# Report from AI EURL on the developing situation with H5 HPAI

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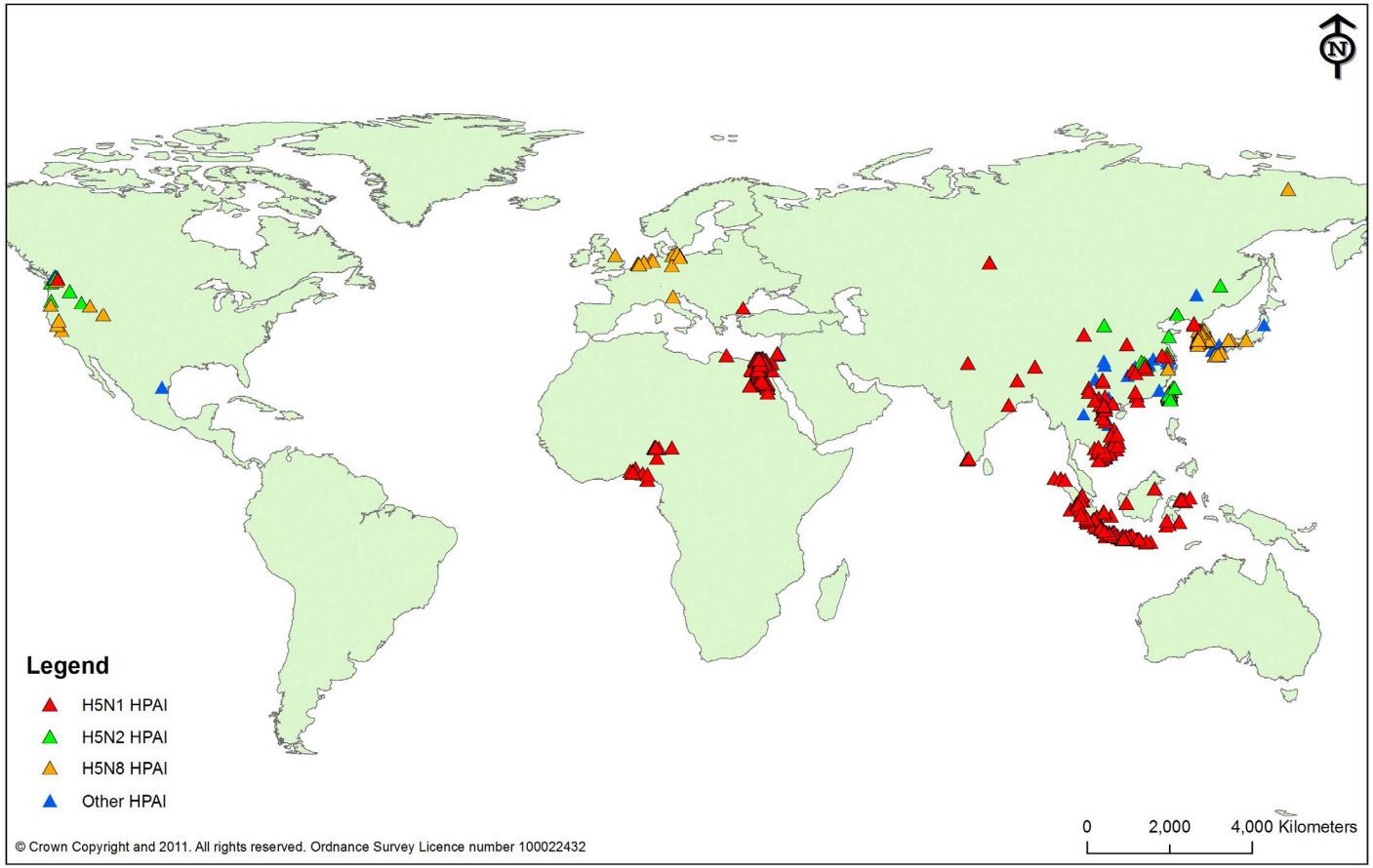
Animal & Plant Health Agency

