

Highly Pathogenic Avian Influenza (H7N7) in Italy

STANDING COMMITTEE ON PLANTS, ANIMALS, FOOD AND
FEED

Section Animal Health and Welfare


1st June 2016

H7N7 HPAI Outbreak in Emilia Romagna - 16/0001

- Organic free-range laying hens holding in Ferrara province (Emilia Romagna region)
 - 17.000 laying hens
- 29 April 2016 - Farmer reported increased daily mortality
- 30 April 2016 - The National Reference Laboratory confirmed the positivity for Influenza A virus subtype H7

H7N7 HPAI Outbreak in Emilia Romagna - 16/0001

- **1 May 2016** – Beginning of depopulation and carcasses disposal
- **2 May 2016** – The National Reference Laboratory identifies the **H7N7 HPAI** virus
- **2 May 2016** – End of depopulation and disposal of carcasses (rendering)

An aerial photograph of a farm. At the top, there is a cluster of buildings including an office and a warehouse. Below them is a large, long shed. A dirt road, labeled 'Run', runs parallel to the shed. The surrounding area is a mix of green fields and brown, tilled soil.

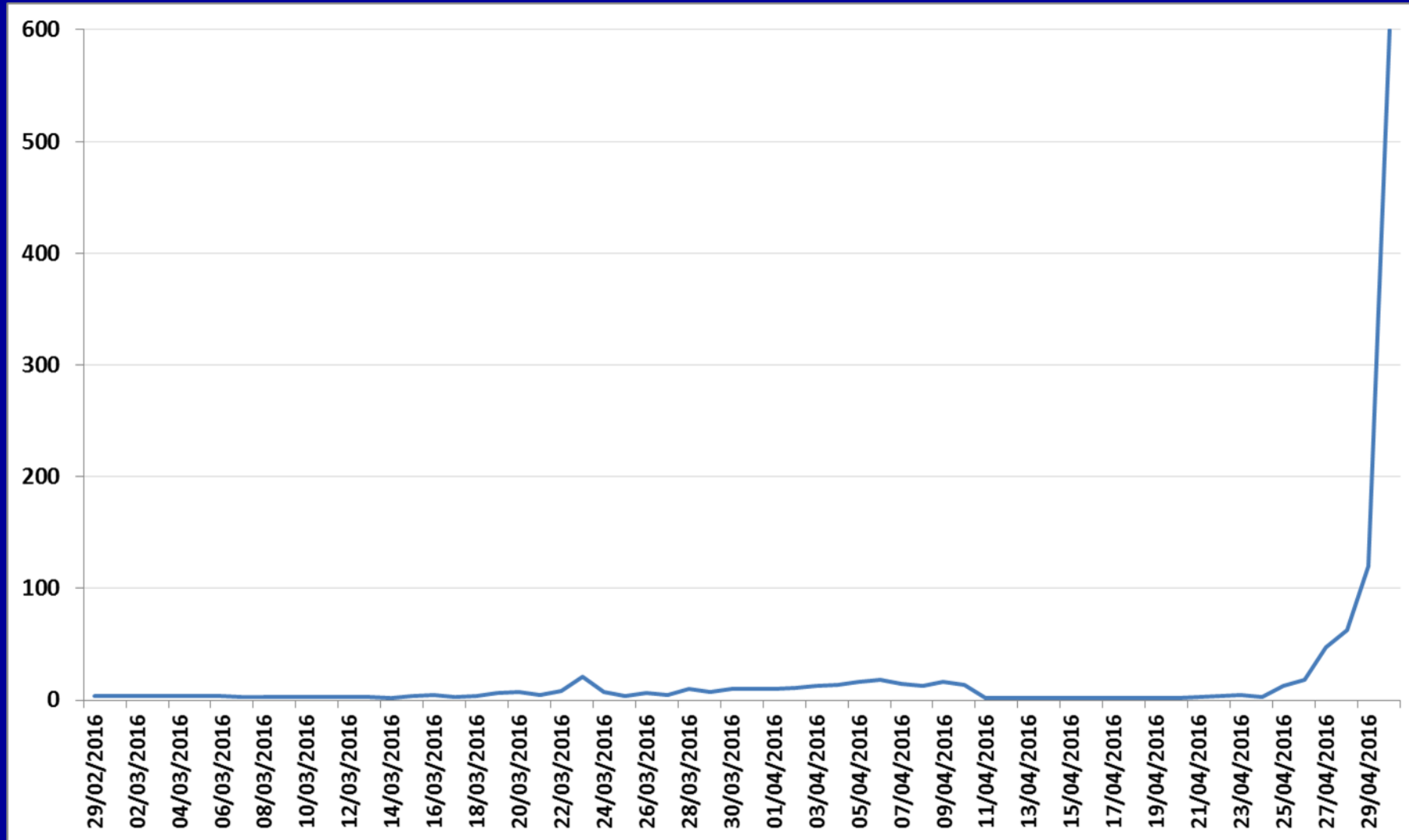
Office and
warehouse

Shed

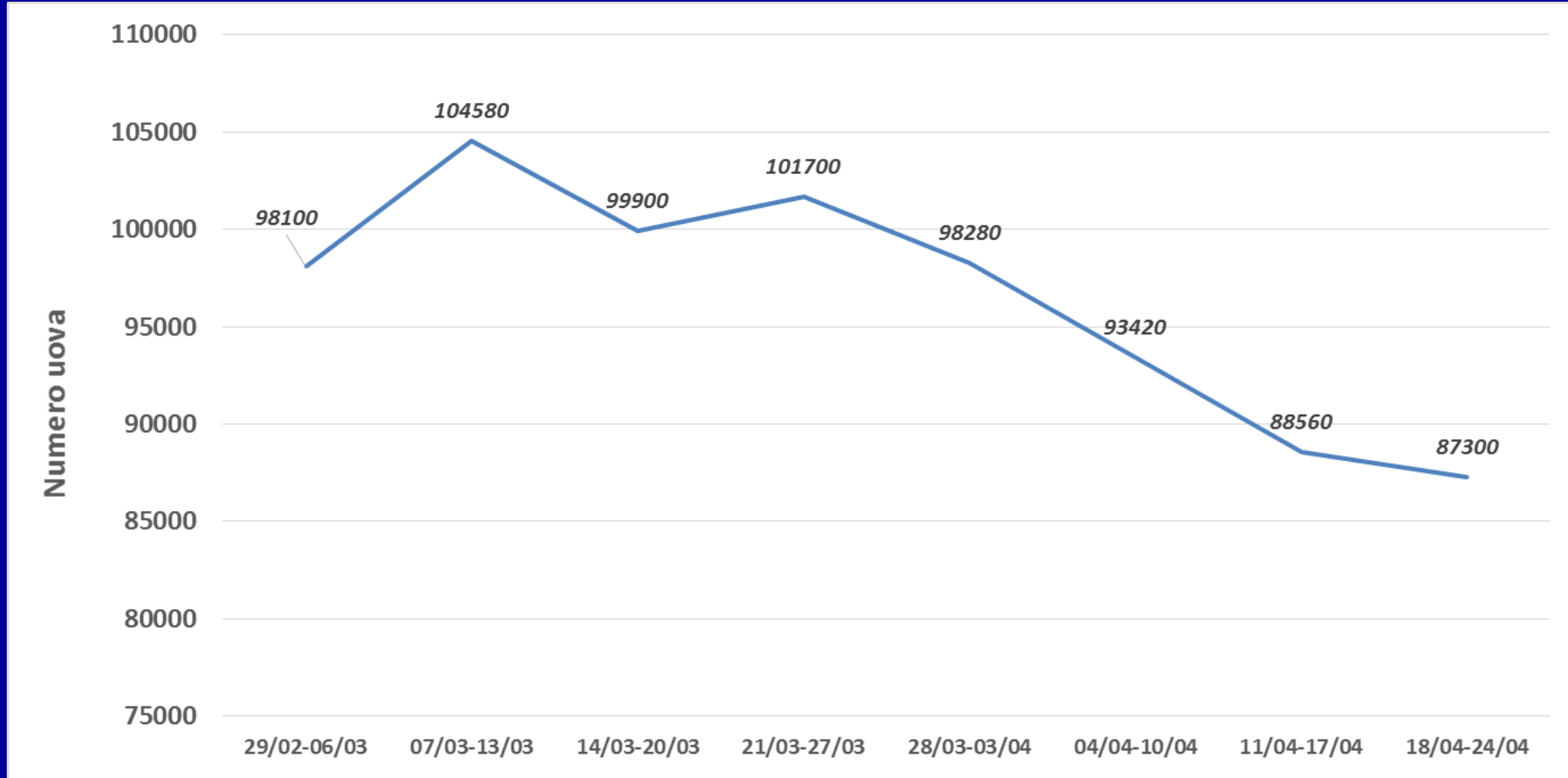
Run



Daily Mortality



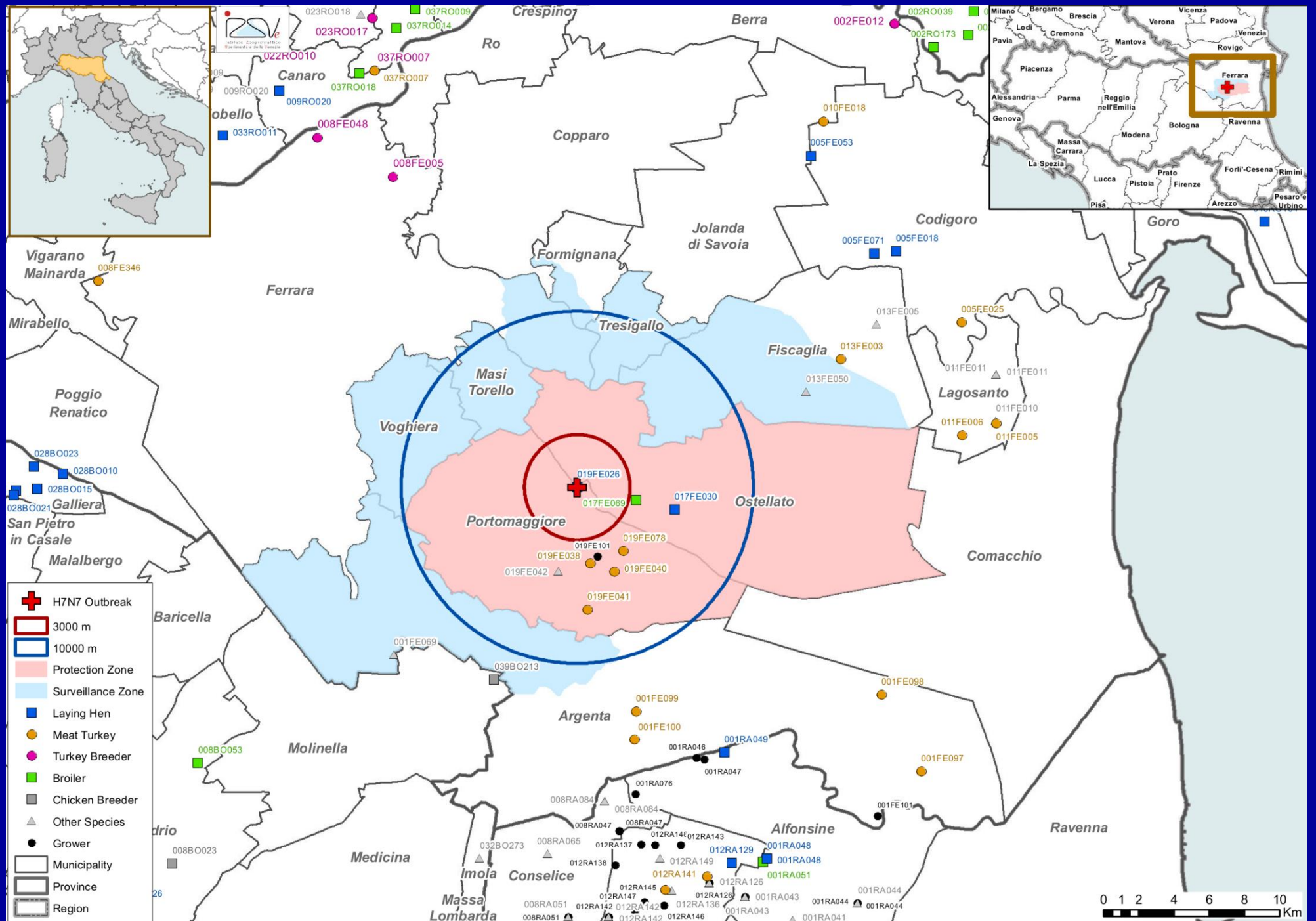
Weekly Egg Production



Consumption of feed

Data	Weekly Consumption (kg)	Average daily consumption (kg)
29/02/2016 - 06/03/2016	139,72	19,98
07/03/2016 - 13/03/2016	139,51	19,93
14/03/2016 - 20/03/2016	139,3	19,9
21/03/2016 - 27/03/2016	138,88	19,84
28/03/2016 - 03/04/2016	138,39	19,77
04/04/2016 - 10/04/2016	137,69	19,67
11/04/2016 - 17/04/2016	137,2	19,6
18/04/2016 - 24/04/2016	137,13	19,59

