



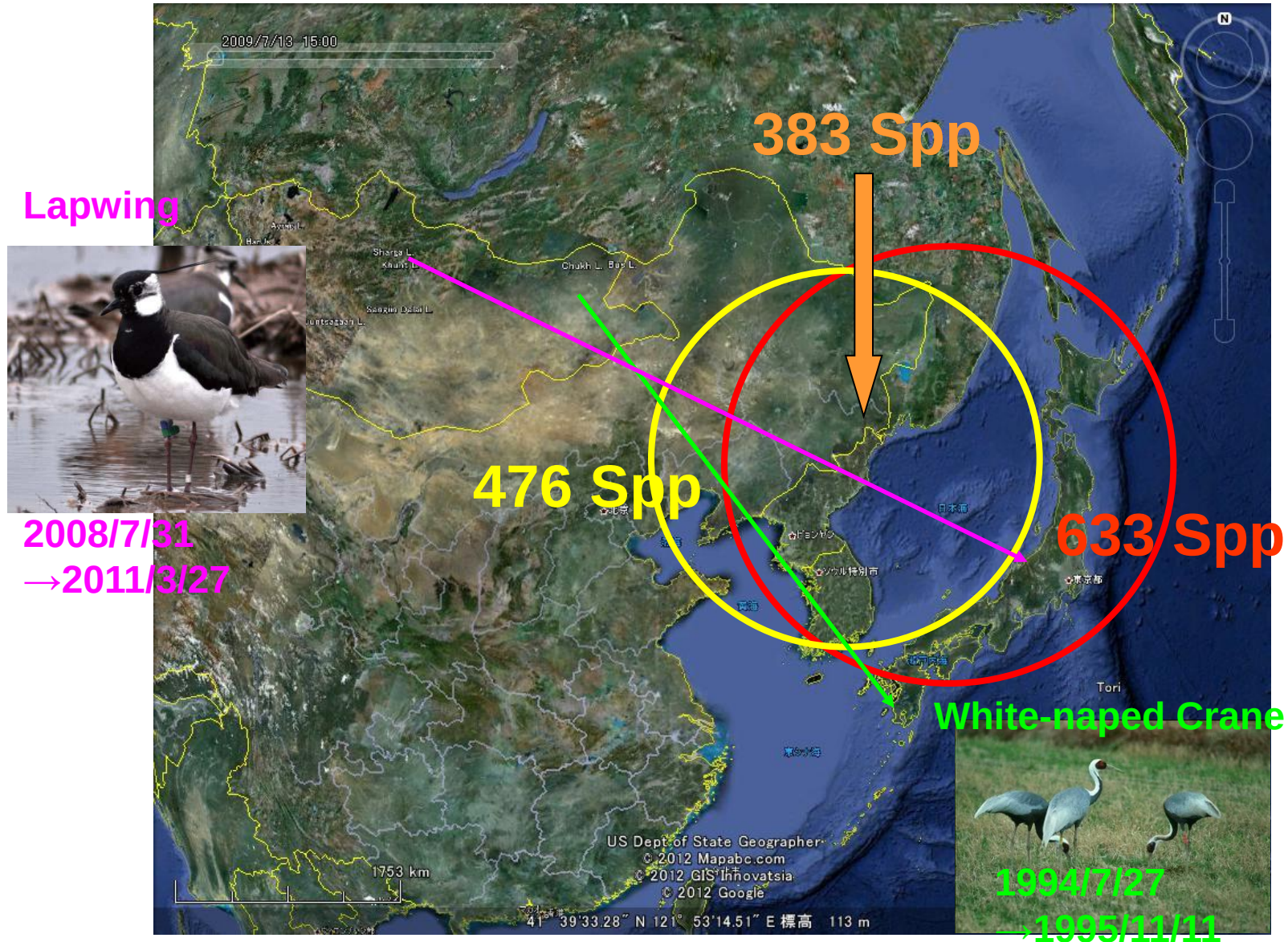
AI Surveillance in Mongolia

OIE/Japan Trust Fund Project for
Strengthening HPAI Control in Asia

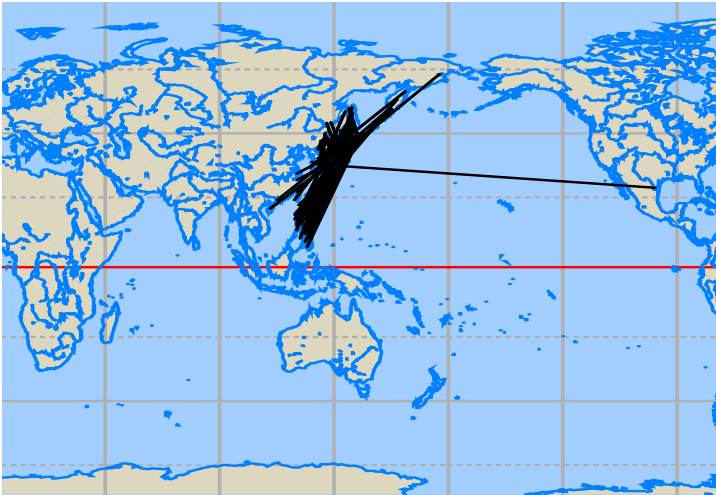
- wild birds survey -

Yamashina Institute for Ornithology
Kiyoaki Ozaki

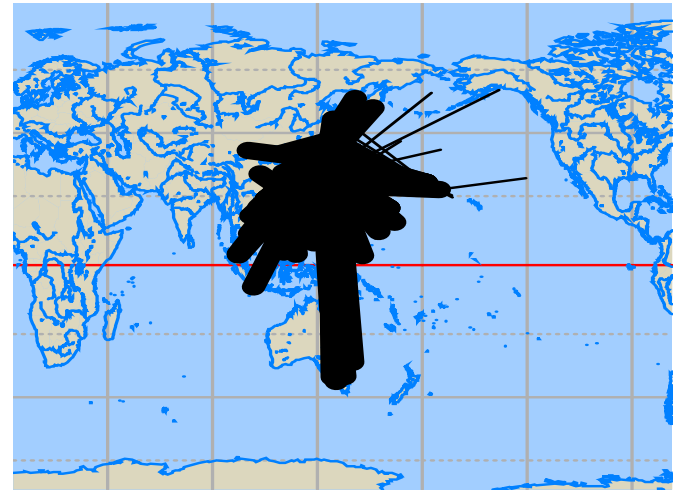
Birds of Mongolia and Japan



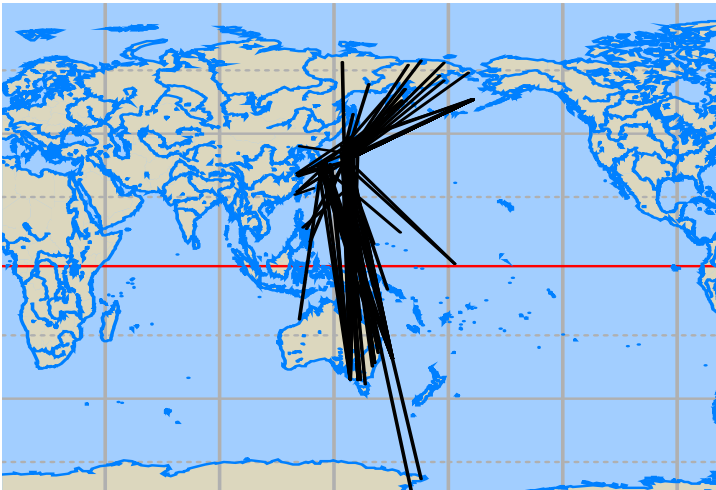
Migration & Distribution of Japanese Birds shown by Banding Recoveries



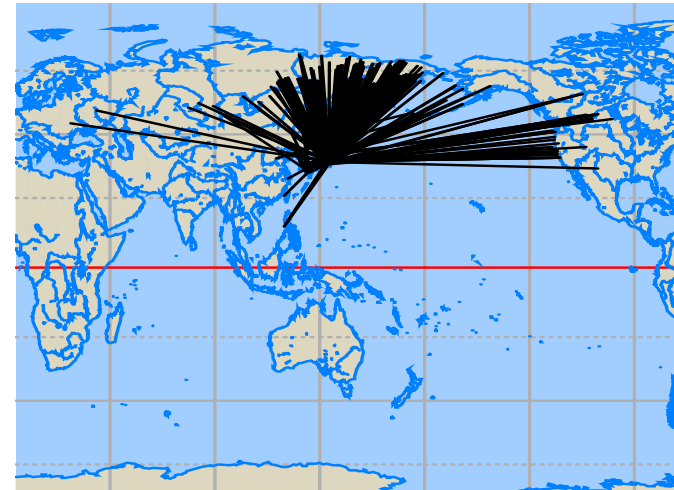
Resident 128



Summer visitor 354

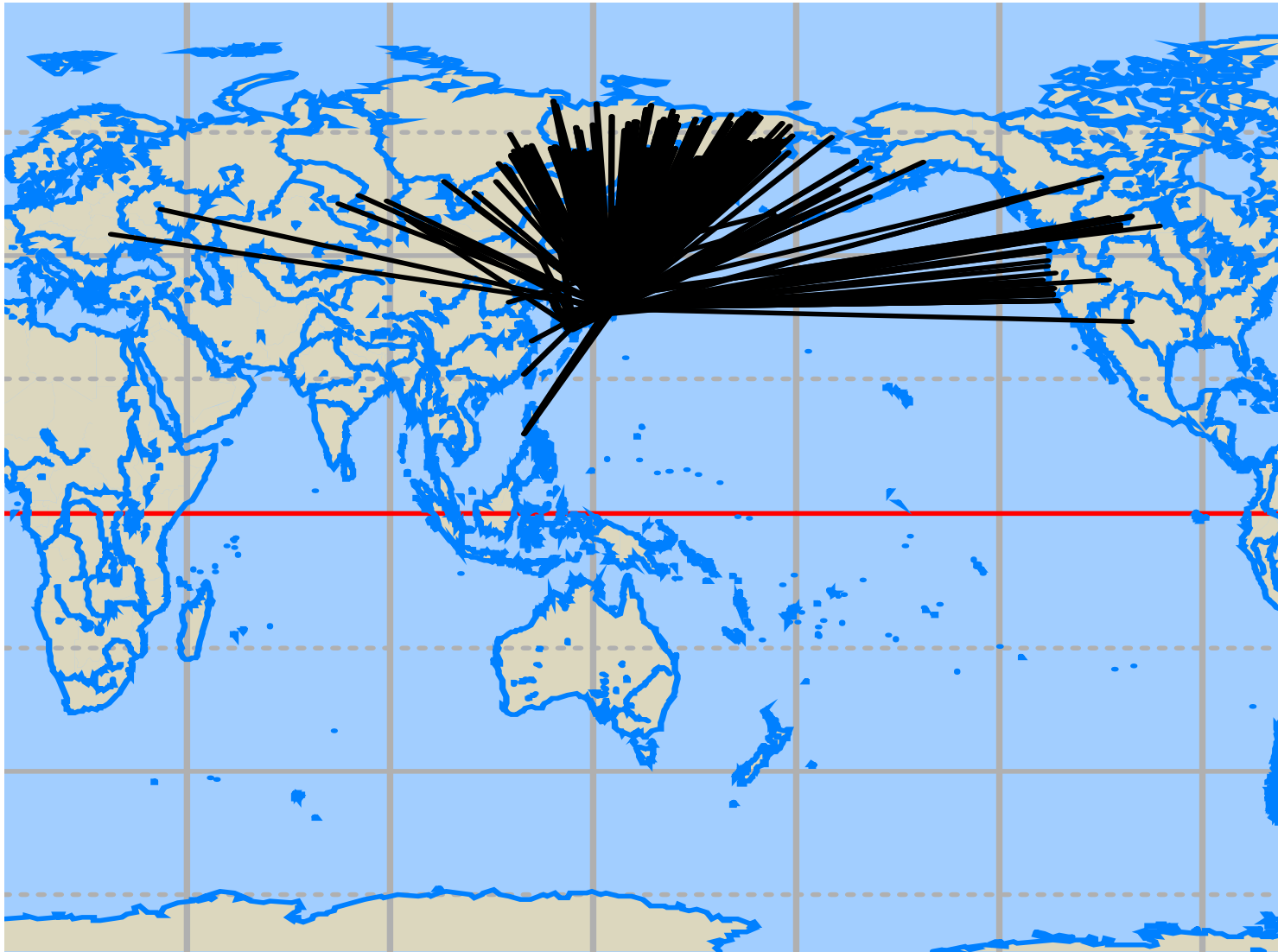


Transient 159



Winter visitor 623
(exclude Pintails < 3,000km)

Migration & Distribution of Japanese Birds shown by Banding Recoveries



Winter visitor 623
(exclude Pintails < 3,000km)

Field work



2012



2010



2011



2009

☆ウランバートル

2009.July.Chukh/Bus Lake etc.

2010.July Sharga/Khunt/Tsegeen Lake

2011.July Buuntsgaan/Borogchin Lake etc.