# Recent events (late 2014 – 2015)

- Evolving and complex situation with multiple HPAI subtypes in four continents (Asia, Europe, North America, Africa)
- Unprecedented spread of H5 HPAI lineage 2.3.4.4

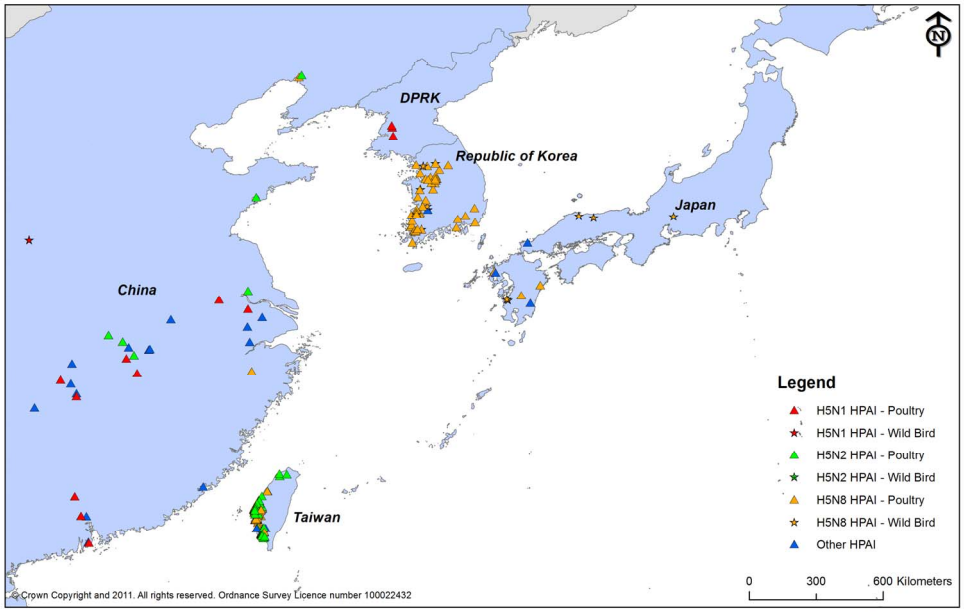





| CREATOR:<br>EU Reference Laboratory<br>DATE: 03/02/2015 | Highly Pathogenic Avian Influenza outbreaks in 2014 and 2015 | Animal & Plant Health Agency |
|---|---|---|

# Recent events – East Asia

- Reports of H5N8 HPAI in poultry and wild birds in Republic of Korea, Japan and China (including Taiwan)
- New clade assigned for H5Nx HPAI lineage – 2.3.4.4
- No reported infections of this H5N8 in humans (Promed report of infection in dogs in ROK)
- Other HPAI subtypes rep



# Recent events – Europe

- Multiple detections of H5N8 HPAI in poultry holdings (5 DE, 5 NL, 1 UK, 1 IT) (plus zoo birds in DE)
- Multiple detections of H5N8 HPAI in wild birds in DE and NL - wigeon (*Anas penelope*), teal (*Anas crecca*), mallard (*Anas platyrhynchos*) [hunted and found dead], gull species
- Detection of H5N1 HPAI in wild bird in BG - Dalmatian pelican *(Pelecanus crispus)*
- Detection of H5N1 HPAI in backyard poultry in BG