Protection and Surveillance Zones



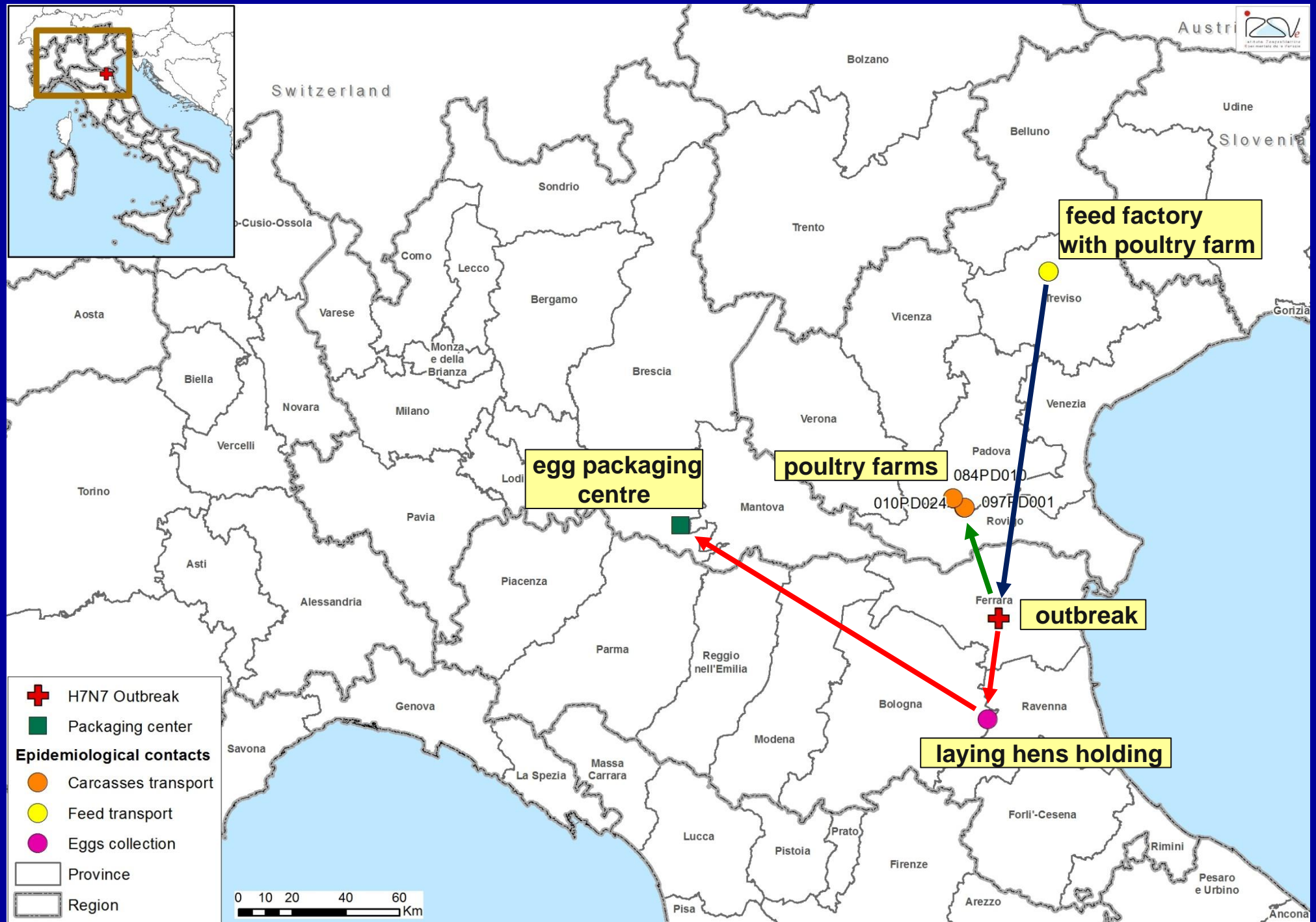
Result of epidemiological enquiry








Basing on epidemiological data and phylogenetic analysis:

- Possible virus introduction as Low Pathogenicity through direct contact between wild birds and free-range laying hens
- Likely mutation from Low to High pathogenicity strain, with increased mortality and decrease in egg production
- Sequencing of the virus showed two different pathotypes (HPAI and LPAI)

Epidemiological contacts

- Feed lorry visited the infected holding on 14 April
 - The vehicle came from a feed factory annexed to a laying hens holding, in Treviso province (Veneto region)
- Table eggs produced before the suspect confirmation were sent to a packaging centre in Cremona province (Lombardia region)
 - The vehicle stopped for egg load in another holding in Bologna province (Emilia Romagna region) before reaching the packaging centre
- Lorry of the rendering plant visited the infected holding on 19 April
 - Vehicle collected the carcasses in other 3 poultry farms in Padova province (Veneto region), after visiting the infected farm



-  H7N7 Outbreak
-  Packaging center
- Epidemiological contacts**
-  Carcasses transport
-  Feed transport
-  Eggs collection
-  Province
-  Region

Control measures implemented in contact holdings

- All the contact holdings were put under official restrictions and official controls on reared birds were performed as provided for by the national provisions
 - 30 blood samples/shed
 - 30 tracheal swabs/shed
 - 5 dead birds/shed
- After 21 days from the last at-risk contact, and after the negative results of the official tests the restrictive measures were lifted in all the contact holdings

Control measures at a national level

- In all layer holdings located in Densely Populated Poultry Areas (DPPAs)
 - 30 tracheal swabs and 30 blood samples for shed
 - Clinical inspection and submission of at least 15 dead birds for each affected shed in case of increased mortality, drop in egg production and/or feed consumption

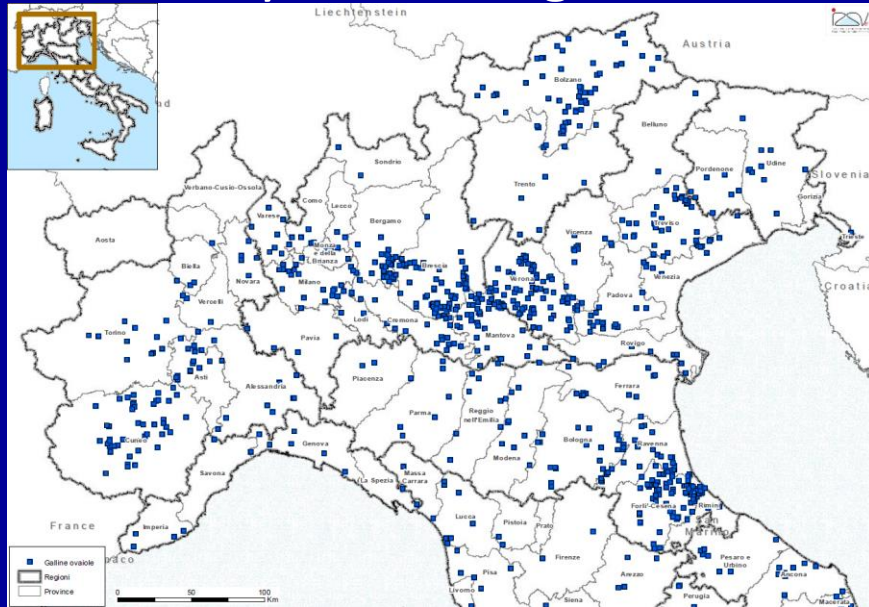
Control measures at a national level

- Pre-moving testing of pullets and laying hens in Densely Populated Poultry Areas (DPPAs)
- Pre-moving testing of fattening turkeys before loading for slaughter in DPPAs