2012.July Han Us/Ayrage Lake

北京

List of birds caught and surveyed-1

	English Name	Scientific Name	Japanese Name	M / R *	2009	2010	2011	2012	合計
1	Great Cormorant	<i>Phalacrocorax carbo</i>	カワウ	M				20	20
2	Grey Heron	<i>Ardea cinerea</i>	アオサギ	M	8	6			14
3	Greylag Goose	<i>Anser anser</i>	ハイイロガン	M				1	1
4	Whooper Swan	<i>Cygnus cygnus</i>	オオハクチョウ	M	15	15	12	12	54
5	Tundra Swan	<i>Cygnus columbianus</i>	コハクチョウ	M				1	1
6	Bar-headed Goose	<i>Anser indicus</i>	インドガン	M		1			1
7	Ruddy Shelduck	<i>Tadorna ferrunginea</i>	アカツクシガモ	M		1			1
8	Mallard	<i>Anas platyrhynchos</i>	マガモ	M		1			1
9	Gadwall	<i>Anas strepera</i>	オカヨシガモ	M		1			1
10	Eurasian Widgeon	<i>Anas penelope</i>	ヒドリガモ	M		1			1
11	Common Pochard	<i>Aythya ferina</i>	ホシハジロ	M	1				1
12	Tufted Duck	<i>Aythya fuligula</i>	キンクロハジロ	M		1			1
13	Upland buzzard	<i>Buteo hemilasius</i>	オオノスリ	M	1				1
14	Demoiselle Crane	<i>Grus virgo</i>	アネハヅル	M		5	2		7
15	Baillon's Crake	<i>Porzana pusilla</i>	ヒメクイナ	M			1		1
16	Kentish Plover	<i>Charadrius alexandrinus</i>	シロチドリ	M				1	1
17	Greater Sandplover	<i>Charadrius leschenaultii</i>	オオメダイチドリ	M			2		2
18	Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	ウズラシギ	M		1			1
19	Green Sandpiper	<i>Tringa ochropus</i>	クサシギ	M			1		1
20	Wood Sandpiper	<i>Tringa glareola</i>	タカブシギ	M		1			1
21	Common Sandpiper	<i>Actitis hypoleucos</i>	イソシギ	M		2			2
22	Wood Sandpiper	<i>Tringa glareola</i>	タカブシギ	M		1			1
23	Common Sandpiper	<i>Actitis hypoleucos</i>	イソシギ	M		2			2
24	Pin-tailed Snipe	<i>Gallinago stenura</i>	ハリオシギ	M	1	1			2
25	Black-winged Stilt	<i>Himantopus himantopus</i>	セイタカシギ	M				2	2
26	Avocet	<i>Recurvirostra avosetta</i>	ソリハシセイタカシギ	M		3			3
27	Mongolian Gull	<i>Larus mongolicus</i>	モンゴルカモメ	M		18			18
28	White-winged Black Tern	<i>Chlidonias niger</i>	ハジロクロハラアジサシ	M				8	8
29	Common Tern	<i>Sterna hirundo</i>	アジサシ	M		2	1		3

Total 153 individuals of 29 Non-passerines species



Great Cormorant



Grey Heron



Demoiselle Crane



Baillon's Crake



Mongolian Gull



Green Sandpiper



Mongolian Gull



White-winged Black Tern

List of birds caught and surveyed-2

English Name	Scientific Name	Japanese Name	M / R *	2009	2010	2011	2012	合計
30 Mongolian Lark	<i>Melanocorypha mongolica</i>	コウテンシ	M		1			1
31 Asian Short-toed Lark	<i>Calandrella cheleensis</i>	コヒバリ	M	4		1		5
32 Barn Swallow	<i>Hirundo rustica</i>	ツバメ	M	4			1	5
33 Yellow Wagtail	<i>Motacilla flava</i>	ツメナガセキレイ	M	7		2	1	10
34 White Wagtail	<i>Motacilla alba</i>	ハクセキレイ	M	1				1
35 Richard's Pipit	<i>Anthus richardi</i>	マミジロタヒバリ	M	3		1		4
36 Brown Shrike	<i>Lanius cristatus</i>	アカモズ	M	2				2
37 Northern Wheatear	<i>Oenanthe oenanthe</i>	ハシグロヒタキ	M	1				1
38 Bearded Reedling	<i>Panurus biarmicus</i>	ヒゲガラ	M		3	4		7
39 Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>	シベリアセンニユウ	M	12	6	10		28
40 Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	コヨシキリ	M	3				3
41 Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	オオヨシキリ	M	2	2	3		7
42 Thick-billed Warbler	<i>Acrocephalus aedon</i>	ハシブトオオヨシキリ	M	2	2			4
43 Paddyfield Warbler	<i>Acrocephalus agricola</i>	イナダヨシキリ	M		26	14		40
44 Siberian Chiffchaff	<i>Phylloscopus tristis</i>	シベリアチフチャフ	M	1				1
45 Dusky Warbler	<i>Phylloscopus fuscatus</i>	ムジセッカ	M	1				1
46 Yellow-breasted Bunting	<i>Emberiza aureola</i>	シマアオジ	M	10				10
47 Pallas's Reed Bunting	<i>Emberiza pallasi</i>	シベリアジュリン	M			3		3
48 Common Reed Bunting	<i>Emberiza schoeniclus</i>	オオジュリン	M			1		1
49 Eurasian Tree Sparrow	<i>Passer montanus</i>	スズメ	R	24			8	32
50 Rock Sparrow	<i>Petronia petronia</i>	イワスズメ	R	6				6
合計				109	103	58	55	325
種数				21	24	15	10	

* : M = migratory R = resident

Total 172 individuals of 21 Passerines species

→Grand total 325 individuals of 50 species of birds



Pallas's Grasshopper Warbler



Paddyfield Warbler





Reed Bunting



Bearded Reedling



Yellow Wagtail



Oriental Reed Warbler

Sampling by swab



Blood sampling

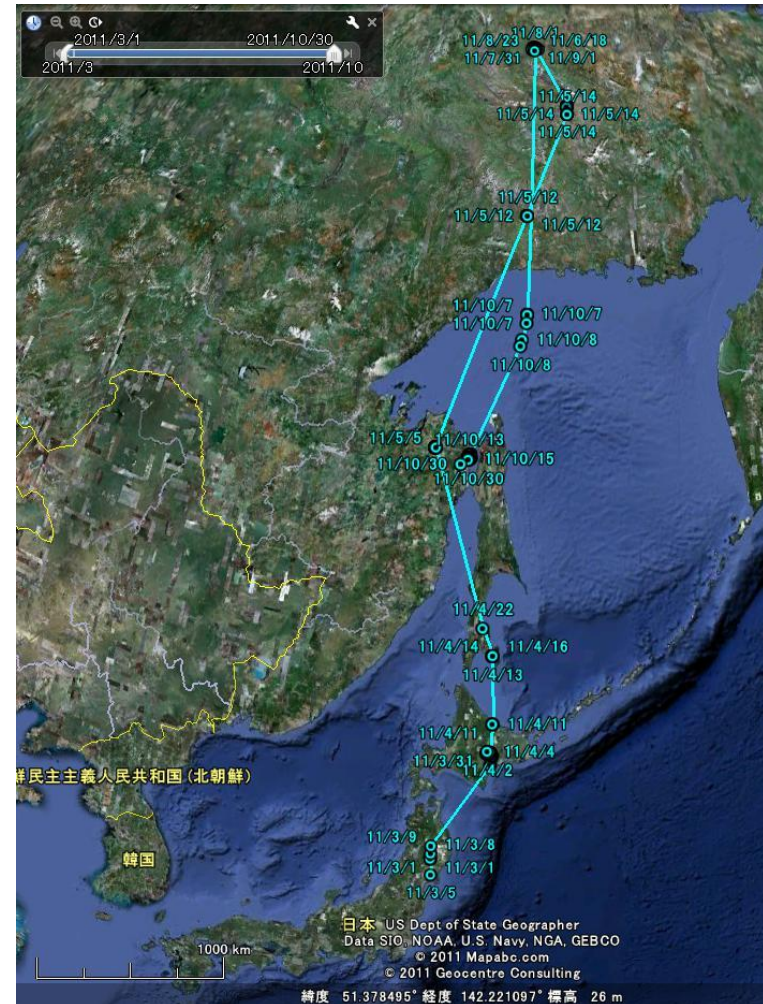


Distribution of Whooper Swan



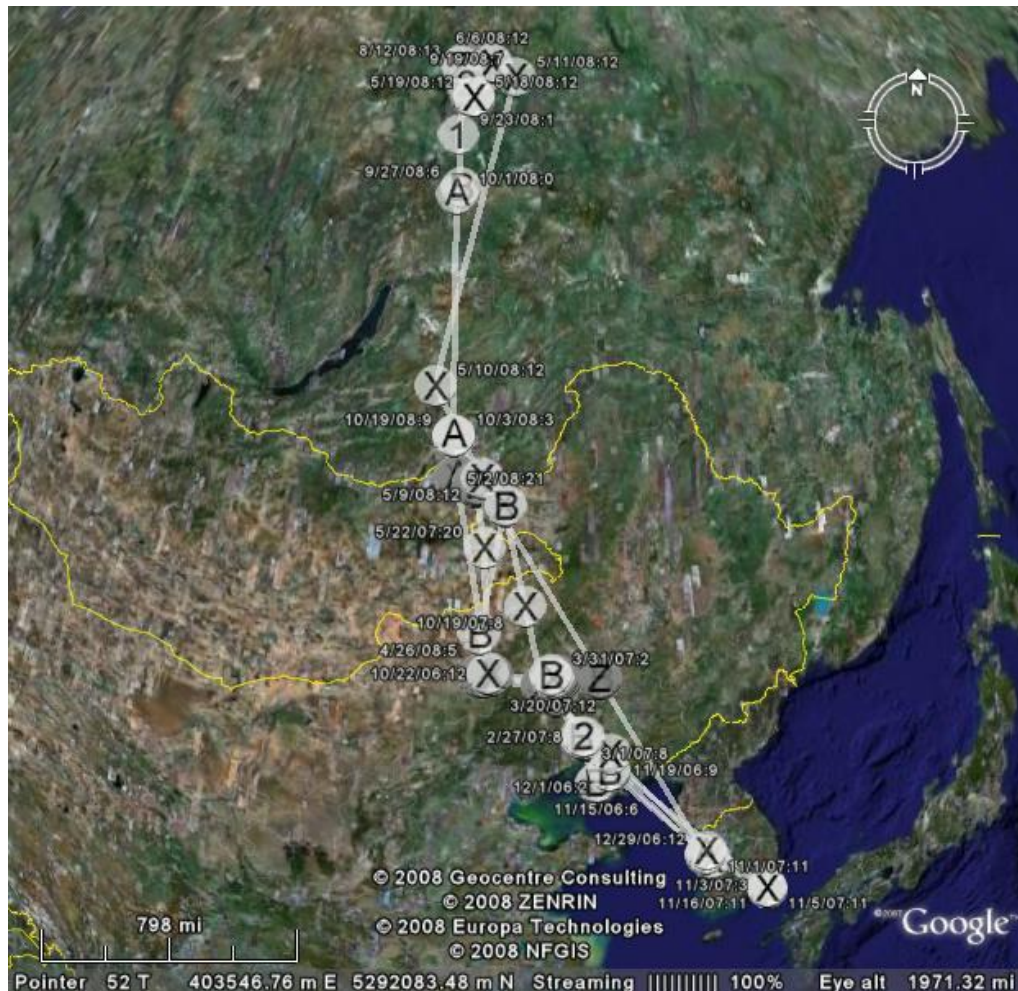
IUCN Redlist Web

Migration routes of Whooper Swans wintering in Japan



Ministry of the Environment Japan. Lab. of Biodiversity Science, Tokyo Uni.

Known migration route of Whooper Swan related Mongolia



USGS 2006

Catching method (2009/10)



Small boat

Drift net





Catch by hand during
flightless period for molt

Catching method (2011/12)