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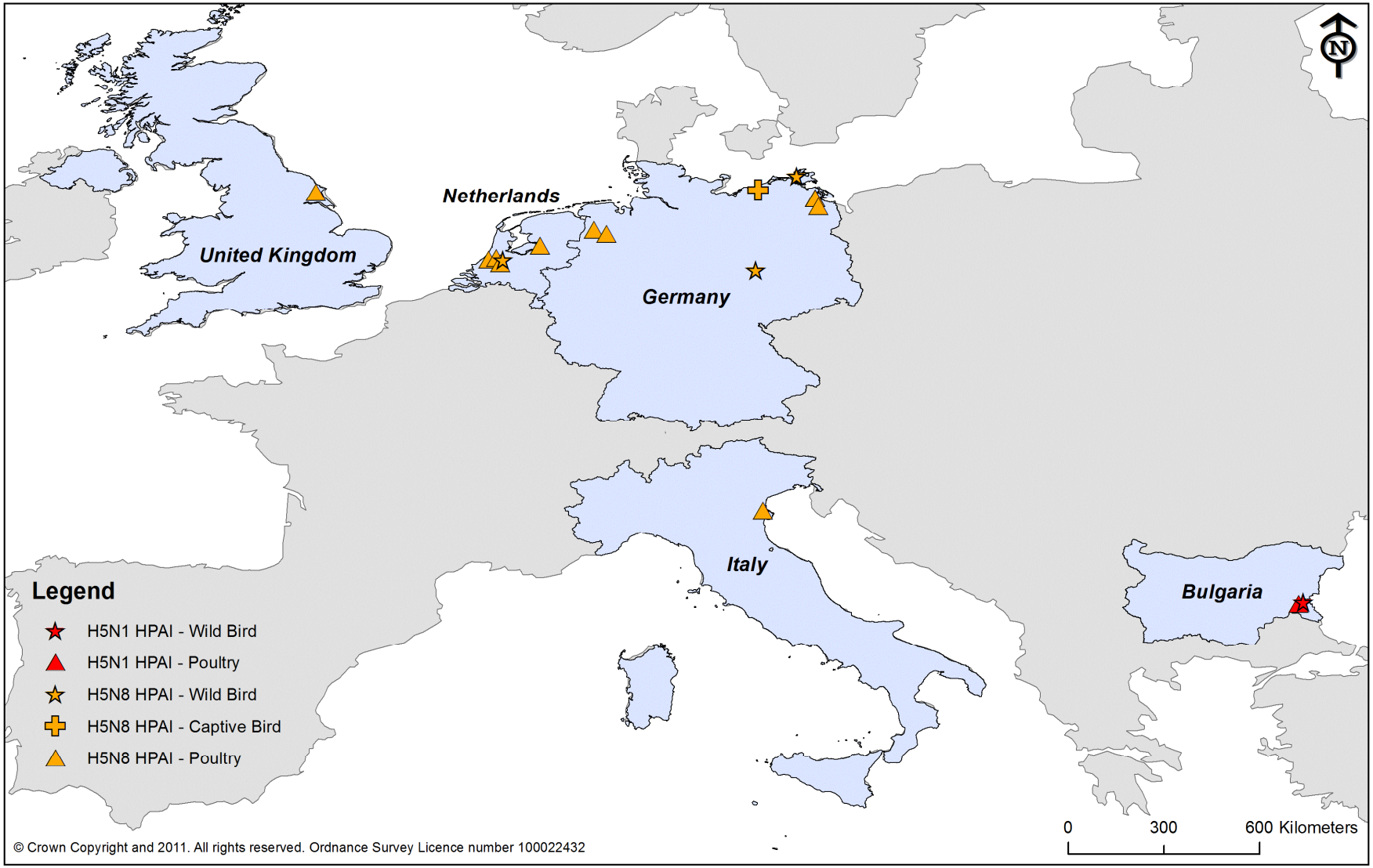
- Detection of H5N1 HPAI in backyard poultry in BG

