

FAO World Reference Laboratory for Foot-and-Mouth Disease (WRLFMD)

Genotyping Report

FMDV serotype: A
Country: Laos
Year: 2018
Batch: WRLMEG/2019/00008
No. of sequences: 4
Report date: 18th January 2019
Report generated by: Nick Knowles
Report checked by: Jemma Wadsworth

This report has been prepared on behalf of OIE Regional Reference Laboratory for FMD in Southeast Asia, Pakchong, Thailand and covers VP1 sequences submitted to the WRLFMD on 18/01/2019 by Dr. Syseng Khounsy, DDG of DLF, Lao PDR.



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email: reporting@pirbright.ac.uk

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Virus sample name:	LAO/20/2018
Sender reference:	A/LAO/20/2018
Location of origin:	Sanamxay, Sompoi, Attapeu
Country of origin:	Laos
Date of collection:	29/10/2018
Host species:	cattle
Serotype:	A
Topotype:	ASIA
Lineage:	Sea-97
Sublineage:	
Sequence length:	630
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	n/a
Received for sequencing:	n/a
Created:	18/01/2019
Last updated:	18/01/2019
VIBASys IDs: sample 38448, genome 38449, sequence viba_38450, sequencing info 38451	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_38454	LAO/21/2018	cattle	99.8	0	A	ASIA	Sea-97	
viba_38462	LAO/24/2018	cattle	99.8	0	A	ASIA	Sea-97	
viba_31589	HY/CHA/2013	yak	97.6	0	A	ASIA	Sea-97	
viba_23777	TAI/12/2016	cattle	97.6	0	A	ASIA	Sea-97	
viba_23789	TAI/16/2016	cattle	97.5	0	A	ASIA	Sea-97	
viba_25175	MYA/3/2015	bovine	97.5	0	A	ASIA	Sea-97	
viba_19532	VIT/25/2012	cattle	97.5	0	A	ASIA	Sea-97	
viba_31512	VIT/16/2015	cattle	97.5	0	A	ASIA	Sea-97	
viba_30481	TAI/23/2016	cattle	97.5	0	A	ASIA	Sea-97	
viba_23781	TAI/13/2016	cattle	97.5	0	A	ASIA	Sea-97	

Most Closely Related Prototype Sequences

see http://www.wrlfmd.org/fmd_genotyping/prototypes.htm

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_122	TAI/7/2003	bovine	92.1	0	A	ASIA	Sea-97	
viba_625	TAI/2/97		88.8	0	A	ASIA	Sea-97	
viba_630	TAI/118/87		86.2	0	A	ASIA	Thai-87	
viba_34671	BAL/PAK/05/2011	cattle	82.0	0	A	ASIA	Iran-05	BAL-11
viba_682	IRN/2/87	bovine	81.3	0	A	ASIA	Iran-87	
viba_677	IRQ/24/64	bovine	81.0	0	A	ASIA	A22	
viba_636	IRN/78/2009		80.8	0	A	ASIA	Iran-05	FAR-09
viba_403	TUR/1/2008	cattle	80.8	0	A	ASIA	Iran-05	ARD-07
viba_429	TUR/33/2008	cattle	80.8	0	A	ASIA	Iran-05	EZM-07
viba_594	IRN/1/2011	bovine	80.7	0	A	ASIA	Iran-05	FAR-11

