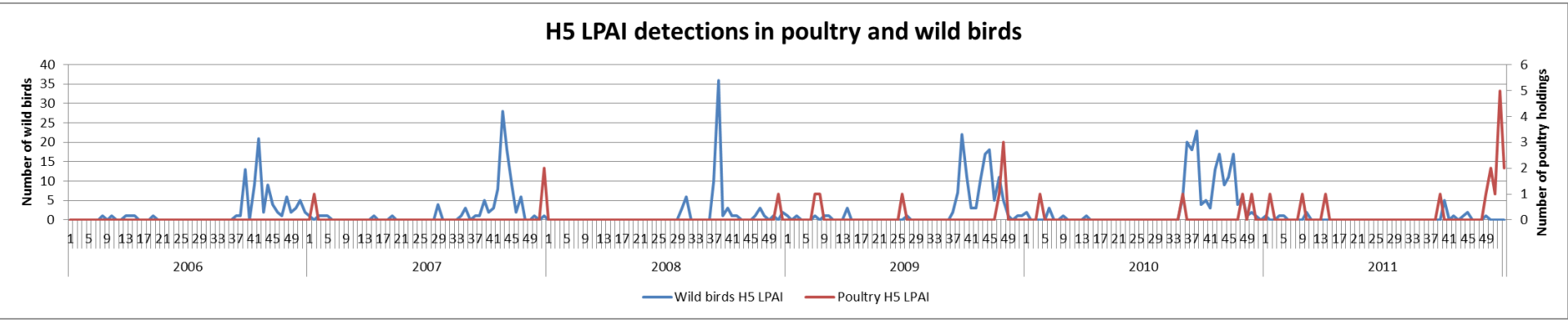
- Analysis of seropositive findings - poultry type (free range and non free range LH), Member State, year
- Analysis of patterns of detection of HPAI and H5 and H7 LPAI in wild birds





Additional epidemiological analyses:

- Analysis of seropositive findings - poultry type (free range and non free range LH), Member State, year
- Analysis of patterns of detection of HPAI and H5 and H7 LPAI in wild birds
- Interface between wild birds and poultry (can detections in one population inform detections in another??)



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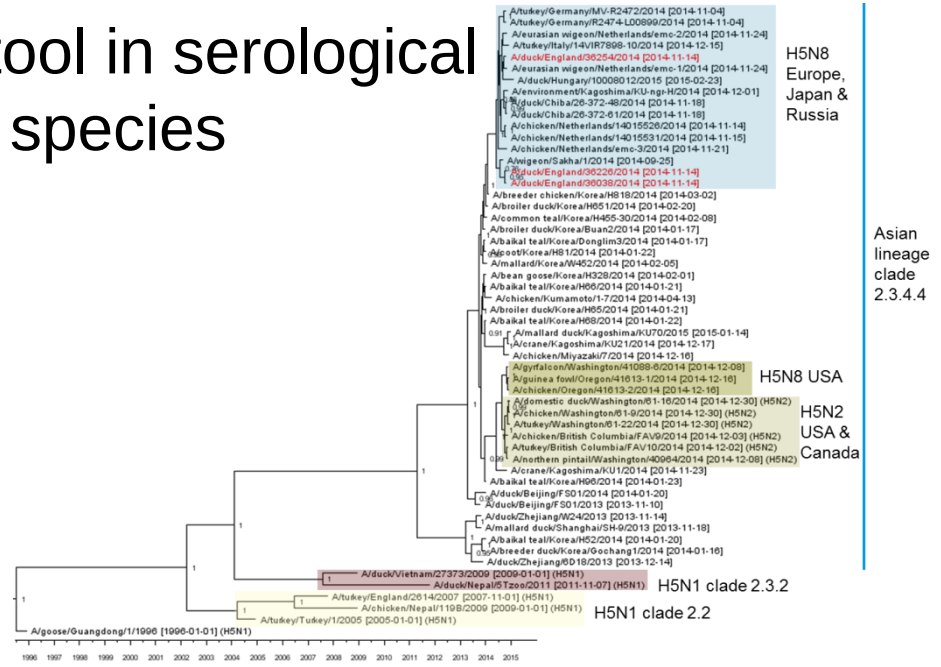
- Analysis of patterns of detection of HPAI and H5 and H7 LPAI in wild birds
- Interface between wild birds and poultry (can detections in one population inform detections in another??)
- Use of ELISA as a screening tool in serological surveillance in various poultry species
- Phylogenetics