- Detection of H5N1 HPAI in turkeys in Israel

# Recent events – Europe

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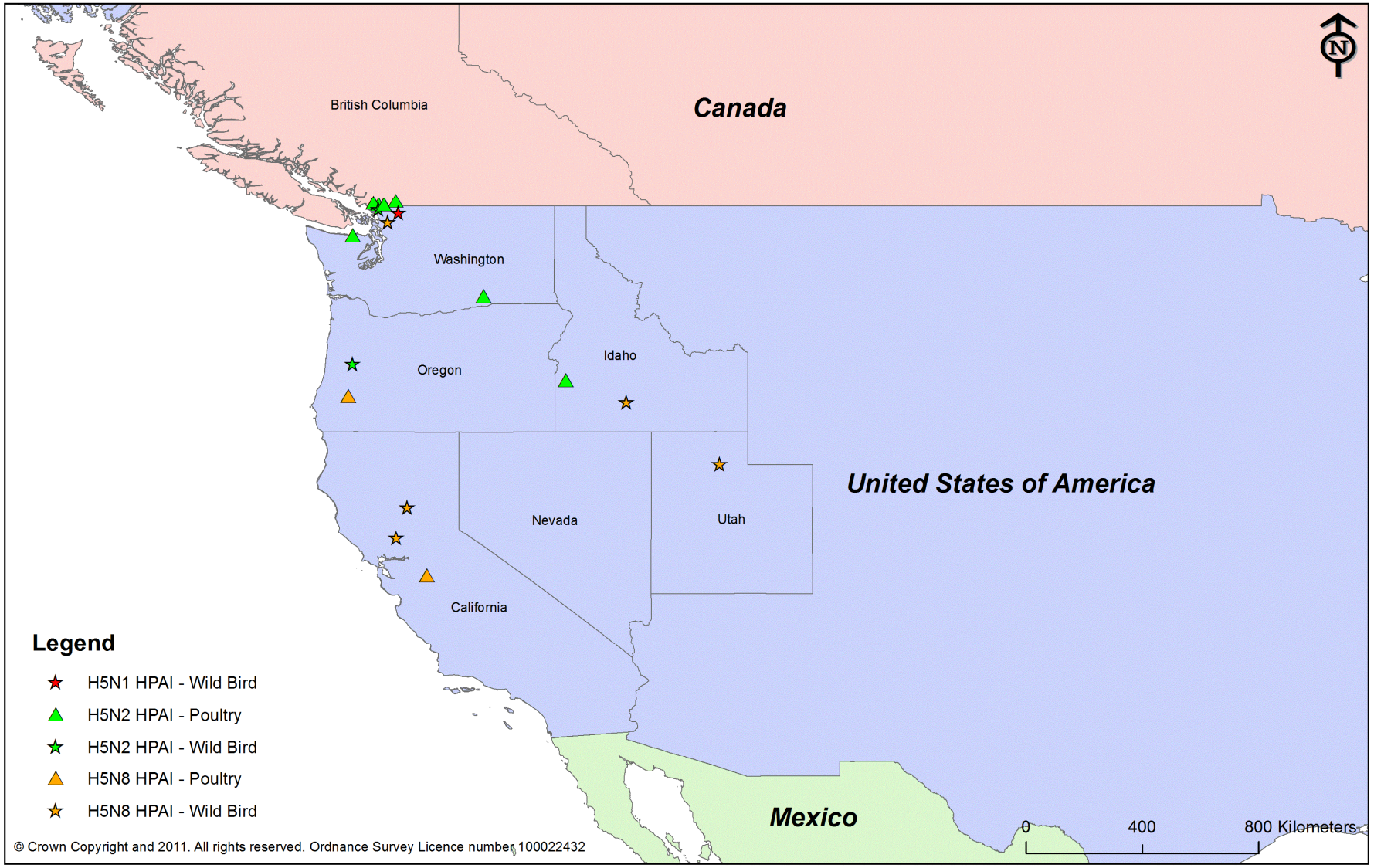
# Recent events – North America

- Multiple detections of H5Nx HPAI 2.3.4.4 in wild birds and poultry in western Canada and USA
- Unprecedented intercontinental spread
- Multiple reassortants with North American lineage viruses
- H5N8 HPAI in commercial turkey holding, backyard poultry, captive gyrfalcon, wild American wigeon *(Anas americana)*, green-winged teal *(Anas carolinensis)*, mallard *(Anas platyrhnchos)* and gadwall *(Anas strepera)* in USA
- H5N2 HPAI in chicken and turkey holdings in Canada (British Columbia) and in backyard poultry and wild mallard, northern pintail *(Anas acuta)* in USA
- H5N1 HPAI in green-winged teal *(Anas carolinensis)* in USA