Virus sample name:	LAO/21/2018
Sender reference:	A/LAO/21/2018
Location of origin:	Sanamxay, Sompoi, Attapeu
Country of origin:	Laos
Date of collection:	29/10/2018
Host species:	cattle
Serotype:	A
Topotype:	ASIA
Lineage:	Sea-97
Sublineage:	
Sequence length:	630
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	n/a
Received for sequencing:	n/a
Created:	18/01/2019
Last updated:	18/01/2019
VIBASys IDs: sample 38452, genome 38453, sequence viba_38454, sequencing info 38455	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_38450	LAO/20/2018	cattle	99.8	0	A	ASIA	Sea-97	
viba_38462	LAO/24/2018	cattle	99.7	0	A	ASIA	Sea-97	
viba_31589	HY/CHA/2013	yak	97.5	0	A	ASIA	Sea-97	
viba_23777	TAI/12/2016	cattle	97.5	0	A	ASIA	Sea-97	
viba_23789	TAI/16/2016	cattle	97.3	0	A	ASIA	Sea-97	
viba_25175	MYA/3/2015	bovine	97.3	0	A	ASIA	Sea-97	
viba_19532	VIT/25/2012	cattle	97.3	0	A	ASIA	Sea-97	
viba_31512	VIT/16/2015	cattle	97.3	0	A	ASIA	Sea-97	
viba_30481	TAI/23/2016	cattle	97.3	0	A	ASIA	Sea-97	
viba_23781	TAI/13/2016	cattle	97.3	0	A	ASIA	Sea-97	

Most Closely Related Prototype Sequences

see http://www.wrlfmd.org/fmd_genotyping/prototypes.htm

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_122	TAI/7/2003	bovine	91.9	0	A	ASIA	Sea-97	
viba_625	TAI/2/97		88.6	0	A	ASIA	Sea-97	
viba_630	TAI/118/87		86.1	0	A	ASIA	Thai-87	
viba_34671	BAL/PAK/05/2011	cattle	81.9	0	A	ASIA	Iran-05	BAL-11
viba_682	IRN/2/87	bovine	81.5	0	A	ASIA	Iran-87	
viba_677	IRQ/24/64	bovine	81.2	0	A	ASIA	A22	
viba_403	TUR/1/2008	cattle	81.0	0	A	ASIA	Iran-05	ARD-07
viba_429	TUR/33/2008	cattle	81.0	0	A	ASIA	Iran-05	EZM-07
viba_594	IRN/1/2011	bovine	80.8	0	A	ASIA	Iran-05	FAR-11
viba_414	AFG/6/2007	bovine	80.8	0	A	ASIA	Iran-05	AFG-07

Virus sample name:	LAO/22/2018
Sender reference:	A/LAO/22/2018
Location of origin:	Sanamxay, Khanmarnao, Attapeu
Country of origin:	Laos
Date of collection:	29/10/2018
Host species:	cattle
Serotype:	A
Topotype:	ASIA
Lineage:	Sea-97
Sublineage:	
Sequence length:	630
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	n/a
Received for sequencing:	n/a
Created:	18/01/2019
Last updated:	18/01/2019
VIBASys IDs: sample 38456, genome 38457, sequence viba_38458, sequencing info 38459	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_38462	LAO/24/2018	cattle	94.9	0	A	ASIA	Sea-97	
viba_38450	LAO/20/2018	cattle	94.8	0	A	ASIA	Sea-97	
viba_38454	LAO/21/2018	cattle	94.6	0	A	ASIA	Sea-97	
viba_19401	TAI/15/2012	cattle	93.8	0	A	ASIA	Sea-97	
viba_31589	HY/CHA/2013	yak	93.7	0	A	ASIA	Sea-97	
viba_21156	Amur/4/RUS/2013	cattle	93.7	0	A	ASIA	Sea-97	
viba_23777	TAI/12/2016	cattle	93.7	0	A	ASIA	Sea-97	
viba_21147	Amur/2/RUS/2013	cattle	93.7	0	A	ASIA	Sea-97	
viba_23789	TAI/16/2016	cattle	93.5	0	A	ASIA	Sea-97	
viba_25175	MYA/3/2015	bovine	93.5	0	A	ASIA	Sea-97	