Acknowlegements

- Support and contribution from all participating National Reference Laboratories and competent veterinary authorities in Member States

Thank you for your attention

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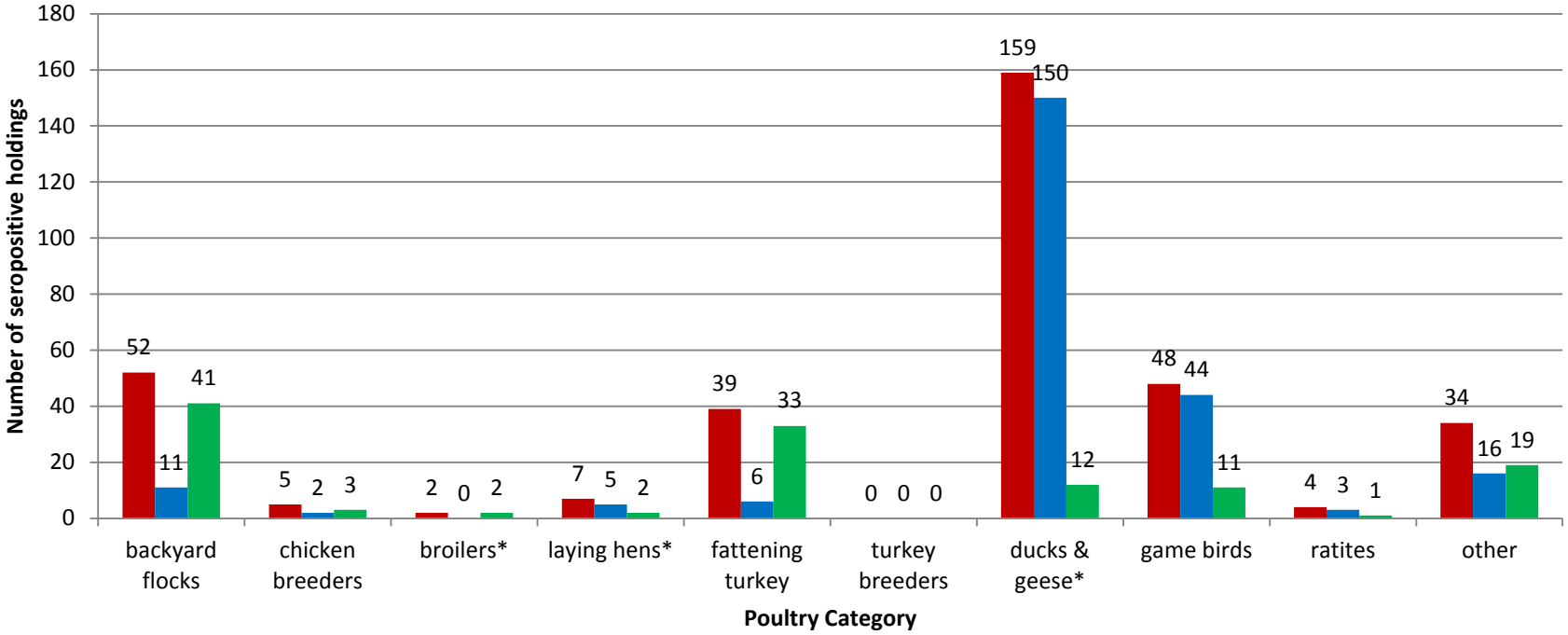
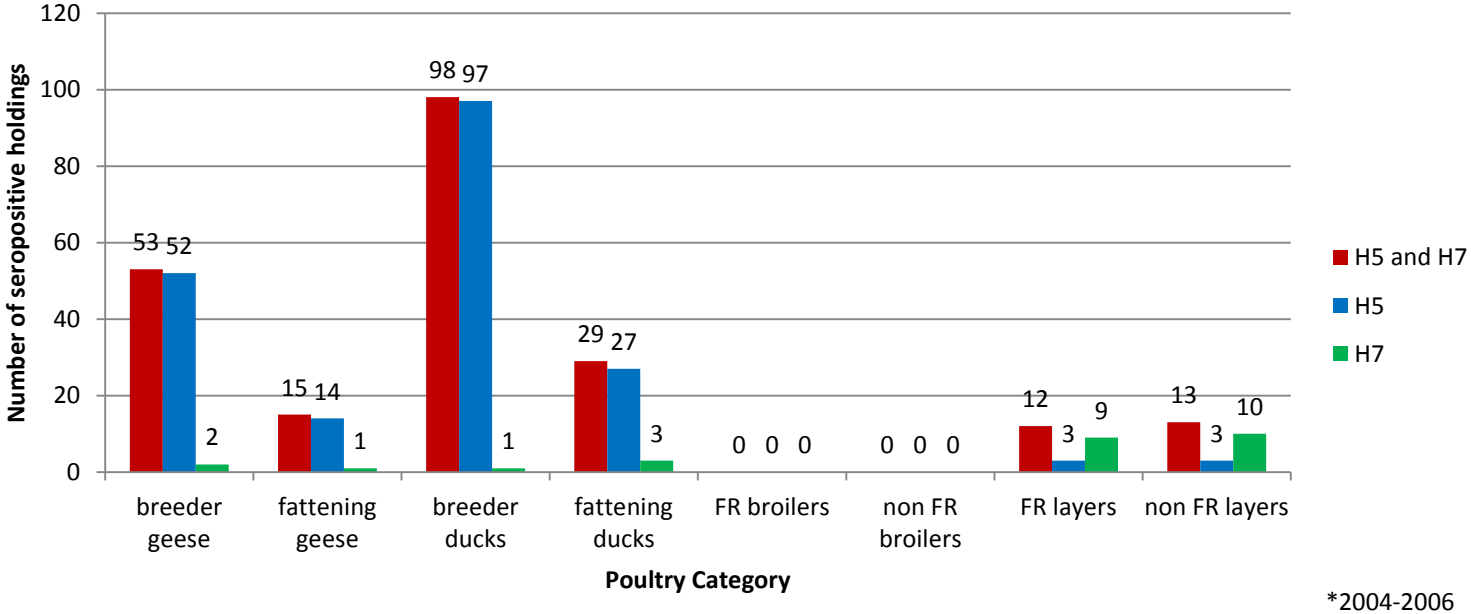
Plant Health
Agency