Big boat with powerful engine





**Find out and catch
flightless Swan**



Attaching PTT with harness



PTT: Platform Transmitter Terminal, 30-45g with GPS solar

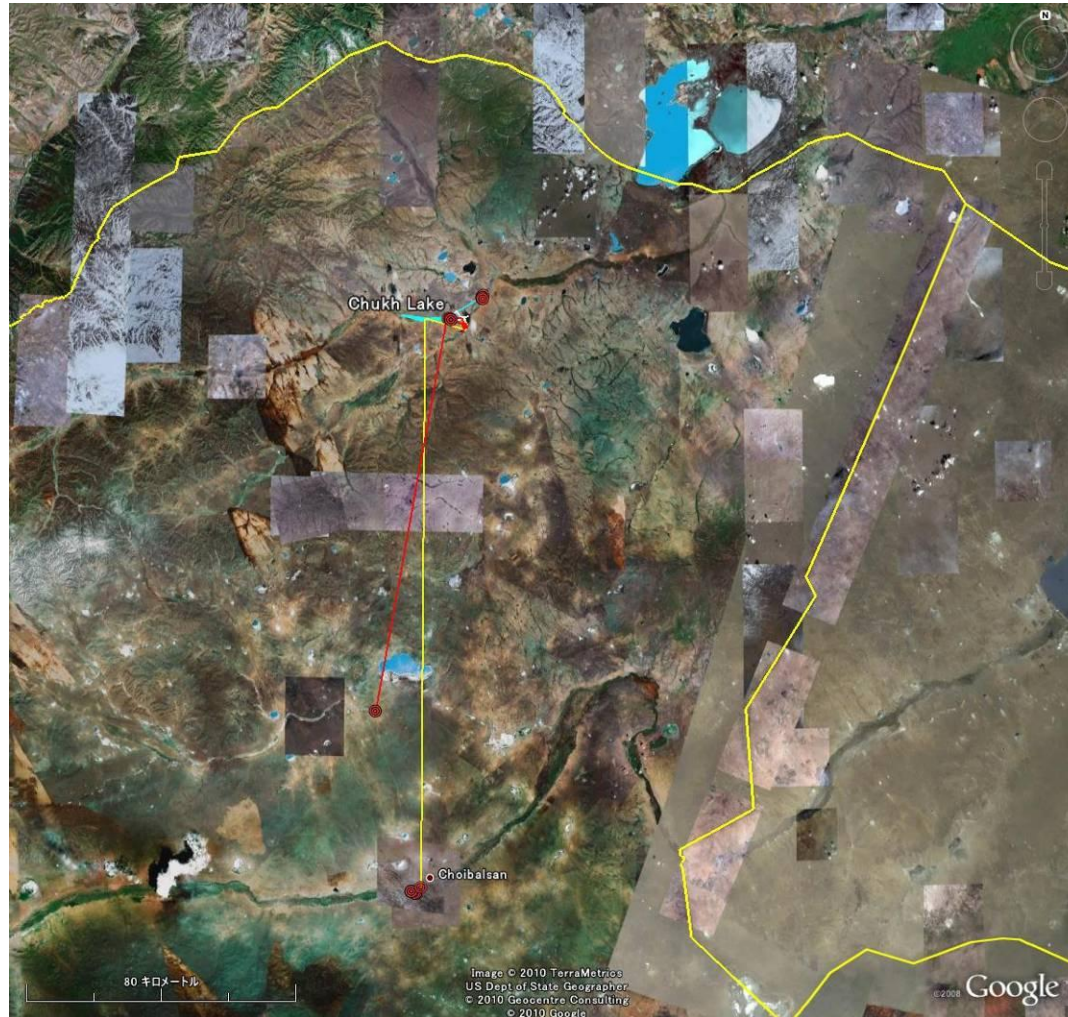
Neck band attaching method



releasing

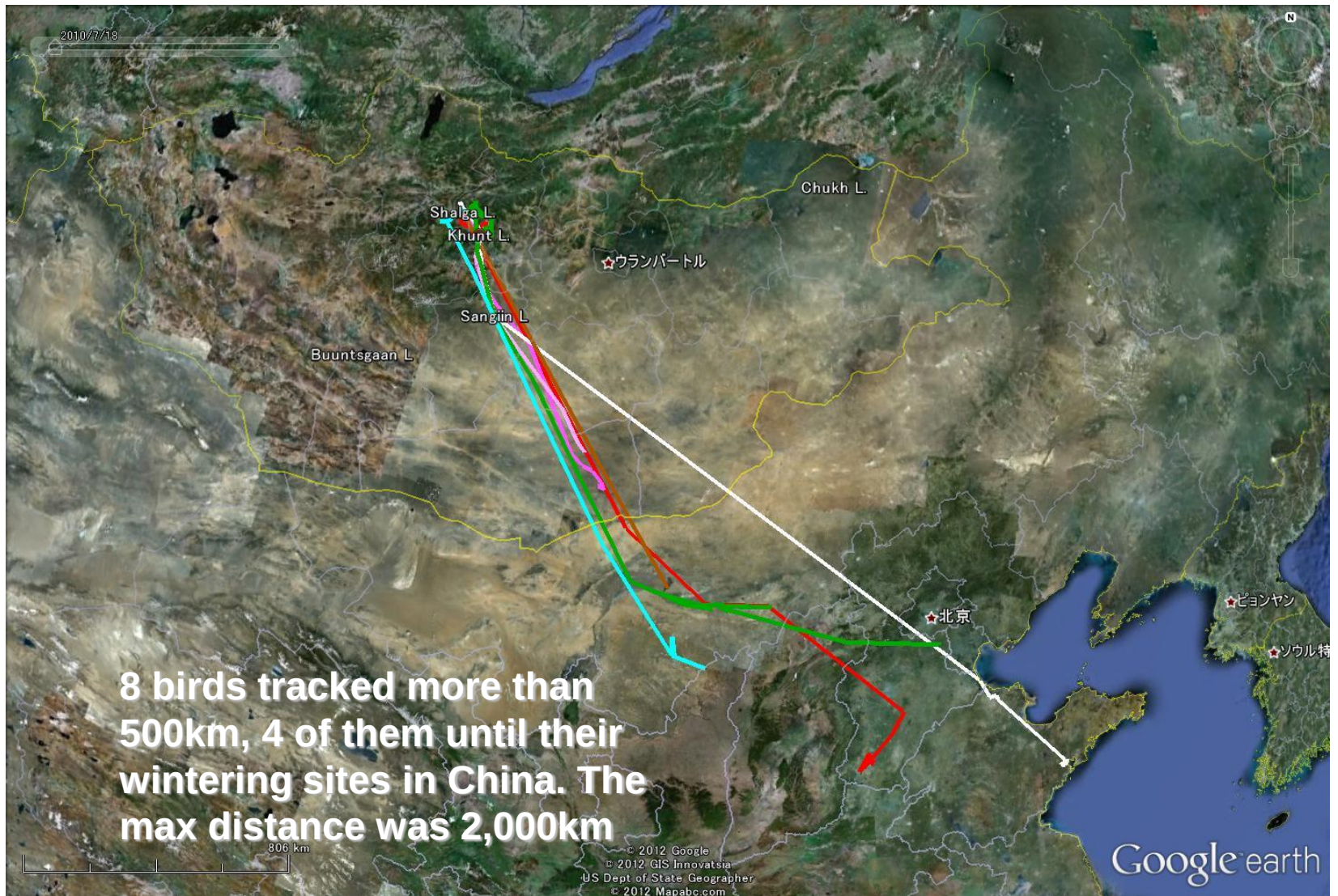


Tracking results 2009



Two birds tracked 166km and 115km to South, but could not follow to their wintering sites

2010



Tracking distances (2010)

ID	Arrived	km
60654	China,中国河北省永清県	1,567
60655	China,中国内モンゴル自治区松道溝	1,268
60656	China,中国内モンゴル自治区烏拉	1,078
60657	China,中国山東省青島九竜鎮	2,042
60658	China,中国内モンゴル自治区烏拉	1,046
60659	China,中国河北省永年県	1,693
60660	Mongolia,モンゴル国ドルノゴビ、ハンボクト	767
60661	Mongolia,モンゴル国オムゴビ、マンライ	593

2011

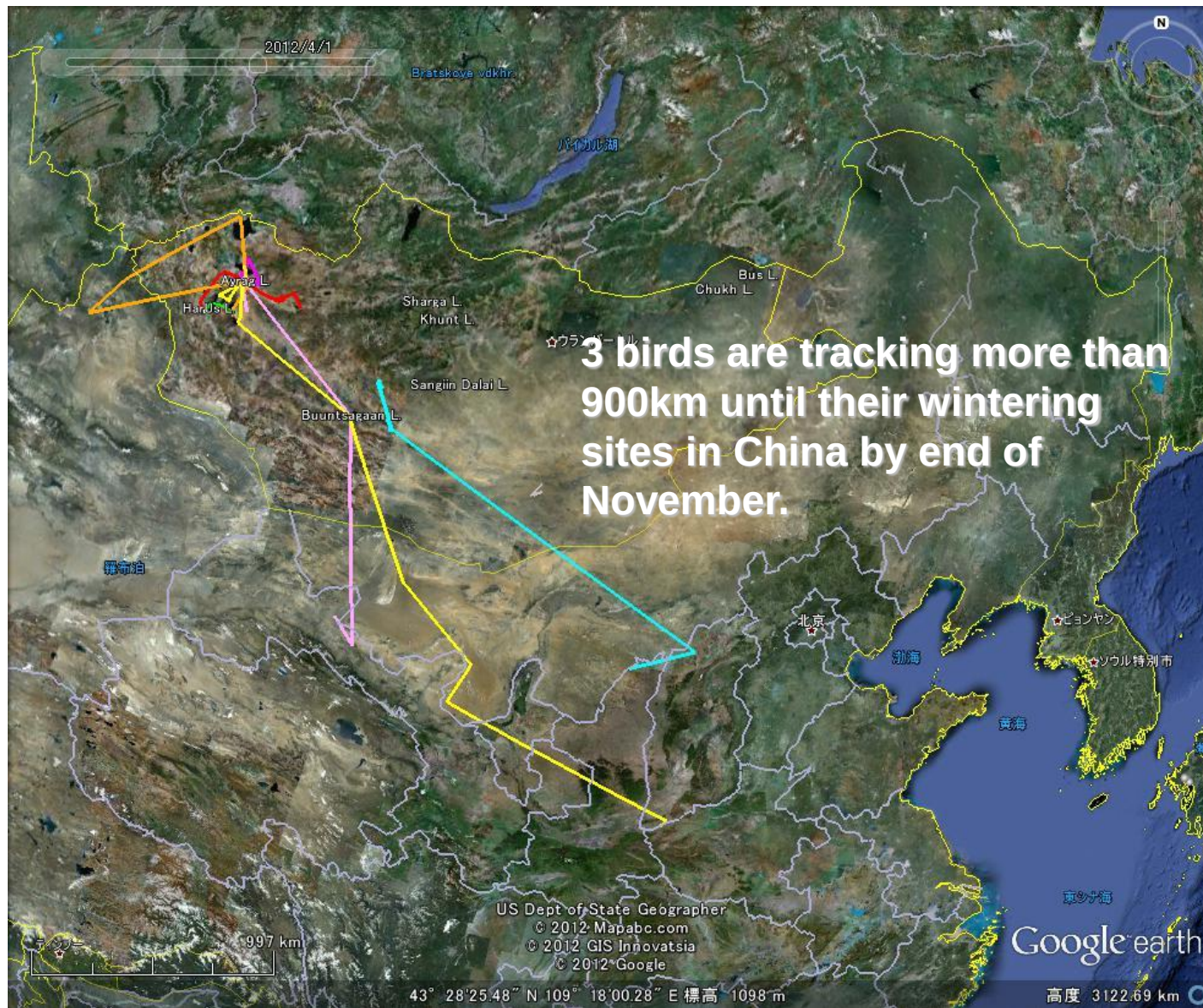


Tracking distances (2011)

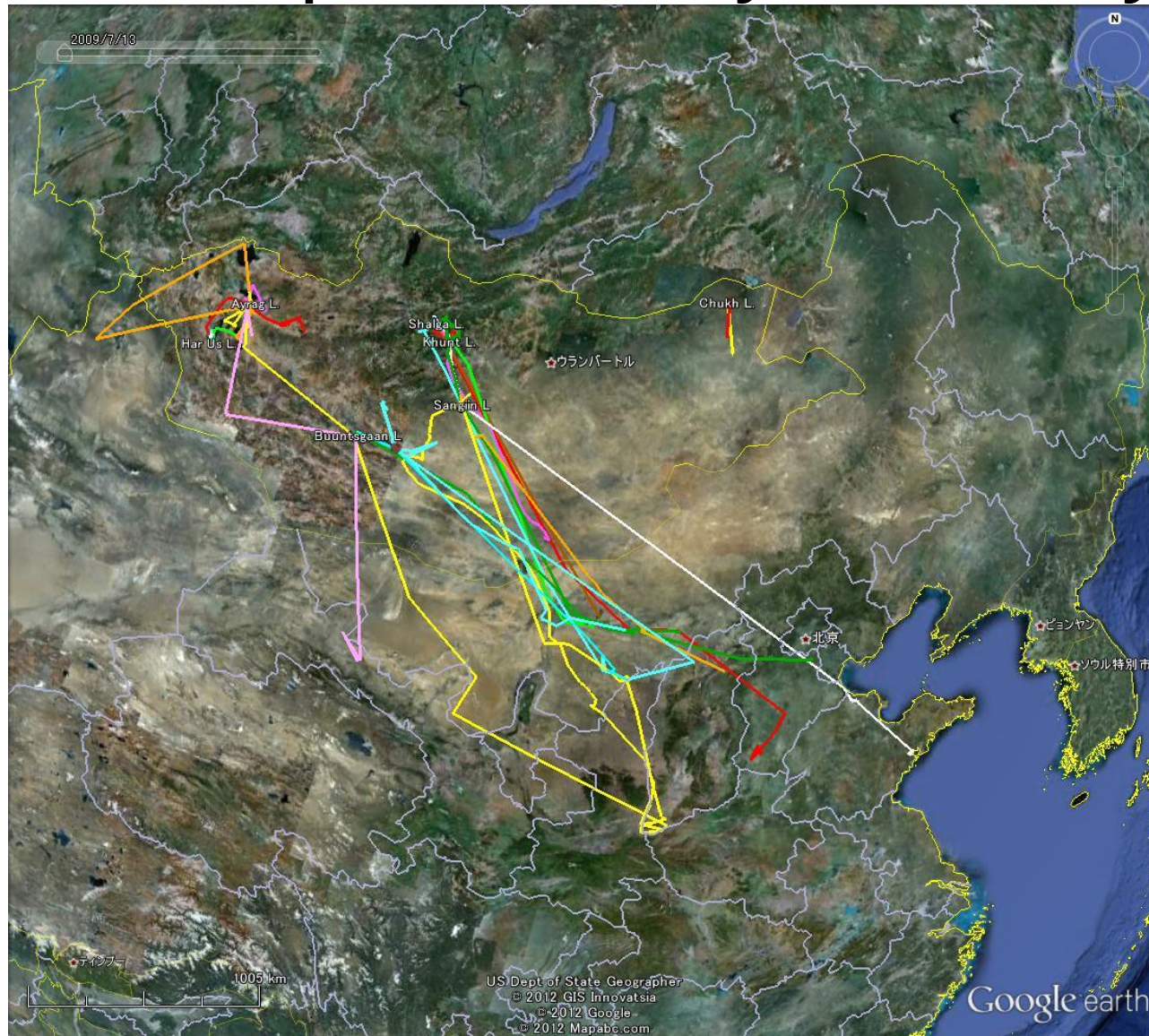
ID	banded	Arrived	km
89256	Buuntsgaan	China, 中国内モンゴル自治区巴彥淖爾市	920
95123	Buuntsgaan	China, 中国山西省河曲県 *	1,210
89285	Sangiin	China, 中国山西省繁峙県	1,170
89292	Sangiin	China, 中国山西省運城市 *	1,470