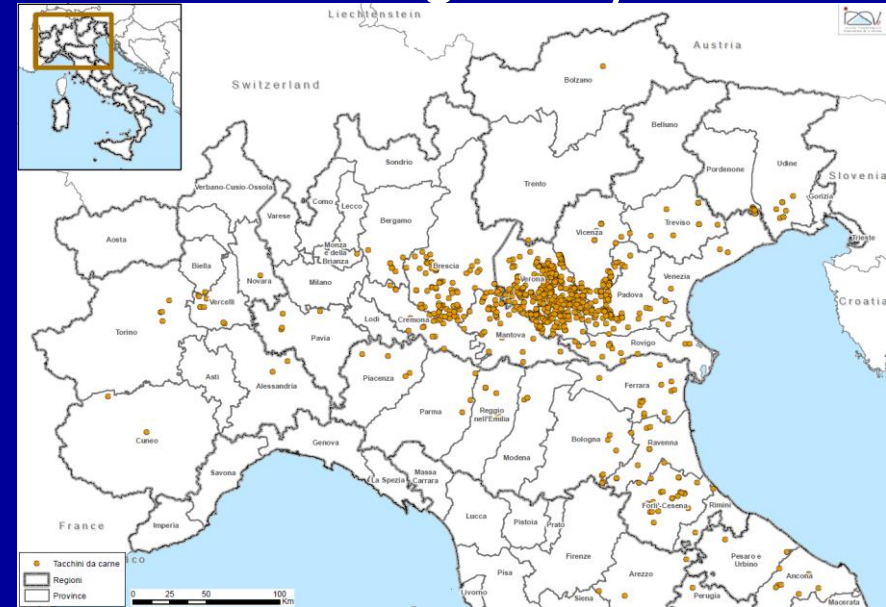
Control measures at a national level (DPPA)

Species	No. Of Farms	No. Of Animals	No. Of PCR Analysis			No. Of Confirmed PCR	
			M-gene PCR	H5	H7	H5	H7
FATTENING TURKEY	108	6774	543	1	1	0	1
LAYING HENS	457	31782	3456	6	6	0	0
TOTAL	565	38556	3999	7	7	0	1