Avian Influenza surveillance seropositive holdings, by poultry type





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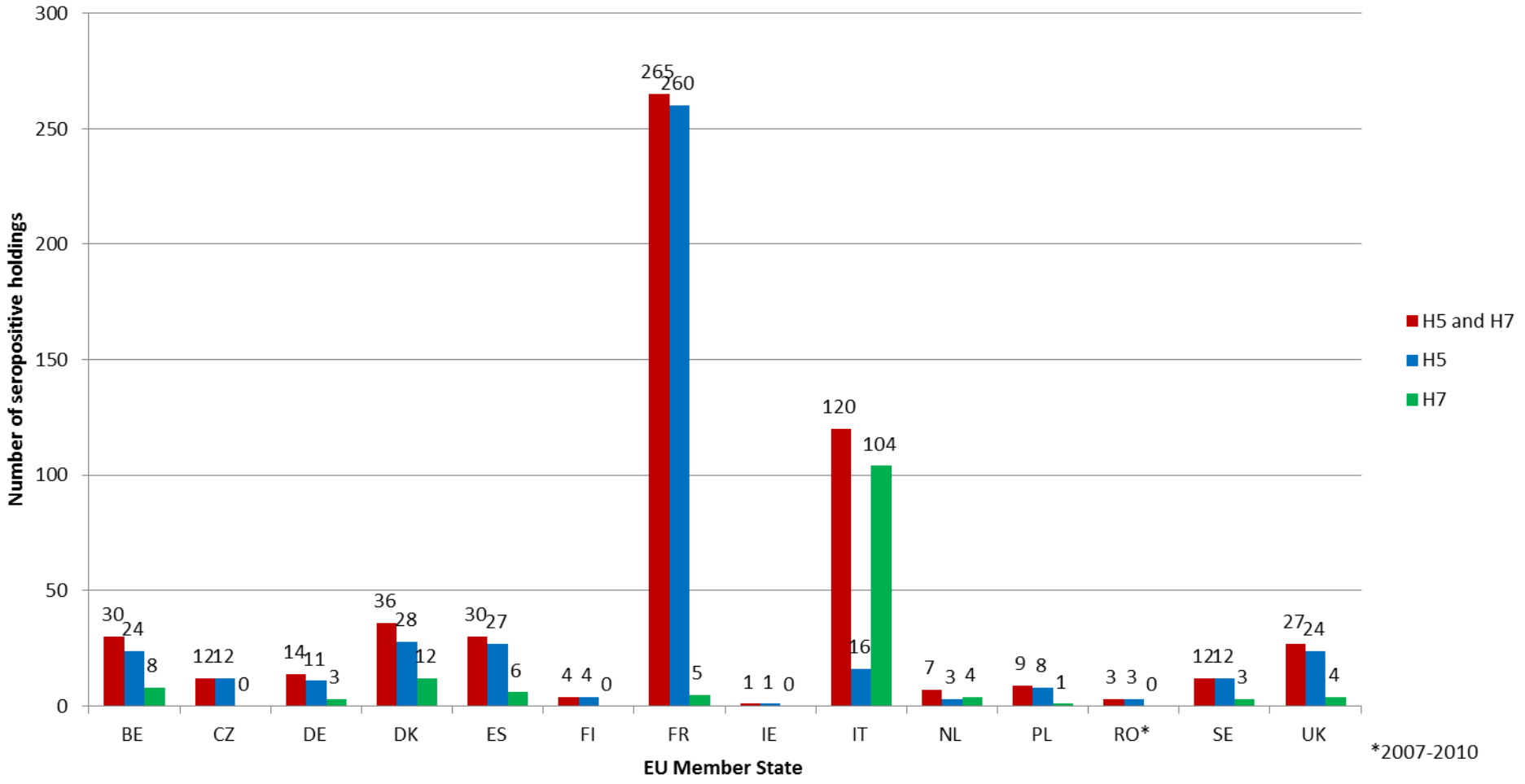
H5 and H7 Avian Influenza surveillance in poultry seropositive holdings, by Member State



Some variation in surveillance design among MS – e.g. risk-based

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Multivariable associations with H5 and H7 exposure

