Spread of Influenza Virus A (H5N1) Clade 2.3.2.1 to Bulgaria in Common Buzzards

Technical Appendix

Technical Appendix Table. Amino acid substitutions in A/common buzzard/Bulgaria/WB38/2010

Gene		
segment	Amino acid substitution	Comment
HA	T195I*	
NA	V321I*	
	D398N*	
PB1	N158S	Also in other viruses isolated in Tyva in 2009 and 2010.
	D464N*	
	S573T*	
PB1-F2	R37Q*	
PB2	V231I	Also in closely related viruses isolated in Tyva and Mongolia in 2009 and 2010 and in
		those from Hong Kong and Qinghai.
	T339M	Also in A/duck/Hunan/8/2008.
	Q628L*	
	K718R*	
PA	V44I*	
	T263A	Also in closely related viruses isolated in Tyva and Mongolia in 2009.
NS1	H17Y*	
	D207N*	
	D70	Also in closely related viruses isolated in Qinghai, Tyva, and Mongolia in 2009 and
	V112	2010.
	M123	
	V128	
	S171	
NS2	L35	
NP	V33I	133 is a characteristic of human viruses and swine viruses.
	R293K	K293 is a characteristic of human viruses.
	N395T	Also in closely related viruses isolated in Tyva and Mongolia.
	S450N	N450 is a characteristic of North American avian influenza strains.
M1	V115	Characteristic of avian viruses.
	T137	
M2	V28	Characteristic of human viruses (1).

*Amino acid substitutions that are not characteristic of other closely related viruses (i.e., unique mutations). HA, hemagglutinin; NA, neuraminidase; PB, polybasic; PA, protective antigen; NS, nonstructural; NP, nucleoprotien; M, matrix.