# Recent events – North America

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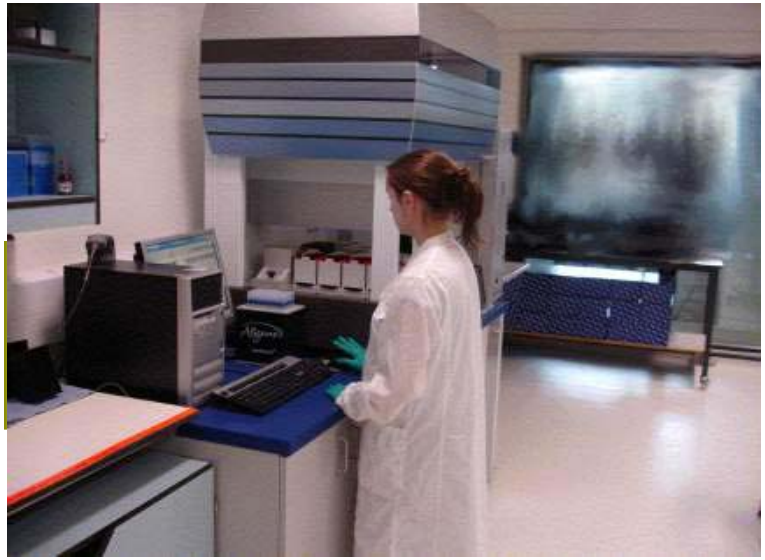
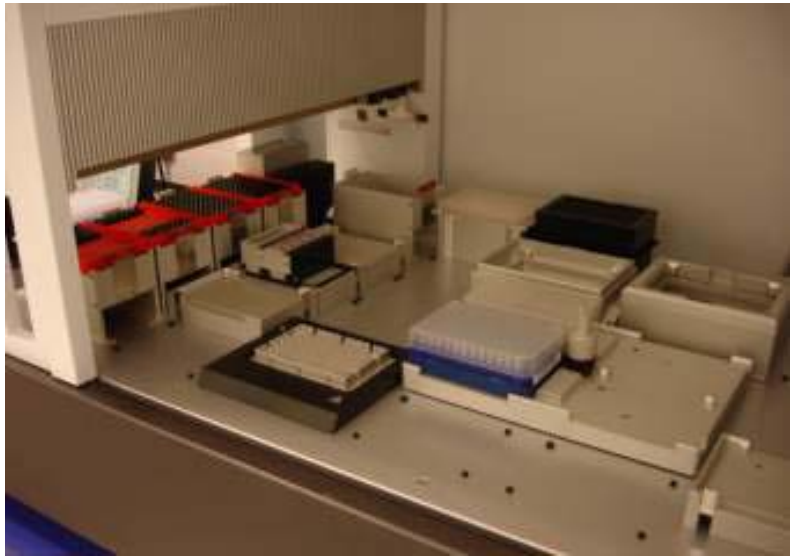
# Laboratory matters