*** returning to breeding site**

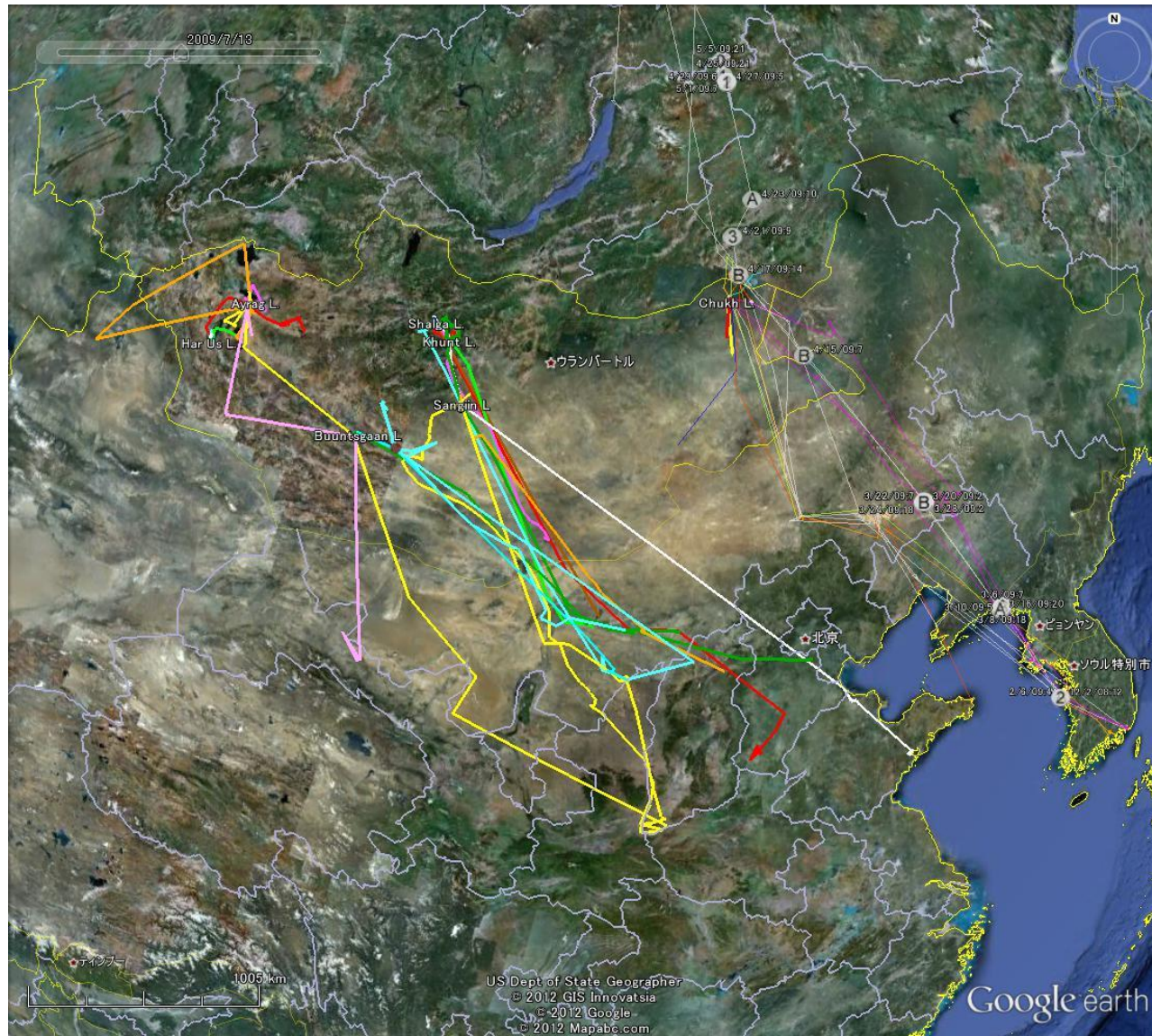
2012



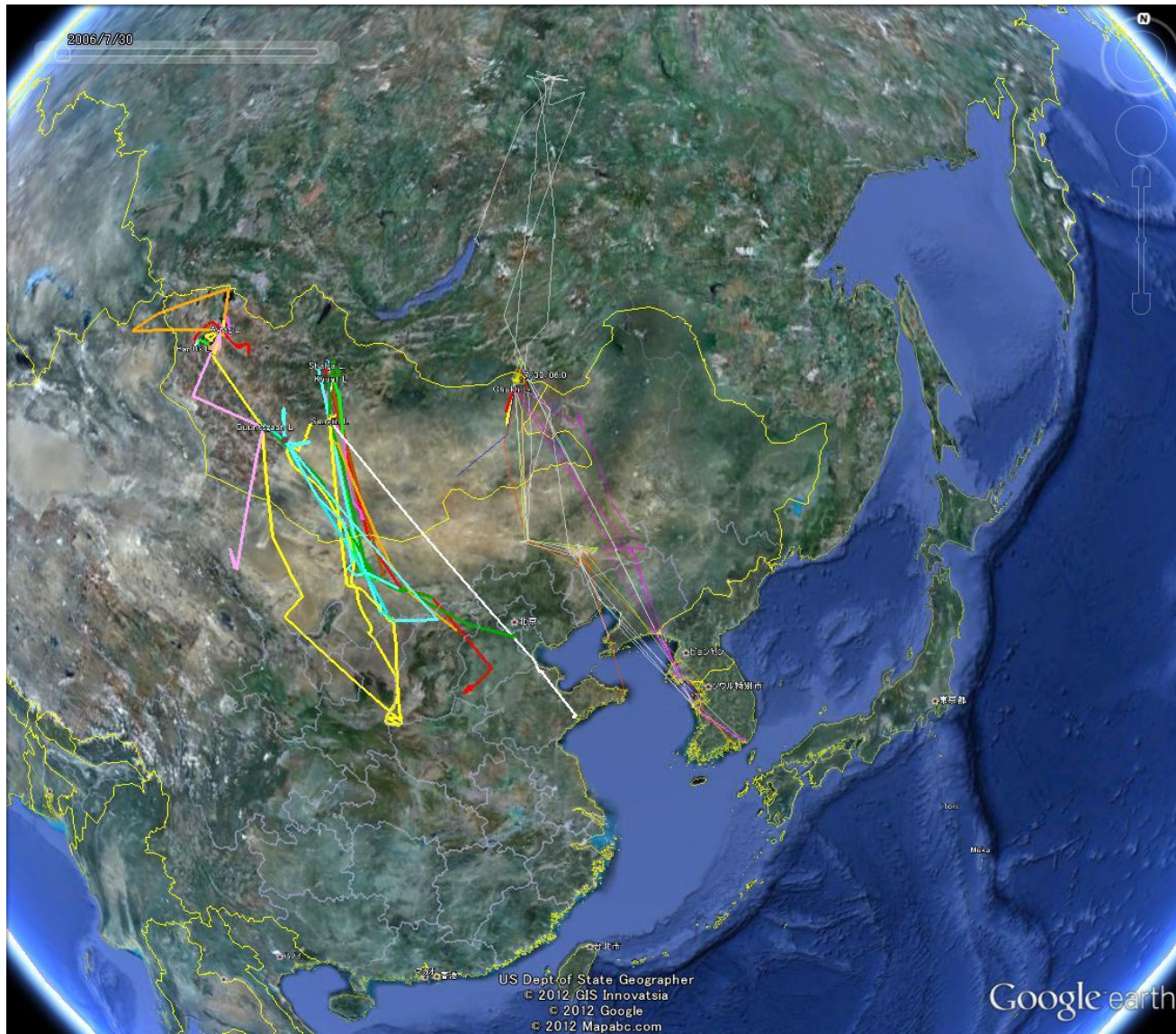
Migration routes of Mongolian Whooper Swan by this study



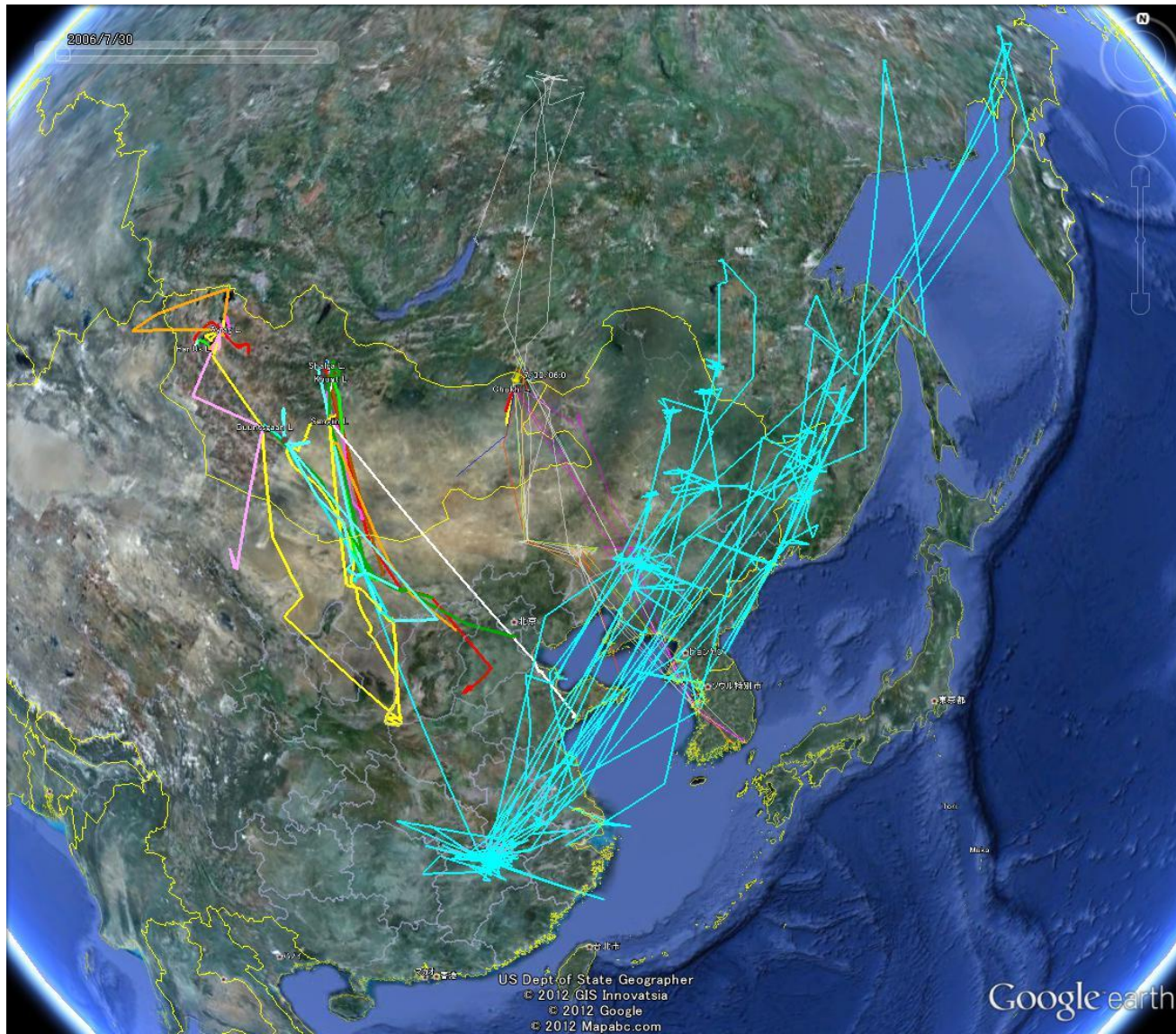
Whooper Swan (this study+USGS)



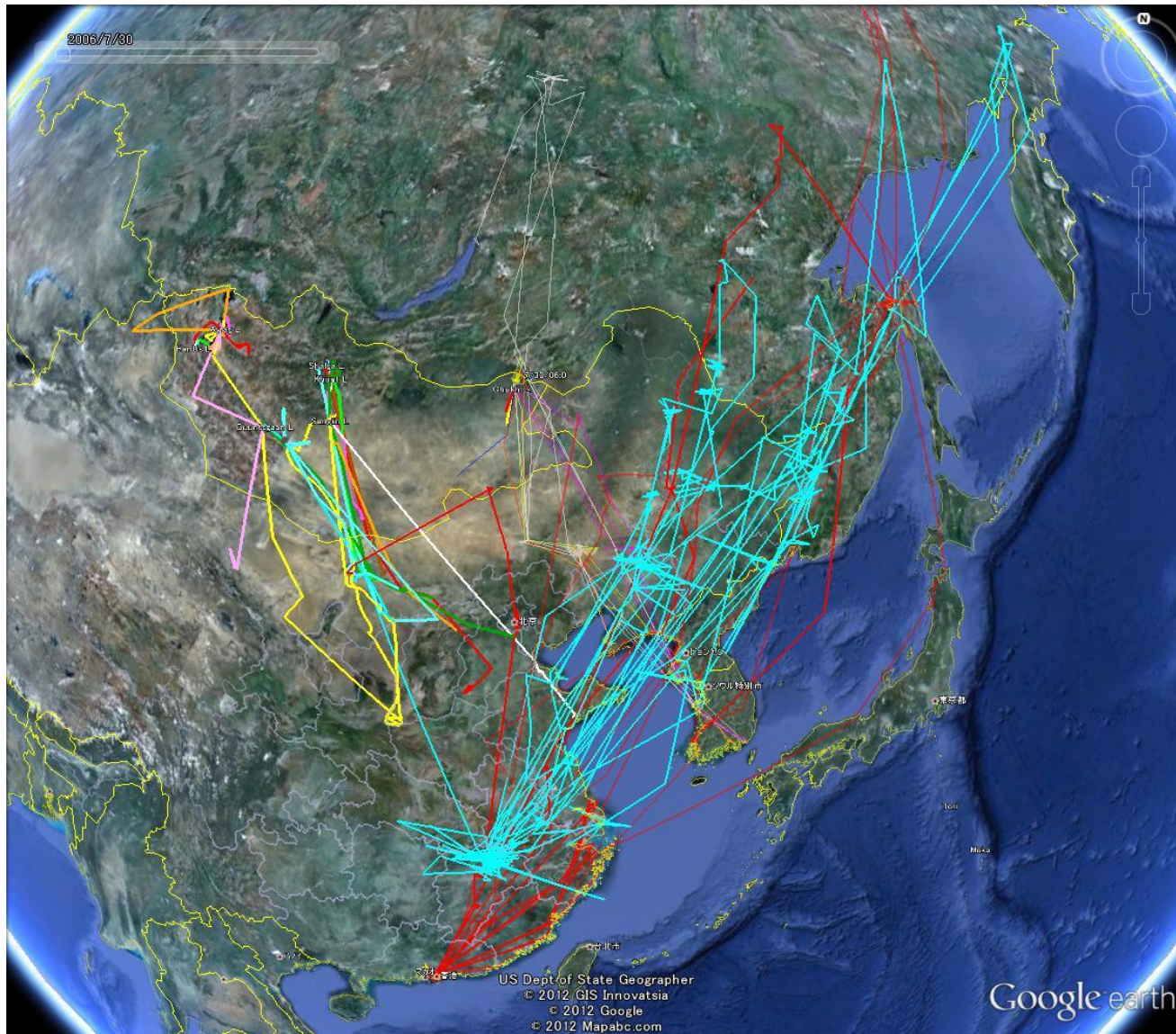
Whooper Swan (this study+USGS)



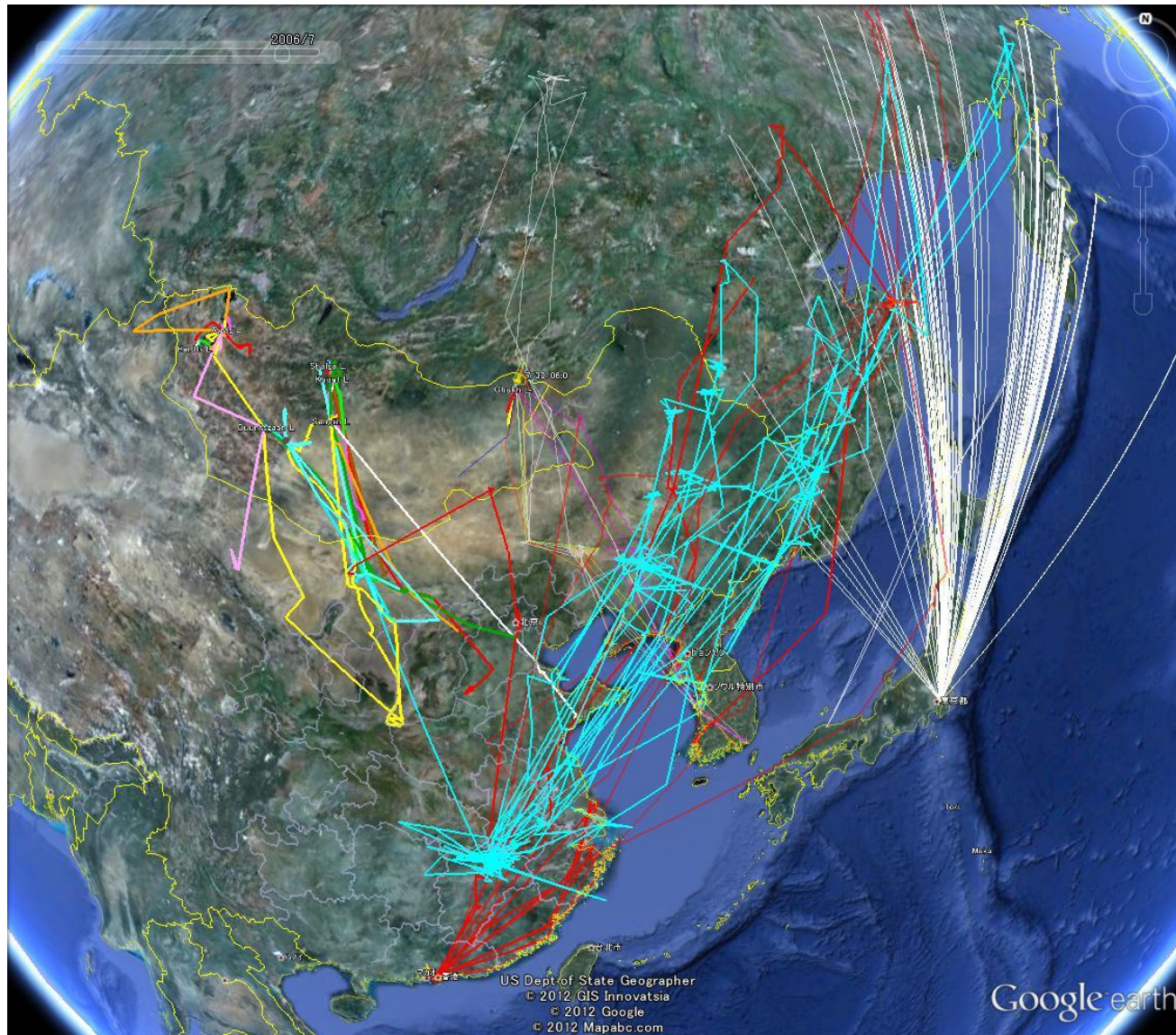
W-Swan + Wigeon(Poyan L.)