	10					
A/Common Buzzard/BG/38WB/2010				DILEKTHNGK		
A/great crested-grebe/Qinghai/	Directorin	<u>Mo</u> rby Prim		Dillinition		
A/grebe/Tyva/3/2009						
A/whooper swan/Mongolia/8/2009						
A/whooper swan/Mongolia/2/2009						· · · · · · · · · · · ·
	70	80	90	100	110	120
				$\cdots \cdots \mid \cdots \mid \cdots \mid$		
A/Common Buzzard/BG/38WB/2010	LLGNPLCDEF	INVPEWSYIV	EKANPANDLC	PGNFNDYEE	LKHLLSRINH	FEKIQIIPKD
A/great crested-grebe/Qinghai/	•••••	•••••	••••	•••••	• • • • • • • • • • •	•••••
A/grebe/Tyva/3/2009	•••••	•••••	•••••	••••••	•••••	•••••
A/whooper swan/Mongolia/8/2009	•••••	•••••	•••••	•••••	•••••	•••••
A/whooper swan/Mongolia/2/2009	•••••	•••••	•••••	•••••	•••••	•••••
	130) 160 .		
A/Common Buzzard/BG/38WB/2010				IKKDNAYPTI		
A/great crested-grebe/Qinghai/						
A/grebe/Tyva/3/2009						
A/whooper swan/Mongolia/8/2009						
A/whooper swan/Mongolia/2/2009						. .
	190	0 200	210	220	230	240
	· · · · · · · ·	$\cdots \cdots + \cdots +$	$\cdots \cdots + \cdots +$	· · · · I · · · · I	••••	
A/Common Buzzard/BG/38WB/2010				PKIATRSKIN		
A/great crested-grebe/Qinghai/				•••••		•••••
A/grebe/Tyva/3/2009				•••••		•••••
A/whooper swan/Mongolia/8/2009				•••••		
A/whooper swan/Mongolia/2/2009			•••••	•••••	•••••	•••••
	250) 280 •••••		
A/Common Buzzard/BG/38WB/2010				YGNCNTRCQT		
A/great crested-grebe/Qinghai/						
A/grebe/Tyva/3/2009						
A/whooper swan/Mongolia/8/2009						
A/whooper swan/Mongolia/2/2009		•••••	••••••			•••••
	310					
- /				· · · · · · · · · · · · · · · · · · ·	••••	
A/Common Buzzard/BG/38WB/2010	ECPKYVKSNK	LVLATGLRNS	PORERRRKRG	LFGAIAGFIE	GGWQGMVDGW	YGYHHSNEQG
A/great crested-grebe/Qinghai/	ECPKYVKSNK	LVLATGLRNS	PQRERRRKRG	LFGAIAGFIE	GGWQGMVDGW	YGYHHSNEQG
A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009	ECPKYVKSNK	LVLATGLRNS	PQRERRRKRG	LFGAIAGFIE	GGWQGMVDGW	YGYHHSNEQG
A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009	ECPKYVKSNK	LVLATGLRNS	PQRERRRKRG	LFGAIAGFIE	GGWQGMVDGW	YGYHHSNEQG
A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009	ECPKYVKSNK	LVLATGLRNS	PQRERRRKRG	LFGAIAGFIE	GGWQGMVDGW	YGYHHSNEQG
A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009	ECPKYVKSNK	LVLATGLRNS	PQRERREKRG	LFGAIAGFIE	GGWQGMVDGW	YGYHHSNEQG
A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009	ECPKYVKSNK	ULATGLENS	PQRERRRKRG	LFGAIAGFIE	GGWQGMVDGW	YGYHHSNEQG
A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009	ECPKYVKSNK	LVLATGLRNS	PQRERRRKRG		GGWQGMVDGW	YGYHHSNEQG
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/</pre>	ECPKYVKSNK	LVLATGLRNS	PQRERRRKG		GGWQGMVDGW	YGYHHSNEQG F. KKMEDGFLDV
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009</pre>	ECPKYVKSNK	LVLATGLRNS	PQRERRRKG		GGWQCMVDGW	YGYHHSNEQG F. KKMEDGFLDV
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/Common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009</pre>	ECPKYVKSNK	LVLATGLRNS	PQRERRRKG		GGWQCMVDGW	YGYHHSNEQG F. K. K. K. K.
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009</pre>	ECPKYVKSNK	LVLATGLRNS	PORERRER PORERRERE 			YGYHHSNEQG F. K. K. K. K.
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/Common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009</pre>	ECPKYVKSNK		PORERRERG 390 VNSIDKMNT	D 400	GGWQGMVDGW 410	20 420 KKMEDGFLDV
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/Common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009</pre>	377. SGYAADKEST		PQRERRERG 		411 411 NLERRIENLN	YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/Common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009</pre>	377 SGYAADKEST		PQRERRERG 	D 400	410 MLERRIENLM 470 470 470	YGYHHSNEQG F. 0 420 KKMEDGFLDV
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/Common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009</pre>	377 SGYAADKEST 430 WTYNAELLVL		PQRERRERG 		410 MLERRIENLM 470 470 470 470	YGYHHSNEQG F.
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009</pre>	SGYAADKEST	LVLATGLRNS	PORERRRRRG 		41(C 41(C 41(C 41(C 41(C 41(C)	YGYHHSNEQG F. F. KKMEDGFLDV
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/</pre>	377 SGYAADKEST 	QKAIDGVTNK	PORERREKRG 		41C GGWQGMVDGW 41C NLERRIENLN NLERRIENLN 47C ELGNGCFEFY	YGYHHSNEQG F.