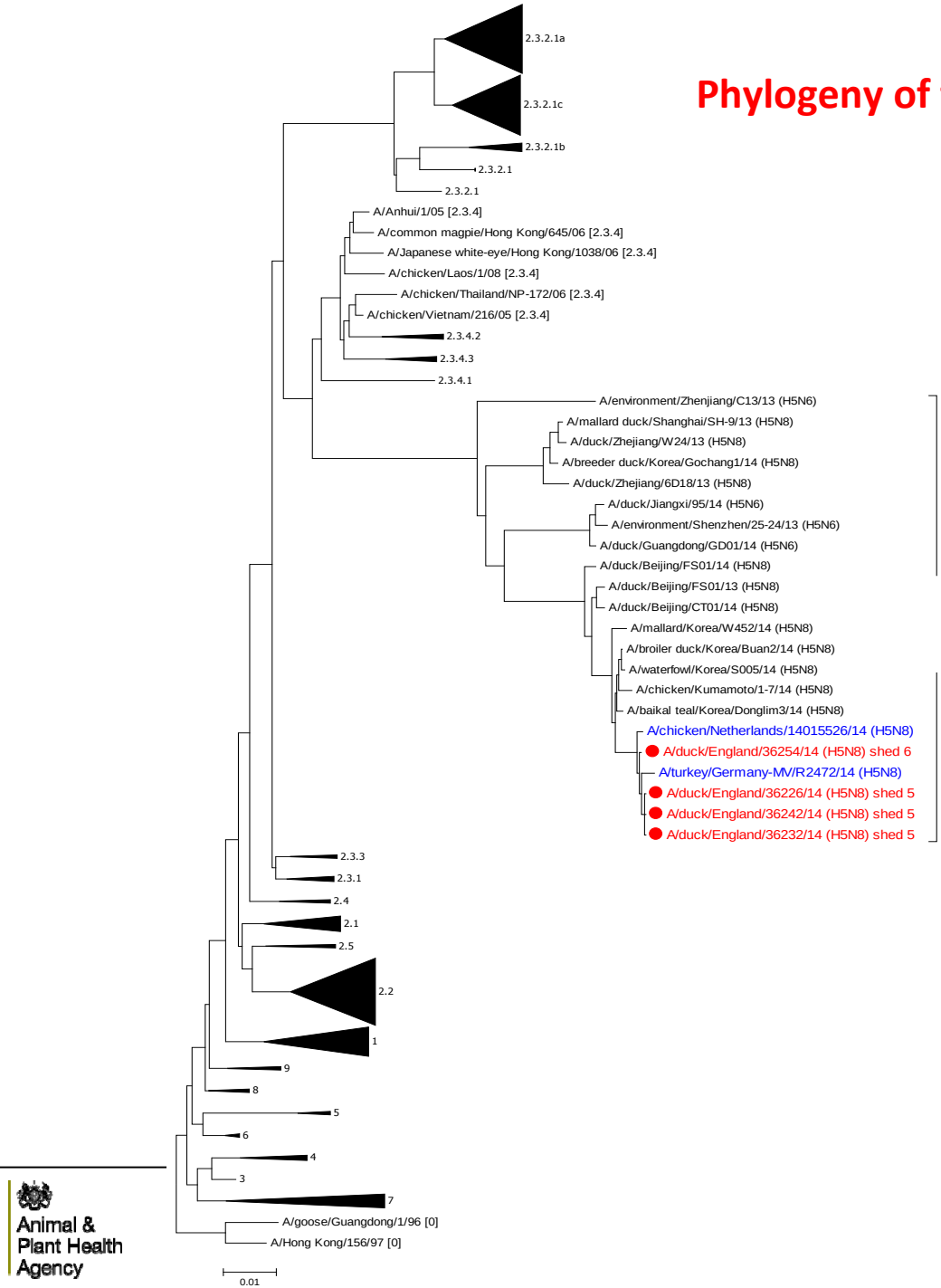




# Utility of standard tests as prescribed in the EU AI diagnostic manual (Decision 2006/437/EC)

- Real time RT-PCR
  - Recommended M gene and H5 gene
  - 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
  - Applicable in species where mortality does not approach 100%: domestic waterfowl and gamebirds
  - Variation in HI sensitivity with different antigens
  - EURL collaborating with NRLs in generating and analysing appropriate data on HI sensitivity
  - EURL has supplied H5N8 antigen to NRLs for emergency use, stockpiling further supplies, and will supply MS's