Most Closely Related Prototype Sequences

see http://www.wrlfmd.org/fmd_genotyping/prototypes.htm

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_122	TAI/7/2003	bovine	91.9	0	A	ASIA	Sea-97	
viba_625	TAI/2/97		89.0	0	A	ASIA	Sea-97	
viba_630	TAI/118/87		87.0	0	A	ASIA	Thai-87	
viba_682	IRN/2/87	bovine	81.0	0	A	ASIA	Iran-87	
viba_34671	BAL/PAK/05/2011	cattle	80.7	0	A	ASIA	Iran-05	BAL-11
viba_677	IRQ/24/64	bovine	80.6	0	A	ASIA	A22	
viba_34575	BAD/AFG/L2814/2009	cattle	80.2	0	A	ASIA	Iran-05	BAD-09
viba_178	SUD/3/77		80.2	0	A	AFRICA	G-IV	
viba_636	IRN/78/2009		79.7	0	A	ASIA	Iran-05	FAR-09
viba_11952	PAK/6/2009	water buffalo	79.7	0	A	ASIA	Pak-09	

Virus sample name:	LAO/24/2018
Sender reference:	A/LAO/24/2018
Location of origin:	Sanamxay, Khanmarnao, Attapeu
Country of origin:	Laos
Date of collection:	29/10/2018
Host species:	cattle
Serotype:	A
Topotype:	ASIA
Lineage:	Sea-97
Sublineage:	
Sequence length:	630
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	n/a
Received for sequencing:	n/a
Created:	18/01/2019
Last updated:	18/01/2019
VIBASys IDs: sample 38460, genome 38461, sequence viba_38462, sequencing info 38463	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_38450	LAO/20/2018	cattle	99.8	0	A	ASIA	Sea-97	
viba_38454	LAO/21/2018	cattle	99.7	0	A	ASIA	Sea-97	
viba_31589	HY/CHA/2013	yak	97.5	0	A	ASIA	Sea-97	
viba_23777	TAI/12/2016	cattle	97.5	0	A	ASIA	Sea-97	
viba_23789	TAI/16/2016	cattle	97.3	0	A	ASIA	Sea-97	
viba_25175	MYA/3/2015	bovine	97.3	0	A	ASIA	Sea-97	
viba_19532	VIT/25/2012	cattle	97.3	0	A	ASIA	Sea-97	
viba_19401	TAI/15/2012	cattle	97.3	0	A	ASIA	Sea-97	
viba_31512	VIT/16/2015	cattle	97.3	0	A	ASIA	Sea-97	
viba_30481	TAI/23/2016	cattle	97.3	0	A	ASIA	Sea-97	