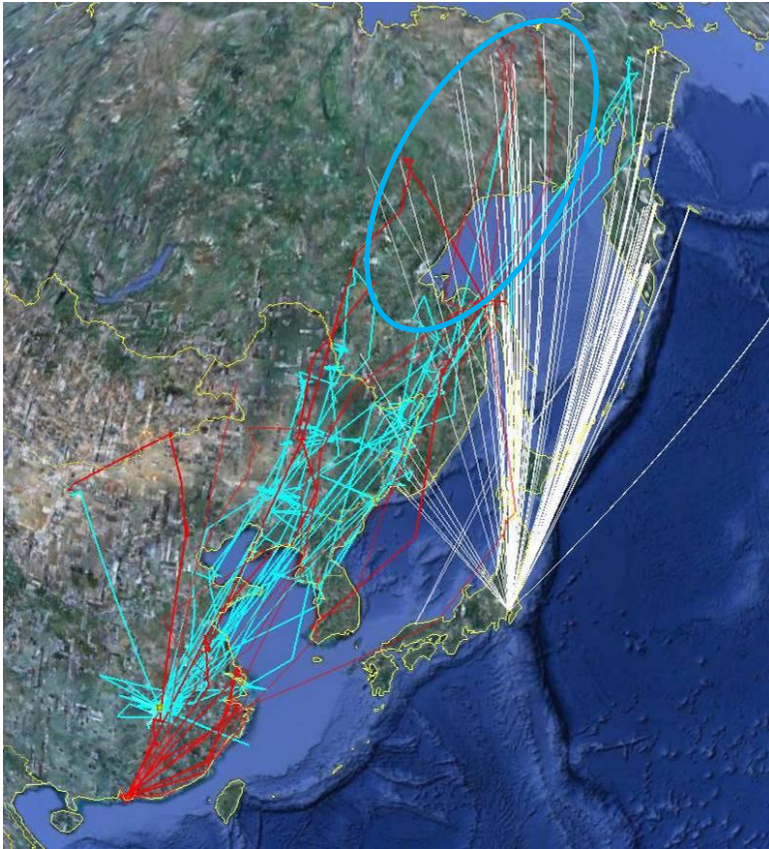
W-Swan + Wigeon(Poyan+HK)



W-Swan + Wigeon(PTT+Band Rec.)



Breeding and wintering distribution of Wigeon

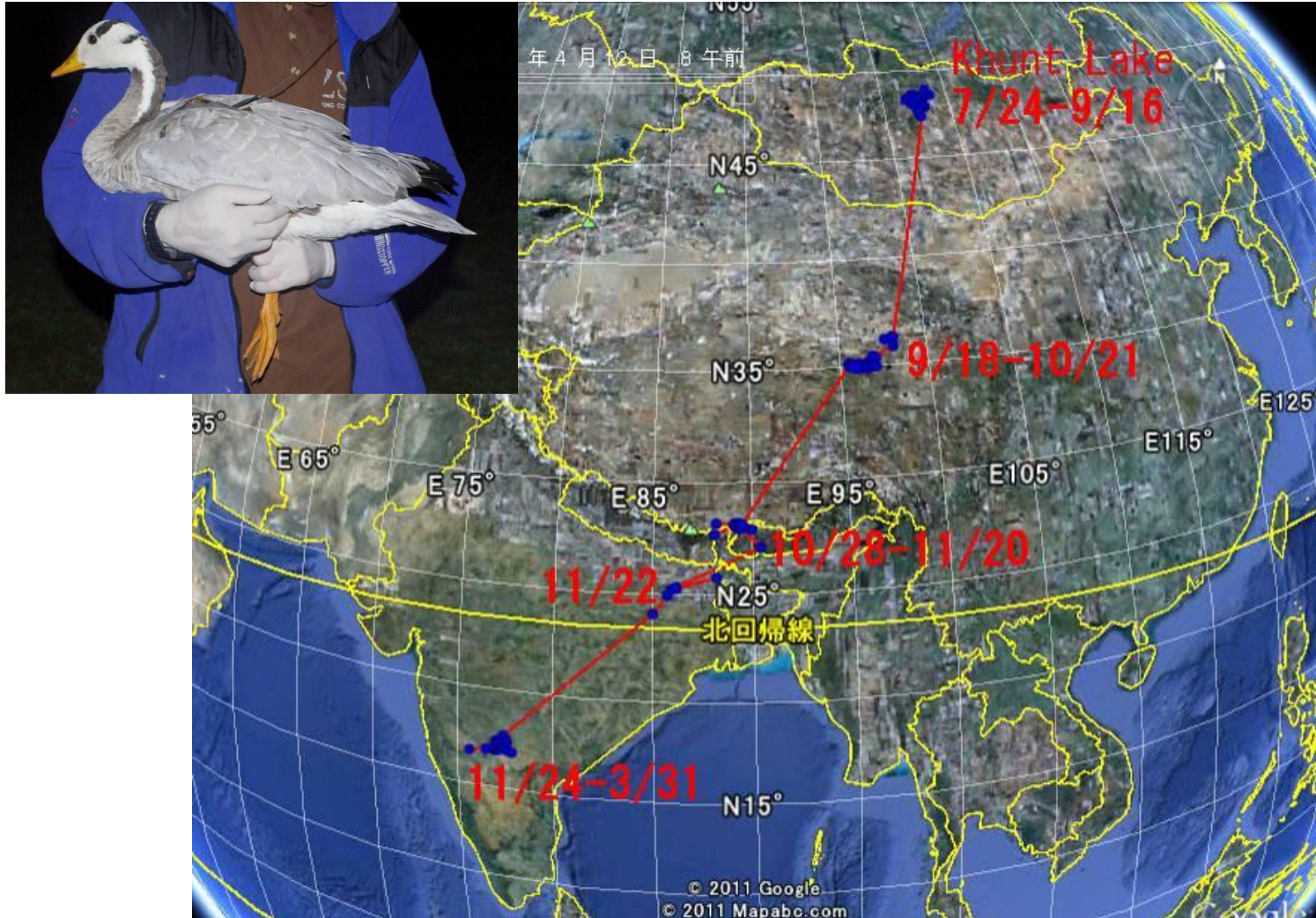


This area is overlapping the birds wintered in Japan and China

Distribution of Wigeon (IUCN Redlist Web)

Satellite tracking and banding recoveries of Wigeon (USGS and Yamashina Institute)

Migration of Bar-headed Geese



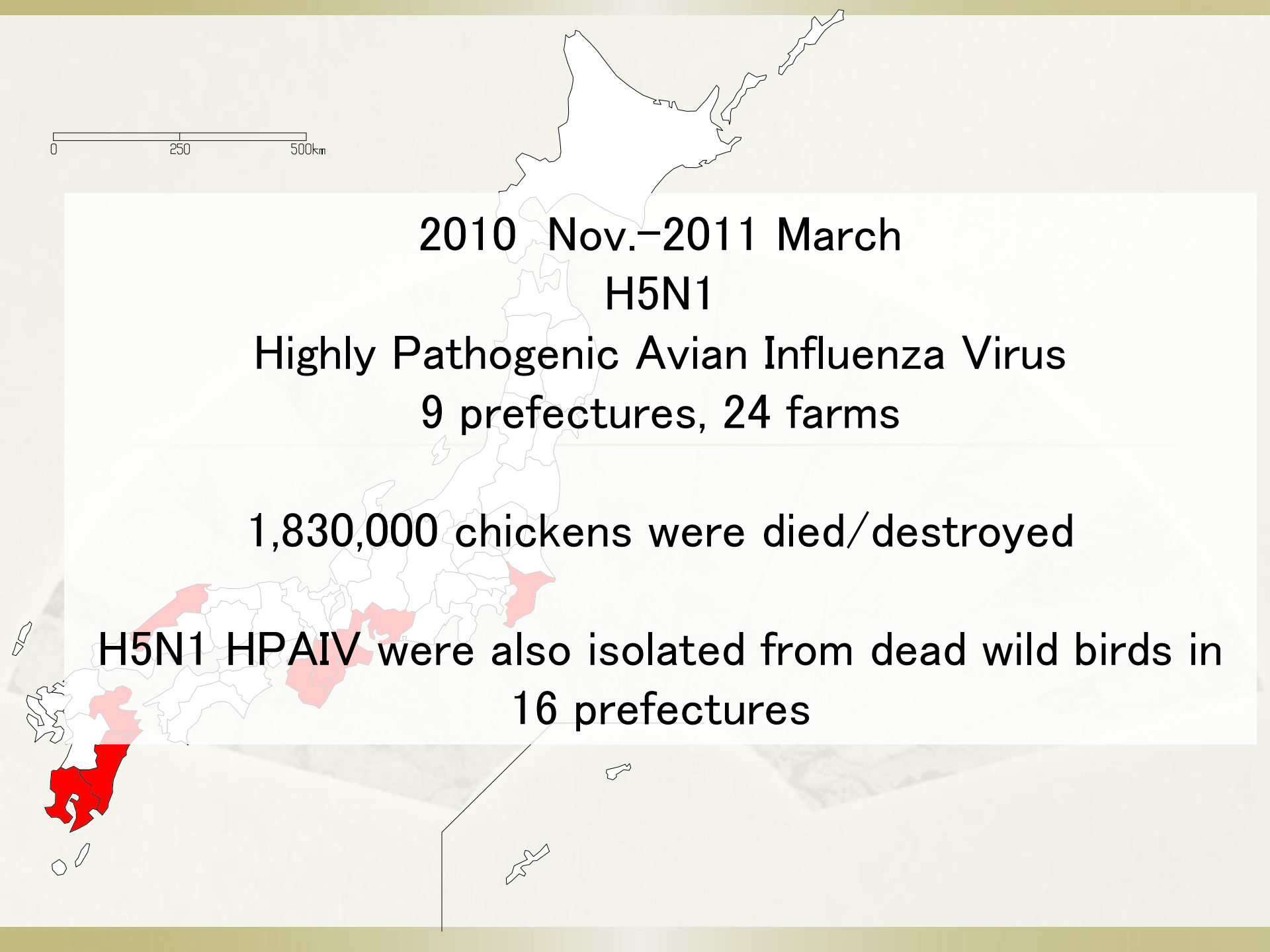
Arrived to south India in two months, the distance is 4,170km

Conclusion

- All samples for 325 individuals of 50 species from wild birds collected in Mongolia were negative for A virus.
- Whooper Swan of Mongolia migrate to south-east direction, wintered in central-east China, and the routes were parallel in each population.
- Wintering sites of Whooper Swan of Mongolia are overlapping with the migration routes of ducks wintered in southern China, and their breeding sites are also overlapping with Japanese wintering ducks.

Characterization of Highly Pathogenic Avian Influenza Viruses isolated in 2010–2011 in Japan

National Institute of Animal Health
Yuko Uchida

A map of Japan is shown in the background. A scale bar at the top left indicates distances of 0, 250, and 500 km. Several regions in Japan are highlighted in red, indicating areas affected by H5N1. These include Hokkaido, Tohoku, Kanto, Chubu, and Kyushu. The text is overlaid on the map.

0 250 500km

2010 Nov.–2011 March

H5N1

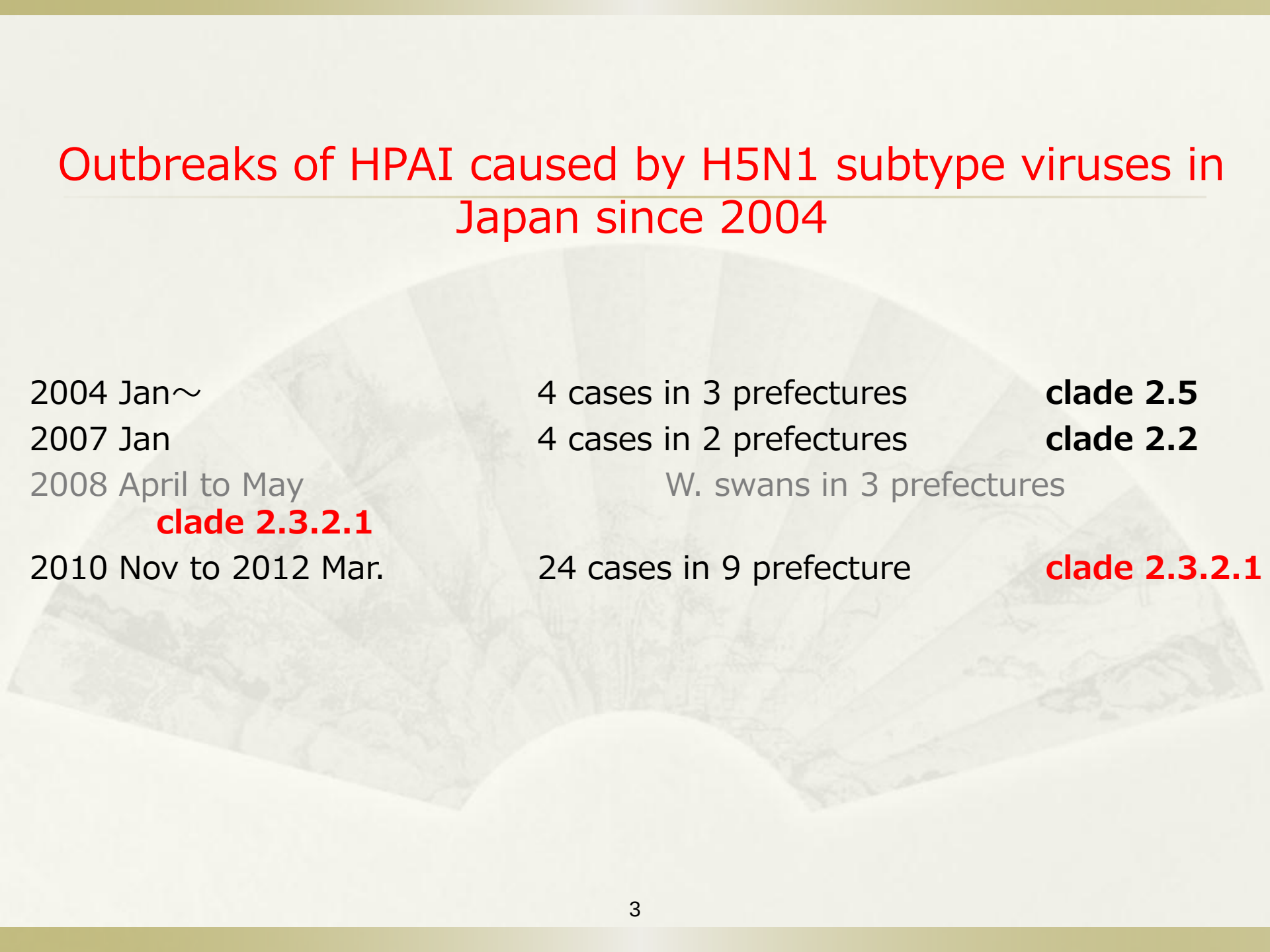
Highly Pathogenic Avian Influenza Virus

9 prefectures, 24 farms

1,830,000 chickens were died/destroyed

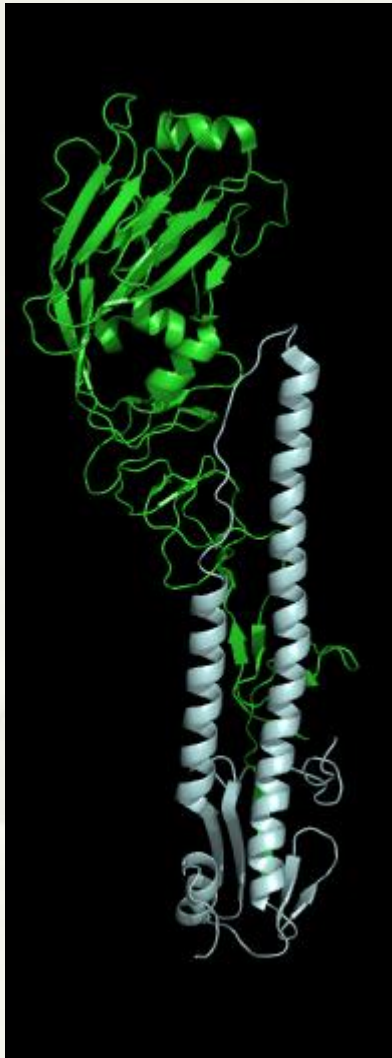
H5N1 HPAIV were also isolated from dead wild birds in
16 prefectures