# Phylogeny of the HA gene of H5N8

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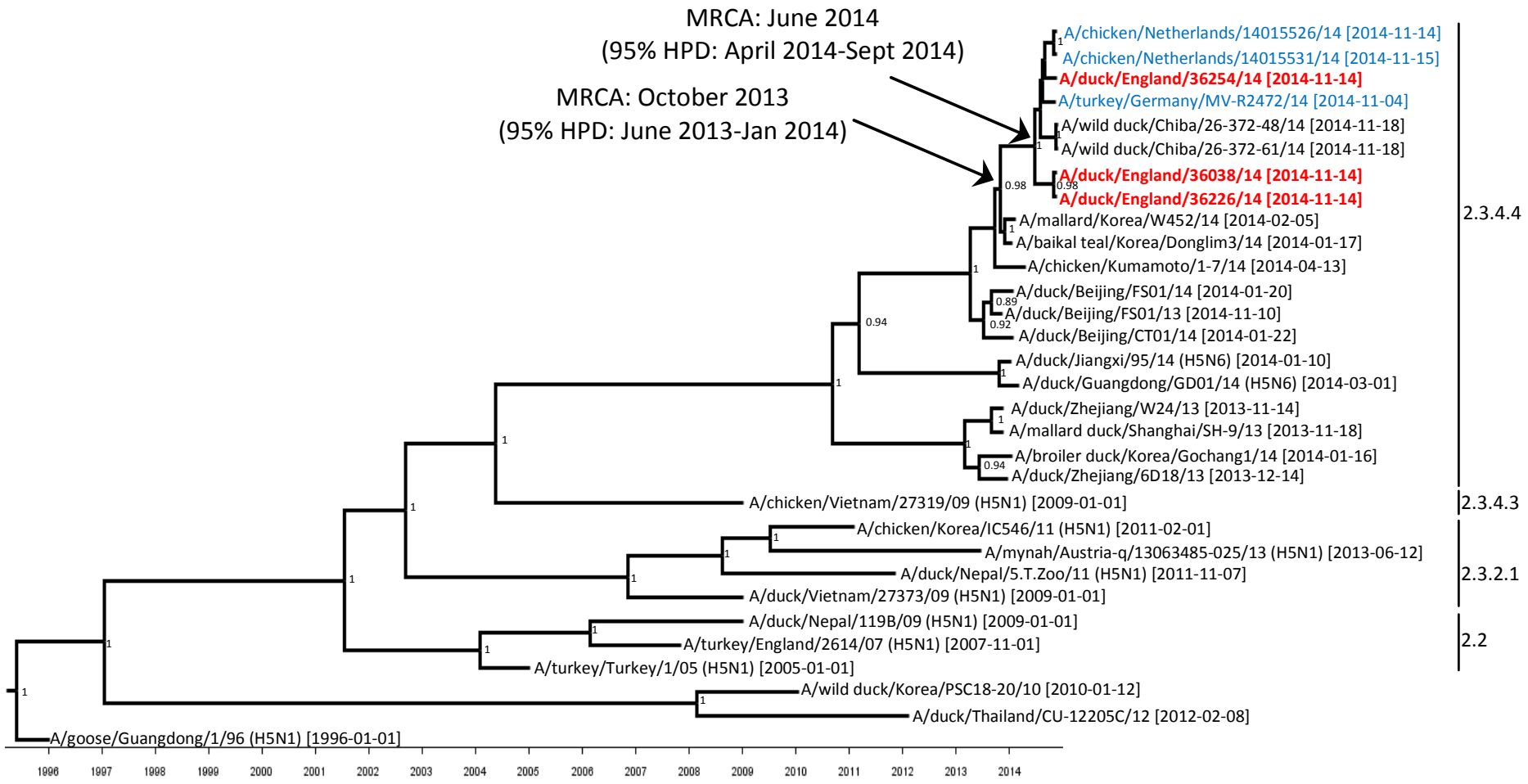
MRCA: June 2014
(95% HPD: April 2014-Sept 2014)
MRCA: October 2013
(95% HPD: June 2013-Jan 2014)
A/chicken/Netherlands/14015526/14 [2014-11-14]
A/chicken/Netherlands/14015531/14 [2014-11-15]
A/duck/England/36254/14 [2014-11-14]
A/turkey/Germany/MV-R2472/14 [2014-11-04]
A/wild duck/Chiba/26-372-48/14 [2014-11-18]
A/wild duck/Chiba/26-372-61/14 [2014-11-18]
A/duck/England/36038/14 [2014-11-14]
A/duck/England/36226/14 [2014-11-14]
A/mallard/Korea/W452/14 [2014-02-05]
A/baikal teal/Korea/Donglim3/14 [2014-01-17]
A/chicken/Kumamoto/1-7/14 [2014-04-13]
A/duck/Beijing/FS01/14 [2014-01-20]
A/duck/Beijing/FS01/13 [2014-11-10]
A/duck/Beijing/CT01/14 [2014-01-22]
A/duck/Jiangxi/95/14 (H5N6) [2014-01-10]
A/duck/Guangdong/GD01/14 (H5N6) [2014-03-01]
A/duck/Zhejiang/W24/13 [2013-11-14]
A/mallard duck/Shanghai/SH-9/13 [2013-11-18]
A/broiler duck/Korea/Gochang1/14 [2014-01-16]
A/duck/Zhejiang/6D18/13 [2013-12-14]
A/chicken/Vietnam/27319/09 (H5N1) [2009-01-01]
A/chicken/Korea/IC546/11 (H5N1) [2011-02-01]
A/mynah/Austria-q/13063485-025/13 (H5N1) [2013-06-12]
A/duck/Nepal/5.T.Zoo/11 (H5N1) [2011-11-07]
A/duck/Vietnam/27373/09 (H5N1) [2009-01-01]
A/duck/Nepal/119B/09 (H5N1) [2009-01-01]
A/turkey/England/2614/07 (H5N1) [2007-11-01]
A/turkey/Turkey/1/05 (H5N1) [2005-01-01]
A/wild duck/Korea/PSC18-20/10 [2010-01-12]
A/duck/Thailand/CU-12205C/12 [2012-02-08]
A/goose/Guangdong/1/96 (H5N1) [1996-01-01]
2.3.4.4
2.3.4.3
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# Epidemiology of H5Nx HPAI 2.3.4.4