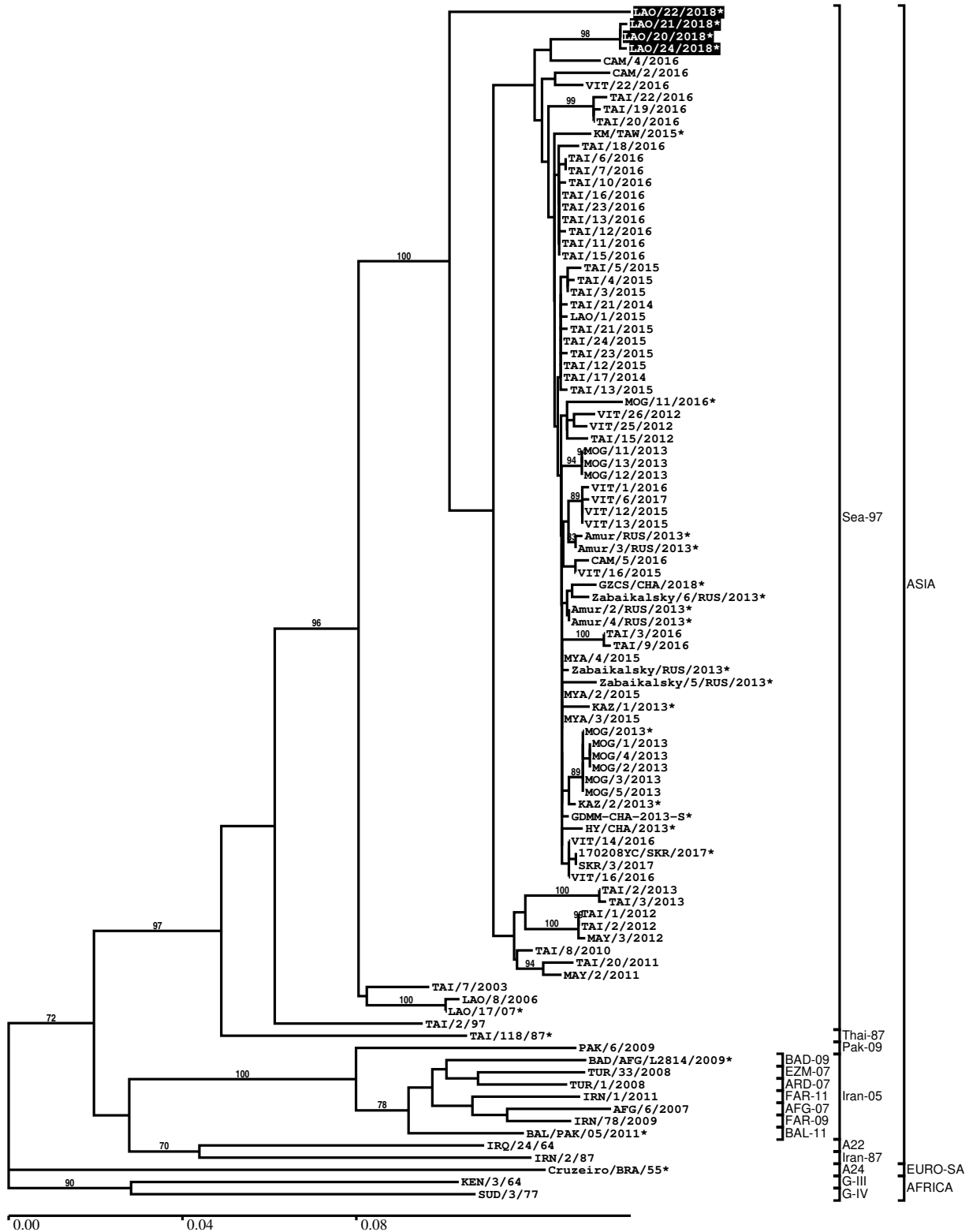
Most Closely Related Prototype Sequences

see http://www.wrlfmd.org/fmd_genotyping/prototypes.htm

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_122	TAI/7/2003	bovine	91.9	0	A	ASIA	Sea-97	
viba_625	TAI/2/97		88.6	0	A	ASIA	Sea-97	
viba_630	TAI/118/87		86.1	0	A	ASIA	Thai-87	
viba_34671	BAL/PAK/05/2011	cattle	81.9	0	A	ASIA	Iran-05	BAL-11
viba_682	IRN/2/87	bovine	81.5	0	A	ASIA	Iran-87	
viba_403	TUR/1/2008	cattle	81.0	0	A	ASIA	Iran-05	ARD-07
viba_429	TUR/33/2008	cattle	81.0	0	A	ASIA	Iran-05	EZM-07
viba_636	IRN/78/2009		80.9	0	A	ASIA	Iran-05	FAR-09
viba_414	AFG/6/2007	bovine	80.8	0	A	ASIA	Iran-05	AFG-07
viba_677	IRQ/24/64	bovine	80.8	0	A	ASIA	A22	

Report on FMDV A in Laos in 2018

Batch: WRLMEG/2019/00008



*, not a WRLFMD Reference Number

Analysis Parameters

VP1 subsequence extractor:	vp1_A
Query sequence set:	WRLMEG/2019/00008-Laos-A (4 sequences)
Sequence database set:	allseqs_A (1903 sequences)
Prototype sequence set:	!prototypes_A (40 sequences)
Number of related sequences reported:	10
Minimal VP1 subsequence match length	600
Sequence alignment method:	muscle (default parameters)
Sequence alignment length:	633
Phylogeny reconstruction method:	fdnadist, fneighbor
Number of bootstrap samples:	1000
Random seed for bootstrapping:	1
Displaying bootstrap values above:	70.0%
Number of sequences in tree capped at:	100
Number of prototype sequences in tree:	14
VIBASys version:	reflabs-1.1.2