Layers holdings



Fattening turkeys



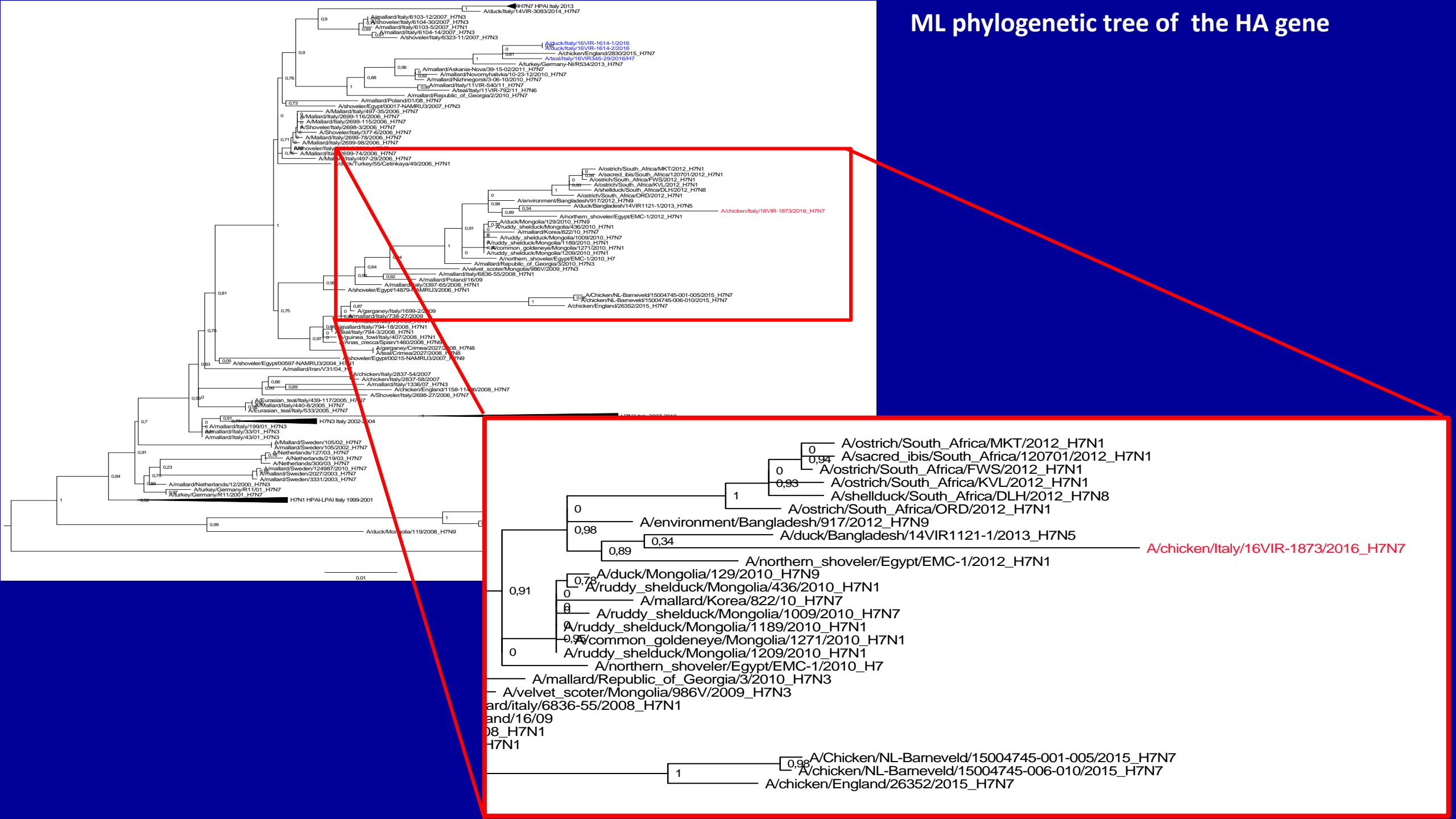
Control measures at a national level

- Enhanced biosecurity measures
- Functional separation of production between Emilia Romagna and the other regions

Phylogenetic analysis

- The HA gene of the virus A/chicken/Italy/16VIR-1873/2016 (H7N7) clusters with H7 subtypes detected in Africa and Asia, between 2010 and 2013 in both wild and domestic birds
- The NA gene of the virus A/chicken/Italy/16VIR-1873/2016 (H7N7) clusters with AIVs belonging to H10N7 and H7N7 subtypes detected in Europe, between 2010 and 2015 in wild and domestic birds and seals
- The HA gene resulted to be low related to other HPAIVs recently identified in Italy and Europe and to the H7N7 LPAI virus responsible for the Ferrara outbreak of 15 April 2016 (similarity lower than 93%)
- No additional glycosylation sites or molecular markers of adaptation to mammalian hosts have been identified in the HA gene.