Outbreaks of HPAI caused by H5N1 subtype viruses in Japan since 2004



2004 Jan~	4 cases in 3 prefectures	clade 2.5
2007 Jan	4 cases in 2 prefectures	clade 2.2
2008 April to May	W. swans in 3 prefectures	
clade 2.3.2.1		
2010 Nov to 2012 Mar.	24 cases in 9 prefecture	clade 2.3.2.1

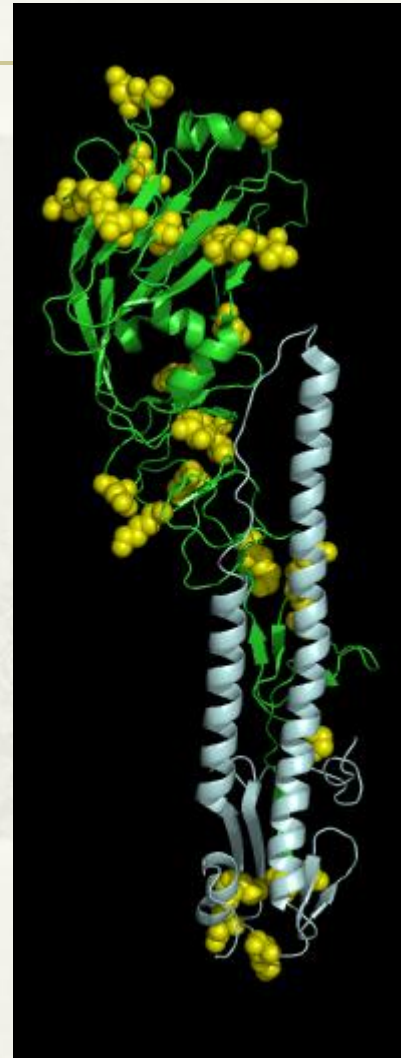
Amino acid substitutions from 2004 isolate to 2010 isolate in the HA protein



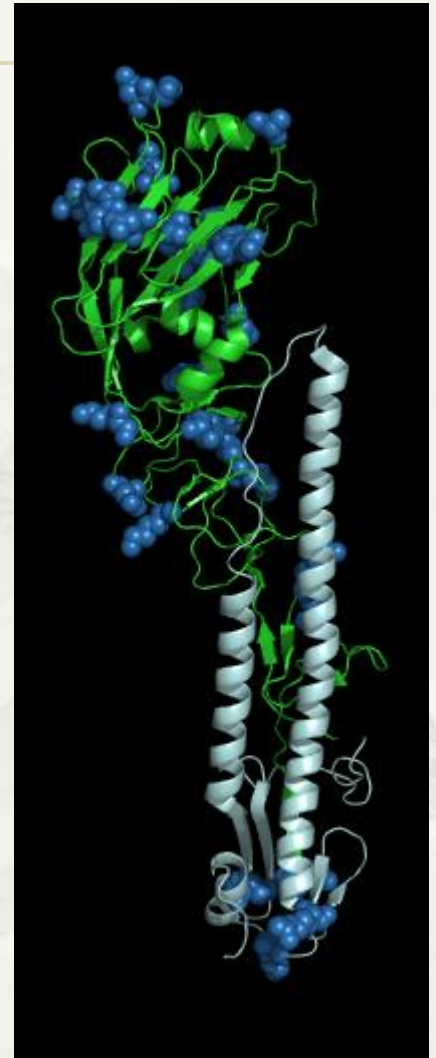
2004 clade 2.5



2007 clade 2.2



2008 clade 2.3.2.1

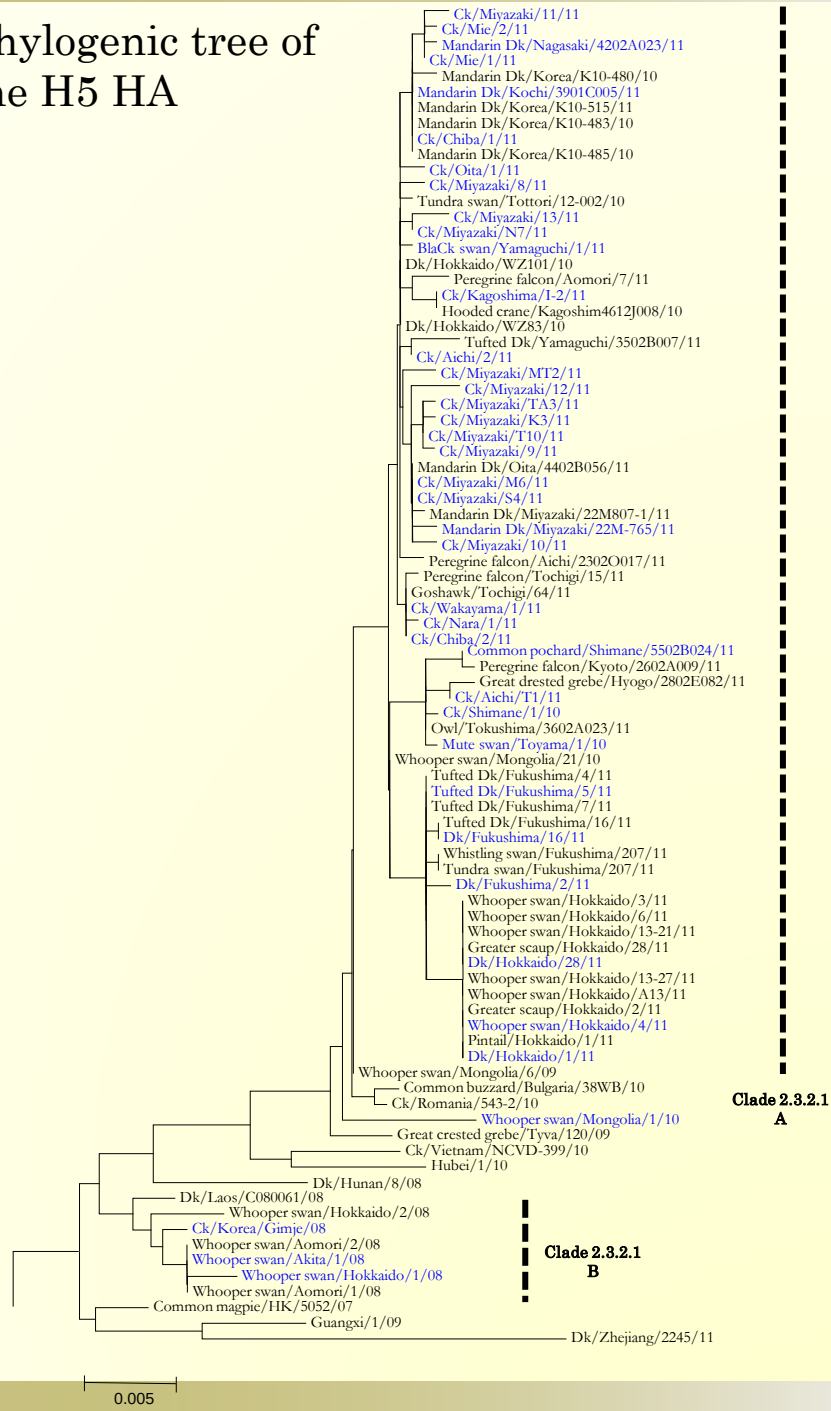


2010 clade 2.3.2.1

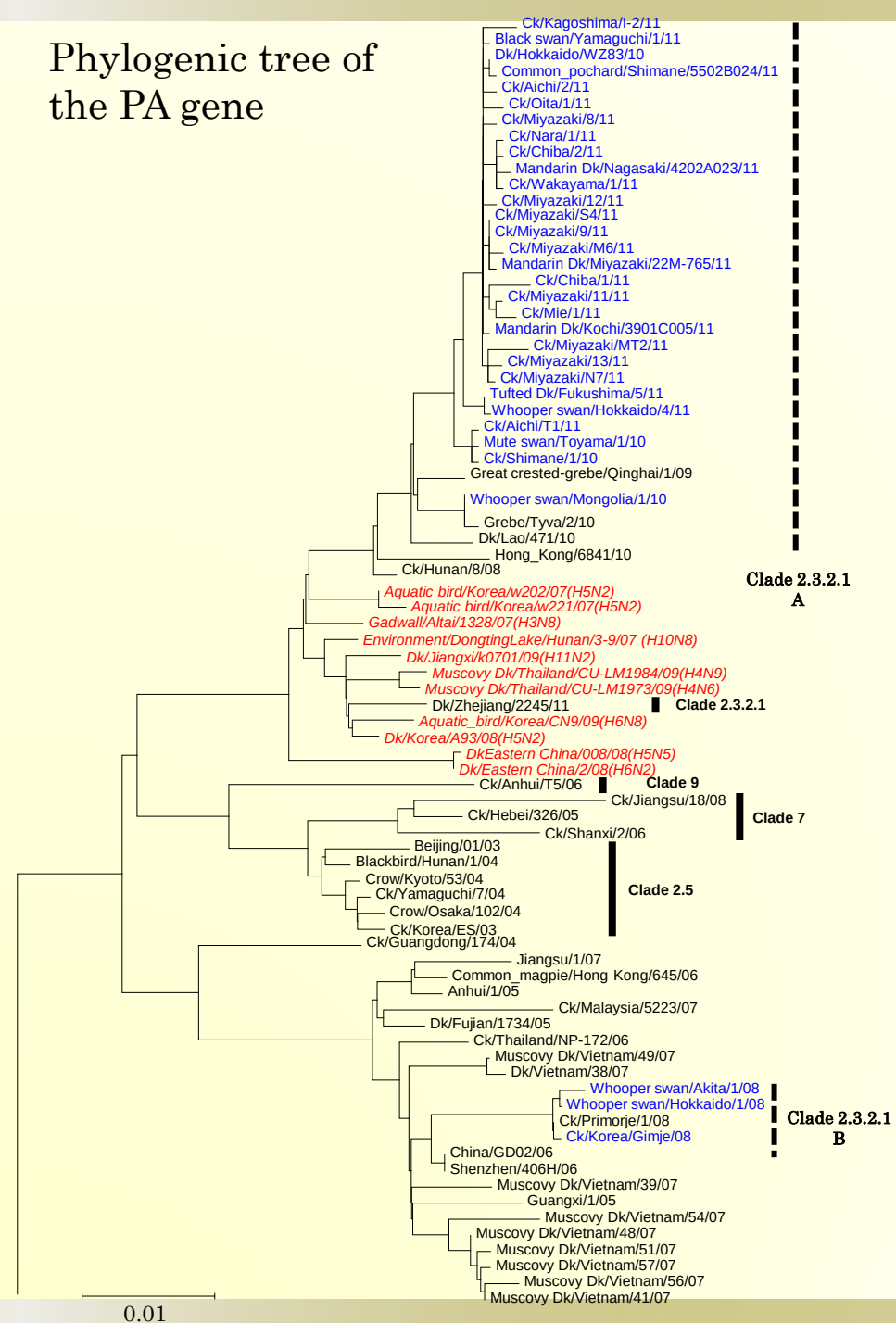
Antigenic analysis by HI test

	Hyper-immune antisera		
	Ck/Shimane/1/2010 clade 2.3.2.1	Ws/Akita/1/2008 clade 2.3.2.1	Ck/Yamaguchi/7/2004 clade 2.5
A/Ck/Shimane/1/2010	<u>1280</u>	640	160
A/Ck/Miyazaki/11/2011	640	640	160
A/Whooper swan/Akita/1/2008	640	<u>1280</u>	160
A/Ck/Yamaguchi/7/2004	160	1280	<u>1280</u>