Sequences in the Phylogenetic Tree

All sequences in the tree are in taxonomic group FMDV/A

label	accession	host(s)	lab	country	taxonomic information
LAO/22/2018*	n/a	cattle	TRRL	Laos	ASIA/Sea-97
LAO/21/2018*	n/a	cattle	TRRL	Laos	ASIA/Sea-97
LAO/20/2018*	n/a	cattle	TRRL	Laos	ASIA/Sea-97
LAO/24/2018*	n/a	cattle	TRRL	Laos	ASIA/Sea-97
CAM/4/2016	n/a	n/a	WRLFMD	Cambodia	ASIA/Sea-97
CAM/2/2016	n/a	n/a	WRLFMD	Cambodia	ASIA/Sea-97
VIT/22/2016	n/a	bovine	WRLFMD	Vietnam	ASIA/Sea-97
TAI/22/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/19/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/20/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
KM/TAW/2015*	n/a	cattle	NVRI	Taiwan	ASIA/Sea-97
TAI/18/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/6/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/7/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/10/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/16/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/23/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/13/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/12/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/11/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/15/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/5/2015	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/4/2015	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/3/2015	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/21/2014	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
LAO/1/2015	n/a	cattle	WRLFMD	Laos	ASIA/Sea-97
TAI/21/2015	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/24/2015	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/23/2015	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/12/2015	n/a	porcine	WRLFMD	Thailand	ASIA/Sea-97
TAI/17/2014	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/13/2015	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
MOG/11/2016*	n/a	cattle	ARRIAH	Mongolia	ASIA/Sea-97
VIT/26/2012	n/a	cattle	WRLFMD	Vietnam	ASIA/Sea-97
VIT/25/2012	n/a	cattle	WRLFMD	Vietnam	ASIA/Sea-97
TAI/15/2012	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97