ML phylogenetic tree of the HA gene

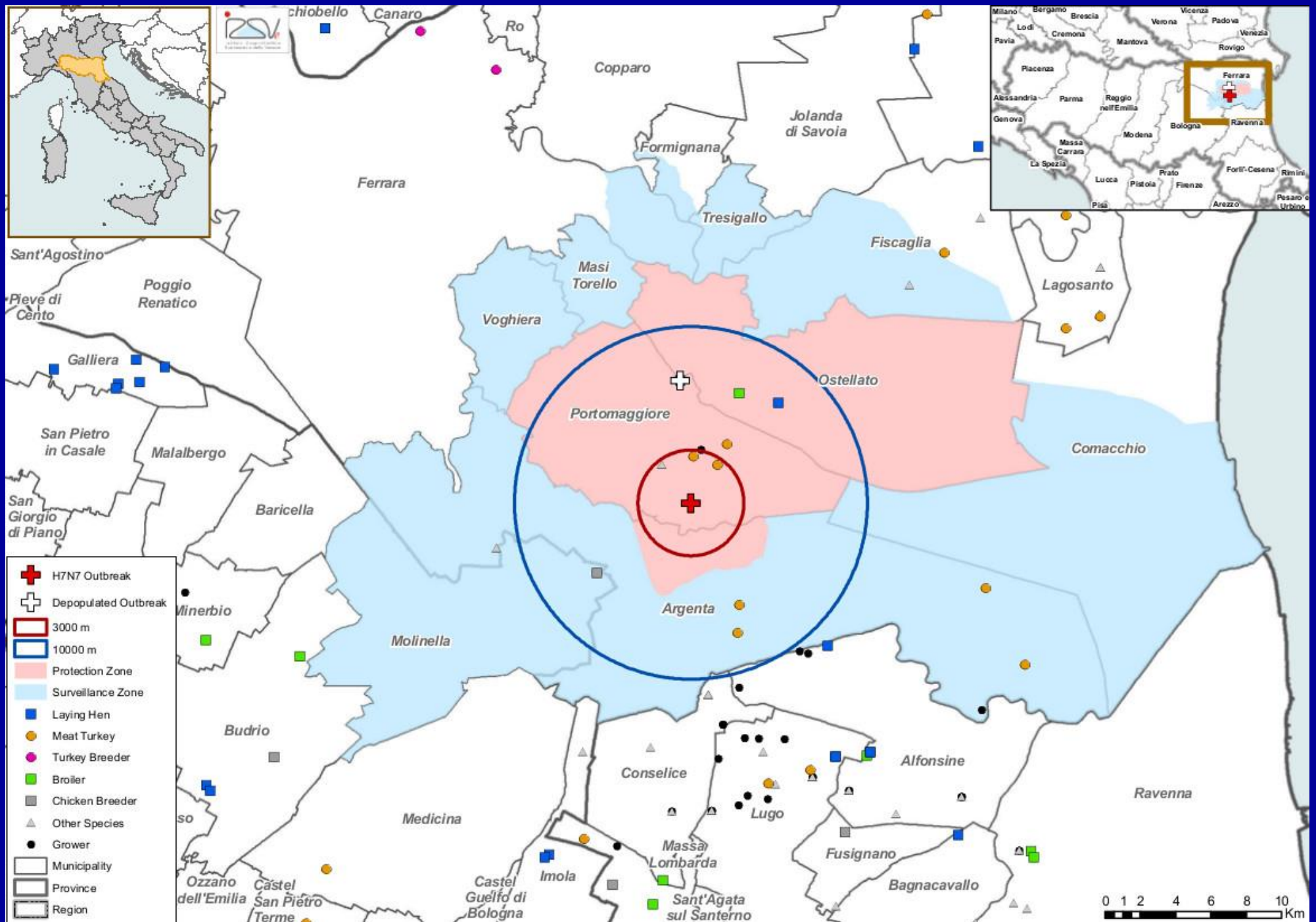


A/ostrich/South_Africa/MKT/2012_H7N1
A/sacred_ibis/South_Africa/120701/2012_H7N1
A/ostrich/South_Africa/FWS/2012_H7N1
A/ostrich/South_Africa/KVL/2012_H7N1
A/shelduck/South_Africa/DLH/2012_H7N8
A/environment/Bangladesh/917/2012_H7N9
A/duck/Bangladesh/14VIR1121-1/2013_H7N5
A/northern_shoveler/Egypt/EMC-1/2012_H7N1
A/duck/Mongolia/129/2010_H7N9
A/ruddy_shelduck/Mongolia/436/2010_H7N1
A/mallard/Korea/822/10_H7N7
A/ruddy_shelduck/Mongolia/1009/2010_H7N7
A/ruddy_shelduck/Mongolia/1189/2010_H7N1
A/common_goldeneye/Mongolia/1271/2010_H7N1
A/ruddy_shelduck/Mongolia/1209/2010_H7N1
A/northern_shoveler/Egypt/EMC-1/2010_H7
A/mallard/Republic_of_Georgia/3/2010_H7N3
A/velvet_scooter/Mongolia/986V/2009_H7N3
A/mallard/Italy/6836-55/2008_H7N1