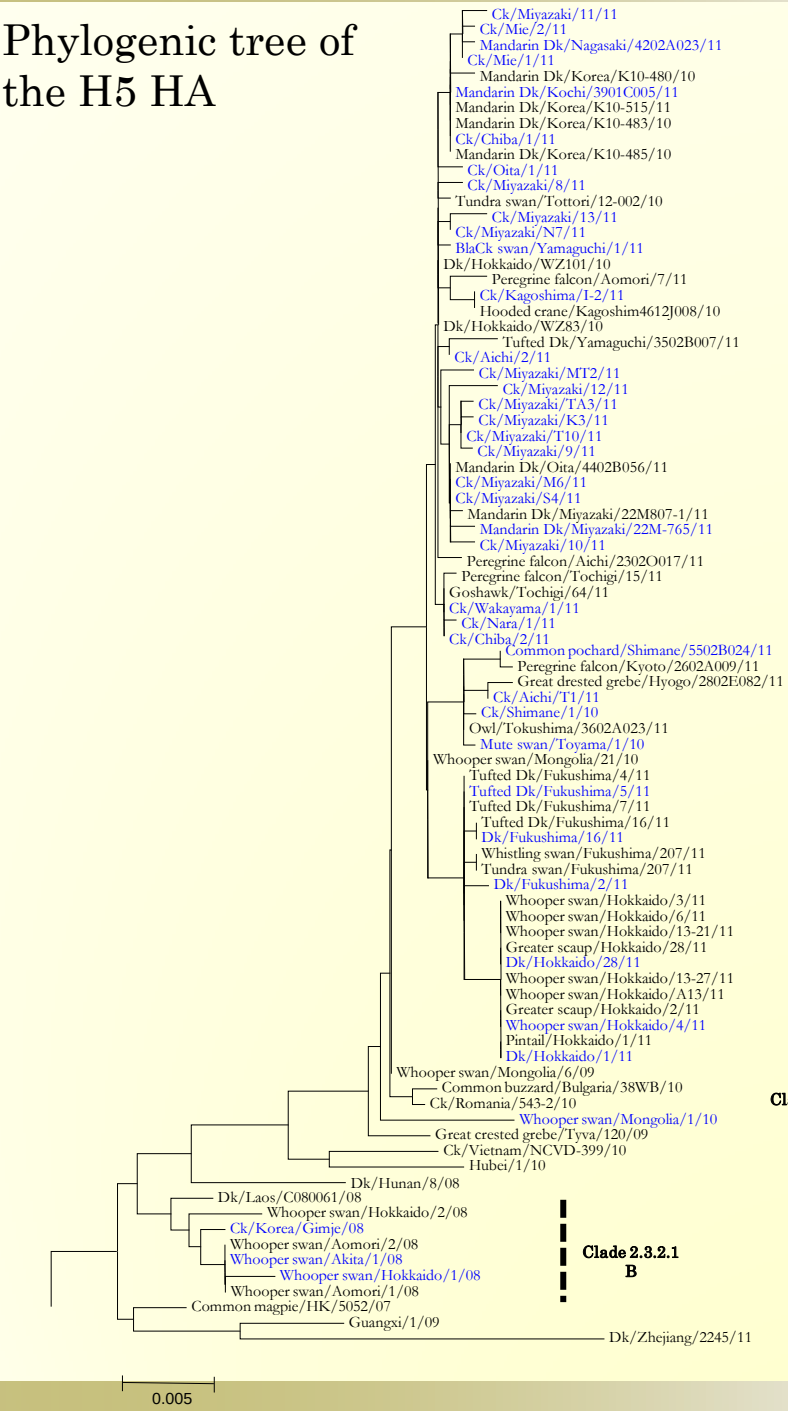
Phylogenetic tree of the H5 HA



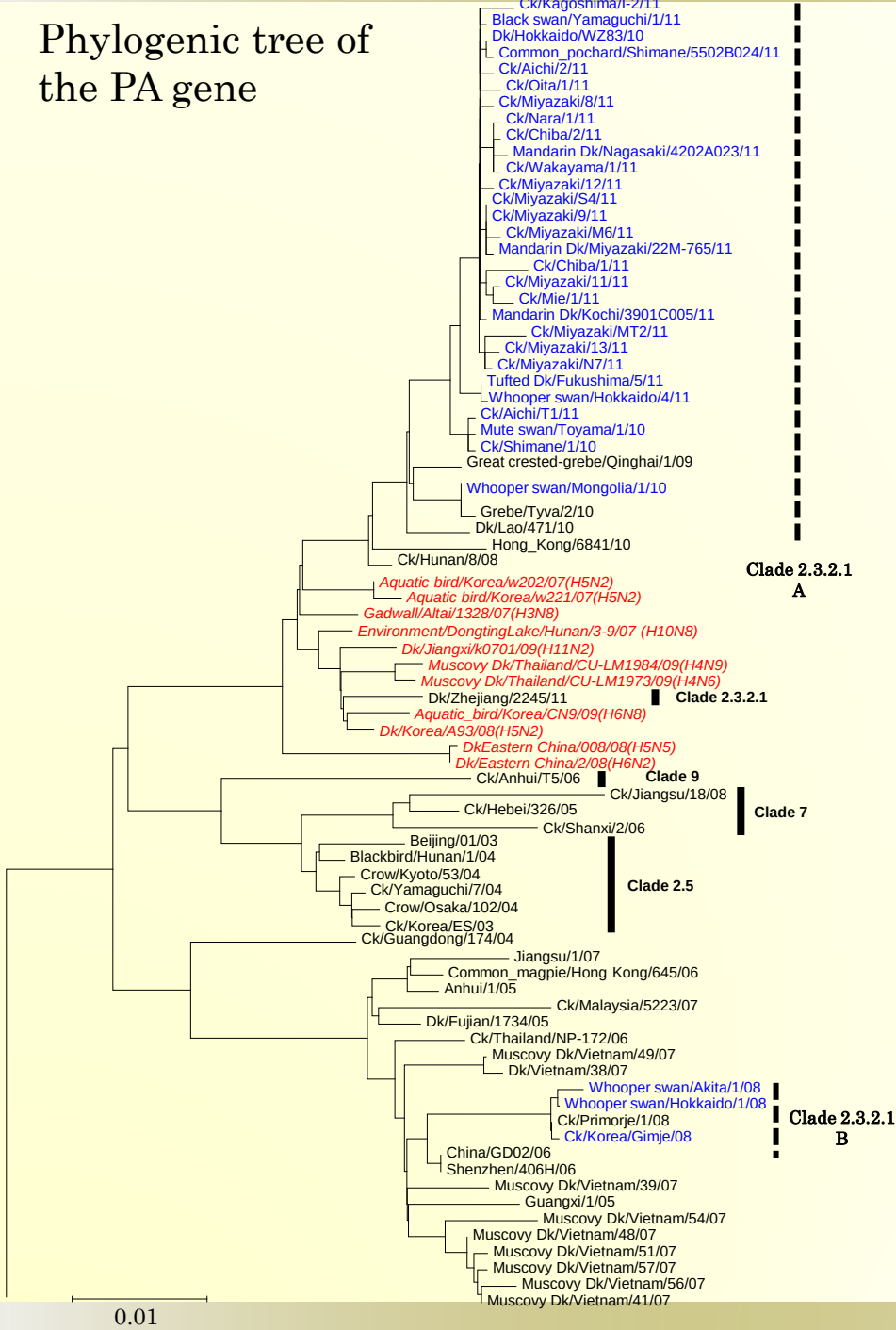
Phylogenetic tree of the PA gene



Phylogenetic tree of the H5 HA

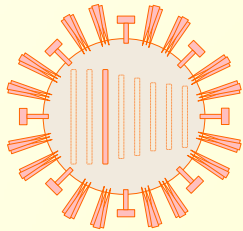
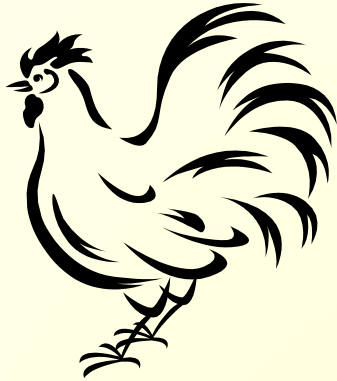


Phylogenetic tree of the PA gene

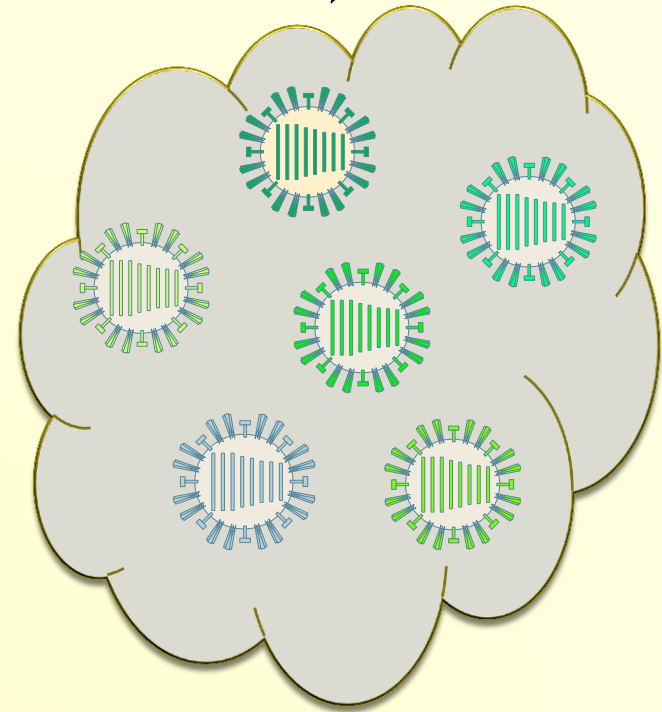
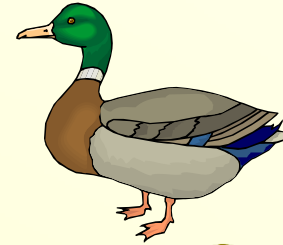
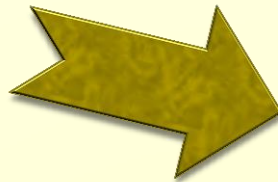


Where did PA gene of Clade 2.3.2.1A come from ?

~2007



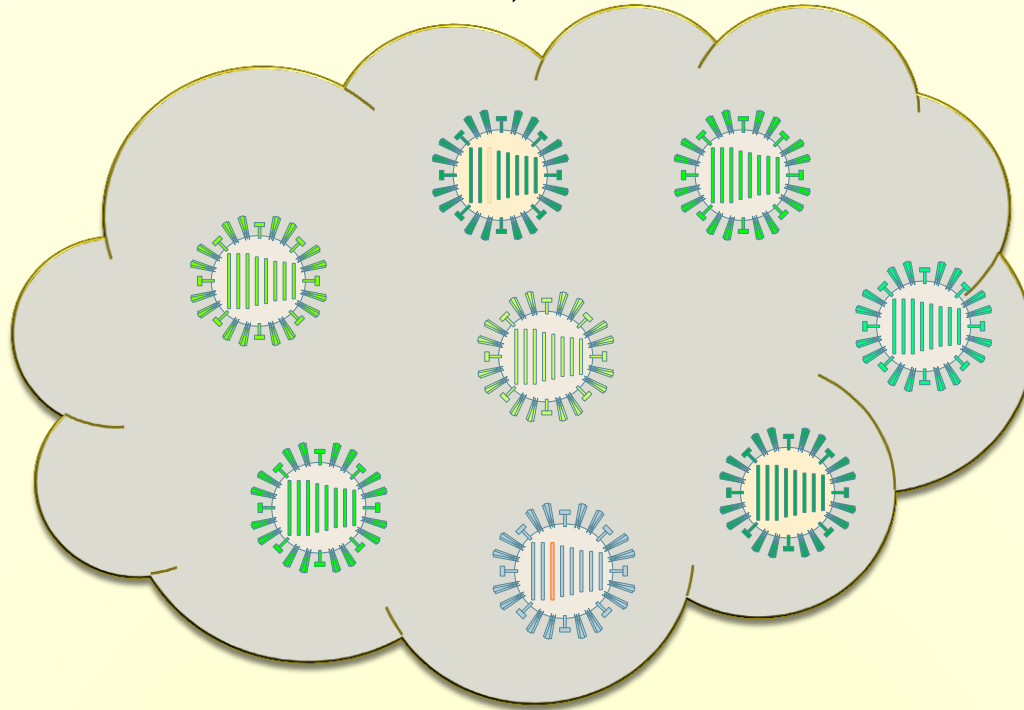
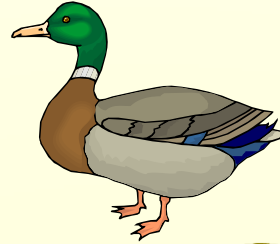
Clade X H5N1 HPAIV



Gene pool in wild birds

Where did PA gene of Clade 2.3.2.1A come from ?

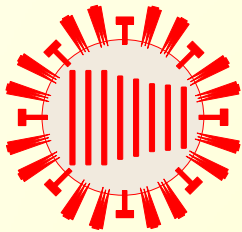
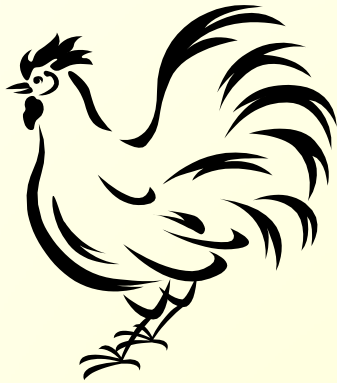
2007



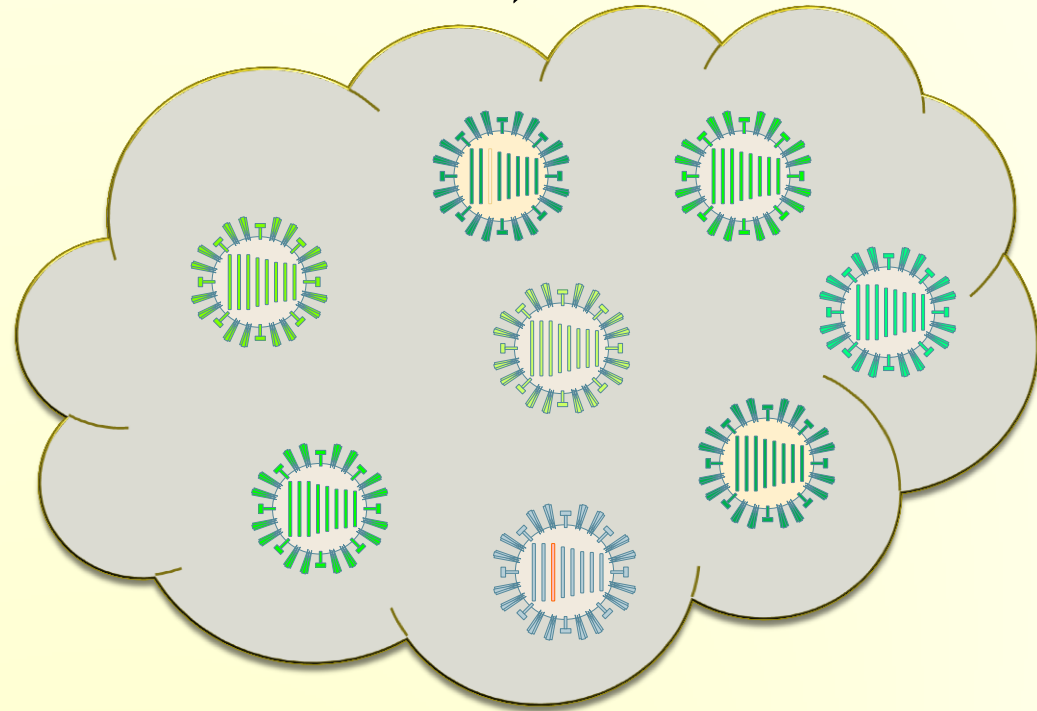
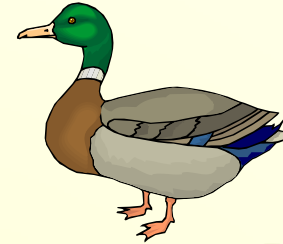
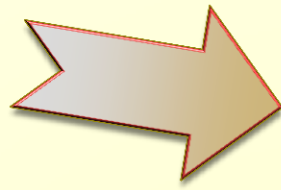
Gene pool in wild birds

Where did PA gene of Clade 2.3.2.1A come from ?