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	adjusted OR:	95% CI[1]	adjusted OR:	95% CI[1]
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Poland	**0.29**	**0.13, 0.69**	1.66	0.17, 16.0
Spain	**1**		1	
Germany	**0.42**	**0.19, 0.92**	2.78	0.63, 12.3
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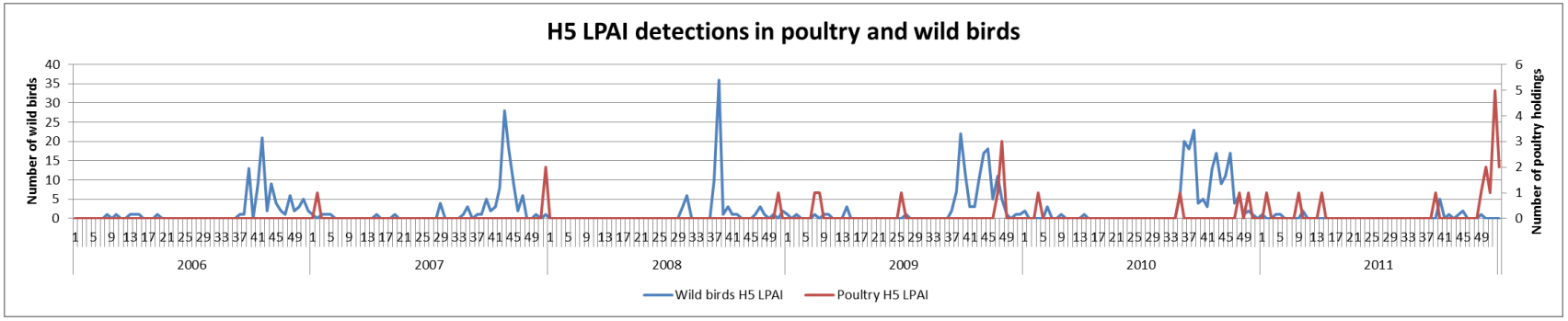
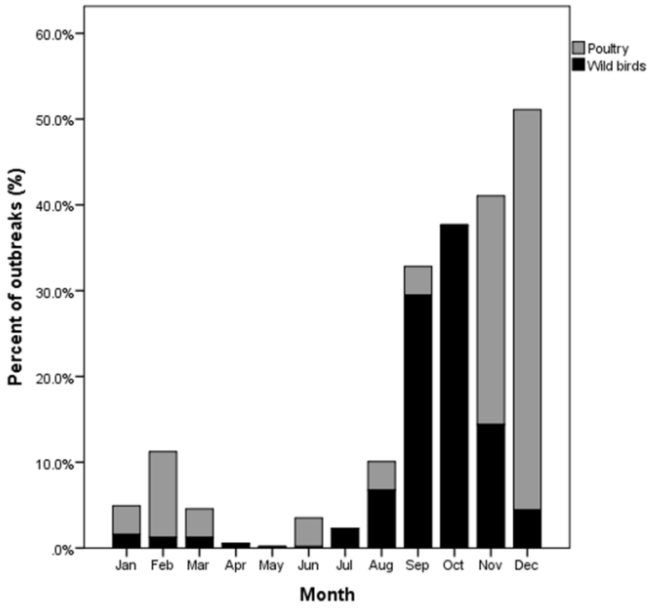
Belgium	**5.62**	**2.83, 11.1**	**15.3**	**4.09, 57**
France	**5.53**	**3.31, 9.22**	3.45	0.95, 12.5

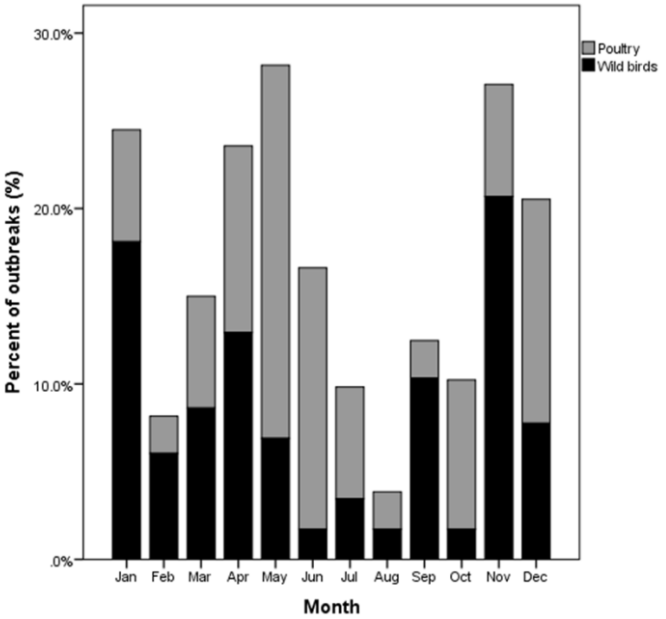
The interface between poultry and wild birds - preliminary results