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009</pre>	arrow and arrow and arrow arr	QRAIDGVTNK MENERTLDFH	PORERREKRG PORERREKRG 399 VNSIIDKMNT VNSIIDKMNT 450 DSNVKNLYDK	LFCAIAGFIE	41C	YGYHHSNEQG F.
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009</pre>	arrow and arrow and arrow arr	QRAIDGVTNK MENERTLDFH	PORERREKRG PORERREKRG 399 VNSIIDKMNT VNSIIDKMNT 450 DSNVKNLYDK		41C	YGYHHSNEQG F.
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009</pre>	37/7 SGYAADKEST 433 	D 380 QRAIDGVTNK MENERTIDFH	O O	LFCAIAGFIE	41C	YGYHHSNEQG
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009</pre>	377 377 377 377 377 377 377 377	D 380 QRAIDGVTNK MENERTLDFH	PORERREKRG 		41(GGWQGMVDGW 41(YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009</pre>	377 377 377 377 377 377 377 377 377 377	D 380 QKAIDGVTNK MENERTLDFH VSEEARLKRE	PORERREKRG PORERREKRG 	LFGAIAGFIE 	41(GGWQCMVDGW 41(YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009</pre>	377 377 377 377 377 377 377 377 377 377	D 386 QRAIDGVTNR QRAIDGVTNR MENERTLDFH VSEEARLKRE	PQRERRERG 		411 GGWQCMVDGW 411 NLERRIENLN 477 ELGNGCFEFY 533 TVASSLVLAI	YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009</pre>	377 377 SGYAADKEST 434 WTYNAELLVL VRNGTYDYPQ	D 386 QRAIDGVINK MENERTLDFH YSEEARLKRE	PQRERRERG 	D 400 QFEAVGREFN VRLQLKDNAK GIYQILSIYS	410 410 410 A10 A10 A10 A10 A10 A10 A10 A	YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2010 A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009</pre>	377 377 SGYAADKEST 434 WTYNAELLVL VRNGTYDYPQ	D 386 QRAIDGVINK MENERTLDFH YSEEARLKRE	PQRERRERG 		410 410 410 A10 A10 A10 A10 A10 A10 A10 A	YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009</pre>	377 377 SGYAADKEST 434 WTYNAELLVL VRNGTYDYPQ	D 386 QRAIDGVINK MENERTLDFH YSEEARLKRE	PQRERRERG 	D 400 QFEAVGREFN VRLQLKDNAK GIYQILSIYS	410 410 410 A10 A10 A10 A10 A10 A10 A10 A	YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2010 A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009</pre>	377 377 377 377 377 377 377 377 377 377	QRAIDGVTNK QRAIDGVTNK MENERTLDFH	PORERREKRG 	D 400 QFEAVGREFN VRLQLKDNAK GIYQILSIYS	410 410 410 A10 A10 A10 A10 A10 A10 A10 A	YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2010 A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009</pre>	377 377 377 377 377 377 377 377 377 377	QRAIDGVTNK QRAIDGVTNK MENERTLDFH	PORERRERREG 	D 400 QFEAVGREFN VRLQLKDNAK GIYQILSIYS	410 410 410 A10 A10 A10 A10 A10 A10 A10 A	YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2010 A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009</pre>	37/1 SGYAADKEST 433 	D 386	PORERREKRG PORERREKRG 	D 400 QFEAVGREFN VRLQLKDNAK GIYQILSIYS	410 410 410 A10 A10 A10 A10 A10 A10 A10 A	YGYHHSNEQG F
<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2010 A/great crested-grebe/Qinghai/</pre>	377 ECPKYVKSNK 377 377 377 377 377 377 377 37	D 388 QKAIDGVTNK MENERTLDFH VSEEARLKRE VSEEARLKRE I+VCEFKL*L 	PORERREKRG 	D 400 QFEAVGREFN VRLQLKDNAK GIYQILSIYS	410 410 410 A10 A10 A10 A10 A10 A10 A10 A	YGYHHSNEQG F
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<pre>A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/common Buzzard/BG/38WB/2010 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/2/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/great crested-grebe/Qinghai/ A/grebe/Tyva/3/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2009 A/whooper swan/Mongolia/8/2010 A/great crested-grebe/Qinghai/</pre>	377 ECPKYVKSNK 377 377 377 377 377 377 377 37	D 380 QRAIDGVTNK MENERTLDFH YSEEARLKRE YSEEARLKRE I*VCEFKL*L *	PORERREKRG 	D 400 QFEAVGREFN VRLQLKDNAK GIYQILSIYS	410 410 410 A10 A10 A10 A10 A10 A10 A10 A	YGYHHSNEQG F

Technical Appendix Figure. Comparison of deduced amino acid sequences of the hemagglutinin protein of A/common buzzard/Bulgaria/38WB/2010 and closely related sequences of 4 other viruses

in the National Center for Biotechnology Information database (A/great crested grebe/Qinghai/1/2009, A/grebe/Tyva/3/2009, A/whooper swan/Mongolia/8/2009, and A/whooper swan/Mongolia/2/2009). Identical amino acids are represented by dots. Potential glycosylation sites are shown as underlined 3-letter sequences. The conserved residues of the receptor-binding site are shaded, and the cleavage polybasic motif is boxed.

Reference

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