continued on next page

label	accession	host(s)	lab	country	taxonomic information
MOG/11/2013	n/a	cattle	WRLFMD	Mongolia	ASIA/Sea-97
MOG/13/2013	n/a	cattle	WRLFMD	Mongolia	ASIA/Sea-97
MOG/12/2013	n/a	cattle	WRLFMD	Mongolia	ASIA/Sea-97
VIT/1/2016	n/a	water buffalo	WRLFMD	Vietnam	ASIA/Sea-97
VIT/6/2017	n/a	bovine	WRLFMD	Vietnam	ASIA/Sea-97
VIT/12/2015	n/a	cattle	WRLFMD	Vietnam	ASIA/Sea-97
VIT/13/2015	n/a	cattle	WRLFMD	Vietnam	ASIA/Sea-97
Amur/RUS/2013*	n/a	cattle	ARRIAH	Russia	ASIA/Sea-97
Amur/3/RUS/2013*	n/a	cattle	ARRIAH	Russia	ASIA/Sea-97
CAM/5/2016	n/a	n/a	WRLFMD	Cambodia	ASIA/Sea-97
VIT/16/2015	n/a	cattle	WRLFMD	Vietnam	ASIA/Sea-97
GZCS/CHA/2018*	MG840802	cattle	LVRI	China	ASIA/Sea-97
Zabaikalsky/6/RUS/2013*	n/a	cattle	ARRIAH	Russia	ASIA/Sea-97
Amur/2/RUS/2013*	n/a	cattle	ARRIAH	Russia	ASIA/Sea-97
Amur/4/RUS/2013*	n/a	cattle	ARRIAH	Russia	ASIA/Sea-97
TAI/3/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/9/2016	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
MYA/4/2015	n/a	bovine	WRLFMD	Myanmar	ASIA/Sea-97
Zabaikalsky/RUS/2013*	n/a	cattle	n/a	Russia	ASIA/Sea-97
Zabaikalsky/5/RUS/2013*	n/a	cattle	ARRIAH	Russia	ASIA/Sea-97
MYA/2/2015	n/a	bovine	WRLFMD	Myanmar	ASIA/Sea-97
KAZ/1/2013*	n/a	cattle	ARRIAH	Kazakhstan	ASIA/Sea-97
MYA/3/2015	n/a	bovine	WRLFMD	Myanmar	ASIA/Sea-97
MOG/2013*	n/a	cattle	ARRIAH	Mongolia	ASIA/Sea-97
MOG/1/2013	n/a	yak	WRLFMD	Mongolia	ASIA/Sea-97
MOG/4/2013	n/a	yak	WRLFMD	Mongolia	ASIA/Sea-97
MOG/2/2013	n/a	yak	WRLFMD	Mongolia	ASIA/Sea-97
MOG/3/2013	n/a	yak	WRLFMD	Mongolia	ASIA/Sea-97
MOG/5/2013	n/a	yak	WRLFMD	Mongolia	ASIA/Sea-97
KAZ/2/2013*	n/a	cattle	ARRIAH	Kazakhstan	ASIA/Sea-97
GDMM-CHA-2013-S*	KF450794	porcine	n/a	China	ASIA/Sea-97
HY/CHA/2013*	KT968663	yak	Sichuan Univ	China	ASIA/Sea-97
VIT/14/2016	n/a	cattle	WRLFMD	Vietnam	ASIA/Sea-97
170208YC/SKR/2017*	KY766148	cattle	QIA	Republic of Korea (South Korea)	ASIA/Sea-97
SKR/3/2017	n/a	cattle	WRLFMD	Republic of Korea (South Korea)	ASIA/Sea-97
VIT/16/2016	n/a	porcine	WRLFMD	Vietnam	ASIA/Sea-97
TAI/2/2013	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/3/2013	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/1/2012	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/2/2012	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
MAY/3/2012	n/a	water buffalo	WRLFMD	Malaysia	ASIA/Sea-97
TAI/8/2010	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
TAI/20/2011	n/a	cattle	WRLFMD	Thailand	ASIA/Sea-97
MAY/2/2011	n/a	cattle	WRLFMD	Malaysia	ASIA/Sea-97
TAI/7/2003	HQ116312	bovine	WRLFMD	Thailand	ASIA/Sea-97
LAO/8/2006	EU667459	cattle	WRLFMD	Laos	ASIA/Sea-97
LAO/17/07*	n/a	n/a	TRRL	Laos	ASIA/Sea-97
TAI/2/97	EF208778	n/a	WRLFMD	Thailand	ASIA/Sea-97
TAI/118/87*	EF208777	n/a	WRLFMD	Thailand	ASIA/Thai-87
PAK/6/2009	n/a	water buffalo	WRLFMD	Pakistan	ASIA/Pak-09
BAD/AFG/L2814/2009*	HQ439296	cattle	LINDHOLM	Afghanistan	ASIA/Iran-05/BAD-09
TUR/33/2008	FJ755155	cattle	WRLFMD	Turkey	ASIA/Iran-05/EZM-07
TUR/1/2008	FJ755133	cattle	WRLFMD	Turkey	ASIA/Iran-05/ARD-07
IRN/1/2011	KY091292	bovine	WRLFMD	Iran	ASIA/Iran-05/FAR-11
AFG/6/2007	FJ755007	bovine	WRLFMD	Afghanistan	ASIA/Iran-05/AFG-07
IRN/78/2009	KY091291	n/a	WRLFMD	Iran	ASIA/Iran-05/FAR-09
BAL/PAK/05/2011*	KT832824	cattle	Univ Malakand	Pakistan	ASIA/Iran-05/BAL-11
IRQ/24/64	AY593763	bovine	PIADC	Iraq	ASIA/A22
IRN/2/87	EF208770	bovine	WRLFMD	Iran	ASIA/Iran-87
Cruzeiro/BRA/55*	AY593768	bovine	PIADC	Brazil	EURO-SA/A24
KEN/3/64	AY593761	n/a	PIADC	Kenya	AFRICA/G-III
SUD/3/77	GU566064	n/a	WRLFMD	Sudan	AFRICA/G-IV

*, not a WRLFMD Reference Number
n/a, not available