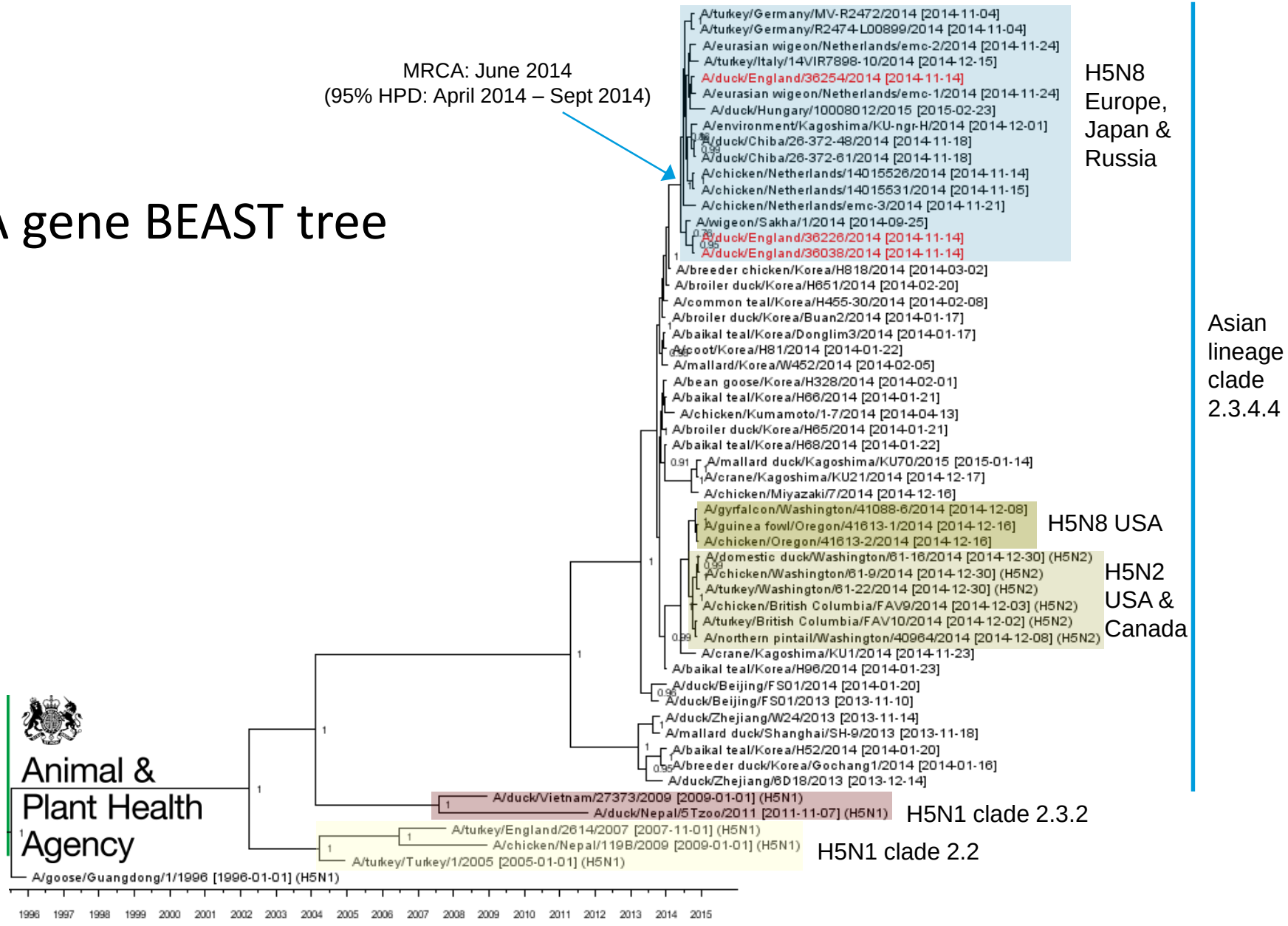
LPAI H5



LPAI H7



HA gene BEAST tree



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