A/mallard/Poland/16/09/2008_H7N1
A/chicken/NL-Bameveld/15004745-001-005/2015_H7N7
A/chicken/NL-Bameveld/15004745-006-010/2015_H7N7
A/chicken/England/26352/2015_H7N7

H7N7 HPAI Outbreak in Emilia Romagna -16/0002

- Meat turkey holding in Ferrara province (Emilia Romagna region)
- The farm belongs to a vertical integrated group
- 49.472 male turkeys (59 days old)
- Within the Protection Zone of the first H7N7 HPAI outbreak (16/0001)

Protection and Surveillance Zones

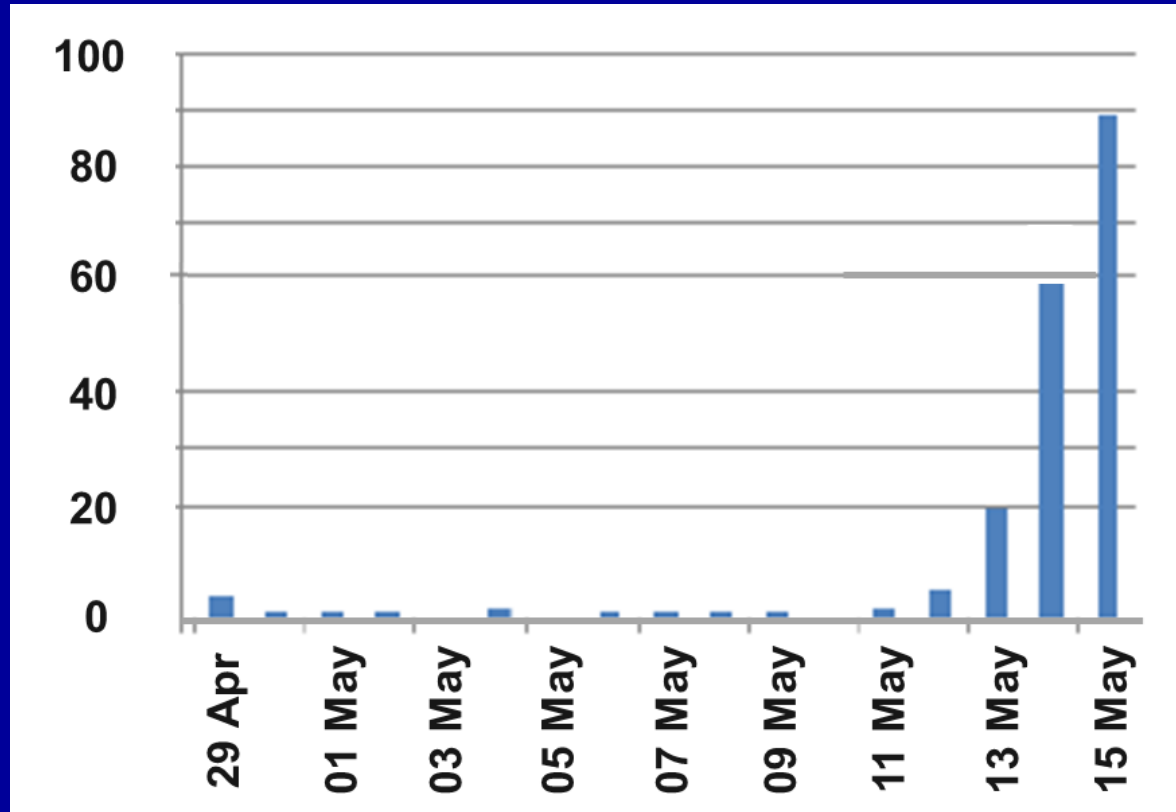


H7N7 HPAI Outbreak in Emilia Romagna - 16/0002

- **13 May 2016** – Reported increased mortality in a single shed (n.12)
- **16 May 2016** – National Reference Laboratory confirmed the positivity for H7N7 HPAI virus
- **18 May 2016** – End of depopulation and carcass disposal