2007~



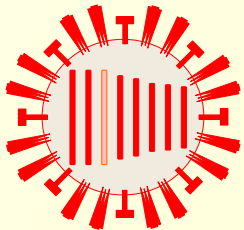
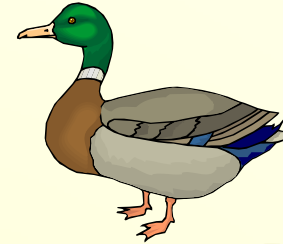
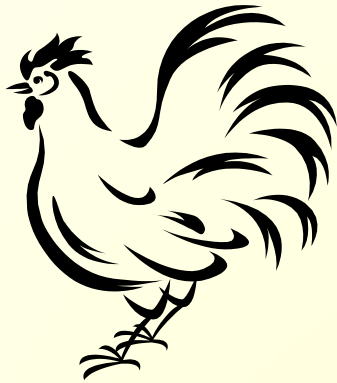
Clade 2.3.2.1B
H5N1 HPAIV



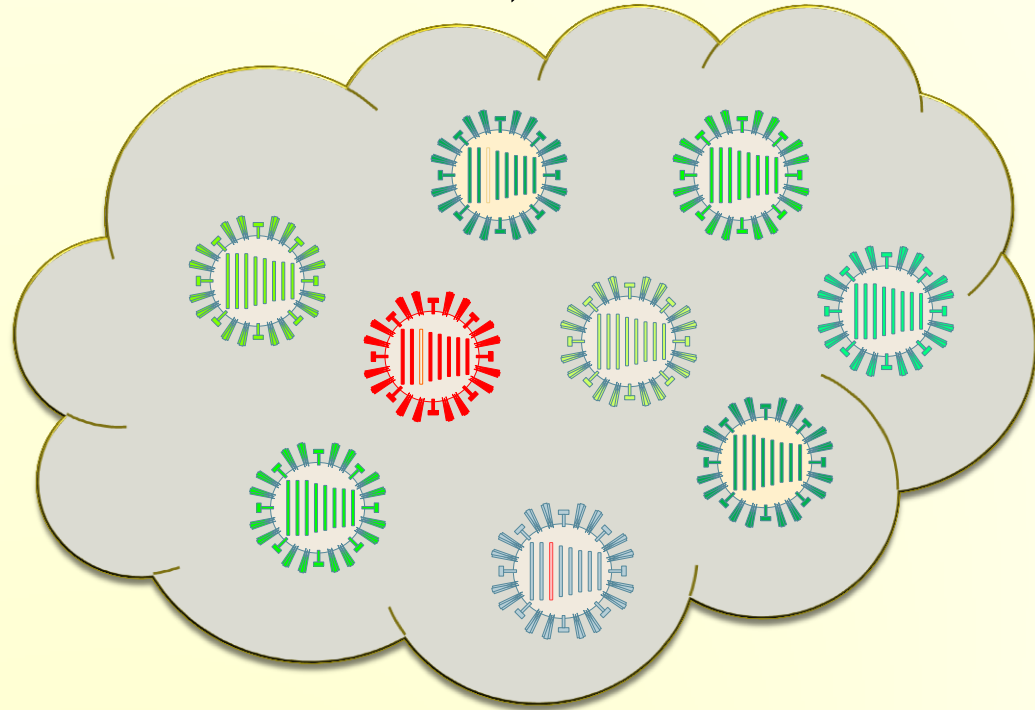
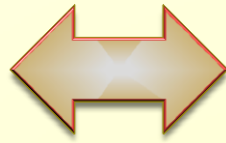
Gene pool in wild birds

Where did PA gene of Clade 2.3.2.1A come from ?

2008~

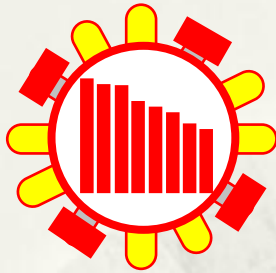


Clade 2.3.2.1A
H5N1 HPAIV

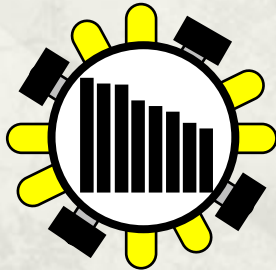


Gene pool in wild birds

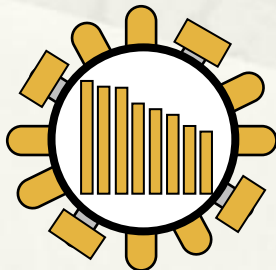
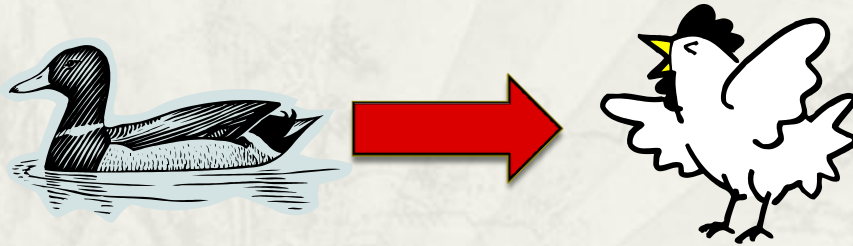
Three isolates were examined for replication, lethality and transmissibility in chickens



Chicken isolate: farm to farm transmission suspected



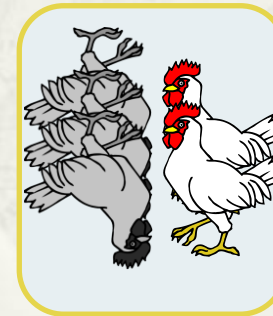
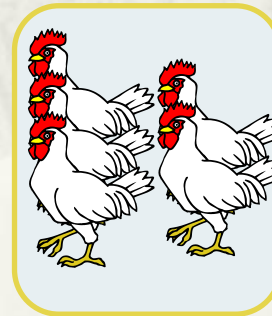
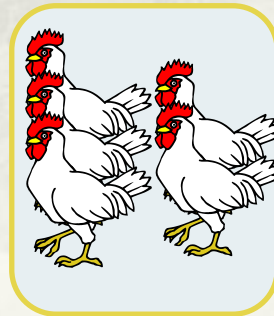
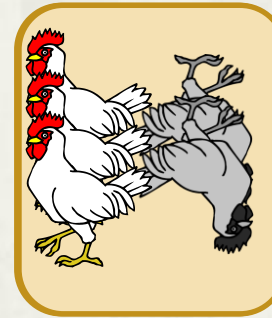
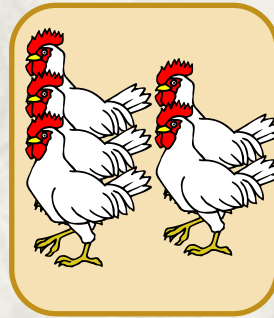
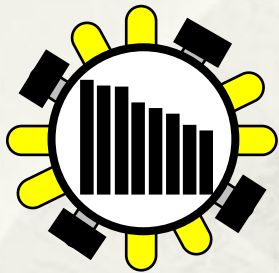
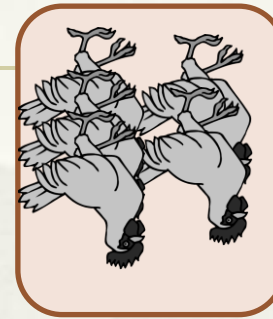
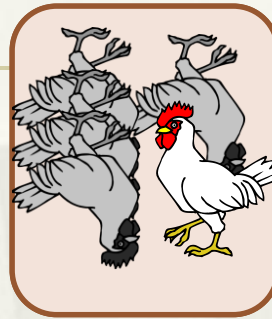
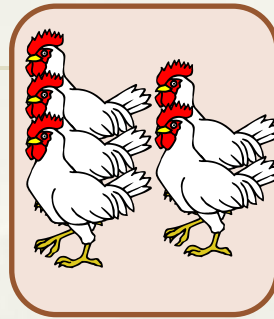
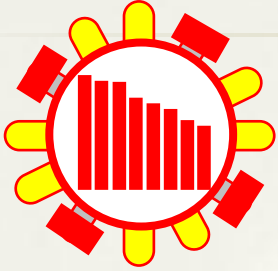
Index strain: transmitted from wild bird to chicken



MD: Mandarin Duck isolate



Lethality against chickens



Hours post inoculation

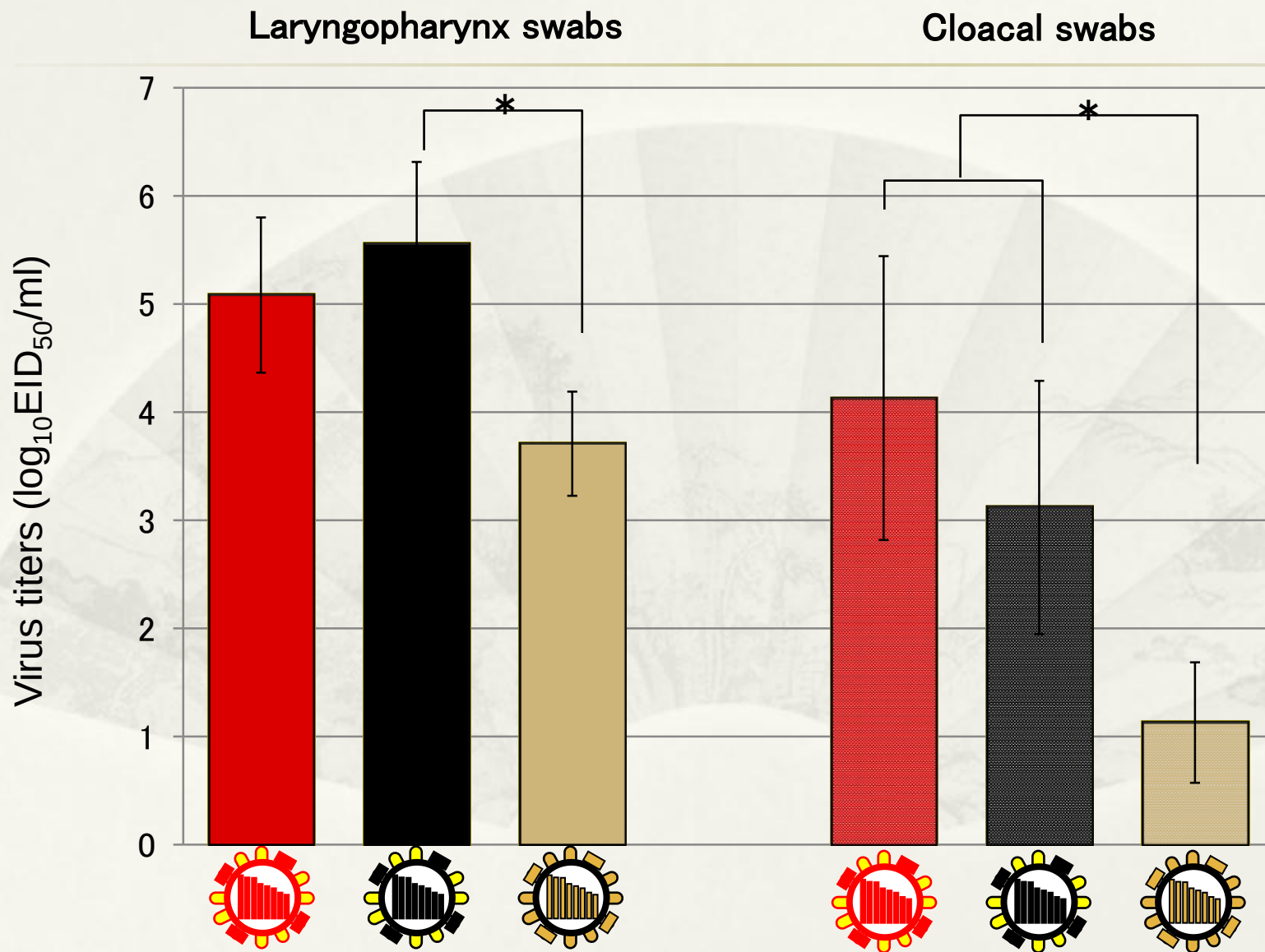
0 hr

48 hrs

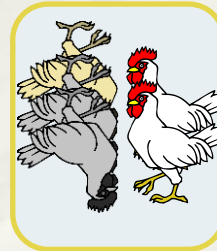
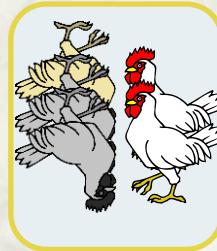
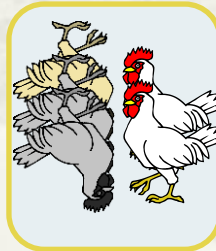
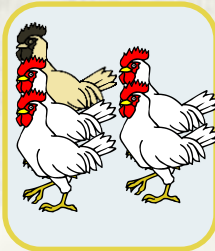
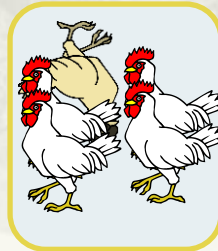
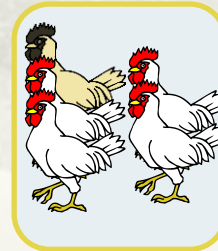
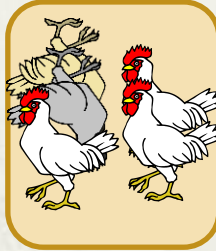
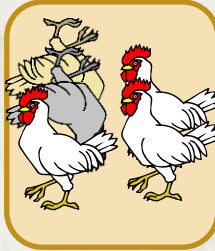
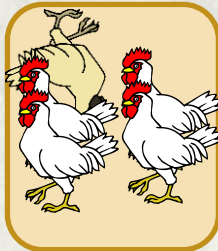
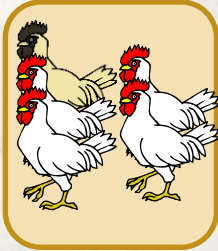
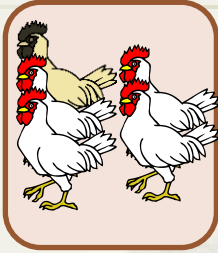
66 hrs

90 hrs

Virus titers at the time of death



Transmissibility among chickens by direct contact



Hours of
direct contact
with an
infected
chicken

0 hrs

72 hrs

96 hrs

120 hrs

144 hrs

174 hrs

214 hrs

Clade 2.3.2.1 HPAIVs in Japan in 2010–2011

- * Genetic origin of the PA gene differs from that of clade 2.3.2.1 in 2008
 - * Reassortment of H5N1 HPAIV and AIV in wild birds could have occurred before 2007
- * They differ their pathogenic characteristics even with high similarity in their genome
- * The mandarin duck isolate examined appeared to be attenuated in their replication, lethality and transmissibility in chickens