- EFSA Journal 2014;12(12):3941 Highly pathogenic avian influenza A subtype H5N8 (Cross EU contributions)
- Entry of H5N8 HPAI into Europe and subsequent spread are separate events and may involve different routes
- No known direct migration routes of wild birds from East Asia to Western Europe
- Hypothesised that long distance transmission could occur via cross infection of different species and populations

# Epidemiology of H5Nx HPAI 2.3.4.4

- H5N8 HPAI appears to be less pathogenic than H5N1 HPAI in some wild waterfowl and domestic ducks, although still retains high pathogenicity in chickens and turkeys
- Clinical presentation in ducks and geese is challenging – may be inapparent infection
- Multiple incursions to holdings in Europe with indoor poultry emphasising potential role for fomite spread and need for biosecurity
- Environmental persistence
  - H5 HPAI $4^0$C >50 days

# Ongoing work at EURL

- Working with global network
  - Horizon scanning, reviewing epidemiology and risk pathways
- Virus characterisation
  - EU and global
- Diagnostic test evaluation
  - Provision of specialised reagents
  - Ongoing fitness for purpose assessment of tests
- Implications for surveillance
- Advanced phylogenetics
- Available for technical consultancy and support

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# Acknowlegements


- All Member States and NRL network

- Team at EURL :
  - Adam Brouwer, Daisy Duncan, Amanda Hanna, Jill Banks, Sharon Brookes, Alex Nunez, James Seekings, Viv Coward, Scott Reid, Vanessa Ceeraz, Ruth Manvell

# Thank you for your attention

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

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