Daily mortality (shed n.12)

Increased mortality in shed n.12 leads to suspect AI introduction





Shed No. 8

Shed No. 7

Shed No. 6

Shed No. 5

Shed No. 4

Shed No. 3

Shed No. 2

Shed No. 1

Shed No. 9

Shed No. 10

Shed No. 11

Shed No. 12

Shed No. 13

Shed No. 14

Strada Provinciale N. 48



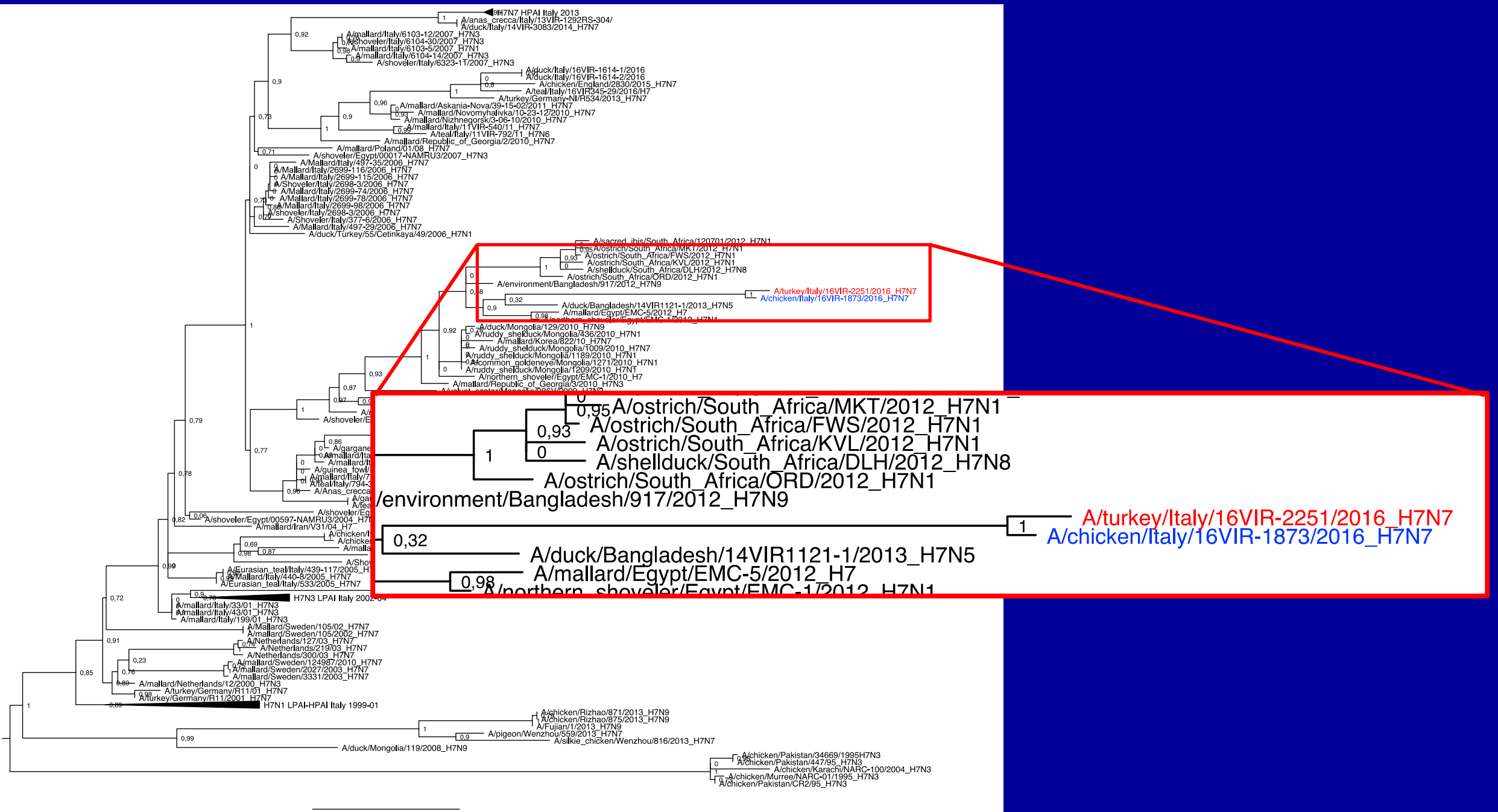
Result of epidemiological enquiry

- So far the introduction path of the virus remains unknown
- Pre-emptive killing in a single contact holding (same company; proximity)
 - **17 May 2016** – Ministry of Health orders the pre-emptive slaughter of the turkey holding
 - **18 May 2016** – Depopulation begins in the contact holding

Phylogenetical analysis

- The HA gene of the virus A/turkey/Italy/16VIR-2251/2016 (H7N7) shows a similarity of 99.6% with the H7N7 HPAI virus isolated in the previous outbreak (16/0001) clustering with H7 subtypes collected in Africa and Asia, between 2010 and 2013 in both wild and domestic birds;
- No additional glycosilation sites or molecular markers of adaptation to mammalian hosts have been identified in the HA gene.

ML phylogenetic tree of the HA gene



Thank you